

# iamo

Leibniz Institute of Agricultural Development  
in Transition Economies





Leibniz Institute of Agricultural Development in  
Transition Economies (IAMO)

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## Introduction

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Martin Luther University Halle-Wittenberg and IAMO have been closely linked in a variety of ways for almost 20 years now. This association is based on a broad and solid foundation. It ranges from teaching and a partnership agreement to close cooperation between IAMO, university institutes and other Leibniz institutions in the "Plant-Based Bio-Economy Science Campus", founded in 2011. The chief aims of the Science Campus are to increase the intensity of interdisciplinary cooperation and support the knowledge and technology transfer between business, politics and the general public. A strong university in alliance with pioneering non-university institutions, such as the Leibniz Institutes based in the region, also promotes Halle as a business location. Such an environment, where teaching, research and practice dovetail closely, offers the ideal conditions for future technologies to settle here. We wish IAMO every success in its forthcoming tasks, too, and look forward to working even more closely with the Institute in the future.

Udo Sträter



*Rector of the Martin Luther University  
Halle-Wittenberg  
Prof. Dr Udo Sträter*

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## Contents

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Introduction	3
Foreword	7
Exposure of EU farmers to the financial crisis	11
Russian Cereals Exports – A Flash in the Pan?	23
How effective are the property rights on agricultural land? Some lessons from the case of Altai Krai in Russia	33
Vertical coordination in the Ukrainian dairy sector	41
The modernization of the agrifood industry and small producers in Kazakhstan	51
The evolving farming system in China	61
The cost efficiency of precision farming – The case of Czech wheat producers	69
The concept, evidence and implications of regime shifts in land systems in Southeast Asia	77
Long-only index funds help agricultural futures markets to function smoothly	91
"Rural Areas in Transition: Services of General Interest, Entrepreneurship and Quality of Life". IAMO Forum 2013	95
IAMO – A brief portrait	105





## Foreword

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### Introduction

*Theoria cum praxi: Science for the benefit and use of humankind.* This is the motto attributed to the polymath, politician and diplomat, Gottfried Wilhelm Leibniz (1646-1716), and to which the 89 research institutions of the Leibniz Association stand committed. The Leibniz Association intensively promotes the transfer of knowledge between politics, science, business and the wider public. In this regard IAMO has made great progress in 2013. For example, on 17 May 2013, IAMO researchers, together with colleagues from Martin Luther University Halle-Wittenberg, presented their findings on the topical and controversial subject of financial speculation with agricultural raw materials to CDU/CSU and FDP Bundestag deputies as well as representatives from the German Ministry of Agriculture. This was followed up on 10 July 2013 by a hearing in Brussels on the topic of "Trade and Food Security" in the European Parliament's Committee for International Trade.

The collaborative project "German-Ukrainian Agricultural Policy Dialogue" has helped consolidate IAMO's position as an important provider of scientifically based policy advice. Together with IAK Agrar Consulting GmbH,

IAMO was commissioned to organise the "German-Ukrainian Agricultural Policy Dialogue" for the period 1 January 2013 to 31 December 2015. The aim of this collaborative project is to advise policymakers in Ukraine on reform of agricultural policy and shaping agricultural legislation.

Statistics issued by independent institutions on quality control in science show that IAMO researchers have continually increased their publication activity in high quality international journals over the last few years. This welcome trend is also reflected in the citation figures – also issued independently – relating to publications produced at IAMO, which over a number of years have risen by 20 % on average. The Institute's profile in national and international research is thus growing continually and dynamically.

The fact that research, as the basis of all of IAMO's activities, continues to forge ahead is in no small measure down to the positive development of the Institute's securing of third-party funding. As an example we can cite the project "International Comparison of Product Supply Chains in the Agri-Food Sectors: Determinants of their Competitiveness and Performance on EU and International Markets" (COMPETE), which began in

2012 and is part of the 7<sup>th</sup> EU Framework Research Programme. With funding for this project approaching 2.5 million euros, IAMO is coordinating 16 partners from 10 EU countries. The aim of this methodologically challenging analysis of the competitiveness of European agri-food chains is to generate more targeted and evidence-based policy recommendations at EU and national level.

The functioning and effectiveness of agricultural factor and commodity markets, as well as of value chains, lie at the heart of the forthcoming IAMO Forum 2014, too, with a focus on the leading transition countries and emerging nations of Eurasia. The IAMO Forum 2014 is being organised by IAMO in cooperation with the International Agricultural Trade Research Consortium (IATRC) and the Agricultural and Applied Economics Association (AAEA), and will take place from 25-27 June 2014 in Halle.

For the first time IAMO has been honoured for its considerable success in, and ongoing commitment to, equal opportunities in staff management. With the award, bestowed by the German TOTAL E-QUALITY association, IAMO makes an individual pledge, without any statutory provisions, to continually monitor the implementation of its equal opportunities policy and ensure it becomes permanently enshrined in the Institute's working practices.

To adapt the Institute's organisational structure to the ever-growing tasks and requirements of institutional management, a change in IAMO's management came

into effect in January 2013. As a consequence, all four directors of the Institute are now managing directors on an equal footing with collective authority, although individual areas of responsibility for internal and external affairs have been defined. In addition, on 20 June 2013 IAMO Director Thomas Glauben was elected the new spokesman of the Economics, Social Sciences and Spatial Research section of the Leibniz Association. The post lasts for two years and, as spokesman for Section B, Thomas Glauben is automatically a member of the twelve-strong presidium of the Leibniz Community.

Without the extraordinary efforts of our administrative staff, IAMO would have been unable to achieve the successes outlined above. We therefore offer our warmest thanks to all of them.

At this point IAMO would also like to express its thanks to the Ministry of Science and Economic Affairs of Saxony-Anhalt, the German Ministry of Food, Agriculture and Consumer Protection (BMELV) and to the members of its board of trustees and its scientific advisory board. From these ministries and board members IAMO has received important advice and valuable stimuli, which have helped the Institute to substantially develop its activity in all areas. Without their support IAMO would find it impossible to maintain and even enhance its position in an increasingly competitive national and international research environment.

The opening article in this IAMO yearbook looks at the consequences of the current financial crisis for agricultural enterprises in the EU. Even in the crisis-hit countries of the Eurozone, the effects have been kept within limits.

The high levels of agricultural subsidies combined with a low rate of private farm debt, especially in southern countries, are largely responsible for the stabilisation. Then come two papers about Russia, the first of which deals with the potential of Russian agricultural exports; the second with questions of land ownership structure, focusing on the example of the Altai region. Great importance is attached to the increase in Russian agricultural exports for the stabilisation of agricultural markets.

At the same time, whether this potential can be realised depends on, amongst other things, improved institutional parameters for agricultural enterprises. Another important determinant of exploiting potential is the efficiency and competitiveness of supply chains. The fourth and fifth article thus examine vertical cooperation in the Ukrainian dairy sector and the development of supply chains in the food sectors of Central Asia.



*The managing directors of IAMO (from l. to r. :)  
Prof. Dr Thomas Glauben, Dipl. Ökon. Hannelore Zerjeski, Prof. Dr Thomas Herzfeld,  
Prof. Dr Alfons Balmann*

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Chinese agriculture has been registering positive growth rates for more than three decades. The forces driving this growth have changed over time. The article on China offers a brief overview of the major structural changes in the Chinese agricultural sector, and an outlook on the agricultural structure we can expect to see in the future. The seventh article, which looks at precision farming in the Czech Republic, also deals with questions of business productivity. On a different subject, greenhouse gas emissions as a result of change in land use are the focus of the eighth article on the project "Impacts of Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks (I-REDD+)" from the EU's 7<sup>th</sup> Research Framework Programme. By means of equalisation payments, REDD+ should

create incentives for developing countries to avoid deforestation and degradation, and increase the carbon dioxide storing capacity of forest land. IAMO researchers are working for the REDD+ programme, developing possible monitoring systems for South-East Asia.

Questions of agricultural speculation have also attracted public interest in 2013. The penultimate article outlines a theoretical study by IAMO researchers on long-only index funds, which have been accused by some non-governmental organisations as being a "cause of hunger", examines the impact of this investment strategy on pricing on agricultural markets. The final paper summarises the most important findings of the IAMO Forum 2013, "Rural Areas in Transition: Services of General Interest, Entrepreneurship and Quality of Life".

## Exposure of EU farmers to the financial crisis

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MARTIN PETRICK, MATHIAS KLOSS

Following recent headlines from crisis countries in the Eurozone, fears of a credit crunch in the Italian farming sector loom large, and Spanish food producers worry about crumbling domestic demand. Indeed, many European economies and the European Union (EU) as a political and economic project are currently in deep trouble. But how severely are EU farmers really hurt by the recent crisis? How much are they exposed to the threats emanating from the epicenters of recent economic turmoil? This article attempts to collect the available evidence to give some answers to these questions. The insights are tentative because there is a lack of up-to-date data, and consolidated information on EU agricultural finance markets is hardly available.

Our analysis draws on recent research conducted within the Factor Markets consortium funded by the EU's seventh framework research program ([www.factormarkets.eu](http://www.factormarkets.eu)). This project has access to farm-individual data from the Farm Accountancy Data Network (FADN), a microeconomic database collected in a harmonized way in all EU member states. In addition, the article uses information from a variety of sources, including insights from work in progress reported in JANSSON et al. (2013), PETRICK and KLOSS (2012; 2013), and PIETOLA et al. (2011).

### Evolution of the crisis and possible impacts on EU agriculture

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Following years of an expansionary monetary policy of the Federal Reserve, the massive default of highly leveraged real estate loans marked the outbreak of the U.S. "subprime crisis" in spring 2007. As these loans had been distributed globally in the form of structured financial products, the bursting bubble hurt the portfolios of commercial banks and institutional investors worldwide and led to a massive loss of trust in the financial system. In waves, these financial institutions faced large losses and experienced difficulties in borrowing, epitomized by the collapse of Lehman Brothers in September 2008. As a response, central banks in the U.S. and Europe cut their lending rates, substantially increased the assets on their own balance sheets and provided the banking sector with large amounts of liquidity. Governments stepped in to guarantee the solvency of financial institutions and set up stimulus packages to counteract the looming economic recession. Government bailouts and nationalizations in almost all euro area countries but also Denmark and the United

Kingdom led to an explosion of sovereign debt. In December 2009, Greece declared significant problems in its debt exposure, followed by Ireland, Portugal and Spain in 2010. By mid-2011, also Italy had witnessed rising spreads of its government bond yields over those of Germany, which are typically considered as a secure benchmark. Amidst economic recession and rising unemployment rates, the "GIIPS-countries" moved center stage in the genuine Eurozone crisis (GERMAN COUNCIL OF ECONOMIC EXPERTS, 2012). The Eurozone governments reacted by implementing multibillion stability facilities, including the European Financial Stability Facility (EFSF) and its follower organization, the European Stability Mechanism (ESM). In a highly controversial act, the European Central Bank (ECB) declared to buy unlimited amounts of government bonds in August 2012.

As this snapshot illustrates, it is useful to speak of a *series* of crises which recently disrupted economic growth in the Western world. Following the instructive review in SHAMBAUGH (2012), there are at least three interlinked crises currently affecting the Eurozone:

- (a) a banking crisis,
- (b) a growth and competitiveness crisis, and
- (c) a sovereign debt crisis.

What makes the situation so complex and difficult to resolve is that none of these crises can be dealt with in isolation. The massive bailout of banks by the public directly adds to sovereign debt. On the other hand, banks holding government bonds in their balance sheet suffer when sovereign default is imminent. If banks no longer

supply sufficient credit, economic growth will be slowing. But increasing bankruptcies in the real economy also strain the banking sector. Austerity on the side of governments as a result of mounting public debt likely reduces growth. Finally, lacking economic dynamism in the economy also means reduced tax incomes for the government to solve its debt problems. Of course, not all problems are similarly acute in all Eurozone countries; the imbalances among them in fact add to the complexity. For example, while poor fiscal policies were a main cause of the crisis in Greece, problems of the banking sector predominated in Ireland and a collapsed housing boom dragged down Spain (SHAMBAUGH, 2012, p. 161). Germany and other northern Eurozone countries, on the other hand, display positive growth rates and record-low unemployment levels.

This anatomy of the crisis suggests at least three ways how it can distress EU farmers:

- The banking crisis may cause a credit crunch for agricultural borrowers, by spoiling the functioning of rural financial markets.
- Economic recession and dwindling demand for income-elastic food products may lead to a reduction of farm incomes.
- Constraints on public budgets may lead to spending cuts in agricultural and rural policy.

In the following, we concentrate on the first, most immediate effect of the crisis. We come back to the second and third pathways in the latter part of the article.

**Production and banking structure in EU agriculture**

A closer look at the institutional settings on European agricultural credit markets reveals a multifaceted picture. Table 1 displays information on farming structures

and main financial intermediaries for agriculture in selected EU member states. Of course, this table is highly simplifying, but it conveys an impression of the considerable heterogeneity across EU members. Denmark, France, Germany and the UK tend to be characterized

**Table 1: Farm structures and agricultural finance in selected EU member states**

Country	Farm structures	Degree of farm commercialisation	Dominating agricultural banking institutions	Investment in farming assets
Denmark	Medium	High	Commercial banks	Traditionally high, recent decline
France	Medium	Medium	Centralised coops	Medium
Germany	Medium (West) Large (East)	Medium (West) High (East)	Coops, savings banks	Medium
Greece	Small	Low	Agricultural sector bank	Very low
Ireland	Small	Medium	Commercial banks	High before crisis
Italy	Small	Medium	Commercial banks	Very low
Poland	Small	Low	Coops	Low
Spain	Small to medium	Medium	Savings banks	Low
UK	Large	High	Commercial banks	Medium

Sources: Authors’ compilation based on EUROPEAN COMMISSION (2012) (farm size and standard gross margins); JANSSON et al. (2013) (banking institutions); FADN data (investment activity), miscellaneous sources.

by relatively big, commercial operations in agriculture. The GIIPS countries are dominated by smaller farms with comparatively low levels of investment and value creation. While some member countries have a long tradition of locally anchored savings and cooperative banks, state mandated agricultural sector banks or commercial banks prevail in others.

Farmers' exposure to the financial crisis also depends on their past lending behavior, their current leverage, and the extent to which their local financial intermediaries are themselves subject to the crisis' impacts. As the table shows, the countries most affected by the financial crisis may not be those with the most exposed farming sector. In particular, Greece, Ireland, Italy and Spain tend to be dominated by small farms exhibiting low investment levels in the past.

### **Farm financial indicators (2000-2009)**

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We now examine some of the financial indicators of EU farmers in further detail. Figure 1 displays the interest paid on agricultural loans, the debt-to-asset ratio of farms, farm debts per ha and net investment per ha for a sample of EU countries. We include the five GIIPS countries, Germany as a reference, as well as Denmark and the UK as non-euro members. Denmark is particularly interesting due to its developed agricultural banking system, whereas the UK was itself subject to turbulence during the financial crisis. The figures are based on FADN data for the last ten years of observation

that are publicly available. Unfortunately, there is no data for the very recent crisis years.

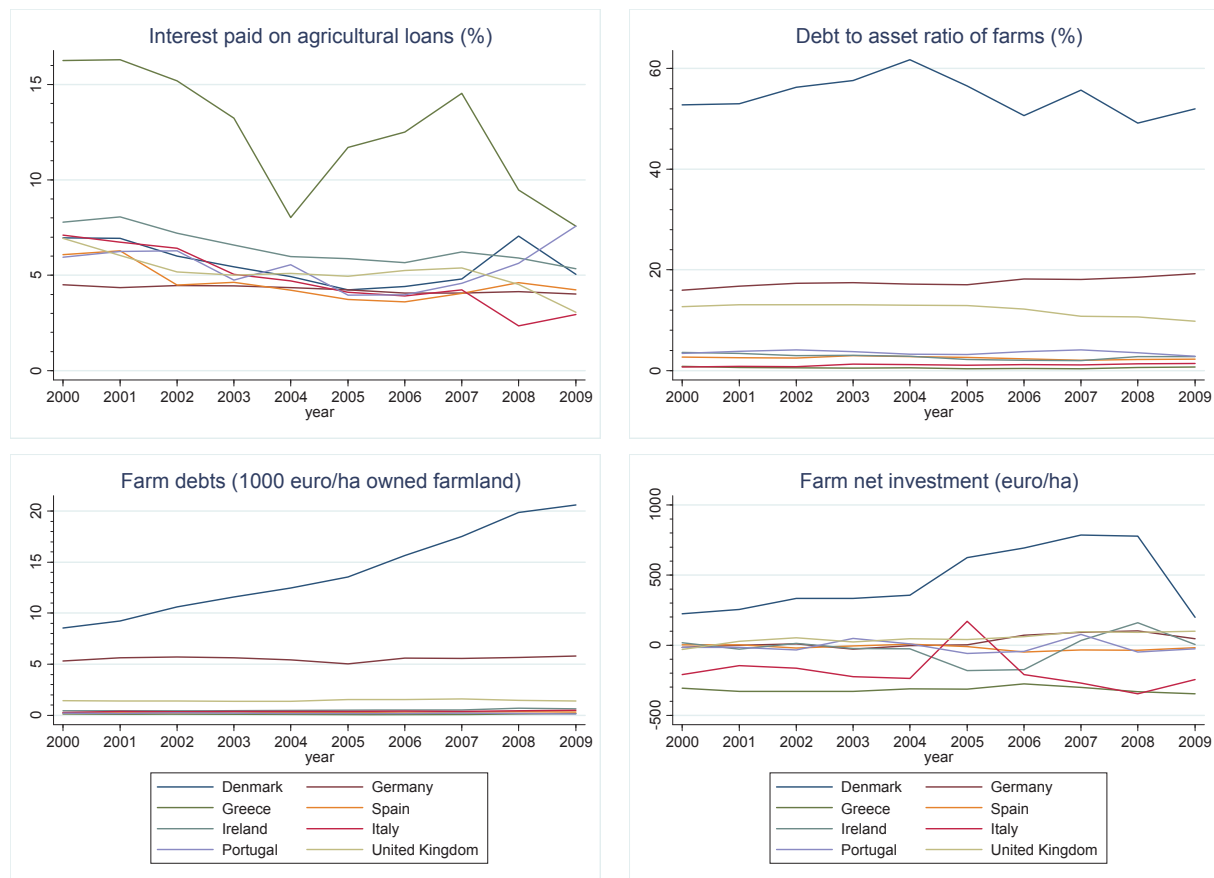
With regard to interest paid on agricultural loans, Greece stands out with the highest interest level and one with considerable fluctuation. This is despite the fact that the indicator is already reflecting an average of maturities. In all other countries except Denmark and Portugal, farmers faced long-term declining interest rates up until 2009.

In terms of indebtedness, farmers in Denmark lead the group by far. Not only did an average debt-to-asset ratio of fifty percent and more prevail over the recent decade, indebtedness per land owned more than doubled. While not a euro member, Denmark's financial system has the reputation of being quite liberal and Danish farmers being very entrepreneurial, which is reflected in these figures. Traditionally, Denmark has a very large market for mortgage lending, to which farmers, up to the crisis, had easy access (ASSOCIATION OF DANISH MORTGAGE BANKS, 2013). There is notable use of credit funding in British and German farms, but agricultural debt levels in all of the GIIPS countries were very low throughout the decade.

The chart on net investment confirms the leading role of Denmark. However, while there was still moderate growth in farm debt on Danish farms in 2009, investment almost collapsed in that year. This is, very likely, a direct effect of the banking crisis in Denmark. In 2009, investment also went down in Ireland, one of the core



**Figure 1: Financial indicators of farms for selected countries**



Source: FADN data.

Notes: Interest paid is ratio of annual interest payments to all outstanding loans. Net investment is investment outlays minus depreciation.

crisis countries. Net investments in all other countries were close to zero throughout the observed period, which means that new investments just compensated the depreciation of the existing capital stock. For Greece and Italy, the figures are even significantly negative, so that farmers are effectively running down their capital stock.

In sum, the picture that emerges from these indicators shows that farmers in all countries except Denmark exhibit very low debt levels. Those who did borrow benefited from overall declining nominal interest levels. In 2009, impacts of the financial crisis were visible in the investment behavior of Danish and Irish farmers.

### **Lending rates in agriculture and the general economy**

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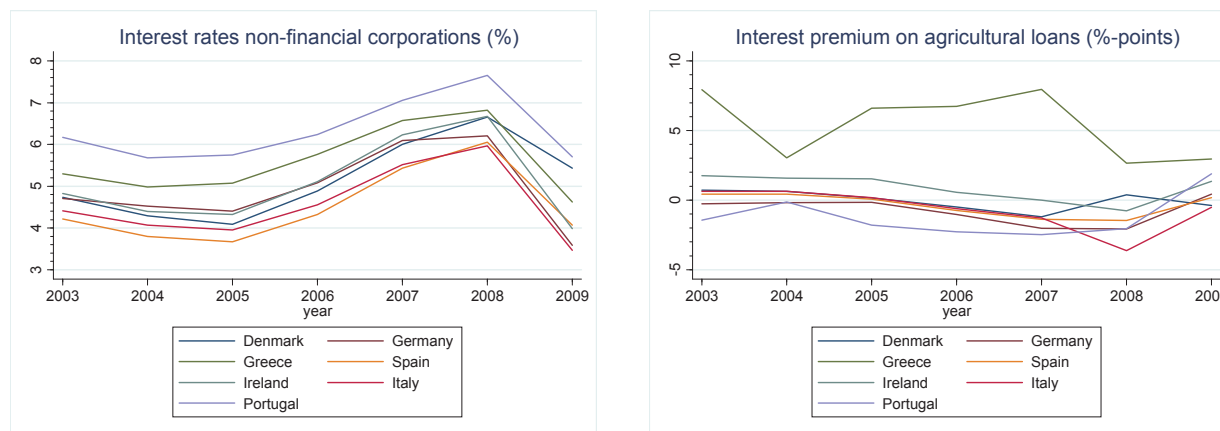
We now attempt to evaluate whether farmers pay higher interest rates than other business entities or whether they obtain less credit than they demand. We start with the former by comparing interest rates paid in agriculture with the rest of the economy. The left chart of Figure 2 shows the average interest rates of new loan contracts arranged between banks and non-financial corporations (i.e., firms) in selected EU countries. The right chart shows the difference between the interest rates paid in agriculture (Figure 1) and the former, or what may be called an "agri-premium". Note that the two are not fully comparable, as the first only includes

new business while the second is an average of all outstanding loans weighted by outstanding loan size. It thus reacts with delay to changing market conditions.

One interpretation of the left chart is that lending rates grew with the increasing stress on financial markets in the mid-2000s, but then fell with significantly loosened monetary policies after September 2008. Spreads among countries reflect specific risk premiums and the institutional conditions on domestic financial markets. Greek and Portuguese banks stand out here for charging above-average loan rates. Denmark and Spain did not completely follow the interest drop in 2009 and thus reshuffled the order, but otherwise the lines mostly move in parallel.

If new contracts in agriculture closely followed the interest level in the general economy, the agri-premium should be slightly positive in years of falling overall interest levels and slightly negative in times of rising rates, due to the sluggish agricultural interest indicator. In our sample, this appears to be the case for most of the countries in the years 2006-8 (rising overall rates) and 2009 (falling rates), respectively. So in fact, there seems to be no significant agri-premium for new loan contracts. Only Greece displays an excessively high interest rate level in agriculture. Portuguese farmers, on the other hand, tend to pay even lower rates than firms do in the rest of the economy.

**Figure 2: Current interest rates and the agri-premium for selected countries**



Source: Authors' calculations based on ECB and FADN data.

Notes: Left chart: Interest rates for loans up to EUR 1 million to non-financial corporations in the entire economy (new business other than revolving loans and overdrafts, convenience and extended credit card debt; annual averages). Right chart: Interest paid on agricultural loans minus interest rates non-financial corporations.

## Marginal capital productivity at the farm level

If farmers are quantity constrained with regard to credit, the return on their farm-internal capital use should be notably higher than the market-going interest rates. This insight motivates a test of credit rationing based on the marginal productivity of capital use. As detailed in PETRICK and KLOSS (2012; 2013), we fitted production functions to the FADN data of farm subgroups. The estimated parameters allowed us to compute farm-specific shadow prices of capital use. Figure 3 summarizes the results in the form of boxplots for working capital on field crop farms in Italy and Spain. Both countries reveal a similar picture. The median values suggest that

the highest levels were reached in the last two years of observation, just after the onset of the financial crisis. In these years, the level is at 20 percent and above and thus notably higher than the interest rates to be paid on loans (Figure 1). However, the dispersion of the farm-individual shadow prices is considerable and tends to increase, at least for Italy. The evidence is thus pointing at an at least moderate level of credit rationing towards the end of the period, when the crisis set in. After a peak in 2007, the median went down again slightly in 2008. The charts also suggest that individual farms were affected quite heterogeneously.

Results for other EU member states reported in PETRICK and KLOSS (2013) show that shadow prices of working

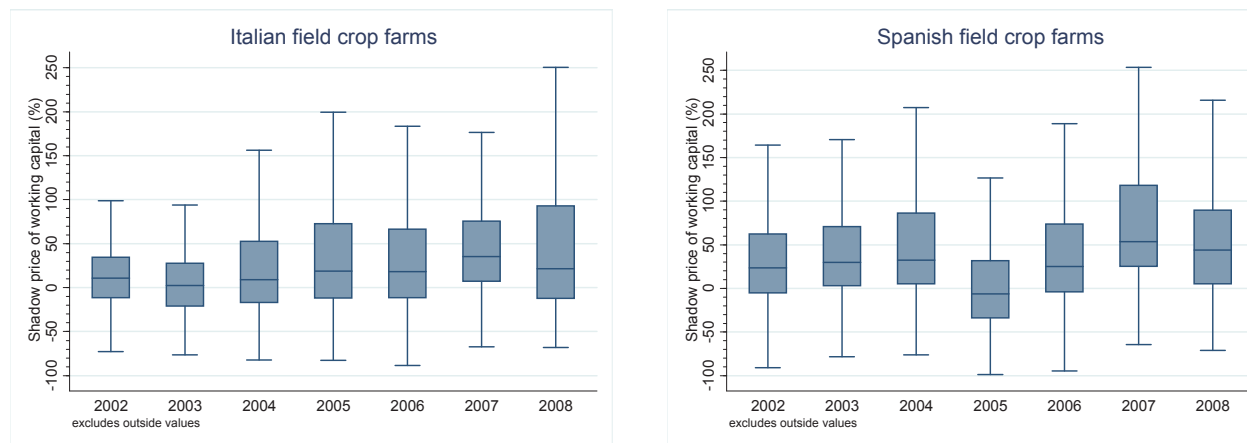
capital are much lower in some countries such as Denmark or Germany. They also suggest that the marginal return on fixed capital is substantially below the return on working capital in all countries, in fact it is typically negative. In a long-run perspective, this is a sign of overcapitalization in agriculture and not of credit rationing.

It would be useful to complement these figures by more direct evidence on credit constraints based on farm surveys. While the ECB does collect data on the access to finance by small and medium sized enterprises (SMEs), the agricultural sector is excluded from these surveys.

## Crisis effects on commodity markets and policy responses

As noted before, two other possible pathways of crisis impacts on EU agriculture include a decline in food demand and spending cuts in agricultural policy. During recessions, income-elastic and easy-to-substitute products are consumed less. In 2009, there were drops in the import of fruits and vegetables in some countries of Eastern Europe (particularly Russia) and the Near East because of the crisis (SCHOCKEMÖHLE & WÜRTEMBERGER, 2010). European exporters suffered from them. More recently,

**Figure 3: Shadow price of working capital on Italian and Spanish farms**



Source: Authors' estimates based on FADN data.

Notes: Line dividing the box is the median, lower and upper limits of the box are first and third quartiles of the distribution. Lower and upper whiskers defined by most extreme data point within first (third) quartiles minus (plus) 1.5 times the inter quartile range. N=5053 (7917) for Italy (Spain).

while there were reports about temporary shocks in the demand for alcoholic beverages, sweets and premium goods like duck meat, the European food industry seemed to have weathered the crisis relatively well. As global export markets recovered, the domestic effects of the euro crisis could be diversified away.

In 2009, an immediate effect of the crisis played out in the European milk market. The year 2007 had seen a price surge in world dairy markets, partly due to exceptional weather events and small supply from producers in Oceania. The unfolding world financial crisis then led to a drastic decline in the demand for dairy products, also by European consumers (USDA-FAS, 2008). As a result, dairy prices plummeted below pre-2007 levels and triggered what was perceived to be the EU dairy crisis in 2009. A crucial and widely discussed problem was that dairy prices failed to fully adjust at the consumers' level, so that margins for dairy processors and retailers increased, while consumers' demand did not rise enough to buffer the price drop.

These volatile and ultimately adverse price movements on the dairy market provoked protests and complaints from the side of dairy farmers and interest groups. They induced policy makers to respond with a multi-million rescue package for EU milk producers. Some of this money was taken from the direct payments pillar of the Common Agricultural Policy (CAP). Another share was available from the European Economic Recovery Plan (EERP), a stimulus package set up to mitigate the consequences

of the global financial crisis in the EU. The usual co-financing requirement for these measures was lowered down to 10 % in the most economically disadvantaged regions of the EU (EUROPEAN COMMISSION, 2010). Implementation of the support differed by member country; it typically funded extra premiums for dairy farmers and concessional credit access. Ultimately, the dairy crisis also led the European Commission to promote a restructuring of dairy markets in the longer run, including new regulations on contracting between farmers and processors (the "milk package", EUROPEAN COMMISSION, 2013).

In retrospective, rescue measures at the EU level provided a significant safety net for farmers affected by the crisis, and the CAP turned out to be a guaranteed source of funding. National co-financing requirements were even substantially lowered to accommodate the difficult budgetary situation in some of the member states. It is possible that national support programs were cut down during the crisis, but there is no systematic evidence available to support this statement.

## Conclusions

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The evidence presented here suggests that some but definitely not the majority of EU farmers faced difficulties in credit access after the outbreak of the financial crisis. Low financial leverage and declining interest levels have insulated most farms in the crisis regions from excessive risk exposure. In Denmark, high leverage in the past has now led to perceivable credit constraints

in agriculture. Increasing returns on farm-internal use of working capital in Italy and Spain are also consistent with tightening credit constraints. But most farms in the other GIIPS countries have traditionally used so little external funding that worsening credit terms due to the financial crisis are unlikely to be a major extra obstacle for their business.

Little exposure of farmers in the crisis countries is thus also a consequence of low financial penetration in agriculture. This raises the question to what extent agricultural banking is subject to deeper structural problems. For example, agricultural interest rates in Greece fluctuated much more than in other countries, and farmers pay much higher rates than businesses in other sectors of the economy. Both are signs of lacking financial market integration. On the other hand, net investment levels in agricultural assets have been consistently negative for years. What helped during the current banking crisis may turn out to be a bottleneck for future development of the sector. Institutional weaknesses in banking may slow down structural change and inhibit further modernization. Future institutional reforms thus should not bypass the agricultural banking sector.

The recent financial crisis coincided with increasing volatility on many commodity markets, some of them induced by demand drops because of the crisis. Even so, agricultural policy measures at the EU level provided farmers with a reliable stream of transfer payments. Following up on collapsing milk prices in 2009, the

European Commission even set up a specific rescue program for dairy farmers. In all likelihood, this extraordinary level of public support to the agricultural sector will also be available in the near future, thus continuing to shield farmers from the most severe crisis impacts.

### **Acknowledgements**

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This article was first published in *Choices – The magazine of food, farm, and resource issues*, 2nd. Quarter 2013, <http://www.choicesmagazine.org>.

### **Further literature**

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ASSOCIATION OF DANISH MORTGAGE BANKS (2013): Informationen verfügbar unter <http://www.realkreditraadet.dk>.

EUROPEAN COMMISSION (2010): Overview of the CAP Health Check and the European Economic Recovery Plan. Modification of the RDPs. Luxembourg: European Commission. [http://ec.europa.eu/agriculture/healthcheck/recovery-plan\\_en.pdf](http://ec.europa.eu/agriculture/healthcheck/recovery-plan_en.pdf).

EUROPEAN COMMISSION (2012): Rural Development in the EU. Statistical and Economic Information. Report 2012. Luxembourg: European Commission. [http://ec.europa.eu/agriculture/statistics/rural-development/index\\_en.htm](http://ec.europa.eu/agriculture/statistics/rural-development/index_en.htm).

EUROPEAN COMMISSION (2013): Agriculture and Rural Development – The "Milk Package". [http://ec.europa.eu/agriculture/milk/milk-package/index\\_en.htm](http://ec.europa.eu/agriculture/milk/milk-package/index_en.htm).

GERMAN COUNCIL OF ECONOMIC EXPERTS (2012): Stable Architecture for Europe – Need for Action in Germany. *Annual Report 2012*. Wiesbaden: German Council of Economic Experts. <http://www.sachverstaendigenrat-wirtschaft.de>.

JANSSON, K. H., HUISMAN, C. J., LAGERKVIST, C. J., RABINOWICZ, E. (2013): Agricultural Credit Market Institutions. A Comparison of Selected European Countries. Brussels: CEPS (*Factor Markets Working Paper*, 33). <http://www.factor-markets.eu/system/files/FM%20WP33%20Credit%20Market%20Institutions.pdf>.



PETRICK, M., KLOSS, M. (2012): Drivers of agricultural capital productivity in selected EU member states. Brussels: CEPS (*Factor Markets Working Paper*, 30). <http://www.factor-markets.eu/system/files/FM%20No.%2030%20D5.1%20Petrick%20%2526%20Kloss.pdf>.

PETRICK, M., KLOSS, M. (2013): Identifying Factor Productivity from Micro-data. The case of EU agriculture. Brussels: CEPS (*Factor Markets Working Paper*, 34). <http://www.factor-markets.eu/system/files/FM%20WP34%20Identifying%20Factor%20Productivity%20from%20Micro-Data.pdf>.

PIETOLA, K., MYRÄ, S., HEIKKILÄ, A.-M. (2011): The Penetration of Financial Instability in Agricultural Credit and Leveraging. Brussels: CEPS (*Factor Markets Working Paper*, 2). [http://www.factor-markets.eu/system/files/FM\\_WP2\\_Pietola%20et%20al.pdf](http://www.factor-markets.eu/system/files/FM_WP2_Pietola%20et%20al.pdf).

SCHOCKEMÖHLE, U., WÜRTEMBERGER, E. (2010): Der Markt für Obst. *German Journal of Agricultural Economics Vol. 59*, supplement, pp. 79-89. [http://www.gjae-online.de/news/pdfstamps/freeoutputs/GJAE-543\\_2010.pdf](http://www.gjae-online.de/news/pdfstamps/freeoutputs/GJAE-543_2010.pdf).

SHAMBAUGH, J. C. (2012): The Euro's Three Crises. In *Brookings Papers on Economic Activity* (Spring), pp. 157-231.

UNITED STATES DEPARTMENT OF AGRICULTURE – FOREIGN AGRICULTURAL SERVICE (USDA-FAS) (2008): Dairy: World Markets and Trade. December 2008. Washington, DC: USDA. <http://usda01.library.cornell.edu/usda/fas/dairy-market//2000s/2008/dairy-market-12-11-2008.pdf>.



*Cereal harvest in Russia*

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## Russian Cereals Exports – A Flash in the Pan?

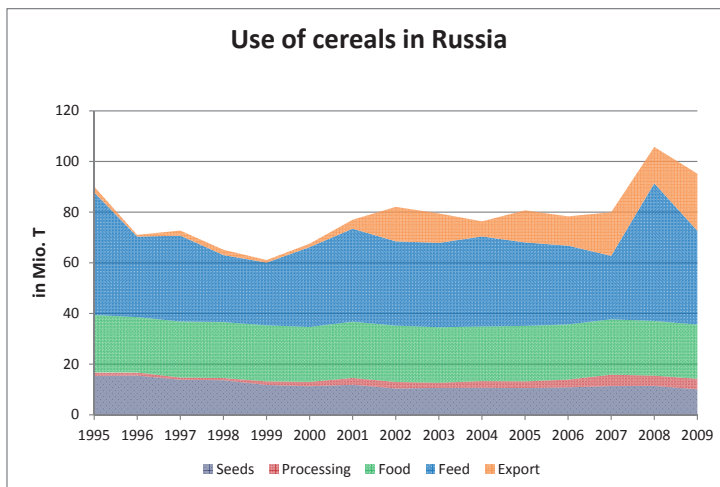
HEINRICH HOCKMANN, INNA LEVKOVYCH

Over the past decade the Russian Federation has become one of the ten largest exporters of cereals in the world. As the level of exports is calculated as the residual difference between domestic supply and consumption, a detailed analysis of the use and supply of cereals is necessary to answer the question of whether Russia can continue to maintain her strong position on the global cereals market in the coming years.

### Use of cereals in Russia

Figure 1 gives an overview of the cereals available for domestic consumption, sorted by usage. Around 20 % are used as seed. Here, however, we can observe a declining trend as a result of the fall in the total area of farmed land. In the last few years the proportion of cereals used for industrial processing, e.g. for packaging

**Figure 1: Use of cereals in Russia in millions tons**



Source: FAOSTAT.

or biofuels, has risen considerably, but is still at an insignificant level. The volume used for human food has basically remained constant in recent years. Because of the price- and income-inelastic demand for cereals, economic growth and the associated rise in per-capita income have not triggered any additional stimulus for demand.

The largest share of cereals is used domestically for feed. In the 1990s, however, the volume of cereals used for feed fell as a result of the reduction in livestock numbers, and in 2000 constituted only 40 % of overall domestic cereal use, compared with more than 50 % in 1995. Over the same period pig numbers dropped by around 30 %. With the broad stabilisation of pig numbers in the first decade of the 21<sup>st</sup> century, the consumption of feed cereals more or less remained at a constant level, rising again at the end of the decade.

As cereals output rose substantially during the same period, Russia was able to achieve a clear export surplus in cereals. Whether this continues in the short and medium-term, if not the long-term, will depend chiefly on future domestic use, especially on domestic demand for feed, livestock numbers and feed efficiency in livestock farming. In the major cereal-farming areas there is scarcely any fallow land with good soil that can be brought into cultivation. Russia is currently a large pork importer. Only 65 % of the pork consumed in Russia is produced domestically. The degree of self-sufficiency is set to rise by 85 % by 2020.

## **Agricultural policy and the development of the demand for feed**

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### *Investment support and restructuring of pig production*

Pig production was already subsidised in state programmes for agricultural development over the period 2006-11. More than €6 billion was set aside for supporting investment, most of which went into modernising pig farming. In 2011 in Rostov district alone, the state supported twelve agricultural investment projects with investment assistance totalling about €969 million. In the whole of the Russian Federation around 750 pig farms were refurbished or rebuilt. As a consequence, the share of output from pig farms that were outdated fell from around 86 % (2005) to 14 % (2010). In addition to modernisation a large number of new facilities were built. In 2010 more than 40 % of total pork output came from modern plants.

Independent farms have generally concentrated on refurbishing existing facilities. For the most part it has been agroholdings that have built new plants from scratch. Agroholdings are forms of organisation with a high degree of vertical integration, which control the various stages of their value chain. The largest pig producer is the agroholding "Miratorg", whose seat is in Belgorod region. In 2012 it farmed around 133,000 ha. and employed about 13,000 staff. Around 50 % of those were working in pig farming. The agroholding includes two specialised cereals farms, various cereals silos each with a capacity of about 200,000 tonnes, and three feed

**Figure 2: Restructuring in Russian pig farming**



Source: KOVALEV, 2012.

factories each with a production capacity of 60,000 tonnes. The holding operates 23 industrial pig farms throughout Russia, as well as various slaughter and processing businesses, logistics firms and commercial centres. Since 1995 around €698 million euros worth of investments have been made. In 2012 its pork output amounted to 182,000 tonnes, which was 42 % higher than in 2011.

The investments made by "Miratorg" have not only led to a significant expansion in the holding's stock. The agroholding has also adapted and modernised its technology to make it more efficient. Various of "Miratorg's" performance indicators for pig farming are considerably above the Russian average, and in 2012 they just about matched German levels (Table 1).

"Miratorg" and other agroholdings enjoy a very strong position in the Russian pig market. In 2012 the ten largest enterprises controlled around 40 % of this market (Figure 3).

#### *Pricing and market policy in the pig sector*

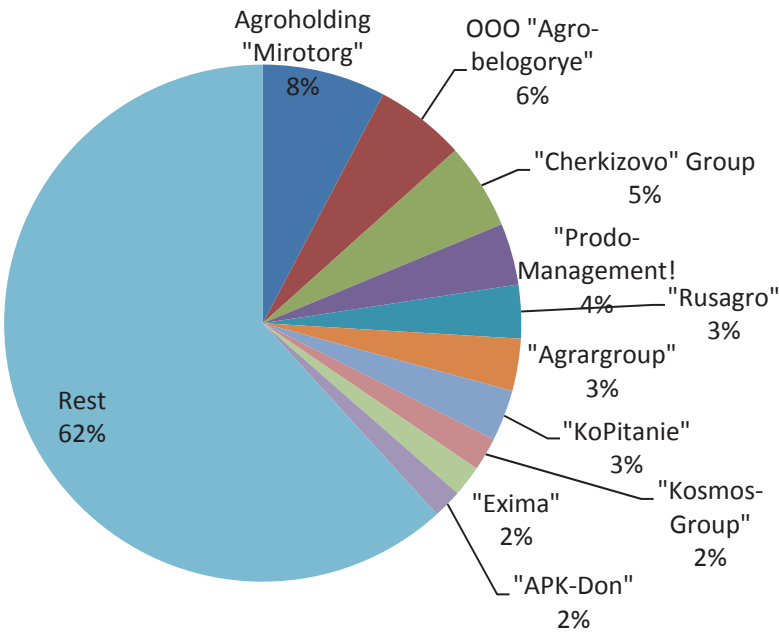
Not only has pig production been subsidised by state investment programmes, these have been also been complemented by intensive support for the pig sector through market and pricing policy (Table 2). In 2012 the import quota for pork was 430,000 tonnes. This quota was insufficient to cover the demand for pork in Russia, however. Imports within the quota attracted a duty of 15 %; those above it were subjected to a duty of 75 %. These measures have given Russian pig producers a

**Table 1: Performance indicators in pig production (2012)**

	Russia	Miratorg	Germany	Denmark
Number of piglets per sow per year	21	22,36	22,47	25,63
Daily growth, grams	465	751	753	898
Feed conversion ratio	4,7	2,94	2,92	2,66
Killing out percentage	63	72	79	76

Source: MIRATORG, 2013, ROSSTAT.

**Figure 3: Concentration in Russian pig farming 2012**



Source: NSSRF (2013), own depiction.

high degree of protection. This is highlighted in Table 2 by a Producer Nominal Protection Coefficient (NPC), which measures the relationship between producer price (including subsidies) and global market price for individual agricultural products. According to this, in 2008-10 the Russian producer price for pork including subsidies was almost twice as high as the global market price, while in 1995-2007 it was on average only 15 % higher. This intensive market support is also reflected in the Single Commodity Transfer indicator (SCT), which for individual agricultural products measures the proportion of income from agricultural output that comes from state support. Using the SCT as a benchmark, at the end of the last decade on average more than 50 % of income from pork production in Russia came from state subsidies.

Pig farming is a priority sector for current Russian agricultural policy. This is also shown by the fact that state market intervention is far stronger here than in other agricultural sectors. The Producer Support Equivalent (PSE), which measures the level of protection for agricultural production as a whole, was on average only 22 %

for the same period, and thus less than half that for pig production (SCT). Pig farming is expected to continue to enjoy favourable treatment. For example, a national project on key development areas in the agricultural sector is scheduled to give around 11 billion euros in support for animal production by 2020, a substantial share of which will go towards expanding and modernising pig farming.

*Demand for feed with a constant level of meat consumption but improved feed conversion ratio*

Given the huge state support for pork production it is likely that the Russian Federation will succeed in its ambitious goal to raise the level of self-sufficiency in pork by around a third to 85 % by 2020. This will require a similarly high increase in pig numbers, roughly to the 1995 level. This does not mean, however, that the demand for feed would have to reach the 1995 level, thus costing Russia its position as one of the largest net cereals exporters (Figure 1). The modernisation of pig farming and the establishment of modern facilities by agroholdings may substantially improve the feed con-

**Table 2: Internal support for Russian pork production**

Indicators	1995-1997	2008-2010	2005	2008	2010
Producer SCTs, in million euros	382,5	2440,1	1376,8	2493,7	2506,6
SCT percentage (see text)	16,6	53,4	43,8	62,1	47,6
Producer NPC, in million euros (see text)	1,14	1,99	1,69	2,35	1,72

Source: OECD, own depiction.

version ratio in Russian pork production. It is realistic to assume, therefore, that the feed conversion ratio will reach the European level in the near future; some holdings have already attained this level. This would correspond to an increase in feed conversion ratio by a third (Table 1), and more or less compensate for the additional demand for feed resulting from the anticipated rise in pig numbers. The overall consumption of feed should thus remain constant.

#### *Effects of changes in demand*

This conclusion assumes a constant demand for pork. At present the annual per-capita consumption of pork is 20kg, only about 30 % of the German level. If Russian consumer behaviour were to align with that of the Germans, this would create a substantial additional demand for pork and thus for feed, too. If we examine in isolation the structure of Russian meat demand, however, there is nothing to suggest that the country's consumer behaviour will align with that of the Germans. In the first decade of the 21<sup>st</sup> century, this structure remained largely unchanged. Only for poultry was there slight rise, at the cost of beef; the ratio of pork consumed was broadly unchanged, however.

Having said that, we can assume an increase in meat consumption overall. After 2000 the per capita consumption of meat rose annually by almost 5 %. As this shows no signs of levelling out, we can assume that meat consumption will continue to expand. It is debatable whether technological progress in animal and crop production will be sufficiently high to compensate for

the increased demand for feed generated by this additional consumption. Therefore, a significant drop in the export of Russian cereals cannot be ruled out. This question cannot be answered, however, without a closer examination of the development of cereals yields.

#### **Prospects for increases in output of cereals**

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To this end we designed a prognosis model for cereals production. The interplay with other crop and animal production was accounted for by using an output distance function. As the output side encompasses all agricultural production, the total factor input – i.e. the overall input of labour, land, capital and inputs – was also given consideration in the study. The model differentiated between regions, i.e. all outputs and inputs were gathered at regional level to allow consideration of differences in development between regions. The analysis covers the period from 1995 to 2011.

#### *Factor input in Russian agriculture*

First we must examine factor input in Russian agriculture. The development of this is shown in Figure 4.

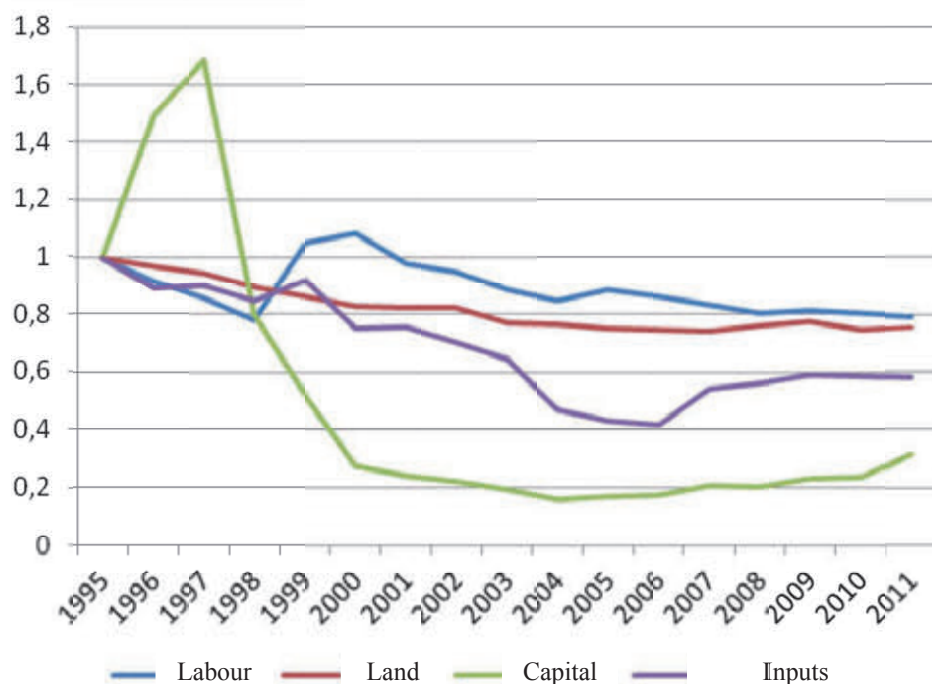
Apart from capital, factor input in agriculture fell constantly in the first 10 years. The huge depreciations in the first few years after transition and the economic difficulties up to the financial crisis of August 1998 are reflected as a rise in capital input. We can assume, therefore, that the depreciations do not sufficiently reflect the actual capital stock in this phase of transition. In the following years, however, there was a considerable

reduction in capital input. The cause of the rise in labour input can likewise be found in the financial crisis, which caused a significant remigration of labour from urban centres to rural areas and thus into agriculture. The use of produced inputs (capital, materials) experienced the biggest decline as a result of poorly functioning credit markets and agribusiness markets.

#### *Major significance of advances in productivity*

In spite of the reduction in factor input, agricultural production in the study period more or less maintained itself at the same level (Figure 5), and even rose in the last few years. This is chiefly a result of technological progress. Our calculations have shown that agricultural production in Russia is marked by a high degree of

**Figure 4: Development of factor input in the Russian Federation (1995=100)**



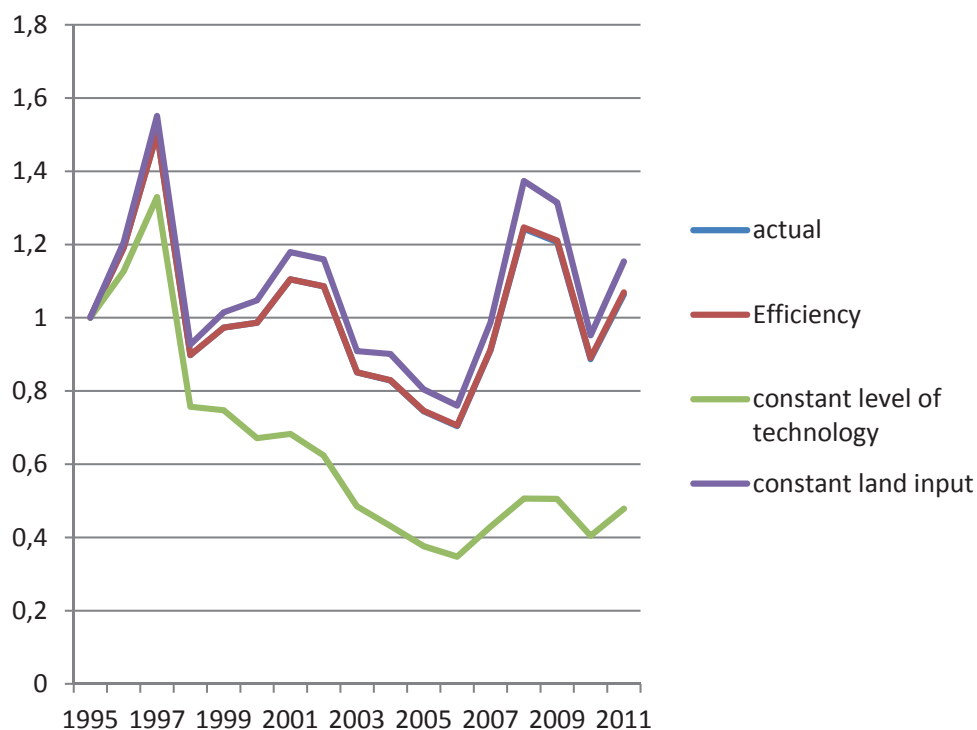
Source: Own calculations based on ROSSTAT data.

Note: The capital input does not reflect the actual capital stock in agriculture, but has been approximated from depreciation figures.

technological progress. The yield increases as a result of advances in productivity (effects of restructuring, technological progress) were around 4 % per year in the study period. The trend is declining, however, which means that at the end of the study period these advances are relatively insignificant for the continued increase in agricultural output. In Figure 5 we can also see the effects of advances in productivity in cereals production.

The green curve represents how cereals output would have developed without the effects of technological progress and business restructuring. Given the decline in productivity advances in Russian agriculture we can conclude that there are considerable doubts as to whether the additional demand for feed due to the rise in meat consumption can be met without a reduction in cereals exports.

**Figure 5: Development of cereals production in the Russian Federation (1995=100)**



Source: Own calculations.



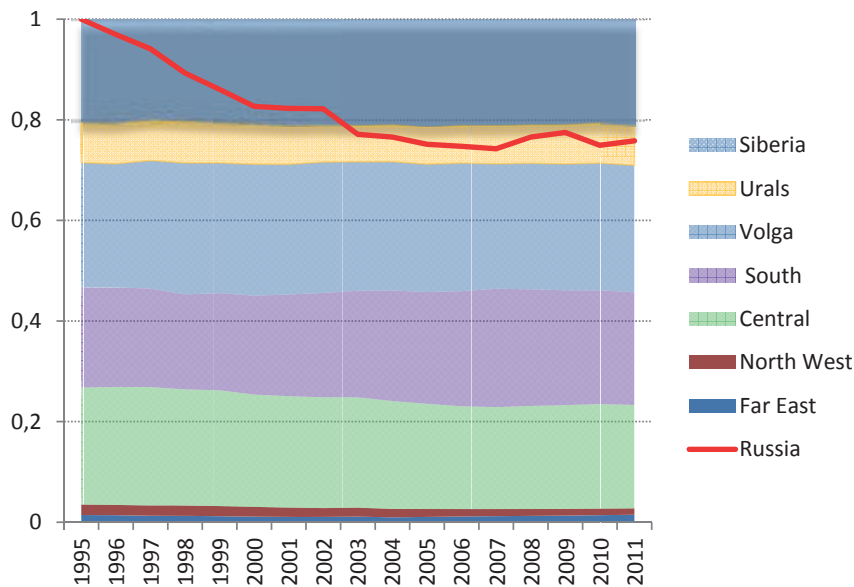
### Land recultivation

Alternatively, the additional demand for cereals could be met by the recultivation of large swathes of land that have become fallow since 1990. Our calculations indicate that this option would make only a minor contribution to overall cereals output (red line in Figure 5) as not all the fallow land would be used for cereals farming, but for other production lines, too.

We also examined the likely consequences if all land which was being used for farming cereals in 1995 were to be put into production again. Since that time, the

amount of land used for cereals has developed parallel to arable land overall. By 2011 the land used for cereals had dropped to around 80 % of the 1995 level (Figure 6). Moreover, the ratios between the large regions have remained overwhelmingly constant. Only southern Russia, with its favourable access to the Black Sea and thus to international markets, showed a slight increase in land used for farming cereals. This was in contrast to a decrease in the Volga region. We cannot rule out the possibility, however, that more fallow land will be put into production again as a result of an increase in domestic demand, although it must be noted that the effect on

**Figure 6: Development of land used for cereals cultivation and its regional distribution in the Russian Federation (1995=100)**



Source: ROSSTAT, own calculations.

output may be comparatively slight. This is chiefly due to the fact that the land which was taken out of production was mainly that which could no longer be farmed competitively because of the natural and economic conditions of the locality.

## Conclusion

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As the result of huge state support, investments and the restructuring of pig farming, it is likely that Russia will meet her ambitious targets for self-sufficiency in pork. Given this realistic assumption, the future export potential for cereals may be drastically reduced. This paper has shown that because of technological advances in the sector, even a significant increase in Russian pig production to replace falling imports might not necessarily lead to an increase in feed consumption, and thus cereals exports could remain high. This scenario would be dependent, however, on a constant per-capita consumption of pork. In fact, this consumption is rising rapidly. At present technological progress cannot compensate for the additional demand for feed created by the rising consumption of Russian pork. As a result, there is likely to be significant shift for cereals from the international to the domestic market.

## Further literature

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ROSSTAT (2013): Staatliches Statistikamtes der Russischen Föderation, Zentrale statistische Datenbank, <http://www.gks.ru/>.

OECD (2013): Organisation for Economic Co-operation and Development, OECD.StatExtracts, <http://stats.oecd.org/>.

MIRATORG (2013): Agroholding "Miratorg", Tätigkeitsbereich "Schweinefleischproduktion", <http://www.miratorg.ru/about/default.aspx>.

NSSRF (2013): Rating der größten Schweinefleischproduzenten in Russland im 2012 [www.nssrf.ru/documents.php](http://www.nssrf.ru/documents.php).

KOVALEV, J. (2012): Pig production in Russia, EPP Congress "Pig production in Baltic regions: Chances and Challenges", Vilnius, Litauen, May 30-June 1, 2012.



*Agroholding sign in Belgorod Province, Russia*

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# How effective are the property rights on agricultural land? Some lessons from the case of Altai Krai in Russia

LADISLAV JELINEK, ALEXANDER V. PRISHCHEPOV, ELENA PONKINA

## Introduction, objectives

Effective property rights and well-coordinated land transactions play an important role in the structural changes of farms and can improve the economic development of a country's agriculture. This requires that actors holding the formal land ownership rights are able to decide on the land use without incurring unreasonably high transaction costs. In practice, however, this is often not the case in many regions undergoing social and economic transition. As a result, the reallocation of production factors among established farm units can be restricted and unresponsive to wider market signals. The farms that emerge from the transition process affect not only production itself, but also the individual farming practices and the volume of production factors that are used. They therefore have far-reaching influence on the social domain (e.g. local employment) and environment (e.g. soil quality).

In this study, we used a heuristic approach to identify the legislative and policy failures (such as poorly designed public interventions, missing legislation, etc.), in which the newly emerging institutions for land property rights

may not be functioning properly. In particular, we have focused on those institutional issues that may explain the process of structural adjustment by creating obstacles in terms of access to land or high transaction costs, thus preventing the improvement of production efficiency. The main sources of information for this study were the analysis of legal land texts, research papers and statistical documents. A small number of face-to-face interviews were conducted with farmers and land and agricultural economic regional experts.

This paper takes the view that the redistribution of land property rights should be regarded as a phenomenon of institutional change that can only be controlled to a limited extent (HAGEDORN, 2004). This approach assumes that institutional innovation does not follow pre-designed concepts which can be implemented prescriptively by political and administrative actors. The ability of political actors to govern and control real changes in institutions (in this case the right of private land ownership) is therefore relatively low. This is true not only of the creation of formal institutions (such as new laws), but also of their effective implementation. A region in Russia provides a good example to examine the process of implementing property rights.

## Study area

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Altai Krai, situated in the south-western part of Siberia, on the eastern border of Kazakhstan, is a fertile region in Russia, in spite of its severe climatic conditions. Its potential began to be exploited in 1950s and 60s when the former natural steppes were transformed into arable land. This land has mainly been used extensively; the yields of wheat or barley have seldom exceeded one tone per hectare.

At the beginning of 1990, the total area of agricultural land amounted to 12.6 million ha., accounting for 66 % of the krai's territory (RUSSIAN FEDERAL SERVICE FOR STATISTICS). All the land was state property, and the production units had the right to use the land free of charge. The majority of land was cultivated by 226 cooperative farms and by 460 state farms. Household (peasant) farms held at that time less than 1 % of agricultural land in the krai. As there were no land sale transactions, there were no prices on land, either.

Large-scale technology, relatively low inputs and inadequate anti-erosion management created pressure on the (local) environment. Researchers currently indicate that land-use management contributed to the following problems: decreasing content of the humus in the soil (with negative consequences for soil fertility and water infiltration), susceptibility to wind and water erosion, and salinisation (cf. FRÜHAUF, MEINEL, 2007). According to official figures, 75 % of agricultural land has been environmentally degraded to some extent (FEDERAL

CADASTRAL SERVICE, 2012). Some findings show that the region has significant potential to function as a carbon sink if land users introduce appropriate land management. These problems, coupled with the region's importance as a food supplier, have presented the political actors with the difficult task of ensuring that the transition to environmentally sensitive cultivation takes place without any social or economic collapse. Without effective rights of land ownership, however, challenges such as this cannot be met.

## Findings

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### *Elements of the institutional transformation of property rights*

Restitution in Altai Krai was not feasible because previous boundaries of land ownership borders (before 1929) were no longer available, and federal law made no provision for restitution. So land was distributed to eligible persons (active and retired agricultural workers) on a *per capita* basis. This mechanism provided free shares of land and assets. This method of distribution reflected key objectives of privatization: "historical justice" (as there were no private property rights to land, there could be no conflict between former owners and new ones); and "social equity" (equitable distribution of shares amongst the eligible persons, at least at the beginning of privatisation). It is estimated that more than 350,000 eligible persons (workers) received these shares. Currently the proportion of land share owners who no longer work in agriculture varies between 50 to 95 %

(BOBORJOV, ZUBACHYN, 2013). By law these shares, which existed only on paper, could be converted into real land plots and assets (or monetary equivalents), if a shareholder decided to quit the collective. The crucial question was under what conditions these shares could be converted and at what (transaction) cost. As will be shown below, the costs were high.

Another way of distributing land ownership rights to private persons was from the *privatisation* (or redistribution) land *fund* (this reserve was created in all Altai's districts except one). In the first period, until 1992, the government distributed 682,000 ha. (6.2 % of the total agricultural area in the krai, BOBORJOV, ZUBACHYN, 2013) amongst private and household farms. In the second period, further land distribution took place to natural persons and enterprises. In 2011, the fund transferred two million ha. of farmland into private hands. By 2012, as a result of the distribution of shares and the privatisation fund, more than half of agricultural land in Altai Krai was already in private ownership (i.e. owned by natural persons or legal entities), a figure higher than the national average.

To better understand the process of redistributing property rights, we must consider the *informal* institutions existing amongst the rural population (these often change much more slowly than the formal ones). In this regard, the rural population of Altai Krai did not differ too much from the rest of the country. Rural inhabitants tend to have conservative modes of thinking, oriented to the past, and thus the notion of private land

ownership was not very popular, because it was often considered immoral. Entrepreneurial activity, meanwhile, was regarded as speculative and unfair (cf. SEROVA et. al., 1998). Also important for the reform was the fact that there was great scope for maintaining cooperative activity. There was – and according to our findings, there still is – the widespread belief that collectivism is related to equality. The positive perception of equality is based on an organisational pattern of society that considers the group rather than the individual as the basic unit.

### **Towards effective property rights**

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Since 1990, private ownership of land (and private farming) has officially been permitted. During the transition process more than 56 % of the regional land fund passed into private ownership (of which only 2.2 % belongs to legal entities, STATE SERVICE FOR CADASTRAL REGISTRATION, 2012). Collective farms that have been transformed into corporate farms have retained more than half of agricultural land in the region, however. They have thus become an important part of agricultural structures in Altai Krai. More than 55 % of agricultural land is currently farmed by (large) agricultural enterprises (of which 2 % by state or municipality farms), 20 % by family farms and 25 % by (semi)subsistence household plots (this includes "common pastures"; STATE SERVICE FOR CADASTRAL REGISTRATION, 2012) with much smaller average sizes (Table 1). Though some marginal areas are out of cultivation, overall only seven percent of agricultural farmland is not currently being utilised.



*Household farm in Belgorod Province, Russia*

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As far as the actual transference of effective rights to individuals is concerned, however, privatisation remains incomplete. Only 7 % of all private agricultural land is fully and clearly defined and registered in the cadastral system (cf. BOBORJOV, ZUBACHYN, 2013). Some major problems have slowed down the process of restructuring.

Once legislation had been completed, disputes arose over the implementation of land ownership rights. According to the Russian constitution, land regulation was simultaneously a competence of federal and regional authorities. However, many pieces of legislation were not implemented in the regions; both the public and the authorities were confused by some contradictory regulations passed at federal level and even

in some cases boycotted the law (KUSELER, SARNA, 2008). The texts of regional legislation were often unclear and frequently contradicted federal legislation. The Russian law on land ownership stipulates that it is the right of the federal government to determine the principles of land legislation, while regional legislatures are authorised to issue detailed land laws. This division of authority has created the problem where a number of regions have laws which have operated in contradiction to federal legislation (SEROVA et. al., 1998), and the federal authorities have had no real power to intervene in these developments.

In several cases the land legislation provides only general assertions (e.g. foreigners are allowed to own land)

**Table 1: Distribution of land and production in corporate farms and individual private farms in Altai Krai, 2011**

	Corporate farms	Individual private farms	Semi-subsistence households
Crop production per ha. of arable land (roubles)	5,909	5,916	15,727
Livestock production per ha. of farmland (roubles)	11,990	2,941	15,273
Distribution of land (utilised) amongst the groups	55%	20%	25%
Distribution of total agricultural production amongst the groups	46%	12%	42%
Average size (ha)	4629	414	5.6
Share of own land in the category	2.6%	9.5%	87% <sup>1)</sup>

Source: FEDERAL GOVERNMENTAL SERVICE FOR CADASTRAL REGISTRATION, CASTER AND CARTOGRAPHY (2012), FEDERAL GOVERNMENTAL STATISTICAL SERVICE, 2013 (available at: [http://akstat.gks.ru/wps/wcm/connect/rosstat\\_ts/akstat/ru/statistics/enterprises/agriculture/](http://akstat.gks.ru/wps/wcm/connect/rosstat_ts/akstat/ru/statistics/enterprises/agriculture/)).

Note: <sup>1)</sup> The figure does not include the "common pastures" category that is fully in state ownership in Altai Krai.

while the specific conditions are established by different regulating authority (in this case, for example, only the Russian president has the authority to define the areas in which foreign land ownership is forbidden). In fact, foreigners (including legal entities) have the right to buy or rent agricultural land (but not to inherit or receive it as a donation). However, this right is restricted to "non-border regions" and other defined regions. There needs to be a critical assessment of the consistency and continuity of federal and regional legislation.

As stated above, although the new shareowners received land (and assets), any kind of independent business activity was out of the question. First, they were not assigned any clearly defined plots of land (such plots could not be sold or purchased, and thus could not generate any income to stimulate investment). Initially, the costs of physically identifying the land and of producing a cadastral plan were borne by the individual users; now these are subsidised by the state. Second, the legislation did not provide technical details of implementation regulations for the allocation of land, which led to disputes, for example when eligible shareholders asked the management of corporate farms to surrender land. Whereas shareholders demanded the highest quality plots, often managers of former collectives only offered lower quality land, so as to retain the best parcels for their farms. Furthermore no trading in land was officially permitted until 2001 (by the terms of a ten-year moratorium). Land sale transfers were allowed only between the state and citizens and vice-versa. The right

to purchase land from subsistence households was transferred to municipal authorities. There were improvements when legislation (presidential decree) stipulated that each land use on a basis of tenancy has to be registered – as a result it became obligatory to conclude legally-binding lease contracts. Since then, the owners have partial ownership rights (e.g. to receive rent on land).

One specific issue is so-called "unclaimed" land shares. These are shares which were distributed, but still have no registered owners to date. The problem with land shares intensified further in 2006 when new legislation stipulated that the value of land shares should be calculated based on the cadastral price for tax purposes. The problem was that although these shares were used by (large) farms, their physical boundaries had not been defined. At the same time, users of such land shares do not pay the taxes or rents while the owners have still no right to remove such land from the enterprise (BOBORJOV, ZUBACHYN, 2013). Currently, a total of 551,000 hectares are yet to be settled (9 % of all owned land).

To a certain extent, the flexibility of the land market is limited by the supposed threat of land speculation: the hierarchy of the right to buy private land is as follows: 1) governmental (regional) authority (krai); 2) municipality; 3) agricultural organisations that cultivate land. This applies to any land traded by private persons. If none of the specified groups buy the land in question, then it can be traded on the free market. The price, however, must not be lower than the previous offers. This



makes it difficult for the seller, as at the start they may have no knowledge of the demand for land on the free market, and the prices may be too high or too low, thus adjustment is thus needed via the free market.

## Conclusion

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The process of property redistribution in our study region is still ongoing, and it is having an impact on structural change in agriculture. Although some private farms as well as agroholdings have been constantly growing, their chances of acquiring more land are often impeded, either by institutional and administrative obstacles, or by the current land users. Some of the weaknesses from the initial phases of transition in the effective implementation of land ownership rights have already disappeared, which can be seen in the trend towards a liberalisation of private sales. As a result, the annual share of agricultural land that has a change in owner is relatively low, amounting to 0.6 % (STATE SERVICE FOR CADASTRAL REGISTRATION, 2012, including inheritances and donations). The corresponding figure in European countries ranges between 0.6 % and 3.1 % (CIAIAN, 2012). Land price (both sale and rented) has remained (as have other production factors) relatively low. Paradoxically this may preserve some of the market inefficiencies outlined above. The price of traded land is even lower than the official one, amounting on average to 50 euros per hectare, (BOBORJOV, ZUBACHYN, 2013). Despite some improvements, the land market in Altai Krai is still a long way from satisfying the criteria of a developed one.

## Further literature

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BOBORJOV, S. P., ZUBACHYN, A. M. (2013): Efficient Usage of Agricultural Land in Altai Krai (Effektivnost Ispol'zovaniya Zemelnykh Dolej v Celskom Chozjajstve Altajskovo Kraja). *Bulletin of Altai Economic and Law Academy*. Vol. 28 (1), S. 20-22.

FEDERAL GOVERNMENTAL SERVICE FOR CADASTRAL REGISTRATION, CADASTER AND CARTOGRAPHY (2012): Report on the Assets and Land Utilization in Altai Krai (Doklad o sostojanii i ispol'zovanii zemel Altajskovo kraja), Barnaul.

FRANKS, L. R., KALUGINA, Z. I., FADEEVA, O., DAVYDOVA, I. (2005): Farm Ownership and Management in Russia: A Study of the Novosibirsk Region. *Journal of Farm Management*. Vol. 12. No. 6, S. 329-350.

FRÜHAUF, M., MEINEL, T. (2007): Desertification in the Agricultural Used Dry Steppes in Central Asia. Proceedings of the International Conference Soil and Desertification – Integrate Research for the Sustainable Management of Soils in Drylands, May 5-6, 2006, Hamburg, Germany.

HAGEDORN, K. (2004): Property rights reform on agricultural land in Central and Eastern Europe. *Quarterly Journal of International Agriculture*, 43 (2004), No. 4, S. 481-486.

KUSELER, D., SARNA, E. (2008): Land Reform in Russia remained unfinished (Zemlnaja reforma v Rossii ostalas nezavershenoj). Available at <http://newsland.com/news/detail/id/314731>. October 14, 2013.

SEROVA, E., MOGILEVTWEV, I., EMELIN, D., RTISCHEV, N. (1998):  
The Impact of Privatization and Farm Restructuring in  
Russian Agriculture. Institute for Economy in Transition.  
Moscow.



*Agrohodling machine park in Belgorod Province, Russia*

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*Cereals store in Belgorod Province, Russia*

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## Vertical coordination in the Ukrainian dairy sector

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MARYNA MYKHAYLENKO, FRANZISKA SCHAFT

Vertical coordination is becoming increasingly important in the agricultural and food sectors of Central and Eastern European countries, as well as in other parts of the world. The combined driving forces of "globalisation" and "transition" pose substantial challenges to the efficient organisation of supply chains in the agricultural and food sector. By vertical coordination we mean the institutional arrangements of cooperation entered into voluntarily by enterprises at different stages of the production chain to achieve process harmonisation between the firms involved. The form of coordination can vary in intensity and extend as far as full firm integration.

Various studies dealt with the analysis of vertical coordination, especially in Central and Eastern European regions (SWINNEN ed., 2007; DRIES et al., 2009; WHITE and GORTON, 2006). However, empirical evidence on the factors which are decisive for the initiation of vertical coordination is scarce, especially for Ukraine. Although there is broad agreement that integration into modern supply chains can in principle be advantageous for all producer groups, irrespective of their size, opinions vary as to the degree of participation of smaller firms.

This paper focuses on vertical coordination in the Ukrainian dairy sector. We will begin by outlining the measures of vertical coordination of Ukrainian milk-processing firms and factors that influence it. Then, from the perspective of milk-processing firms, we will examine the effects of vertical coordination, looking especially at the relationship to their raw milk suppliers. Here, particular consideration will be afforded to the role of small producers.

### **Background: Developments in the Ukrainian dairy sector**

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The high proportion of small producers continues to be a significant feature of the Ukrainian dairy sector. Whereas in 1990 more than 76 % of milk was produced in large enterprises, in the past two decades production has shifted from large-scale businesses to household farms. In 2012 around 80 % of milk was produced by rural households with on average 1.5 dairy cows. Meanwhile, large agricultural enterprises have managed to stabilise their production volumes only in the last few years, and only at a comparatively low level (Figure 1).

One important challenge to the Ukrainian milk-processing industry continues to be efficient organisation of the milk supply chain, as raw milk from household farms often fails to meet the necessary quality standards and uncertainty in milk deliveries exists. To meet these challenges, Ukrainian milk-processing firms have increasingly been offering support measures over the past decade, such as price incentives, financing and training opportunities, and the provision of equipment for their milk producers or suppliers. These measures have enabled the dairies to stabilise milk deliveries in recent years. This is particularly true of large enterprises. For the first time in 2012 they delivered to dairies more raw milk – 2.2 million tonnes, over 90 % of their production – than household farms (Figure 2).

Quantitatively, therefore, the significance of household farms as suppliers to the processing stage in the Ukrainian dairy industry is declining. Annual supply volumes have fallen from 3.8 million tonnes in 2005 to around 2 million tonnes in 2012. What is more, the majority of raw milk produced by household farms (78 %) is not passed on to the processing level. It tends to be used for own consumption or sold on the open market and thus remains outside the milk supply chain. These developments raise the question of the future role of household farms within the context of vertical coordination and the dairy sector as a whole.

## **Data basis**

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The analysis is based on findings of a quantitative survey which was carried out in summer 2009 with managers from 38 milk-processing firms involved in forms of vertical coordination (Table 1). Two-thirds of the processors in the sample are part of a so-called "agroholding". These business entities, which are highly integrated vertically and horizontally, are a specific feature of the Ukrainian, Russian and to some extent also of the Kazakhstani farming sector. Currently agroholdings farm up to several hundreds of thousands of hectares. Frequently it is businesses from the downstream stages, rather than farms, which act as the core component of these integrated structures. Less frequently this role is performed by firms from the upstream stages of the agricultural supply chain. Fourteen of the enterprises surveyed are independent businesses which market most of their products in the region.

In total, twenty-eight of the dairies in the sample are financed by national capital from the milk-processing industry, and international dairy firms have majority involvement in ten of those businesses surveyed.

## **Measures and factors of influence**

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The majority of businesses surveyed would theoretically prefer to source their raw milk exclusively from large agricultural enterprises, due to higher quality and

**Figure 1: Milk production by producer type, Ukraine**



Source: State Statistics Service of Ukraine.

**Figure 2: Suppliers to the processing stage, Ukrainian dairy**



Source: State Statistics Service of Ukraine.



**Table 1: Descriptive statistics on the dairy sample, 2009**

<b>Employees</b> <i>Size groups</i>	<b>Firms</b> <i>Number</i>	<b>Ø Annual milk volumes</b> <i>in 1000 tonnes</i>	<b>Ø Annual turnover</b> <i>in millions UAH</i>
20-200	7	28,1	54,22
201-500	17	78,2	142,70
501-900	11	101,7	298,31
>900	3	357,4	452,42

Source: Own figures.

delivery volumes. As this is not really feasible given the producer structure in the Ukrainian dairy sector, dairies continue to rely on deliveries from household farms. The processing firms surveyed source on average 49 % of their milk from household farms. Whereas contractual terms with large enterprises are generally defined in writing, only 65 % of the dairies surveyed formalise their business relations with household farms in the same way. The remaining processors refer in their interactions with household farms to verbal agreements or to general framework arrangements which are negotiated with municipality representatives.

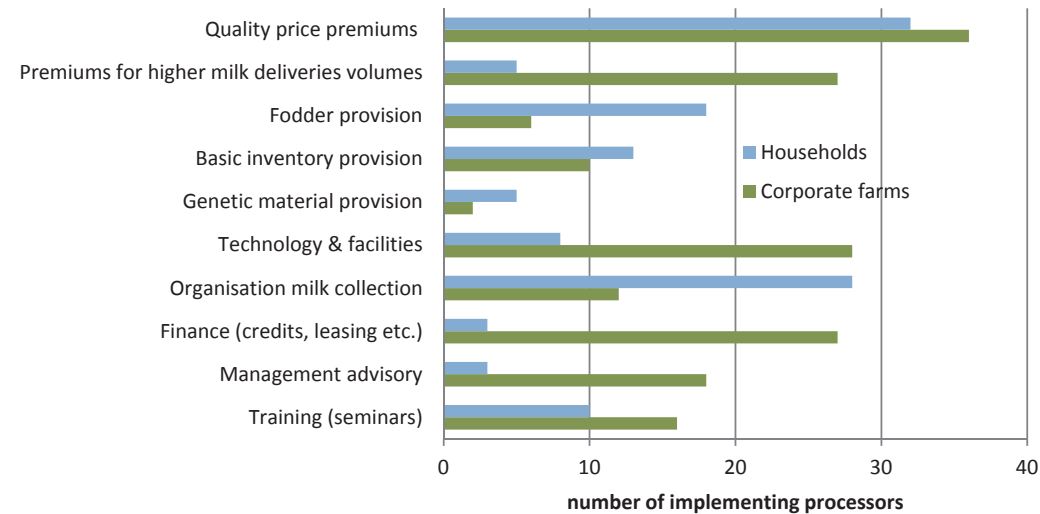
The majority of dairies (32) in the sample state that they pay an additional price premium for higher milk quality to both producer groups (Figure 3). In general we can identify differences in the design support programmes depending on particular the producer characteristics. For example, processors are increasingly stating that they are implementing basic support measures for household farms, such as the organisation of milk collection or

milk-collection points with cooling units, the provision of fodder or basic inventory.

More processors are offering complex support measures for large enterprises, which are better suited to enable long-term business growth, such as premiums for higher volumes of milk deliveries, credits, provision of technology and facilities e.g. through leasing contracts, or extension and training programmes.

More than 65 % of dairies interviewed agree with the statement that without these support measures they would not obtain sufficient milk of the required quality. For the majority of processors, the volume of milk deliveries (97 %), previous cooperation experiences (89 %), and general motivation of producers for cooperation (66 %) are very important or important criteria when deciding on whether to implement a support programme (Figure 4). More than 75 % of dairies surveyed also cite their own financial resources and 50 % their internal organisational know-how as important or

**Figure 3: Support measures by different producer groups**



*Note: N= 38, multiple statements.*

very important factors that influence whether they implement support measures.

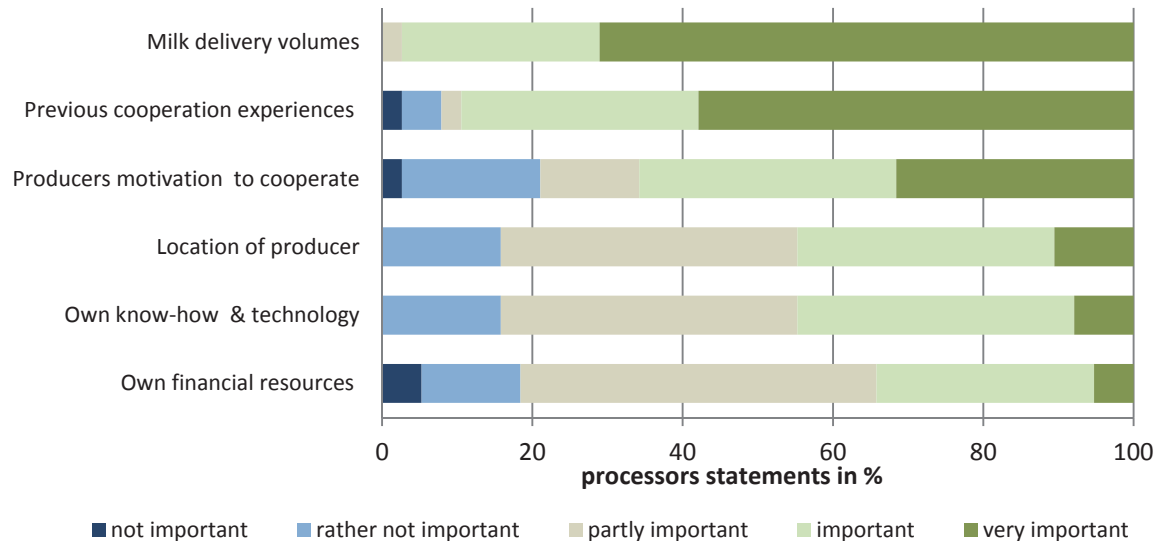
**Effects of vertical coordination**

The majority of dairies confirm that the support measures have improved the quality of milk deliveries overall, for example with regard to quality grade, or fat and protein content. In addition milk processors confirm improved hygiene production standards on the producer side. This applies particularly to large dairy farms. Here the overwhelming majority of processors agree that the milk quality of their supplies (87 %) and hygiene standards (90 %, or 35 dairies) have improved (Figure 5).

Assessments on household farms paint a different picture. Here only 40 % (15 processors) agree or quite agree that milk quality has improved, and 53 % (20 processors) agree or quite agree that hygiene standards are now better. The disparity in their assessment of the two producer groups can be explained by the fact that the overwhelming majority of household farms do not have milking equipment or machinery; the milking largely takes place by hand. Therefore, the demands of the highest quality grades cannot be met technologically. By contrast, as part of the support measures, large-scale enterprises in particular are benefiting from a technology transfer (Figure 3) which allows them to improve the



**Figure 4: Processors motives to initiate support measures for producers**



Note: N= 38.

hygiene standards in the production process and thus the overall milk quality.

More than 90 % (35 firms) of the processors surveyed agree or quite agree that the support measures have strengthened milk deliveries. For 86 % of the processors (33 firms) this has led to a rise in production volumes. Moreover, more than two-thirds confirm that support measures have generally increased their own market share (71 %) and profit (68 %).

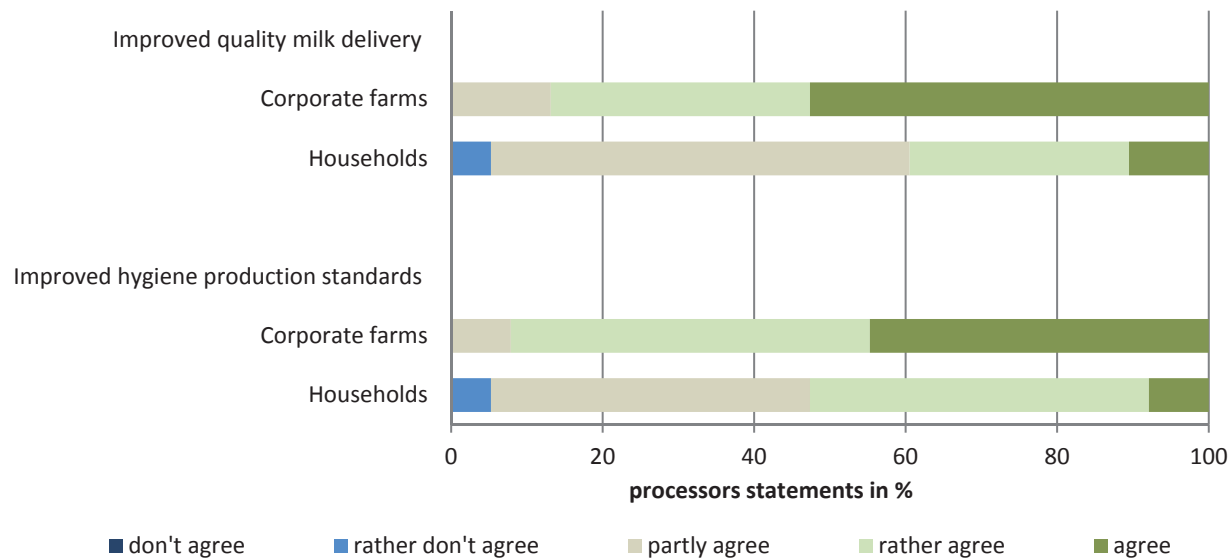
From the processors' perspective, cooperation relationships have improved to a greater extent with large enterprises. Almost 90 % agree that the reliability of milk quality and delivery volumes from large-scale producers

has improved, whereas considerably fewer dairies (11 %) share this opinion with respect to the household farms that supply them (Figure 6). Similar assessment patterns can be identified with regard to the intensification of supply relationships, contract compliance or willingness to exchange information.

### Outlook

The intensity of vertical coordination measures is closely associated to enterprise size in primary production. Although household farms today still play a key role in overall production and also, albeit to a lesser extent, for the processing sector in the Ukrainian dairy industry,

**Figure 5: Effects of support measures on milk quality**



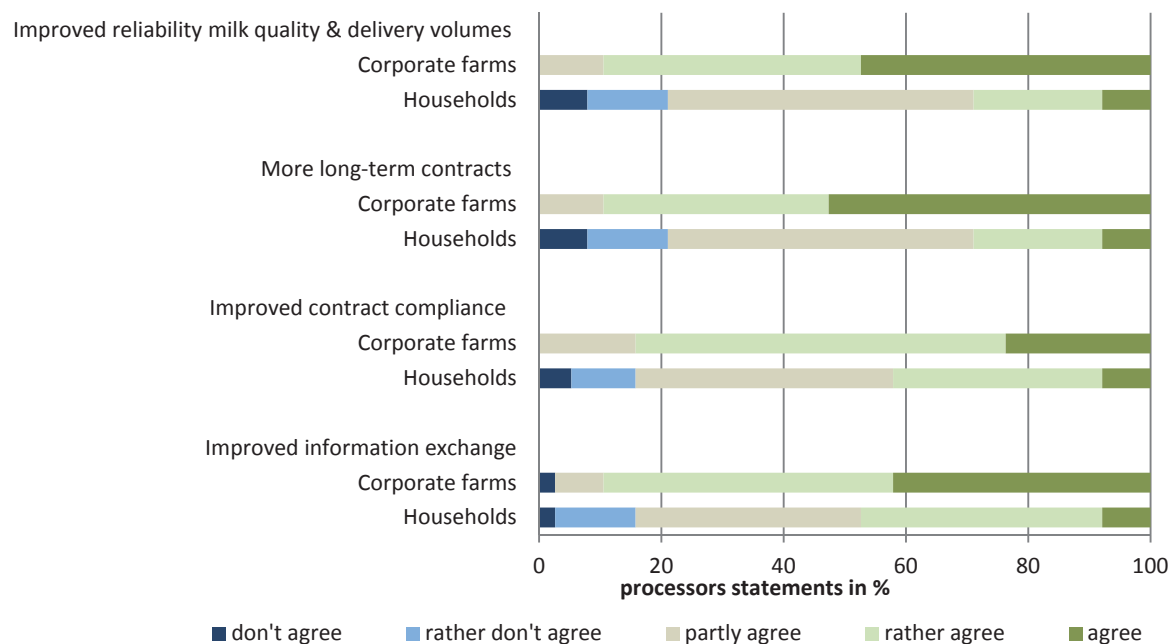
Note: N= 38.

we can assume that their significance with regard to deliveries to dairies will continue to decrease over the next few years. The survey findings indicate that, from a purely quantitative perspective, household farms are participating in the cooperation measures initiated in the framework of vertical coordination. The way in which the support measures are configured for the producers, however, indicates that in the long term the processors will focus on collaborating with large enterprises.

### Further literature

- DRIES, L., GERMENJI, E., NOEV, N., SWINNEN, J. (2009): Farmers, vertical coordination, and the restructuring of dairy supply chains in Central and Eastern Europe. *World Development*, 37(11), S. 1742-1758.
- MYKHAYLENKO, M., SCHAFT, F. (2010): The role of semi-subsistence farms and corporate farms in the modern supply chain: Evidence of Ukrainian dairy industry, 118<sup>th</sup> Seminar of the EAAE, Ljubljana, Slovenia, August 25-27, 2010.

**Figure 6: Effects of support measures on relationship to producer**



Note: N= 38.

SWINNEN, J. (ed.) (2007): Global Supply Chains, Standards and the Poor, CABI, Oxon, UK.

WHITE, J., GORTON, M. (2006): A comparative study of agri-food chains in Moldova, Armenia, Georgia, Russia, and Ukraine. in: SWINNEN J. (ed.): Case Studies. The Dynamics of Vertical Coordination in Agrifood Chains in Eastern Europe and Central Asia. *World Bank Working Paper No. 42*, Washington, DC: ECSSD, Europe and Central Asia, The World Bank, S. 5-43.



## The modernization of the agrifood industry and small producers in Kazakhstan

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IHTIYOR BOBOJONOV, THOMAS GLAUBEN

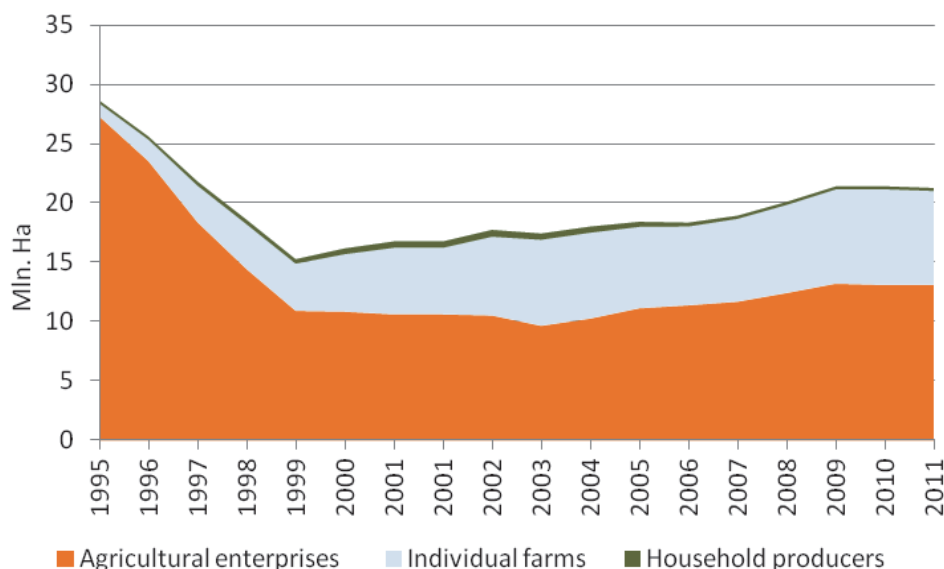
In the past, agricultural policies in Kazakhstan have largely favoured the development of large-scale farming systems. The large-scale producers play an important role in cereals production and have made a significant contribution to the emergence of Kazakhstan as one of the important players on the world cereals market. Small-scale producers such as individual farms and household producers operate side by side with those large-scale producers in the country (PETRICK et al., 2013). The average size of a large agricultural enterprise is 6,900 hectares, whereas that of private farms is 286 hectares, and the average household farm has about 0.11 hectares of agricultural land (STATKAZ, 2012).

Kazakhstan was one of the largest cereals producers in the former Soviet Union, but production dropped significantly in the early years of transition. Both agricultural enterprises and individual farms had problems in obtaining the necessary financial capital and inputs, and difficulties adjusting to market-oriented production in the early years of independence. From 2000, however, cropland under cultivation and total outputs started to increase in all farm types, due to favourable international prices, more secure land-use rights and improvements in the market infrastructure (Figure 1,

Figure 2). The state also prioritised policies which aimed at improving cereals productivity and exports (MENG et al., 2000). This target seems to have been achieved over the last few years, as Kazakhstan has become as one of the leading cereals exporters in the world. However, the high dependency of cereals yields on rainfall and price fluctuations makes farming systems based on a cereals monoculture prone to climate and market risks. This can also be seen by looking at the volatile developments in Figure 2, where drought during 2010 and 2012 had negative consequences for agricultural production, especially for agricultural enterprises. By contrast, the agricultural output of household producers remained very stable across different climactic conditions (Figure 2). This stability can be explained by the flexibility of small producers with regard to decision making and using simple irrigation techniques in their home gardens and vegetable plots during drought years. The development of small production units in parallel to large scale production may, therefore, provide more diverse, secure and sustainable development options in rural areas.

There are very marked regional differences in the share of individual farms and household producers of the gross agricultural output (Figure 3). The contribution

**Figure 1: Land use for crop production by farm types in Kazakhstan**



Source: Own calculations based on *STATISTICAL YEARBOOKS OF AGRICULTURE, FORESTRY AND FISHERY IN KAZAKHSTAN*.

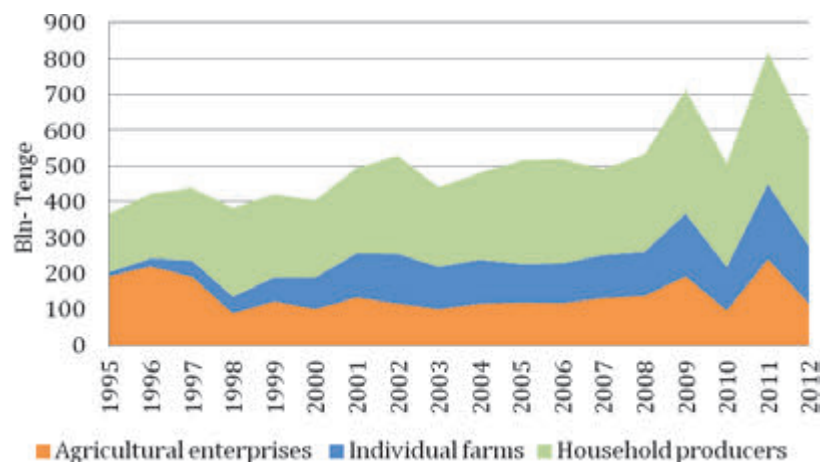
of agricultural enterprises is relatively higher in the northern cereals belt regions of Akmola, Kostanay and North Kazakhstan, and lower in the remaining regions.

These differences can partly be explained by agro-ecological conditions, per capita land availability and off-farm employment options. Furthermore, access to markets, availability and capacity of processing industries may also be important factors for the development of small producers in the country.

### The processing industry and retail trade modernisation

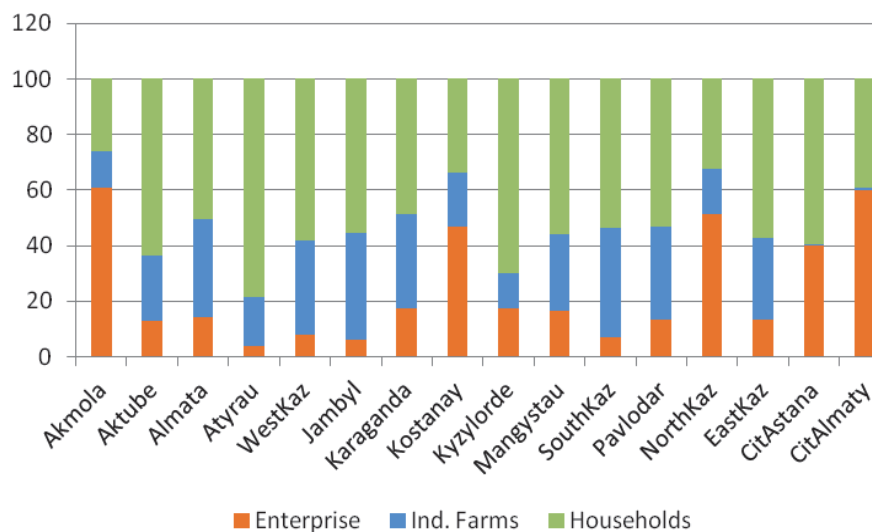
In 1999 the share of trade through modern retail stores was only 23.3 percent, but by 2012 it had risen sharply to 53.6 percent (Figure 4). The share of trade through modern outlets is still lower than Russia (e.g. 87.6 percent in 2010) but it is the highest rate in Central Asia (Tajikistan, for example, has a figure of 7.3 percent) (CISS<sub>STAT</sub>, 2013; GKS, 2013). What is more, the value of domestically processed food in the country almost doubled between 1995 and 2011 (Figure 5). These

**Figure 2: Gross Agricultural Output by farm types, deflated to the year 2000 with agricultural commodities price index**



Source: Own calculations based on *STATISTICAL YEARBOOKS OF AGRICULTURE, FORESTRY AND FISHERY IN KAZAKHSTAN*.

**Figure 3: Share of farm types in Gross Regional Agricultural Product in 2011**



Source: Own calculations based on *STATISTICAL YEARBOOKS OF AGRICULTURE, FORESTRY AND FISHERY IN KAZAKHSTAN*.

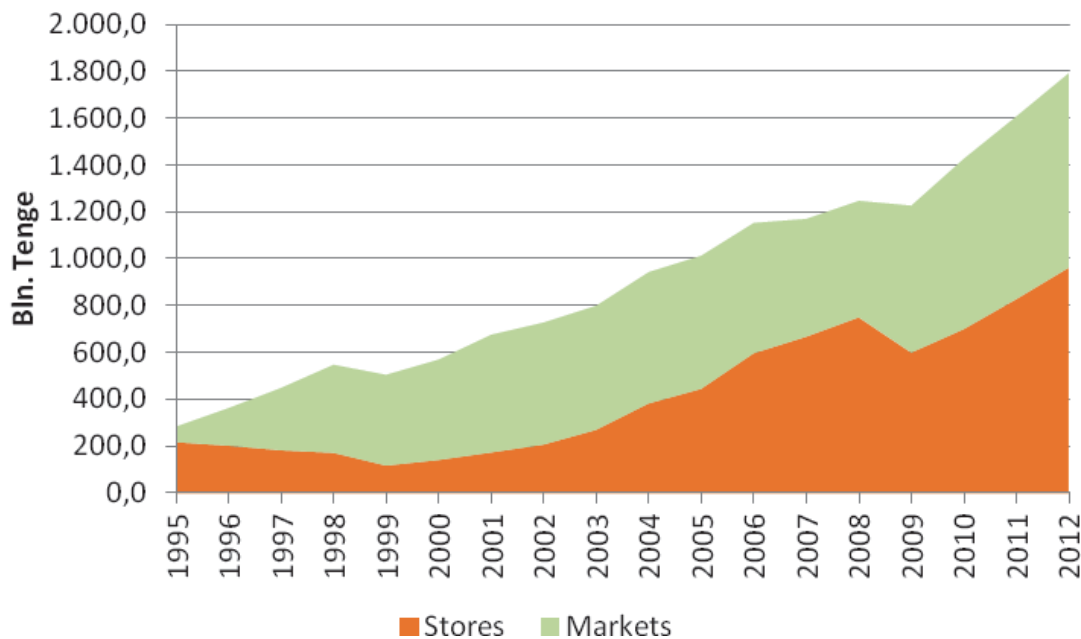
growing shares of modern trade outlets and the processing industry have also created secure market channels for agricultural producers and improved producer-consumer linkages. However, the impact of these developments on the production potential of small producers is yet to be investigated.

This study, therefore, investigates how developments in the agrifood industry impact production changes at individual farm and household producer levels.

### Literature on the transformation of the agrifood industry in developing countries

The existing literature generally agrees that agro-industrialisation has led to positive gains: increased opportunities for obtaining credits, inputs, information and price security. RAO and QAIM (2011) show that farmers delivering to supermarkets obtain almost 50 % more income than those who do not. MICHELSON (2013) found that involvement with supermarket chains in Nicaragua

**Figure 4: Gross value of retail trade according to the trade channels, deflated to the year 2000 with consumer price index**



Source: Authors' calculations based on Statistical Yearbooks of Retail and Wholesale Trade in Kazakhstan.

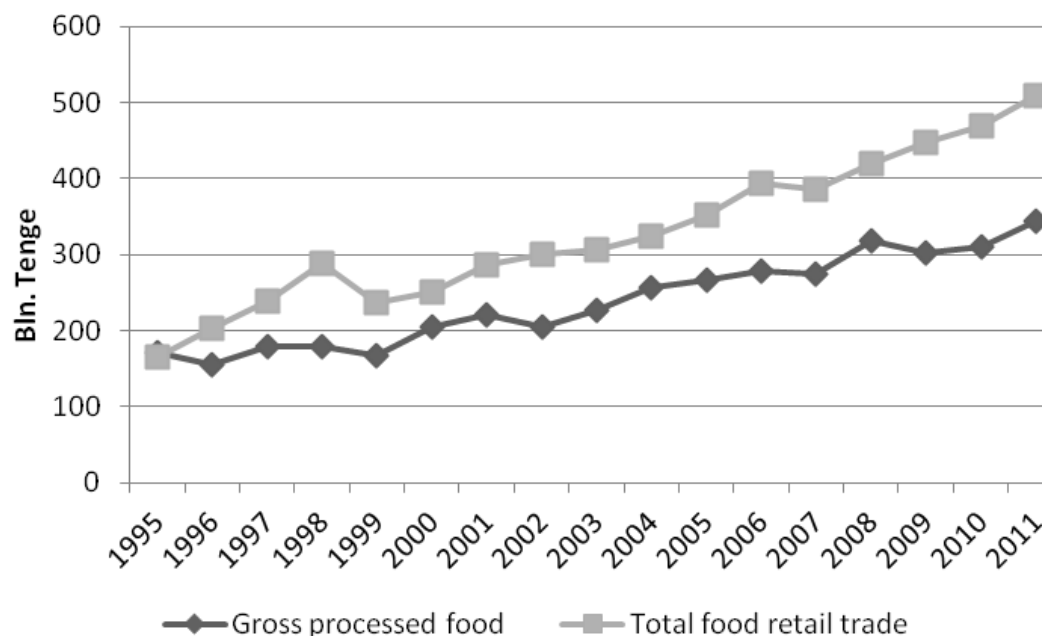


improved not only farmers' incomes but also their productivity. There is some evidence, however, that the modernisation of supply chains may exclude the participation of small producers due to difficulties in meeting the quality standards, as observed by REARDON and BERDEGUÉ (2002) in Latin America. STRINGER et al. (2009) also provide similar evidence from China, where agricultural processors prefer to work mainly with larger farm units in order to reduce transaction costs. Another study from the same country explains that this is particularly due to the

relatively small farm sizes in China (0.5 ha) when compared to other Asian countries (MIYATA et al., 2009).

There is also a wide range of literature on the impact of the restructuring of the agrifood industry in Central and Eastern Europe (e.g. DRIES and SWINNEN, 2010; VAN HERCK et al., 2011). These studies have found that the modernisation of, and foreign direct investment into, agrifood supply chains have improved the quality standards for agricultural producers but also raised on-farm investment opportunities for small-scale producers. Similar

**Figure 5: Food retail trade and processed food volume, deflated to the year 2000 with consumer price index**



Source: Authors' calculations based on Statistical Yearbooks of Retail and Wholesale Trade in Kazakhstan.

analyses have not been conducted for Central Asia and thus this study provides a first overview of the impact in this region of the restructuring of the agrifood industry on small producers' welfare.

### Data and analysis

This study uses panel data at regional (oblast) level for 14 regions in Kazakhstan for the period 1995-2011, obtained from the Agency of Statistics of the Republic of Kazakhstan. Regional level data includes gross agricultural output by producer type, the share of modern trade in total retail, the volume of total food retail, and the total value of processed food. All monetary variables are deflated with consumer price and agricultural commodity price indices. The lack of railway carriages

is often highlighted as the main problem, because it leads to an increase in export costs and dampens local prices (OECD, 2013). Therefore, the total value of cargo transportation by railway is considered as a proxy variable for the improvement of the railway transport system in Kazakhstan. The fixed effect model is used to investigate the impact of the restructuring of the agrifood industry on production change at individual farm as well as household producer level.

### Findings

The findings indicate that developments in the food processing sector have positively influenced the revenues of private farms and household producers (Table 1). The analysis shows that an increasing demand for

**Table 1: The impact of agrifood industry development on the output of individual farms and household producers**

Variable	Output of individual farms, million tenge	Output of household producers, million tenge
Total volume of processed food, million tenge	0.33**	0.11*
Total food retail trade, million tenge	0.91***	0.33***
Modern trade outlet share in total retail, percentage	-0.49***	0.01
Railway cargo turnover, million tonnes	0.45***	0.02
Share of livestock output in the total production, percentage	-0.47***	-0.11***
Constant	-3.51*	5.04***
Number of observations	214	214
R <sup>2</sup>	0.58	0.33

Note: All variables are log transformed; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

agricultural commodities has also enabled both private farms and household producers to improve their revenues, as demonstrated by the positive and significant coefficient on retail food trade in Table 1.

The growing share of modern trade outlets had a negative influence on the production growth of individual farms. The impact of retail transformation on production at household level is not significant. In contrast, the rise in railway cargo transportation has a positive impact on the production growth of individual farms. The impact of railway cargo transportation is not significant for household producers. This can mainly be explained by the limited export levels of household producers who mostly produce for domestic markets. The specialisation in livestock production may reduce the level of revenues as shown by the negative signs in Table 1, which could be explained by concentration of government subsidies towards crop production, with less attention paid to the livestock sector.

## Conclusion

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The agrifood industry in Kazakhstan has seen huge developments over the last decade. An increase in output levels by the processing industry, and a modernisation of the retail trade was made possible by a stable investment environment and rising incomes amongst the population. This study shows that small producers have benefited from rising incomes and a growing demand for food in Kazakhstan. Furthermore, the increased

production capacity of the processing industry has positively contributed to the welfare of small producers. Most of the processing plants purchase agricultural products from small producers, which provide secure marketing options to small producers. However, transformation in the retail sector has negatively impacted the production of individual farms. Small producers are often excluded from participation in the modern supply chains due to the lack of quality controls and certificates. Traditional bazaars remain the only possible marketing channel, which poses a very tough challenge, especially to livestock producers. There is an urgent need, therefore, to establish certification and quality control services in villages which are located far from the large city centres. The lack of railway carriages is often highlighted as one of the obstacles impeding a growth in export revenues, especially for cereals producers. The analyses carried out for this study substantiate the fact that improving the capacity of railway cargo transportation should have a positive effect on the output of private farms.

## Further literature

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CISSTAT (2013): Consumer Markts. Interstate Statistical Committee of the Commonwealth of Independent States., Moscow.

DRIES, L., SWINNEN, J. F. M. (2010): The impact of interfirm relationships on Investition: Evidence from the Polish dairy sector. *Food Policy*, 35, S. 121-129.



*Meat market in Kostanay, Kazakhstan*

- GKS (2013): Turnover of Einzelhandel by different channels. Russland Federation Federal Agency of Federal State Statistics Service. Moscow.
- MENG, E., LONGMIRE, J., MOLDASHEV, A. (2000): Kasachstan's wheat system: Priorities, constraints, und future prospects. *Food Policy*, 25, S. 701-717.
- MICHELSON, H. C. (2013): Small Farmers, NGOs, und a Walmart World: Welfare Effects of SuperMarkts Operating in Nicaragua. *American Journal of Agricultural Economics*, 95, S. 628-649.
- MIYATA, S., MINOT, N., HU, D. (2009): Impact of Contract Farming on Income: Linking Small Farmers, Packers, und SuperMarkts in China. *World Entwicklung*, 37, S. 1781-1790.
- OECD (2013): Review of Agrarpolitik in Kasachstan. OECD Paris.
- PETRICK, M., WANDEL, J., KARSTEN, K. (2013): Rediscovering the Virgin Lands: Agricultural Investition und Rural Livelihoods in a Eurasian Frontier Area. *World Entwicklung*, 43, S. 164-179.
- RAO, E. J. O., QAIM, M. (2011): SuperMarkts, Farm Household Income, und Poverty: Insights from Kenya. *World Entwicklung*, 39, S. 784-796.
- REARDON, T., BERDEGUÉ, J. A. (2002): The Rapid Rise of SuperMarkts in Latin America: Challenges und Opportunities for Entwicklung. *Entwicklung Policy Review*, 20, S. 371-388.
- STATKAZ (2012): Agriculture, forestry und fishery in the Republic of Kasachstan. *The Agency of Statistics of the Republic of Kasachstan*, Astana.
- STRINGER, R., SANG, N., CROPPENSTEDT, A. (2009): Erzeuger, Processors, und Procurement Decisions: The Case of Gemüse Lieferkettes in China. *World Entwicklung*, 37, S. 1773-1780.
- VAN HERCK, K., NOEV, N., SWINNEN, J. F. M. (2011): Institutions, exchange und firm growth: Evidence from Bulgarian agriculture. *European Review of Agricultural Economics*.





# The evolving farming system in China

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YANJIE ZHANG, YUEQING JI

## **An overview of China's agriculture since the reform<sup>1</sup>**

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The development of China's agriculture over the past three decades has been remarkable. The rural reform that began in the late 1970s improved incentives for farmers and had a huge impact on China's agricultural productivity growth and output. The value of agricultural output increased enormously, from 139.7 billion Chinese yuan in 1978 to 8,130.4 billion Chinese yuan in 2011. Total factor productivity (TFP) in agriculture has grown extremely rapidly: on average by 4.115 % per year from 1979 to 2008 (ZHANG and BRÜMMER, 2011).

It is generally agreed that this major achievement was driven by a series of institutional reforms in the initial phase of reform, and later by a far greater use of agricultural technology. LIN (1992) indicates that the productivity change resulting from the various reforms made up 48.6 % of the growth in output, and that the dominant source of output growth was the change

<sup>1</sup> Where the sources of statistics in this article are not indicated, they have been taken from, or calculated based on, CHINA STATISTICAL YEARBOOK (various issues) and CHINA RURAL STATISTICAL YEARBOOK (various issues), NATIONAL BUREAU OF STATISTICS OF CHINA.

from the production-team system to household responsibility system (HRS) in the 1978-84 period. Biological and biochemical technologies, which mainly contribute to an increase in land productivity through the intensive use of intermediate inputs, the adoption of new varieties, and the improvement of soil and genetic resources, have been the main driving force in TFP growth since the second half of the 1980s (ITO, 2010; ZHANG and BRÜMMER, 2011).

## **The main challenges facing China's agriculture**

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### *Widening rural-urban income gap*

Despite the great success of China's agriculture in feeding the country, earning a comparable living in farming has become increasingly challenging. Per capita net income of rural households has risen substantially, from 133.60 Chinese yuan in 1978 to 6,977.30 Chinese yuan in 2011. But urban incomes have been increasing even faster, with per capita disposable income growing from 343.40 Chinese yuan in 1978 to 21,809.80 Chinese yuan in 2011. Starting from above 2.5 in 1978, the ratio of urban to rural income first fell to around 1.85 in the

mid-1980s, and since then it has been growing almost constantly, reaching a peak of over 3 in recent years.

The widening rural-urban income disparity stems from a considerable gulf in labour productivity between agriculture and other sectors of the economy, which is largely due to constrained factor mobility, especially of labour and capital, but also to differences in access to education, health care and other social services (OECD, 2005).

### **Agricultural land under pressure**

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China has successfully fed its 20 % of the world's population with only 11 % of the world's agricultural land. At this point in China's development process, however, the potential for expanding the area of land used for agricultural production is limited. With rapid industrialisation and urbanisation, there is increasing competition for land intended for habitation, infrastructural development, etc. As a result, the total area of land under cultivation has fallen continuously from 130.04 million ha. in 1996 to 121.65 million ha. in 2011. The continuing population growth adds extra pressure, with a decrease of per capita arable land from 1.59 mu in 1996 to 1.35 mu in 2011. In the meantime, there is increasing soil degradation especially in the western parts of the country. This will undermine the production capacity of arable land.

In response to the decline in the quality of China's agricultural land base, the government launched the "Grain for Green" project (officially called the "Returning Farmland

to Forests Programme") in 1999, under which cultivated land in environmentally fragile areas is retired from crop production (mainly cereals), and converted to pasture or forest. In recent years, however, there has been a significant slowdown in the conversion rates largely due to growing concerns over cereals security. For the same reason of food security, in 2006 a so called "Red Line" was set, meaning that the total area of arable land for agricultural production was not to fall below 120 million ha. Moreover, the conversion of farmland to non-agricultural use is strictly controlled (OECD, 2013).

### *Rising labour costs*

According to research findings from recent literature on China (FLEISHER et al., 2011), non-agricultural labour market participation in China has continued to rise steadily and off-farm employment wages have been rising constantly since the early 2000s. Statistics show that only 15 % of individuals in the rural labour force had an off-farm job in the early 1980s. By 2000, the corresponding share had increased to 45 %. The upward trend of rural labour participation in off-farm employment continues, reaching 62 % in 2008. Studies indicate that the real wage rate was relatively stable in the 1980s and 1990s. After a long period of stagnation and lagging behind, China's labour wages have experienced fast growth since the beginning of the 21st century. Real wages rose at the rapid rate of 14 % per year after 1998 (CAI et al., 2008); the hourly earnings of a rural worker engaged in unskilled paid labour has increased from 3 Chinese yuan in 2000 to 5.40 Chinese yuan in 2008 (HUANG et al., 2012).



The exhaustion of the "demographic dividend" and rapid trend of urbanisation are pushing up the costs of rural labour in agricultural production. The continuing rise in the opportunity costs of agricultural labour will mean that the advantage of low labour costs in China's agricultural development will gradually disappear. In these circumstances, workers with a higher level of education and greater physical strength will become rare in agricultural production. A corollary to this change is that technological choices of China's agricultural production will gradually transform from land-saving technologies to labour-saving ones, i.e. the mechanisation of agriculture.

### **Changing dynamics of farming**

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#### *Farming structure*

After 30 years of reforms, China's agricultural sector has experienced significant structural changes geared towards ensuring food security. Agricultural GDP statistics show that the share of crop production with an intensive use of land and water has largely decreased. Despite an annual growth rate of 4.4 % in agriculture over the last three decades, the share of crop production has dropped substantially from about 75 % at the beginning of the reform to 55 % in 2010.

The dynamics of crop structure illustrate that cash crops and horticultural crops, especially labour-intensive and high value-added cultivation of vegetables and fruits, have rapidly expanded. Correspondingly, the proportion

of cereals has been constantly falling. At the beginning of the reforms, 80 % of cultivated land was used for cereals production; by 2011 this share had decreased to roughly two thirds. Agriculture thus has been transformed from a sector based almost purely on cereals to a compound one, with cash crops and horticultural products gaining in importance.

The great achievement of China's agricultural production has so far come almost entirely from smallholder farming, represented by about 200 million small-scale farms. Average farm size is small: 0.7 ha per household in 1985. The land holdings are fragmented, with each household having on average three or four plots, mainly due to heterogeneity in land quality which has led to a system of government allocation that aims at egalitarian land distribution. Average farm size fell to 0.55 ha in 2000, chiefly because of the subdivision of land holdings, which were reallocated to new households as the population grew. This decreasing trend stopped after 2000 and average farm size has started to increase moderately, to 0.6 ha. in 2010. GAO et al. (2012) assert that it is mainly driven by the emerging land rental market and the rapid growth of migration against the backdrop of urbanisation and industrialisation.

#### *Land rental market*

At the core of China's rural land reform is the co-existence of individual land-use rights with collective land ownership. Consequently, farm household rights to land are incomplete, with farmers permitted only to transfer

land-use rights amongst themselves. Land sale, however, is legally prohibited. With the rapid process of urbanisation and industrialisation, rural workers are continuously and increasingly moving out of agriculture and into off-farm income work. By 2008, 310 million rural workers were fully or partially employed in non-agricultural sectors, which de facto facilitate farm consolidation. Since land cannot be bought or sold under the law, land consolidation thus mainly relies on the development of the land rental market.

The trend in land rental has been strongly positive in recent years, with less than 5 % of agricultural land in 1995 increasing to 19 % in 2008 and a clear acceleration since

2003. According to statistics from a fixed-point survey data series from the Ministry of Agriculture (Figure 1), we can see that the share of farm households renting out land has increased continuously since 1993, from 3.95 % to 11.46 % in 2010 as a national average. By contrast, the share of farm households renting additional land first increased from 2005, but then decreased. Before 1997, the number of households renting additional land was greater than those renting out land. The situation reversed after 1997 and the difference has become more pronounced since 2005, which reflects increasing land consolidation as a result of the rapid out-migration of the rural labour force.

**Figure 1: Activities of cultivated land transfer (1993-2010)**



Source: Authors' calculation based on statistics from fixed-point survey data series of the Ministry of Agriculture, China.

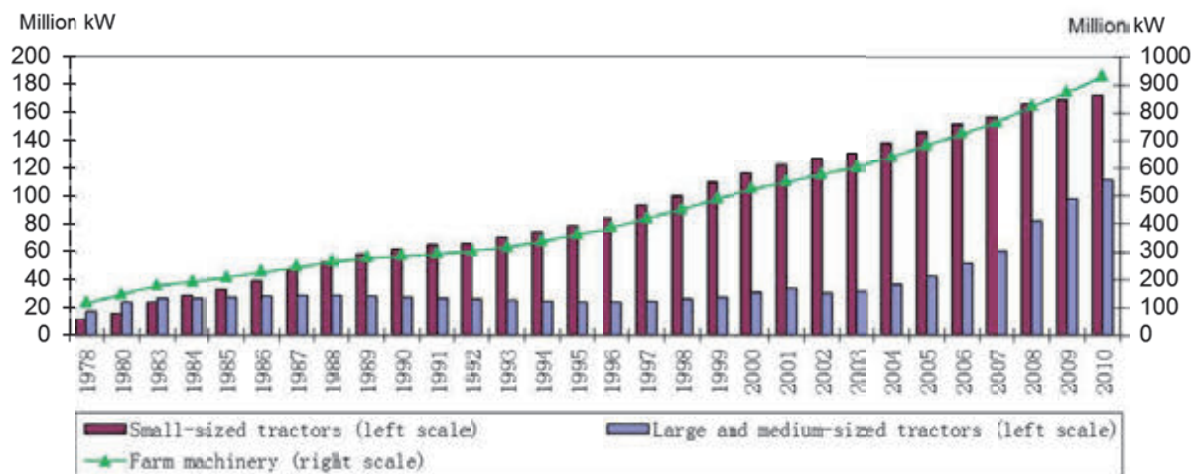
## Machinery services market

Prior to 1978, China was a purely centrally planned economy, and investment decisions regarding farm machinery were made by the government. More specifically, farm machinery stations owned by the state or the collectives had a monopoly on machinery services for agricultural production at fixed prices. Farm machinery increased greatly during this period, and capacity reached 117.49 million kilowatts by the end of 1978. Furthermore, the relatively large production scale of the collective farms facilitated the development of large and medium-sized machinery. At the end of 1978, the capacity of large and medium-sized agricultural

tractors was 17.55 million kilowatts, which is about 1.5 times of the capacity of small tractors.

Rural households have become the pillars of agricultural production since the implementation of Household Responsibility System (HRS) in the late 1970s, and their demand for farm machinery services has increased constantly (Figure 2). By the end of 2010, the capacity of farm machinery reached 927.8 million kilowatts, nearly 7 times the 1978 figure. A closer examination of the demand structure of farm machinery services, shows that the capacity ratio of large and medium-sized machinery to small-sized machinery declined in the first few years, increasing afterwards.

**Figure 2: The capacity of farm machinery and different types of tractors (1978-2010)**



Source: NATIONAL BUREAU OF STATISTICS OF CHINA, the 2011 China Statistical Yearbook.

Initially, farmers were still able to obtain machinery services from agricultural machinery stations. As the reform progressed, the sub-contract system was also introduced into agricultural machinery stations, and machinery was allocated to some farmers who could provide services to other farmers at agreed prices (FEDER et al., 1992). With increases in capital accumulation, farmers started to purchase large numbers of small machines for their own-use or joint-use. As a result, the machinery services market that was characterised by large and medium-sized machinery was stagnant or even shrunk. From 1978 to 1988, the capacity of large and medium-sized agricultural tractors increased by 65 %, and the capacity of small tractors increased enormously by 354 %.

In the period 1988-95, the capacity of large and medium-sized agricultural tractors shrank by 17 %, while that of small tractors grew by 47.5 %. An important reason for the decline in large and medium-sized machinery is that the government gradually phased out policy interventions which favoured the development of large and medium-sized machinery. By 1994, China had abolished all regulations and preferential policies relating to agricultural mechanisation. The development of agricultural machinery markets has since entered a new phase in which the demand for, and demand structure of, agricultural machinery services is market oriented.

From the middle of 1990s, the development of agricultural machinery in China entered a new stage characterized

by specialisation and market-orientation. For instance, the same machinery can be used to harvest wheat across China from south to north; market services of ploughing, sowing and rice-harvesting are no longer confined to individual counties. As a consequence, the capacity of large and medium-sized agricultural tractors has started to increase again and its growth rate has been higher than small tractors since 1999. Subsidies for the purchase of large and medium-sized farm machinery have been provided since 2004, which has further stimulated the demand for their use.

## Outlook

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China's agriculture has experienced a dramatic development and significant structural change over the 30 years of the reform period. The reform of farming institutions has led to the emergence and gradual growth of the rural labour market, land rental market, machinery services market, etc. China's average small farm size, however, is still a major obstacle to the country's remaining competitive in agricultural production, and the structure needs to change. The ongoing development of land rental markets is a practical way to allocate resources efficiently. In addition, the continued migration of rural workers out of agriculture will help boost the profitability of farming, and further boost the mechanisation of agricultural production.

## Further literature

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CAI, F., PARK, A., ZHAO, Y. (2008): The Chinese Labor Market in the Reform Era, in: BRANDT, L., RAWSKI, T. G. (Hrsg.): China's Great Economic Transformation. Cambridge University Press, S. 167-214.

FEDER, G., LAU, L. J., LIN, J. Y., LUO, X. (1992): The Determinants of Farm Investment and Residential Construction in Post-Reform China. *Economic Development and Cultural Change*, 41, S. 1-26.

FLEISHER, B. M., FEARN, R., YE, Z. (2011): The Lewis model applied to China: Editorial introduction to the symposium. *China Economic Review*, 22, S. 535-541.

GAO, L., HUANG, J., ROZELLE, S. (2012): Rental markets for cultivated land and agricultural investments in China. *Agricultural Economics*, 43, S. 391-403.

HUANG, J., WANG, X., QIU, H. (2012): Small-scale farmers in China in the face of modernisation and globalisation. IIED/HIVOS, London/The Hague, London.

ITO, J. (2010): Inter-regional difference of agricultural productivity in China: Distinction between biochemical and machinery technology. *China Economic Review*, 21, S. 394-410.

LIN, J. Y. (1992): Rural Reforms and Agricultural Growth in China. *The American economic review*, 82, S. 34-51.

OECD (2005): OECD Review of Agricultural Policies: China 2005. OECD Publishing.

OECD (2013): Agricultural Policy Monitoring and Evaluation 2013: OECD Countries and Emerging Economies. OECD Publishing.

ZHANG, Y., BRÜMMER, B. (2011): Productivity change and the effects of policy reform in China's agriculture since 1979. *Asian-Pacific Economic Literature*, 25, S. 131-150.



*Sorting sunflower seeds in Gansu Province, China*

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# The cost efficiency of precision farming – The case of Czech wheat producers

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JARMILA CURTISS, LADISLAV JELÍNEK

## Introduction

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Global efforts directed at the sustainable growth of agricultural production reveal the importance of studying the economic and environmental potential of various production technologies that claim to allow a more efficient use of natural resources. Precision farming (PF) belongs to this group of production technologies. It is defined as a technology that replaces the widely-used uniform application of inputs – which fails to consider within-field production potential – using a system that assesses within-field variability in soil and crops (e.g., through yield or soil nutrition monitoring) and responding with site-specific management practices (PAXTON et al., 2011). While positive environmental effects can be expected from using this technology (e.g., KHANNA, 2001), it is mainly economic incentives that prompt farmers to adopt PF technology (e.g., ROBERTS et al., 2000). Despite high levels of political interest in the adoption of PF and its claimed economic benefits to farmers, the PF adoption rate is still relatively low (DABERKOW and MCBRIDE, 2003). Because of this, as well as the lack of clarity in empirical findings relating to the economic impact of

PF technology, agricultural economists are still very keen to research further the economic effects of the technology.

The ways in which PF technology is expected to impact the economics of production are manifold. Indeed, PF has been projected (i) to increase revenues by raising crop yields above those achieved with a uniform level of input application, and (ii) to cut production costs by reducing the level of inputs required to achieve a given yield (ROBERTS et al., 2000). The adoption of PF technology can, however, also incur increases in unit costs due to new technical demands and input reallocation. Since PF substitutes information and knowledge for physical inputs, implementing PF practices can introduce higher costs of information collection (e.g., soil and yield monitoring for the diagnostic stage), as well as costs related to variable input application.

A review of empirical studies examining PF's economic implications indicates that there is a thin line between the positive and negative economic outcomes of adopting PF technology. Several studies have also suggested that the net economic implications of PF technology







depend on a range of farm, field, market, or institutional conditions. For example, KHANNA (2001) concluded that adopting site-specific technologies leads to gains in nitrogen productivity on less productive soils, and GODWIN et al. (2002) showed that the benefits from PF systems outweigh the additional costs only in specific farm (size) categories. ROBERTS et al. (2000) also found that the economic outcomes of PF technology are sensitive to input and output prices.

This paper aims to examine the impact of PF adoption on economic returns measured by cost efficiency and its two components – technical and allocative efficiency. In their analyses of the economic impacts of PF technology, most empirical studies use partial productivity indicators such as profits per hectare, nitrogen and land productivity, or labour productivity. These productivity indicators ignore the production multi-dimensionality with regard to the input structure, and hence the joint productivity effect of the input set. Estimating farm-level cost efficiency that accounts for the multiple-input productivity effect and the possibility of breaking down this measurement into its allocative and technical components thus represents a unique approach for obtaining new insights into the economic effects of PF practices.

### **Methodology and data**

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The analysis consists of three parts. In the first step, farm-level efficiency measurements are obtained by means of a deterministic linear programming method, Data Envelopment Analysis (DEA). Because of the

expected physical input and cost-reducing effect of PF, the cost-minimising behavioural objective is assumed for the DEA model specification. As precision farming has an impact on the structure of inputs, it is important to measure not only technical efficiency, but also allocative efficiency, which measures the optimality of input use based on the relative input prices. Both efficiency measures represent components of cost efficiency.

In the second part of the analysis, efficiency measurements, together with partial productivity and technological structure indicators, are compared between PF adopters and non-adopters. This analysis investigates the existence of systematic differences between these two farm groups, but it does not account for possible endogeneity in the causal inference produced by self-selection. The reason why farms choose to adopt PF technology may be their expectation of the technology-related costs and benefits associated with the observed efficiency of farms. To avoid the possible selection bias, the economic impact of PF technology will be analysed using the nearest neighbour matching method, which allows us to estimate the technology impact on PF users and non-users with identical or for the most part similar characteristics.

The study utilises survey data relating to 93 Czech wheat-producing farms during the production year 2007-08. The data collection was carried out in 2009 as part of the project "Economic system of evaluating farm performance with respect to sustainable use of natural

resources", financed by the Czech National Agency for Agricultural Research. The collected data include, *inter alia*, detailed information on the wheat production process, a list of individual fields cultivated, field-specific yields and sizes, a list of machinery and its working hours, other input quantities and prices. Out of the 93 farms, 59 indicated they had used precision technology in at least one operation of wheat production, and 38 had used this technology in three or more operations. Twenty-nine used PF technology in soil preparation, 37 during sowing, 38 for the application of fertiliser, 53 for the application of chemicals, and 54 for yield monitoring. This study compares economic performance indicators between PF non-users and two groups of PF adopters: (i) farms applying PF in at least one production operation (PF users), and (ii) farms using PF technology in three or more operations (advanced PF users).

## Findings

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Comparing mean values of selected partial production indicators between farms that adopted PF technology and those that did not reveals significant structural and productivity differences (see Table 1). For some indicators, these differences are even more significant when considering the number of operations in which the farms use the precision technique. PF users attain significantly higher wheat yields per hectare than non-adopting farms. Total production costs per tonne of wheat are lower in the group of PF users, but a significant

difference is detected when we take into account the number of operations in which PF technology is used. Total production costs are significantly lower for advanced users (PF technology in at least three operations) than for non-users. An analysis of the input structure between the groups of farms shows a significant difference between PF users and non-users in the use and value of machinery. PF adopters use considerably fewer machinery hours per hectare than non-users, but simultaneously, the machinery has a significantly higher accounting value, which suggests that PF users employ substantially more expensive machinery.

The higher machinery costs, however, do not negatively impact the overall cost efficiency of farms that use PF technology. Indeed, cost efficiency levels are higher for PF users, but this difference only becomes statistically significant when comparing non-users with advanced PF users. The cost efficiency scores imply that there are considerable cost inefficiencies, i.e. differences in performance among both PF users and non-users. For a given production level, farms using conventional production technology have to reduce costs by an average of 34 % to achieve the cost levels of the best producers in the sample. PF users would achieve the optimum cost level by reducing their costs by an average of 30 %. The lower level of allocative efficiency compared to technical efficiency suggests that the main reason for cost inefficiencies is allocative inefficiency. The significant differences in cost efficiencies between PF users and non-users are, however, a result of the differences in their technical efficiencies.

**Table 1: Comparison of mean statistics in partial and DEA indicators between PF users and PF non-users**

	PF non-users [mean (0)]	PF users (PF in at least one operation) [mean (1a)]	Advanced PF users (PF in three or more operations) [mean (1b)]	Difference 1 [mean (0) – mean (1a)]	Difference 2 [mean (0) – mean (1b)]
Nr. of observations	34	59	38		
<i>Partial indicators</i>					
Yield (t/ha)	6.352	6.711	6.680	-0.359*	-0.328*
Total cost/production (thousand CZK/t)	2.400	2.351	2.222	0.048	0.178
Machinery hours/ha	7.731	5.830	5.937	1.902***	1.794**
Capital value/machinery hour (thousand CZK/hour)	0.317	0.433	0.437	-0.116**	-0.120**
<i>DEA indicators</i>					
Cost efficiency (CE)	0.662	0.700	0.714	-0.038	-0.052*
Technical efficiency (TE)	0.821	0.872	0.880	-0.051**	-0.059**
Allocative efficiency (AE)	0.799	0.805	0.814	-0.005	-0.014
Direct inputs <sub>real</sub> /Direct inputs <sub>optimal</sub> <sup>a)</sup>	1.738	1.686	1.561	0.052	0.177*
Energy <sub>real</sub> /Energy <sub>optimal</sub> <sup>a)</sup>	2.132	1.645	1.658	0.487***	0.474**
Capital <sub>real</sub> /Capital <sub>optimal</sub> <sup>a)</sup>	1.483	1.323	1.335	0.159	0.148
Land <sub>real</sub> /Land <sub>optimal</sub> <sup>a)</sup>	1.296	1.213	1.203	0.082*	0.092*
Labor <sub>real</sub> /Labor <sub>optimal</sub> <sup>a)</sup>	1.613	1.593	1.625	0.020	-0.011

*Note:* Asterisks \*, \*\*, and \*\*\* indicate 10 %, 5 % and 1 % significance level of the differences in mean values between farm groups, respectively, estimated based on a two-group mean comparison t-test; <sup>a)</sup> "real" refers to observed and "optimal" refers to cost-minimising level of inputs (derived from DEA application).

The last five rows in Table 1 also indicate the degree to which farms overuse individual inputs and for which inputs significant differences exist between PF users and non-users in the input-use optimality. The results of these indicators show that, on average, farmers use energy (mainly fuel), direct inputs (chemicals and fertilisers) and land least optimally (compared to the cost-minimising input level). Importantly, these input categories are also those that are used by PF non-users significantly less optimally than by PF users.

The group mean comparison of various performance indicators suggests significant differences between PF users, especially advanced PF users and farms staying with conventional field-uniform practices. However, the comparison lacks the analytical power to determine whether these differences are down to the impact of the adopted technology itself, or represent differences in characteristics between PF users and non-users that were decisive for adopting the technology in the first place, and which also have an impact on farm performance under the given technology. To determine the true impact of the technology, the question of self-selection is checked by applying the nearest neighbour matching estimation, the results of which are presented in Table 2. In this method, farms using PF technology (treated group) are matched and compared with those conventional farms (untreated group) with the most similar, optimally identical, characteristics. The characteristics used for matching are: legal form of farm, number of owners, educational qualifications of staff,

farm size (total revenues), share of own land, production specialisation, land rent (proxy for land quality), average wheat-field size and altitude, and share of weather-damaged yield.

The results of the nearest neighbour matching analysis suggest that, similar to the farm group comparison, PF technology is found to have no significant effect on cost efficiency when applied in one or more operations. This is shown by the sample average treated effect (SATE) for cost efficiency in Table 2. The impact on cost efficiency is, however, significant when analysed with respect to advanced users. Estimating this effect separately for the treated and control farms (SATT and SATC), the matching procedure reveals that this general result is mainly due to significant benefits of the technology to advanced PF users. Given their characteristics, PF non-users and PF users in a maximum of two operations would, on the other hand, gain no cost benefits if they adopted PF technology in three or more operations. This suggests that farms that use PF technology in a more advanced way have different characteristics from the other farms, which result in greater benefits from adopting the technology. A mean group comparison shows that more advanced PF-users are significantly more specialised in crop production (higher share of revenues from crop production), have higher proportions of owned land, lower proportions of permanent grassland, and larger cultivated wheat fields.

As the nearest neighbour matching analysis also reveals, the estimated cost benefits of the advanced use

**Table 2: Nearest neighbour matching results for impact of precision farming**

	PF non-users (control group) vs. PF users (treated group)		PF non-users and PF users in up to two operations (control group) vs. advanced PF users (treated group)	
	coefficient	p-value	coefficient	p-value
<i>Cost efficiency</i>				
SATE	0.028	0.462	0.063*	0.062
SATT	0.032	0.481	0.095**	0.032
SATC	0.021	0.575	0.040	0.224
<i>Technical efficiency</i>				
SATE	0.039	0.163	0.053*	0.051
SATT	0.041	0.207	0.080**	0.024
SATC	0.035	0.229	0.034	0.207
<i>Allocative efficiency</i>				
SATE	0.003	0.922	0.032	0.290
SATT	0.005	0.889	0.047	0.214
SATC	-0.001	0.988	0.021	0.500

*Note:* Asterisks \*, \*\*, and \*\*\* indicate 10 %, 5 % and 1 % significance level; SATE denotes Sample Average Treatment Effect, SATT denotes Sample Average Treatment Effect on Treated, and SATC denotes Sample Average Treatment Effect on Controls; One-neighbour matching was applied.

of PF technology are mainly attributable to the positive effect of the technology on technical efficiency (there is no effect of the PF technology on allocative efficiency). There is, however, a difference between the results from the farm group comparison and the matching method for farms using PF technology in at least one operation and for non-users. Significant mean differences and an insignificant technology treatment effect suggest self-selection in the PF technology. In other words, PF users tend to be more efficient technologically, but the technical and economic benefits of PF technology are only gained when the technology is used in three or more operations.

### Conclusion

In its investigation of cost efficiency and other structural indicators of Czech farms’ wheat production in 2007-08, this study is a contribution to the discussion on the economic impact of adopting PF technology. The empirical findings suggest a significant positive effect of PF technology on farms’ cost efficiency. This effect, however, depends on how advanced PF technology use is. Farms that use PF in three or more production operations (soil preparation, sowing, application of fertiliser and chemicals, or yield monitoring) are found to enjoy cost

benefits, while farms using PF only in two or fewer operations are not. These benefits are mainly savings from the reduced use of direct inputs and energy (fuel). More detailed analysis revealed that the cost benefits of advanced PF application can only be attained by farms that have already used PF technology; non-users would not realise significant cost savings if they were to adopt the technology. The heterogeneous effects of PF technology between PF users and non-users thus result from differences in the attributes of PF users and non-users. PF users are characterised by significantly higher specialisation in crop production, a higher share of owned land, a lower share of permanent grassland, and larger wheat fields. Similar to KHANA (2001) or GODWIN et al. (2002), this study thus finds that the net economic effect of PF technology is determined by farm attributes and production conditions.

### Further literature

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DABERKOW, S. G., MCBRIDE, W. D. (2003): Farm and Operator Characteristics Affecting the Awareness and Adoption of Precision Agriculture Technologies in the US. *Precision Agriculture*, 4 (2), S. 163-177.

ENGLISH, B. C., ROBERTS, R. K., MAHAJANESHETTI, S. B. (1998): Spatial Break-Even Variability for Variable Rate Technology Adoption, in: ROBERT, P. C., RUST, R. H., LARSON, W. E.: Proceeding of the Fourth International Conference on Precision Agriculture, Madison, WI: American Science Society of America, Soil Science Society of America.

KHANNA, M. (2001): Sequential Adoption of Site-Specific Technologies and Its Implications for Nitrogen Productivity: A Double Selectivity Model. *American Journal of Agricultural Economics*, 83 (1), S. 35-51.

PAXTON, K. P., MISHRA, A. K., CHINTAWAR, S., ROBERTS, R. K., LARSON, J. A., ENGLISH, B. C., LAMBERT, D. M., MARRA, M. C., LARKIN, S. L., REEVES, J. M., MARTIN, S. W. (2011): Intensity of Precision Agriculture Technology Adoption by Cotton Producers. *Agricultural and Resource Economics Review* 40 (1), S. 133-144.

ROBERTS, R. K., ENGLISH, B. C., MAHAJANESHETTI, S. B. (2000): Evaluating the Returns to Variable Rate Nitrogen Application. *Journal of Agricultural and Applied Economics*, 32 (1), S.133-143.

# The concept, evidence and implications of regime shifts in land systems in Southeast Asia

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ZHANLI SUN, DANIEL MÜLLER

## Introduction

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Land systems are coupled systems characterised by the complex interplay of social and ecological systems. Changes in land systems cause about 30 % of all anthropogenic greenhouse gas (GHG) emissions (IPCC, 2013) and deforestation alone accounts for about half of that (VAN DER WERF et al., 2009). Since 2005, therefore, successive Conferences of Parties (COP) within the United Nations Framework Convention on Climate Change (UNFCCC) have been negotiating an international mechanism for "Reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks" (REDD+). REDD+ aims to compensate developing countries for lower carbon emission from land use compared to a business-as-usual (BAU) baseline, i.e. the emissions levels that would have been produced without intervention. Hailed as a cost-effective and promising pathway to mitigate GHG emissions, REDD+ has received considerable international attention and stirred heated debates. To date, however, it remains unclear whether REDD+ will actually work because a number of political, scientific and technical obstacles may compromise its

effectiveness. One of the critical challenges within REDD+ is to estimate accurate and reliable BAU baselines, which necessitates an understanding of land-use change trajectories and their causal drivers, as well as a prediction of future pathways of land-use change under BAU.

Predicting future land-system change is notoriously difficult, however, due to the intrinsic complexity of land systems, characterised by non-linear dynamics, self-organisation, feedback processes and the emergence of new global patterns from local interaction (MÜLLER et al., 2013). Often, therefore, land-system changes exhibit regime shifts, i.e. gradual incremental changes punctuated by sudden radical transition. Regime shifts represent a rapid and persistent shift of a system to a different state where the attributes and dynamics of the system fundamentally differ from the previous one. In other words, there is no "business as usual" in a new regime, and because of this historic changes in the land-system may not be a good predictor of change. Consequently, the presence of regime shifts in land systems poses a real challenge for REDD+ and may even thwart its ambitious goals.





*Terrace farming in the mountains of Yunnan, China*

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A better understanding of regime shifts in land systems is crucial for land-system governance, because regime shifts may have a substantial impact on socio-ecological outcomes, including land-use intensity, production technology, land-based outputs, livelihoods and ecosystem services. Whilst concepts of regime shifts are being increasingly used in ecosystem research (CARPENTER and BROCK, 2006; SCHEFFER et al., 2001), there are only few examples of the concept of regime shift being applied to land systems. Moreover, modelling regime shifts has proved to be difficult, apart from schematic conceptual models.

In our research, we are focusing on theory-building and modelling of regime shifts in land systems. Our particular aim is to examine more closely the concept of regime shift by a) analysing and comparing historic trajectories of land-system change with data in four study sites in Southeast Asia; and b) simulating regime shifts of land-use systems with a stylised system dynamics model. To conclude, we will discuss the implication of regime shifts for REDD+.

## Material and methods

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### Study areas

We deliberately chose four countries in Southeast Asia (Indonesia, Vietnam, Laos and southwestern China) to analyse land-system dynamics. The dynamic developments and the rapid land-use transitions in the region,

including significant deforestation and forest degradation, suggest potentially high gains from REDD+ in terms of avoiding GHG emissions. Southeast Asia thus represents a region where REDD+ activities could potentially be implemented amongst complex land-use systems, tenure regimes and, possibly, conflicting interests.

We are examining upland forest-agriculture frontiers of Southeast Asia, ranging from the humid forests of Kalimantan, Indonesia, to the sub-humid areas dominated by a monsoonal climate with distinct dry seasons of northern Laos, northern Vietnam and Yunnan in southwest China. The communities in Laos were located close to, and partly within, the Nam Et-Phou Loey National Park in Houaphan Province; in China they are situated in Xishuangbanna Prefecture; in Vietnam in Con Cuong District, Nghe An province, close to Pu Mat National Park; and in Indonesia they are located in Kutai Barat District, East Kalimantan Province (Figure 1).

### *Data collection*

We conducted fieldwork in two communities per country and pursued identical qualitative and quantitative data collection strategies in all eight communities. A pluralistic participatory approach was adopted to collect comprehensive information on land-use and livelihoods, including historic land-use trajectories and demographic change over the past 30 years, and land-use maps (both current and those from ten years ago). Data collection strategies involved focus group discussions, transect walks, stakeholder interviews and

Figure 1: Study sites in Southeast Asia



participatory mapping. The participatory approaches were conducted with groups of between eight to 15 villagers of different age, sex, and social status. The participatory mapping focused on major land-use categories and changes therein. Land-use maps were sketched by villagers on a transparency overlaid on a plot of very high-resolution satellite images. The resulting participatory maps reflect the spatial configuration of contemporary land use at the time of image acquisition. This base map also served to delineate locations of salient land-use changes for the past 50 years.

Besides participatory mapping based on very high-resolution satellite images, we also sketched, together with villagers, long-term transitions for the major land-use categories identified in the mapping exercise. We used the resulting transition curves to discuss rates and processes as well as underlying drivers and proximate causes of land-use change between landmark events, inquired about periods of fast and slow change and used the participatory maps to support the discussions and triangulate responses. We repeated these steps for all land-use categories, thereby obtaining long-term land-use transition curves for all communities. The land-use transition curves reveal the historic land-use trajectories.

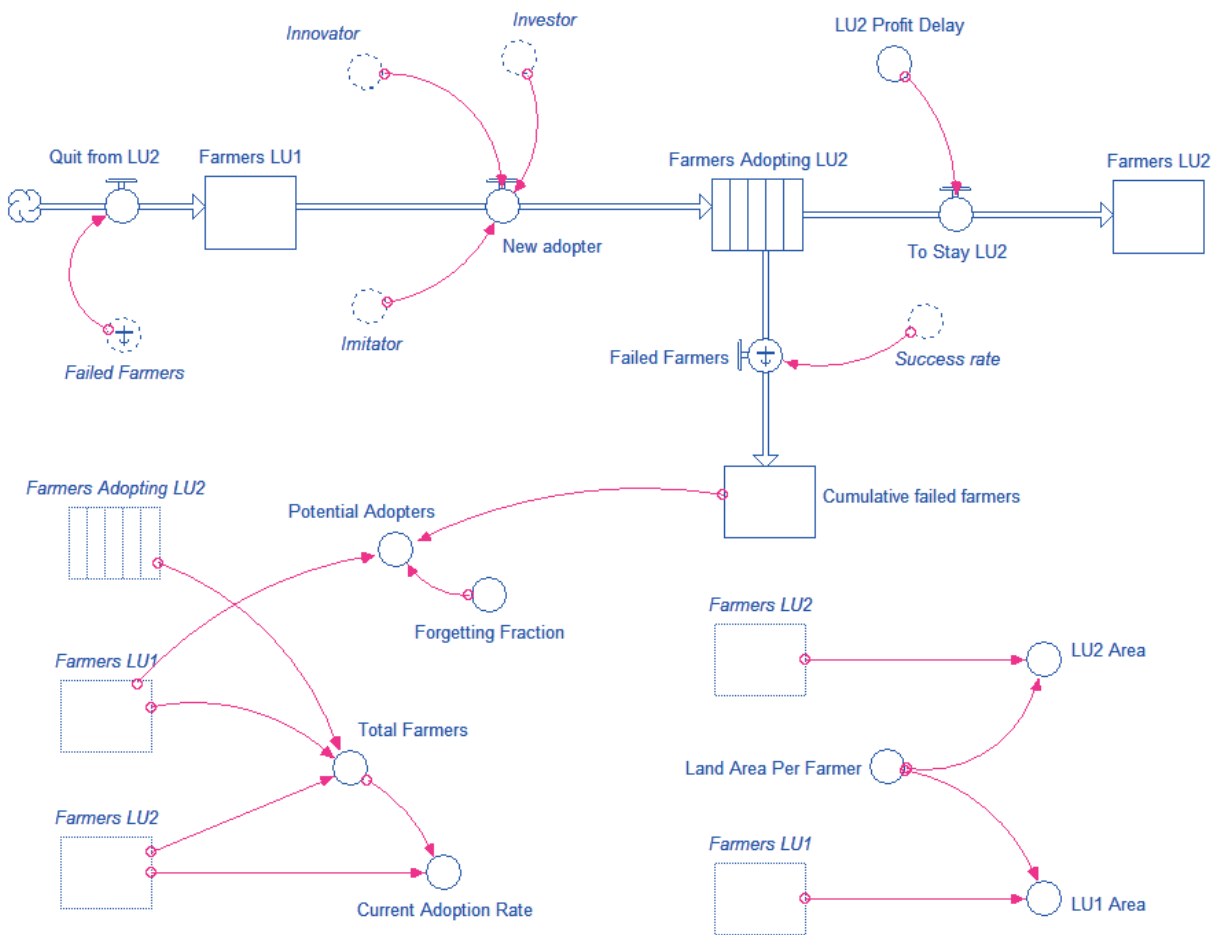
#### *System dynamics*

The modelling of land-use regime shifts is still in its infancy and little research has been conducted, chiefly due to the challenges involved in simulating regime shifts. Statistical models are useful tools to reveal the historic determinants of change by analysing

the contributions of certain drivers of regime shifts (ZHANG et al., 2011) and to detect and delineate regime shifts with time series analysis (RODIONOV, 2005). These equation based dynamic models have been used to model species population dynamics of critical species of an ecosystem. These models have proved inadequate, however, to describe intricate interaction and feedback in social-ecological systems (SCHEFFER, 2009) such as land-use systems. Agent-based modelling (ABM) provides a natural framework from a bottom-up perspective for simulating the emergence phenomenon in complex adaptive systems (BONABEAU, 2002; HARE and DEADMAN, 2004). ABM lacks the capability, however, to capture feedback on the macro level, and it is often a real challenge to analyse and interpret the simulation results. Conversely, system dynamics (SD), based on system thinking, explicitly address the feedback and interaction between sub-systems and variables in a system. Moreover, SD provides a transparent and intuitive graphical interface in a stock-flow framework. We have thus opted for the SD approach to build an explorative model to simulate land-use regime shifts in our study sites.

System dynamics are computer-based simulation tools to understand dynamic complex systems. The key concepts of system dynamic models are feedback loops (positive and negative feedback), accumulation, and delays. The variables are defined by stocks, flows and normal variables. Stocks are integrals of flows, including both in-flows and out-flows; flows are the derivatives of stocks.

Figure 2: A stylised system dynamic model of land-use regime shift



We have conceptualised the land-use regime shifts as a diffusion process driven by underlying drivers of change (e.g., fluctuation in market prices) and, at the same time, constrained by socio-economic factors (e.g., availability of labour, capital, technology, and infrastructure). The main structure of the model is illustrated in Figure 2. In the model, land-use regime shifts are caused by a reinforcing feedback, that is, a new land-use strategy (noted as LU2 in Figure 2) firstly adopted by external investors and innovative domestic farmers, triggering a snowballing effect of rapid adoption by the rest of the farmers due to the increasing returns to scale and economies of agglomeration.

In Xishuangbanna, China, for example, the increase in rubber prices led to land concessions for investors for growing rubber; the investors brought technology and capital to the local community, which further encouraged the widespread adoption of rubber plantation. More rubber plantations then led to the establishment of processing facilities for latex, an improvement in the roads, and the availability of other associated technology and knowledge. All of these factors drove the expansion of rubber plantation even further. At the same time, the Chinese government promoted rubber cultivation, which undoubtedly fuelled the radical regime shift in which rubber is taking over most of the areas of cultivation.

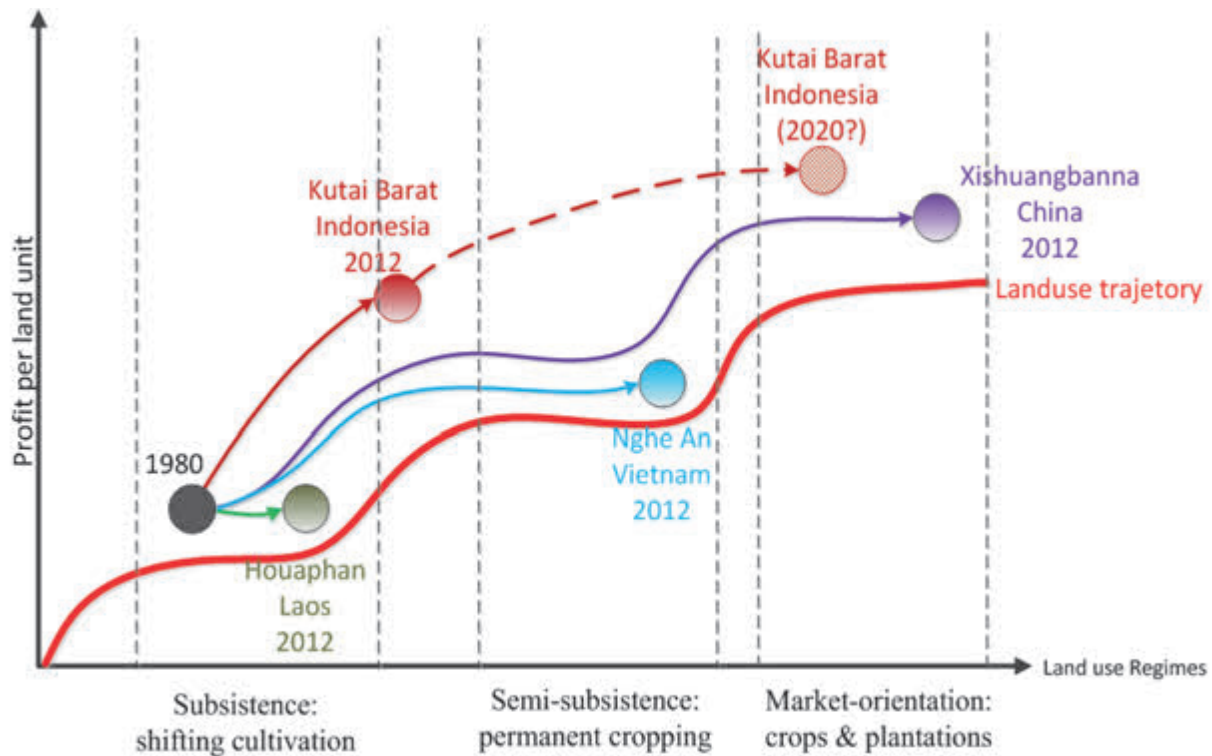
## Results

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### Conceptual models of regime shifts

Land-use systems in the four study areas have diverged significantly in the last 30 years (see Figure 3). The sites in Lao still follow shifting cultivation despite minor changes in land-use practices. Land-use practices in Vietnam shifted partly towards subsistence-based permanent cropping after the Vietnamese government banned shifting cultivation in the 1990s and allocated long-term land-use rights to farmers, which transformed collective farming systems to household-based farming. China also granted long-term land-use rights to farmers with the implementation of the household responsibility system in 1981. Then in the 1990s, with the promotion of rubber planting, some farmers started to adopt rubber plantation on their corn fields and some forest land. Seduced by the potential high profits of rubber, adoption snowballed as most farmers followed the early adopters – and by the early 2000s, the landscape had become dominated by smallholder rubber plantations. Indonesia, unlike the other three countries which at present seem to be in a relatively stable state, is currently undergoing a fast transition from shifting cultivation with vast secondary forests to a landscape dominated by oil palm plantations that are run by commercial investors from outside the communities.

**Figure 3: Historic land-use trajectories and regime shifts in study sites**



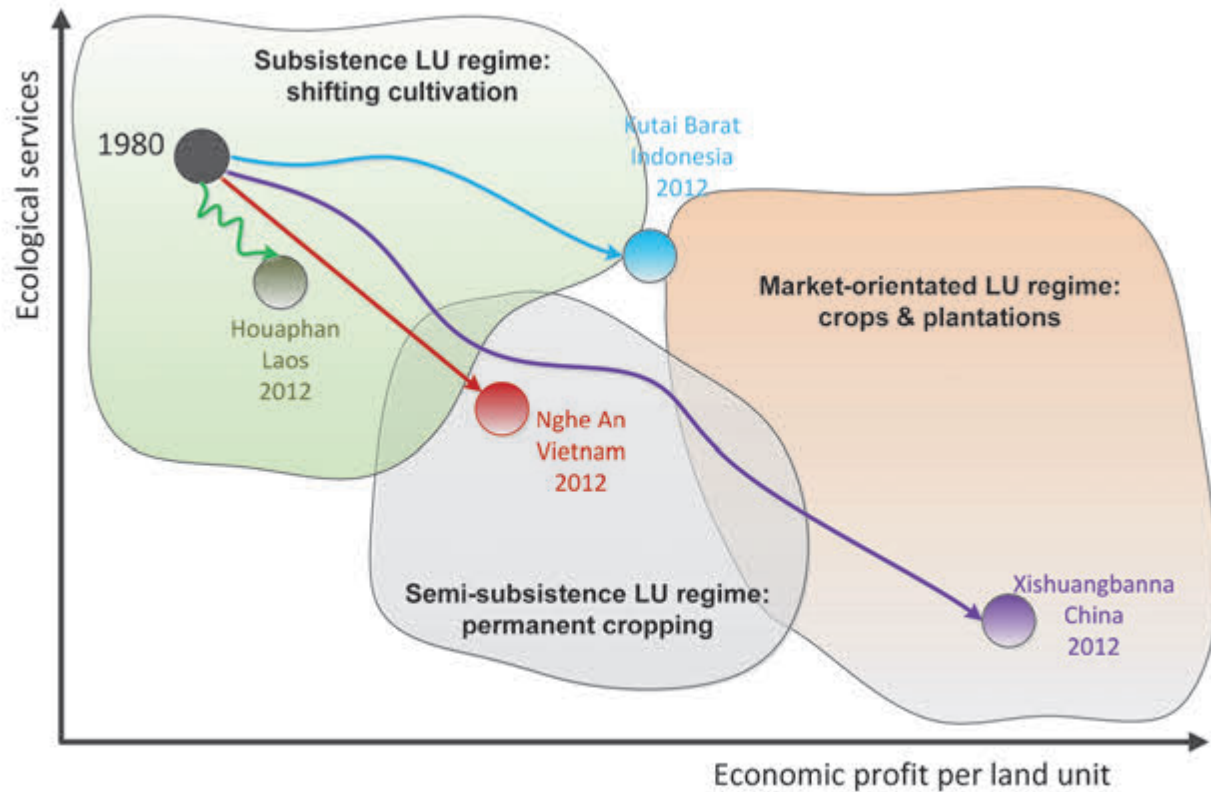
The comparison of land-use trajectories in the four countries reveals how land-use systems evolve in a path-dependent manner, but also highlights the trade-off between economic and ecological benefits amongst different land-use regimes (see Figure 4). We have observed regime shifts of land systems that were caused by both exogenous and endogenous factors, or a combination thereof. Other socio-economic and biophysical factors, such as lack of capital, inferior

infrastructure, and unsuitable terrain, have prevented regime shifts in land use.

### Modelling feedback with system dynamics

To deepen our understanding of the regime-shift processes, especially those driven by interaction, self-reorganisation and the adaptation of actors within the system, we have investigated different scenarios with a

Figure 4: Land-use regime shifts in four study sites

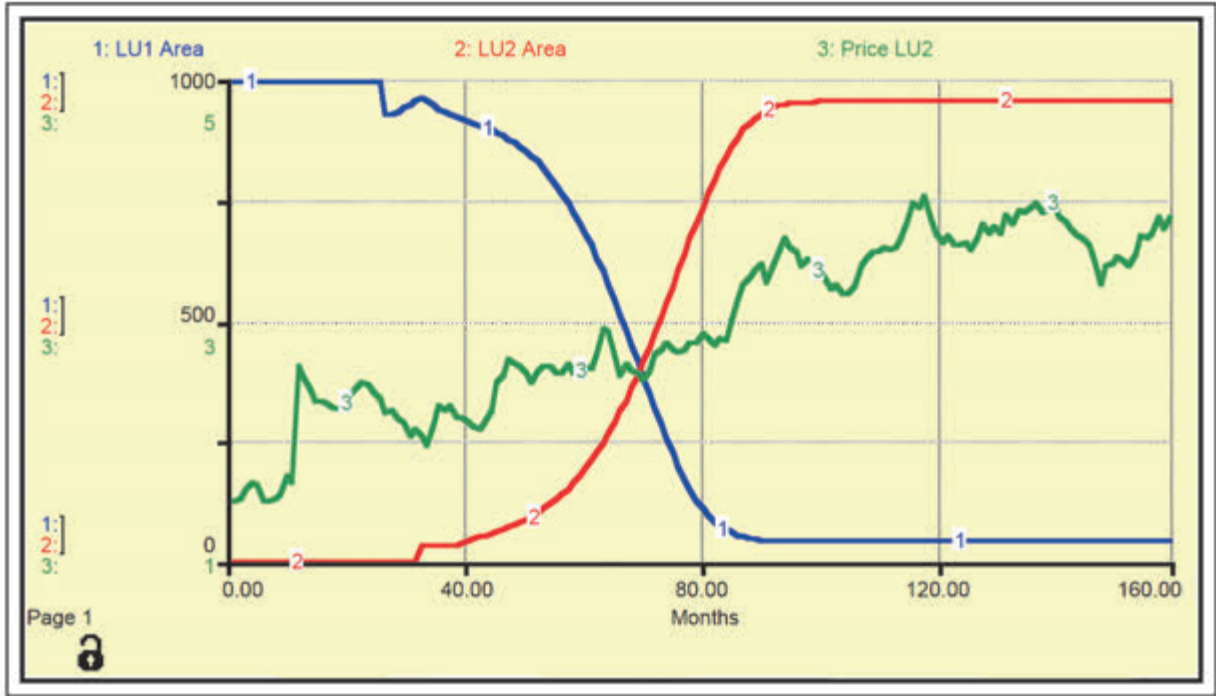


combination of various parameters in the SD models. The empirically observed patterns, such as the S-curve adoption curve and the snowballing effect, clearly emerged from our simulations (see Figure 5). The model also shows how a gradual change of certain driver variables, for example, the increase in commodity price for land use type 2 (e.g., rubber), may eventually trigger

a quick and large-scale switch from land use type 1 (e.g., maize) to type 2. This "winner takes all" phenomenon is consistent with what we have observed on the ground. For example, it mirrors the rapid expansion and dominance of the landscape of rubber plantation in Xishuangbanna, China.



**Figure 5: Simulating land-use regime shift with system dynamics**



## Conclusion and discussion

Our comparative case studies of land-system dynamic in four countries in Southeast Asia demonstrate the existence of regime shifts in land systems. The land systems in all the sites were characterised by the predominance of shifting cultivation before the 1980s. Since then, land systems have embarked on different pathways with diverse land-system regimes, characterised by different agricultural production modes, livelihood

strategies, and ecosystem service outcomes. A regime shift occurs when one or a combination of underlying drivers lead to a reduction in land-system resilience, which may eventually push the land systems over to another regime. At the tipping point, a subtle change in key drivers may bring about a non-linear and abrupt change. Due to the hysteresis inherent in land systems, it is extremely difficult and costly to halt or reverse impending change. Decision makers thus need to be aware of the potential occurrence of regime shifts, and roll out measures and policies well before the tipping



point is reached, in order to prevent the system from tipping towards an undesirable regime.

Regime shifts in land systems pose a considerable challenge to land-use policies, which rely on the prediction of future states of land systems. In the case of REDD+, a business-as-usual baseline of forest-cover changes needs to be predicted to ensure the payments for reductions in carbon emissions are in addition to what would have occurred anyway (ANGELSEN, 2008). However, the existence of regime shifts implies that it is not always "business as usual" in land-system change. In dynamic regions such as in Southeast Asia, in particular, historic land use may be a poor predictor for future land-system change. Moreover, regime shifts are extremely difficult to forecast because the tipping points are often unknown and may even vary over time and space, for example, as a result of changes in land-system resilience. The high uncertainty involved in predicting the future state of land systems, therefore, has important ramifications and may jeopardise the successful implementation of REDD+.

To help understand regime shifts, we developed a stylised system dynamics model that exemplifies how regime shift in land systems can be triggered, for example, via increases in commodity prices, which spur the rapid adoption of plantation-based land use by profit-oriented land users. At the same time, increasing profit causes a positive feedback that is modelled together with an adapted diffusion model (i.e. the word-of-mouth model).

The simulation of SD successfully reconstructed the historic land-system changes observed on the ground. The model is not able to provide numerical forecasts, however, and thus cannot predict potential future regime shifts. Rather, the system dynamics model is a learning tool that is very useful for supporting policy-making via examining the behaviour of key variables over time and under different parameters. Its real value is, therefore, to enhance our understanding of the presence of regime shifts in land systems and to support proactive decision-making. This should prevent undesirable regime shifts of land systems and promote desirable ones.

### Further literature

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ANGELSEN, A. (2008): REDD models and baselines. *International Forestry Review*, 10(3), S. 465-475.

BONABEAU, E. (2002): Agent-based modeling: Methods and techniques for simulating human systems. *Proceedings of the National Academy of Sciences of the United States of America*, 99 (Suppl 3), S. 7280-7287.

CARPENTER, S. R., BROCK, W. A. (2006): Rising variance: A leading indicator of ecological transition. *Ecology Letters*, 9(3), S. 311-318.

HARE, M., DEADMAN, P. (2004): Further towards a taxonomy of agent-based simulation models in environmental management. *Mathematics and Computers in Simulation*, 64(1), S. 25-40.

IPCC (2013): Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis: Summary for Policymakers. IPCC.

MÜLLER, D., SUN, Z., VONGVISOUK, T., PFLUGMACHER, D., XU, J., MERTZ, O.: Regime shifts limit the predictability of land-system change (in Begutachtung).

RODIONOV, S. (2005): A brief overview of the regime shift detection methods. Large-Scale Disturbances (Regime Shifts) and Recovery in Aquatic Ecosystems: Challenges for Management Toward Sustainability, S. 17-24.

SCHEFFER, M. (2009): Critical transitions in nature and society. Princeton University Press.

SCHEFFER, M., CARPENTER, S., FOLEY, J. A., FOLKE, C., WALKER, B. (2001): Catastrophic shifts in ecosystems. *Nature*, 413 (6856), S. 591-596.

VAN DER WERF, G. R., MORTON, D. C., DEFRIES, R. S., OLIVIER, J. G., KASIBHATLA, P. S., JACKSON, R. B., COLLATZ, G. J., RANDERSON, J. (2009): CO<sub>2</sub> emissions from forest loss. *Nature Geoscience*, 2(11), S. 737-738.

ZHANG, D. D., LEE, H. F., WANG, C., LI, B., PEI, Q., ZHANG, J., AN, Y. (2011): The causality analysis of climate change and large-scale human crisis. *Proceedings of the National Academy of Sciences* 108(42), S. 17296-17301.





## Long-only index funds help agricultural futures markets to function smoothly

SÖREN PREHN, THOMAS GLAUBEN, ULRICH KOESTER, JENS-PETER LOY

Since mid-2007, agricultural futures markets have been attracting increasing attention from the wider public. After a phase of low prices, the market prices of the most important cereals (wheat, corn and rice) more than doubled within just a few months. In some developing countries this even led to food riots. Very quickly public opinion and the political community concluded that so-called long-only index funds<sup>1</sup> were responsible. It was suggested that the increased presence of index funds on the market had not only disrupted the price discovery process, but also distorted market process on spot markets.

The opposite is the case, however. Not only are the accusations levelled against long-only index funds unfounded, the long-only index funds themselves are highly beneficial for the smooth functioning of agricultural futures markets. Because of the investment behaviour of long-only index funds, farmers can hedge at lower cost on the market, while price developments are more stable.

<sup>1</sup> This paper will restrict itself to discussion of long-only index funds, and will not consider long-short index funds or "subindex/single commodity" index funds. These involve different trading strategies and/or investment objectives.

*What happened?* During the Uruguay round agreement had been reached to liberalise national and international agricultural markets. Since then there has been a substantial reduction in political interventions that restrict trade and distort production. The reduction of market-support measures in the EU and elsewhere has led not only to a fall in agricultural prices, but also to a slowdown in annual output growth in the most important producing countries. Global stock levels have reached a historic low, while important exporters such as the EU and the US have decided to expand their production of bio-energy. The state of the market, which was already strained as a result of low harvest yields, has been exacerbated by bio-energy policy.

Even though these developments were expected to bring about appreciable price changes, the extreme price developments of 2007-08 and also of the years that followed surprised even market experts. Moreover, it had not been anticipated that market prices would turn out to be so volatile, i.e. would have such marked price peaks. Debate still continues today over whether the markets overreacted during this period, or whether the price trend can in fact be explained by fundamental



factors, such as population growth or increasing prosperity, as well as by political factors, such as subsidised bio-energy production or export restrictions in key farming regions.

Understandably, the public and the political community are extremely uncertain and confused. The periods of continually falling prices for agricultural raw materials seemed to be over. Everyone was searching for an obvious explanation. Because of the large increase in trading on agricultural futures markets, so-called long-only index funds looked as if they might be a possible cause. Index funds had already appeared on futures commodity markets a few years earlier, and had grown to become the fourth most important market participant after farmers, commercial traders and speculators (hedge funds) on agricultural futures markets. On some markets the market share of index funds is more than thirty per cent. The fact that index funds only adopt a long position on agricultural futures markets, i.e. they conclude long contracts, also gave rise to the suspicion that they were generating an artificial surplus demand on the agricultural futures market, as a result of which market prices skyrocketed. Thus sections of both public and political opinion saw and continue to see index funds as the key "price driver".

*But are index funds really responsible?* First, index funds are investment funds which, in accordance with their investment strategy, are committed to reproducing a certain market price index. For this, long-only funds

always adopt a long position on those agricultural futures markets where the raw materials are in the index to be produced. Second, long-only index funds keep the percentual share of the value of the individual raw materials constant in the index, i.e. raw materials contracts which have relatively gained in value must in part be sold, and raw materials contracts which have relatively fallen in value must in part be purchased. In no way, therefore, do long-only index funds take a long position on the agricultural futures market to generate a demand surplus and thus accelerate an increase in market prices. Adopting a long position is rather a prerequisite for being able to reproduce a market price index. As a consequence, long-only funds tend to stabilise prices rather than drive them upwards.

This operational mode can be criticised for simply representing a snapshot in time, which the continual increase in capital investment in long-only index funds fails to consider sufficiently. For although long-only index funds are obliged to sell raw materials contracts when market prices rise, they also have to purchase raw materials contracts because of the increase in capital investment. It might now be assumed that this second effect – let us call it "investment effect" – overrides the first and brings about considerable price increases.

But this is not the case. This argument ignores the fact that long-only index funds always have to find an opposite position on the market, too, in order to conclude a long contract. Concluding a long contract always requires

the conclusion of a short contract and vice-versa. In principle farmers and what now are large commodity trading companies can be trading partners. As a rule, however, farmers only hedge their own harvest yield on the agricultural futures market and usually this is transacted several times on the agricultural futures market. Incidentally, this is not an unwelcome state of affairs. It increases liquidity on the agricultural futures market and significantly raises the probability of finding trading partners. Long-only index funds are, therefore, forced to find other trading partners besides farmers and commercial dealers. Ultimately this only leaves speculators as possible trading partners.

This means that long-only index funds always need speculators, such as hedge funds, who take a short position and bet on falling prices. A speculator who is behaving rationally, however, will guard as far as possible against taking a short position, if we accept the hypothetical scenario – which is clearly contradicted by the fundamental data – that long-only index funds actually drive up prices on the agricultural futures market. Their expected profit would be negative. But as long-only index funds find trading partners on the agricultural futures market, in practice they cannot have the price-inflationary effect ascribed to them; they must have a different impact on the market.

*How do long-only index funds really work?* To address the question of what impact long-only index funds have on the market, it seems sensible to begin with the actual

function of agricultural futures markets. Agricultural futures markets were established with the intention of giving farmers the opportunity to hedge their price risk. The basic idea is to bring farmers and commercial dealers together on an exchange and conclude long or short contracts to hedge the price risk.

The problem with the traditional agricultural futures market, however, was that there were usually more farmers than commercial dealers wanting to hedge their sales or purchasing price. There was an excess supply of short contracts and this is exactly the point at which speculators came in. Speculators are market participants who are willing to take an opposite position for other market participants (in this case, farmers) on the agricultural futures market, so that the latter can hedge. However, they demand a risk premium for taking on the price risk of the other party.

The risk premium is a theoretical construct. It assumes that both the farmer and speculator are expecting the same future market price. The farmer would like to hedge this price, but the speculator would not be willing to do this, because his expected profit would be zero. The speculator will only be prepared to hedge a low price which on average will promise him a profit. The price that the farmer and speculator then agree on will correspond to the actual futures price, and the difference between this price and the expected future market price is the risk premium which the farmer pays to the speculator for the latter to take on his price risk.

The level of the risk premium depends on how many short contracts are on offer and how many long contracts are in demand. If the number of short contracts on offer exceeds that of the long contracts in demand, the risk premium rises. This, in turn, raises the incentive to request further purchasing contracts. The risk premium will continue to rise until the number of short contracts offered matches that of long contracts requested. If, on the other hand, fewer short contracts are offered than long contracts requested, the risk premium will fall and the incentive to offer more short contracts will rise. However, as we know that long-only index funds only seek short contracts, their market presence must inevitably lead to a reduction in risk premiums. This is the "true" market impact of long-only index funds. Long-only index funds reduce the risk premium and thus reinforce the security function of agricultural futures

markets. Thanks to the market entry of long-only index funds, farmers have been able to hedge on the agricultural futures market at lower costs.

*In conclusion.* Long-only index funds have been unfairly accused by public opinion of disrupting the price discovery process on agricultural futures markets and by extension on spot markets. On the contrary, long-only index funds actually assist the smooth functioning of agricultural futures markets. Their market entry has helped reduce risk premiums. Thanks to long-only index funds farmers are able to hedge more cheaply on the agricultural futures market.

Farmers are well advised to adopt a clearer position in the current discussion and stand up for their interests. Long-only index funds are no longer just the fourth market participant on agricultural futures markets; they are also important, i.e. necessary, to the system.



## "Rural Areas in Transition: Services of General Interest, Entrepreneurship and Quality of Life". IAMO Forum 2013

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NODIR DJANIBEKOV, THOMAS HERZFELD, MARIANNE MÜLLER-ALBINSKY,  
DANIELA SCHIMMING, DIANA TRAIKOVA

The annual IAMO Forum took place from 19 to 23 June 2013 in Halle (Saale). The conference was organised jointly by IAMO and the Thünen Institute (TI) of Rural Studies in Brunswick. Funding for the event was provided by the German Research Foundation (DFG), the Rentenbank, the Marga and Kurt Möllgaard Foundation, the Ministry of Sciences and Economic Affairs of Saxony-Anhalt and the city of Halle.

### **Conference focus: Challenges facing the development of rural areas in transition countries**

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The reason behind the choice of topic for the IAMO Forum 2013, which went under the title "Rural Areas in Transition: Services of General Interest, Entrepreneurship and Quality of Life", are the challenges – some extreme – facing many rural areas in the transition countries of Central and Eastern Europe as well as of Central Asia and China. These range from inadequate infrastructure and declining service provision, low employment and income growth, poor education and training, to higher poverty levels compared to urban areas. Given the rural quality of life and economic prospects, these problems lead to high rates of out-migration,

especially amongst young people. Several billion euros have been invested in problematic regions of EU Member States to boost the local economy and improve quality of life. Despite efforts made in the past, it is debatable whether the right political measures were implemented and it is uncertain how the regions affected will develop in the future. Securing a decent quality of life in rural areas poses challenges to public actors, but we must also examine the role and opportunities of private entrepreneurs (both inside and outside agriculture). The main objective of the individual events at the IAMO Forum was to identify and discuss future risks and opportunities facing rural areas, focusing on Eastern Europe, the former Soviet Union and Asia, as well as to debate the opportunities for public and private actors to shape living conditions in these areas.

With this aim in mind, more than 140 academics from 14 countries took part in the IAMO Forum 2013. A variety of analyses, research findings and solution strategies relating to the topic of the conference were presented in three plenary sessions, 15 parallel sessions and a concluding panel discussion. Participants came from research institutes in Austria, China, Czech Republic,



*Plenary session, IAMO Forum 2013*

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Germany, Great Britain, Italy, Kazakhstan, the Netherlands, Poland, Romania, Russia, Slovakia, Ukraine and the USA.

### **Plenary session: Public service provision from state and private means**

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Professor Thomas Herzfeld, one of IAMO's directors, opened the IAMO Forum 2013 with an introductory lecture. He explained that the poverty rate in rural areas of Eastern Europe, the former Soviet Union and Asia is far higher than in urban areas. But rural areas are also disadvantaged by the state of their infrastructure as well as poorer access to healthcare and education. Bringing rural areas up to par in infrastructure, employment and income growth will be a major challenge, as will reducing the migration of young and well-educated workers.

Then, Linxiu Zhang, Professor and Deputy Director of the Center for Chinese Agricultural Policy at the Chinese Academy of Sciences, introduced the key topic "Services of General Interest". In her lecture entitled, "Education Inequalities as a Challenge to Development in China: Is There Enough Time to Address Them?" Professor Zhang first examined economic development in China and the challenges facing sustained growth. To cope with the requirements of continually growing economic productivity, it is vital not only to create the right economic conditions and ensure sufficient investment, but also to have a well-trained workforce. Zhang explained that it is essential for the development of

human capital to combat the existing disparity in the education system between rural and urban areas. The international research project "Rural Education Action Program" (REAP) has set itself the goal of investigating the causes of this disparity and developing solutions to eliminate it.

Dr Marek Furmankiewicz of Wroclaw University of Environmental and Life Sciences in Poland gave a lecture on the Polish experiences of creating local networks from the level of communal associations to cross-sector partnerships. Furmankiewicz stated that over the past 20 years new forms of partnership cooperation have not simply replaced outdated structures, but served as extra tools for directing local resources. He noted that a variety of forms of cooperation could exist side by side, as many communes are engaged in different sub-regional and local initiatives. Furmankiewicz explained that, after Poland's accession to the EU, initial local and sector-based cooperation expanded into wider partnership structures. Although actors from local government, local business and civil society jointly initiate and implement projects in these collaborations, which are funded by initiatives such as the EU's LEADER programme, the decision-making bodies of many of the partnerships are dominated by state representatives. This undermines, therefore, the LEADER programme's aim of active and equal participation of third-sector actors. Despite these structural difficulties which still exist, Furmankiewicz concluded that the inclusion of the third sector into steering development processes in Poland had to be regarded as progress overall.

## Plenary session: Improving rural entrepreneurship

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The second day of the conference was begun by Gerard McElwee, Professor at Sheffield Hallam University in Great Britain, who gave a lecture on the subject "Rural Illegal Enterprise". He showed that criminality is not only an urban problem, but that illicit business activities have become widespread in rural areas, too. These include tax and duty evasion, dealing in illegal goods and services, as well as unlawful practices to gain competitive advantage, such as insider trading, cartel

agreements and moonlighting. Defining what specifically constitutes illegal enterprise can be an imprecise science due to differing interpretations of the law and divergent moral positions. We also need to differentiate between legal businesses undertaking unlawful activities of a minor nature and illegal enterprises such as drug-dealing, smuggling and prostitution. McElwee highlighted that the extent of illegal enterprise in rural regions still needs more thorough investigation, even though data collection is difficult because of the restricted access to such enterprises and entrepreneurs.



*Keynote Speaker Gerard McElwee (Sheffield Hallam University), IAMO Forum 2013*

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His goal is to persuade illegal enterprises to engage in legal and formalised economic activities.

The lecture "Supply Chains in Agriculture: Joint Action of GIZ and the Private Sector", given by Sophie Grunze, advisor in the Department for Agricultural Sustainability Standards at the German Society for International Cooperation (GIZ), addressed the challenges and opportunities for the sustainability of agricultural value creation in developing and transition countries. She argued that development partnerships between development organisations and actors from the private sector would lend themselves to the sustained improvement of economic growth and business competitiveness in rural regions. As such partnerships could combine development policy goals with economic ones, and the potential risk on both sides would be minimised, this would produce a win-win situation. These public-private partnerships should focus on core tasks, such as developing education and training programmes, guaranteeing technological innovations, improving market-oriented supply chains, and setting guidelines and standards in enterprise. Grunze concluded by saying that specific factors, such as rising food prices and price fluctuations, changes in consumer preferences, limited resources and effects of climate change represented additional challenges for the sustainable development of the agricultural sector in these regions.

### **Plenary session: Quality of life in rural areas and economic inequality**

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On the third day of the conference, Ida Terluin from the Agricultural Economics Research Institute (LEI) at Wageningen University and Research Centre, Netherlands, gave a lecture focusing on empirical findings and theories relating to the economic development of rural regions in the EU. The qualitative research embedded in the RUREMPLO project on leading and lagging rural regions in the EU demonstrates that the skills of local public and private actors, their degree of mobilisation and organisation, as well as the strength of internal and external networks all play a key role in rural development. These findings emphasise the importance of a bottom-up approach in rural development policy. From the standpoint of economic theory, according to Terluin, a mixed exogenous-endogenous development approach and the "Community-led Development Theory" can be used to account for economic development in the rural regions of the EU. Terluin stated that, because of the heterogeneity of rural regions, it is impossible to identify a single development path applicable to all in equal measure. It is possible, however, from the empirical findings and theoretical basis to derive a general principle for development strategies in rural areas. This involves an approach based on the motto "Think globally – Act locally", developing skills of local actors, improved cooperation between local and regional, or even national actors, a power balance in

external networks, adapted administrative structures, and the rolling-out of a comprehensive spatial development plan.

Professor Charles Becker from the Department of Economics at Duke University in North Carolina, USA, gave a lecture on the decline of rural areas in Russia and the collapse of the USSR. Becker highlighted the constant decline in the rural population, particularly the exodus of young, qualified workers during the Soviet industrialisation and urban development programmes, as one of the key factors leading to the collapse of the USSR. On the basis of national empirical investigations, his study has looked at the way in which changes in the professionally qualified rural population influenced the growth of the urban population during the Soviet and post-Soviet era. According to Becker, an artificially generated demand for new workers in urban areas owing to poorly functioning labour markets led to a depopulation of a large proportion of rural Russia. At the same time, a lack of migration of new workers from other Soviet republics ultimately limited urban growth. In contrast to established theories which attribute the collapse of the USSR to inefficient economic and political structures alone, Becker argues that the devastatingly wasteful handling of labour resources and the lack of an exchange of labour between the Soviet republics contributed to the downfall of the Soviet Union.

### **Working sessions: Threats and chances for rural areas**

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Besides the plenary sessions, IAMO Forum 2013 also hosted 18 parallel working sessions with a total of 54 lectures. These gave academics the opportunity to discuss in depth a variety of topics relating to rural development, using concrete case studies. Besides the exposition of different theoretical, methodological and empirical approaches that reflect the latest research, there was intense discussion of whether and how individual research findings can be applied to other transition countries and regions. Lively debates developed, for example, around questions of education policy, the provision of public goods in rural areas, and the development of governance structures within rural civil society. Rural development in China proved to be a major regional focus in the various discussions and lectures. Articulating a variety of standpoints, the participants debated topics such as the inequality of rural incomes, the efficiency of Chinese funding instruments and the structuring of micro-credit programmes. Other subjects discussed were healthcare in rural areas, the education crisis, as well as labour migration and its significance for the overall economic development of the country.



## Panel discussion: Prospects of rural development policy

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The IAMO Forum 2013 ended with a lively panel discussion involving academics Linxiu Zhang and Charles Becker, as well as Jan Florian from the Czech National Network of Local Action Groups. The discussion was chaired by Sophia Davidova from the University of Kent, Great Britain. Together with Forum participants, the

experts discussed the challenges linked to the design and the implementation of a sustainable policy on rural development, especially in the EU, the successor states of the Soviet Union and China. The debate focused on issues such as how to close the gap between urban and rural areas with regard to employment opportunities, services and income, and how population decline and the out-migration of human capital can be stopped. Participants agreed that access to education, infrastructure and public goods such as healthcare were of key



*Parallel session with Axel Wolz (IAMO), Mieke Meurs (American University Washington DC), Vasyl Kvartiuk (IAMO), Jarmila Curtiss (IAMO), IAMO Forum 2013*

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importance, as were well-trained professionals. More controversial was the question whether public goods and infrastructure, especially in sparsely populated areas, should be preserved, or whether, out of consideration for financial and ecological sustainability, it was preferable to concentrate on priorities, such as schools, health and shopping centres. Here the debate was stimulated by examples from China, the USA and Georgia.

During the evening events on 19 June at IAMO and on 20 June at the barbecue on the Heide-Süd university campus, the international conference guests had further opportunity to swap ideas and information.

More details on the IAMO Forum 2013 can be found at the Institute's webpage: [www.iamo.de/forum/2013](http://www.iamo.de/forum/2013). The individual lectures can also be downloaded there.



*Panel discussion with Sophia Davidova (University of Kent), Linxiu Zhang (Chinese Academy of Sciences), Charles Becker (Duke University) und Jan Florian (National LAG Network of the Czech Republic), IAMO Forum 2013*





*Plenary session, IAMO Forum 2013*

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*IAMO Building*

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## IAMO – A brief portrait

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### Aims and tasks

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The Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) focuses on the far-reaching economic, social and political processes of change in the agricultural and food sector, and in rural areas. Its geographical area of research extends across Central, Eastern and South-Eastern Europe, including Turkey. The transition countries of Central and Eastern Asia have been added to this remit, although here the main focus is on China. In spite of great efforts and much success, the development of the agricultural and food sector in many of these regions still lags far behind that of Western industrial nations, and some of them are following their own, very specific development paths. Furthermore, a huge gulf is emerging between successful and stagnating regions within individual countries, as well as between countries themselves. In addition, large emerging nations such as Russia and China have risen to become "global players" on world agricultural markets. Given the ongoing global food crisis, we need to determine what must happen in these countries to promote sustainable growth and ensure global food security in spite of the growing demands being placed

on agricultural resources. Adapting agriculture and land use to climate change in our target countries – but not in these alone – also represents a major undertaking. Because of this, IAMO faces a very broad challenge for research, both thematically and regionally.

With its thematic and geographical focus, IAMO is a unique global research institution. Since its establishment in 1994 it has been a member of the Leibniz Association as a non-university research centre. The Leibniz Association includes research institutes which are scientifically, legally and commercially independent, together with service institutions. Both these are jointly funded by the federal administration and the *Länder* to address current problems of national interest ([www.leibniz-gemeinschaft.de](http://www.leibniz-gemeinschaft.de)).

The aim of IAMO's work is not just to help understand, but also manage the far-reaching processes of change to reduce ongoing development deficits in the agricultural and food sector, as well as in the rural areas of the Institute's geographical area of research. This goal gives rise to the three core tasks of the Institute:

- Internationally oriented research into agricultural and food economics including the development of rural areas.

- Exchange of ideas between the academic, business and political communities.
- Support for young academic scholars.

The Institute sees itself as a driving force of international research into agricultural economics. Outstanding research is the engine of the Institute's development, and it creates the conditions in which the other two core tasks can be performed. For instance, IAMO acts as a forum for exchange, and in this way it supports the cross-linking of research and dialogue between decision makers from the academic, political and business communities. In view of the unprecedented major challenges, delivering scientifically based policy advice is becoming an increasingly important part of IAMO's work. The Institute also uses its expertise and capacities to help academic scholars become fully qualified. Here there is a particular focus on supporting young academics from partner countries. Through its international orientation and cooperation with other teaching and research institutes, IAMO is helping to strengthen Halle's profile as a centre of science and research in Central Germany. Our close cooperation with Martin Luther University Halle-Wittenberg (MLU) – especially with the Institute of Agricultural and Food Sciences at the Faculty of Natural Sciences III, and the Economic Sciences Department at the Faculty of Law and Economic Sciences – is an important factor here.

## **Academic departments, research fields and key topic areas**

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IAMO's threefold research structure with the departments *Agricultural policy*, *Agricultural markets* and *Structural development* (these are abbreviated descriptions) is derived from the orientation of its research. The basic conditions of agricultural policy and opportunities for shaping policy, markets in the agricultural and food sector, and the development of farms and structures in rural areas are all analysed by the Institute. Developments at the individual farm level and in rural areas, the creation of functioning agricultural markets, and the shaping of agricultural policy are all closely interlinked. Decisions relating to farm development and agricultural policy, as well as market processes also have an impact on human-environment interaction in rural areas. In addition they have an effect on the two key issues of the future: food security and food safety. IAMO's academic work is organised interdepartmentally into four key research areas which focus on major problem areas of agricultural development in Eurasian transition countries and emerging nations. The more intensive level of communication in key research groups counteracts any possible fragmentation of research. Besides positive bundling effects, greater individual responsibility of the key research groups allows efficient, result-oriented research management.

The idea behind the current medium-term agenda, which came into force in 2008, is to adapt the key research areas to the changing problems in those regions of the world studied by IAMO. Increasingly, it is general questions of agricultural development in the context of globalisation and increasing divergence – between countries and also between structurally weak and dynamic regions – that are coming to the fore. But even if, to take Central Europe as an example, transition-specific questions themselves are no longer of much significance, the socialist past still influences the development of the agricultural and food sector of that region. Here we could point to the unique dual farm structure of many EU accession states in Central and Eastern Europe as well as the high degree of vertical integration of food chains in many CIS-countries. The current medium-term agenda contains the following four key research areas:

- I. Policy reforms and institutional change
- II. Structural change and business growth
- III. Employment and livelihoods
- IV. Competitive strategies and market requirements

### **Institutional structure**

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IAMO is a public foundation. Its bodies are the board of trustees, the managing directorate and the scientific advisory board. The Institute is divided into three academic departments:

- External Environment for Agriculture and Policy Analysis; head of department is Prof. Dr Thomas Herzfeld
- Agricultural Markets, Marketing and World Agricultural Trade; head of department is Prof. Dr Thomas Glauben
- Structural Development of Farms and Rural Areas; head of department is Prof. Dr Alfons Balmann

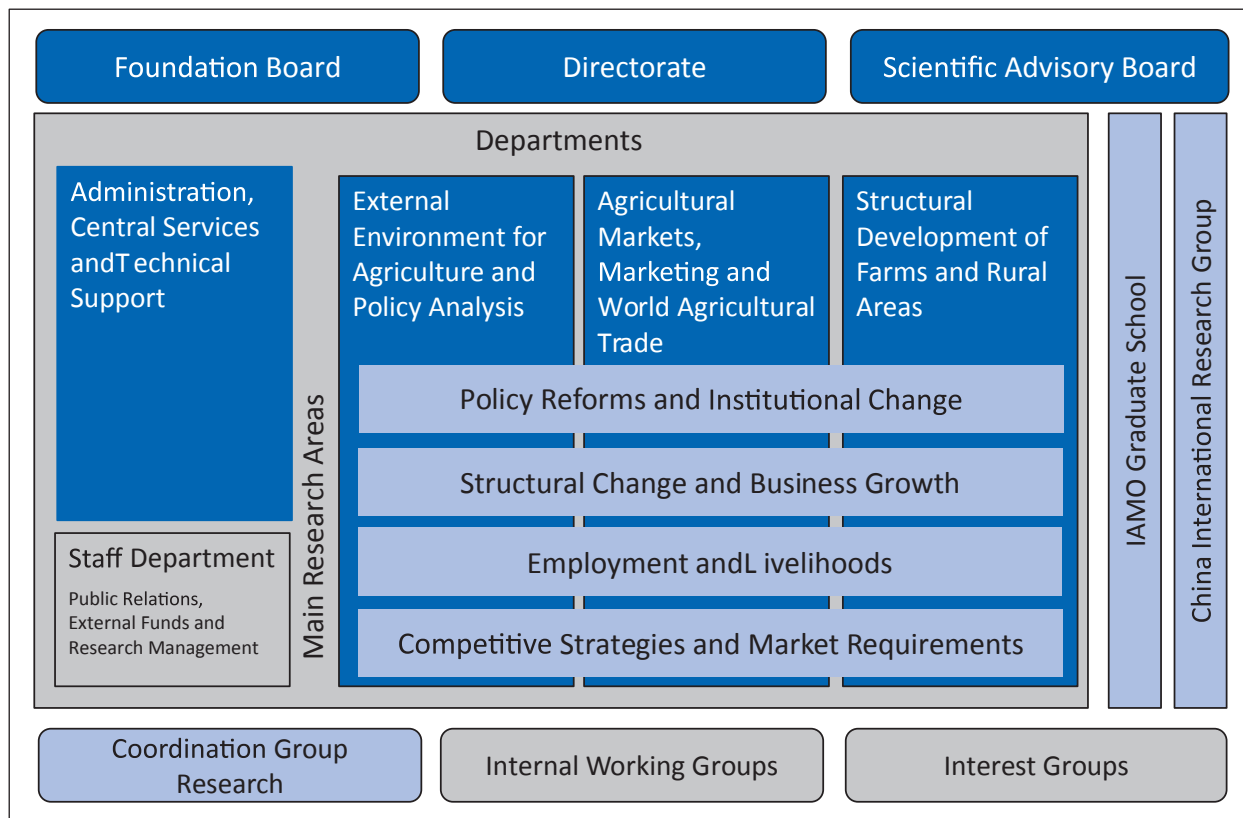
The heads of the academic departments, together with the head of

- Administration and Central Services, Hannelore Zerjeski,

form the directorate of the Institute. Since January 2013, all four directors of the Institute have been on an equal footing as managing directors with collective responsibility.

In coordination with the board of trustees, this collegiate body manages the Institute's business and directs the long-term research and development planning at IAMO. The scientific advisory board advises the directorate and the board of trustees on academic matters and carries out a regular evaluation of the Institute's work.

As of 1/1/2014 the following were members of the board of trustees: Minister Thomas Reitmann (Chairman; Ministry of Science and Economic Affairs of Saxony-Anhalt), Minister Dr Rudolf Wendt (Deputy Chairman; German Ministry of Food, Agriculture and Consumer Protection), Under-Secretary Anne-Marie Keding (Ministry



of Agriculture and the Environment of Saxony-Anhalt), Minister Jobst Jungehülsing (German Ministry of Food, Agriculture and Consumer Protection), Prof. Dr Dr h.c. Dieter Kirschke (Humboldt University, Berlin), Prof. Dr Bernhard Brümmer (Georg August University, Göttingen), Prof. Dr Gesine Foljanty-Jost (Martin Luther University, Halle-Wittenberg), and Dr Reinhard Grandke (CEO of Deutsche Landwirtschafts-Gesellschaft DLG e.V.).

As of 1/1/2014, the following were members of the scientific advisory board: Prof. Dr Dr h.c. Dieter Kirschke (Chairman; Humboldt University, Berlin), Prof. Dr Bernhard Brümmer (Deputy Chairman; Georg August University, Göttingen), Prof. Dr Martina Brockmeier (Hohenheim University), Prof. Dr Emil Erjavec (University of Ljubljana), Prof. Dr Michael Grings (Martin Luther University, Halle-Wittenberg), Prof. Dr Dr h.c. Ulrich Koester (Christian Albrecht University, Kiel), Prof. Ph. P. Johan Swinnen (Catholic University, Leuven, Belgium), Prof. Dr Stefan Tangermann (Georg August University, Göttingen), Dr Heike Harmgart, (European Bank of Reconstruction and Development, EBRD), and Prof. Ada Wossink (University of Manchester).

### **Cooperation with university institutions**

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IAMO's work is closely linked with the Institute of Agricultural and Food Sciences, which is part of the Faculty of Natural Sciences III at MLU, and the Economic Sciences Department at the Faculty of Law and Economic Sciences. The heads of IAMO's academic departments

take part in MLU's teaching and committee work. Many academic members of staff from IAMO with post-doctoral and doctoral qualifications are also involved in university teaching, and in the running of a nationwide PhD student programme. Staff links between MLU and IAMO are also strengthened by the fact that MLU's Prorector of Research and Student Education, Prof. Dr Gesine Foljanty-Jost, sits on IAMO's board of trustees. Cooperation between MLU and IAMO assumed a new dimension when the Science Campus was opened in Halle in June 2012. The Science Campus aims to strengthen the interdisciplinary collaboration between the Halle-based Leibniz Institutes and the corresponding academic departments at Martin Luther University Halle-Wittenberg in the sphere of plant-based bioeconomy. It will also advance higher education in the Halle (Saale) region, as well as supporting knowledge and technology transfer in politics, business and public life.

IAMO also works in close conjunction with many other universities, chiefly with faculties of agriculture and economics. Depending on the requirements of interdisciplinary research, other social science and humanities subjects may be brought in, e.g. human geography and history. As far as our partners in Germany are concerned, we have strong links with Berlin, Bonn, Göttingen, Hohenheim, Kiel, Munich and Münster. There are close relationships, too, with chairs of agricultural economics and institutes at agricultural and economics colleges and universities in our partner countries.



Amongst our partner universities abroad we should give special mention to the Higher School of Economics in Moscow; Altai State University; National University of Life and Environmental Sciences of Ukraine (NUBiP) and the National University "Kyiv Mohyla Academy", both in Kiev; Warsaw University of Life Sciences (SGGW); the Czech University of Agriculture in Prague and Masaryk University in Brno, Czech Republic; Corvinus University, Budapest; Zagreb University in Croatia; Belgrade University; and the Agricultural Economics Research Institute in Athens, Greece. We should also mention the Center for Agricultural and Rural Development (CARD) at Zhejiang University in China. In addition, IAMO maintains a wide range of scientific exchange with the Institute for Agro-Economics and the Centre for Transition Economics at the Catholic University of Leuven, Belgium; Wageningen University in the Netherlands; Alpen-Adria University, Klagenfurt; the University of Copenhagen; the Swedish University of Agricultural Sciences (SLU) in Uppsala; the Swiss Federal Institute of Technology in Zürich (ETH); the University of Kent in Canterbury; and ESSCA School of Management, Angers, France. In the USA we have close contacts with Stanford University, Ohio State University, Pennsylvania State University, the University of Wisconsin in Madison, and with the "Workshop in Political Theory and Policy Analysis" at Indiana University.

## **Cooperation with non-university institutions**

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The numerous contacts with non-university institutions are also very important for IAMO's work. We collaborate with the Johann Heinrich von Thünen Institutes of Farm Economics, Rural Studies, and Market Analysis and Agricultural Trade Policy in Brunswick-Völkenrode (vTI); the Helmholtz Centre for Environmental Research, Leipzig; the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg; the Kiel Institute for the World Economy (IfW); the Halle Institute for Economic Research (IWH); and the Potsdam Institute for Climate Impact Research (PIK). There are close relations with many non-university research institutions in Central and Eastern Europe and other transition countries. Of note here are: in the Czech Republic, the Institute of Agricultural Economics and Information in Prague (ÚZEI), and the Czech Academy of Sciences; in Hungary, the Research and Information Institute for Agricultural Economics (AKI) in Budapest; in Bulgaria, the Bulgarian Academy of Science; in Russia, the Russian Scientific Institute for Agricultural Economics (VNIIESH) and the All-Russian Institute for Agrarian Problems and Information Theory, both in Moscow; in Ukraine, the Ukrainian Agribusiness Club (UCAB) and the Institute for Economics and Forecasting at the National Academy of Sciences in Kiev; in Kazakhstan, the Analytical Center of Economic Policy in the Agricultural Sector (ACEPAS); in China, the Center for Chinese Agricultural Policy (CCAP) in Beijing, and the Institute of Botany in Kunming, both



at the Chinese Academy of Sciences, as well as Gansu Academy of Agricultural Sciences (GAAS). Our most important partners amongst international organisations are the World Bank, the International Food Policy Research Institute (IFPRI) and various institutions of the European Commission, such as the Joint Research Centre in Seville. IAMO's close partners in Western and Northern Europe are: in the Netherlands, the independent research institute LEI at Wageningen University and Research Centre; in Belgium, CEPS, the Centre for European Policy Studies in Brussels; and in France, the Institute for Agricultural and Environmental Engineering Research (Cemagref), Paris, the National Institute for Agricultural Research (INRA) in Rennes, and the National Engineering College for Agricultural Sciences in Paris-Grignon (INA-PG).

### Supporting young academics

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One of IAMO's three core tasks is to help develop the next generation of researchers. In particular, therefore, the Institute supports the study for doctoral and post-doctoral degrees. A large number of dissertation topics are also assigned for master's, diploma and bachelor's degrees. At the start of 2014, 53 theses were being supervised at IAMO. One post-doctoral degree is still being worked on.

Over the past year three long-standing IAMO staff members submitted their theses to Martin Luther University and successfully defended them:

- "Human capital differences or labour market discrimination? The occupational outcomes of ethnic minorities in rural Guizhou (China)" (Bente Castro Campos)
- "Networking" and "New modes of governance" in EU rural development policies: Challenges of implementation in Romania" (Doris Marquardt)
- "Flexibilität von Unternehmen – Eine theoretische und empirische Analyse" ("Business flexibility – A theoretical and empirical analysis") (Swetlana Renner)

Two external theses part supervised by IAMO staff were also successfully defended:

- "Auf der Suche nach der ländliche Moderne: Agrarismus und wissenschaftliche Expertise im späten Zarenreich und der frühen Sowjetunion" ("In search of rural modernism: Agrarianism and scientific expertise in late Tsarist Russia and the early Soviet Union") (Katja Bruisch, Faculty of Philosophy, Georg-August University, Göttingen)
- "An economic evaluation of water allocation mechanisms: The case of Minle county in Gansu Province, Northwest China" (Lei Zhang, Wageningen University)

One IAMO staff member, Insa Theesfeld was called to the chair for Agricultural, Environmental and Food Policy at the Institute of Agricultural and Food Sciences of the Faculty of Natural Sciences III at Martin Luther University Halle-Wittenberg.

## **IAMO awarded the TOTAL E-QUALITY rating**

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With the award this year by the jury of the German TOTAL E-QUALITY association, IAMO has for the first time been honoured for its ongoing commitment to equal opportunities in staff management, an area in which it has been particularly successful. The TOTAL E-QUALITY rating for 2013-15 certifies that aptitude, potential and skills at work are recognised and fostered equally for men and women. The differing circumstances of IAMO employees are also taken into account, with a focus on supporting women in management positions. We will strive to facilitate compatibility of family and career, pursue staff recruitment and development based on gender equality, promote appropriate behaviour in the workplace, and ensure that equal opportunities are reflected in the principles of the Institute. With this rating IAMO makes an individual commitment to continually monitor the implementation of its equal opportunities policy and ensure it becomes permanently enshrined in the Institute's working practices.

## **Prizes and awards**

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For their study "Export Restrictions and Multiple Spatial Price Equilibria: Export Quotas for Wheat in Ukraine", Linde Götz (IAMO), Feng Qui (University of Alberta, Canada), Jean-Philippe Gervais (North Carolina State University, Raleigh, USA) and Thomas Glauben (IAMO) won the Best Paper Award at the 53<sup>rd</sup> annual conference

of the German Society of Economic and Social Sciences in Agriculture (GEWISOLA). Since 2004 this prize has been awarded to the best papers submitted to a conference. The study was carried out as part of the "Global Food Security and the Grain Markets of Russia, Ukraine and Kazakhstan" (GERUKA) project, funded by the German Ministry of Food, Agriculture and Consumer Protection (BMELV) and the Federal Institute of Agriculture and Food (BLE).

## **Training for doctoral students: Seminars and PhD programme**

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As part of its educational provision for doctoral students, IAMO runs a PhD student seminar together with the professors of agricultural economics for agricultural business theory, agricultural market theory and agricultural business management from MLU's Institute of Agricultural and Food Sciences. The seminar is a forum for swapping ideas about research questions, methodological approaches and findings.

The Doctoral Certificate Programme in Agricultural Economics ([www.agraroeconomik.de](http://www.agraroeconomik.de)), designed and run by institutes of agricultural economics from several German universities, the Johann Heinrich von Thünen Institute (vTI) and IAMO, has been up and running since 2005. The "Doctoral Certificate Programme" offers the first structured training in Germany for doctoral students in the areas of agricultural and food economics and rural development. The systematic teaching of essential theory and method aims to increase the quality

of students' education and improve efficiency when working on dissertation topics. Doctoral study is the third stage of a consecutive study programme, following bachelor's and master's degrees in agriculture, food and the environment. The PhD study course is jointly run by the Agricultural and Food Economics Faculty at Christian Albrecht University in Kiel, the Faculty of Agriculture at the Rhine Friedrich Wilhelm University of Bonn, the Faculty of Agriculture and Horticulture at the Humboldt University in Berlin, the departments of Agricultural Sciences, Ecotrophology and Environmental Management at Justus Liebig University Giessen, IAMO, the Faculty of Agricultural Sciences at Hohenheim University, the Institute of Agricultural and Food Sciences at MLU, the department of Ecological Agricultural Sciences at Kassel University, the Faculty of Agricultural Sciences at Georg August University in Göttingen, the Faculty of Economic Sciences and Center of Life and Food Sciences Weihenstephan, Munich Technical University, and vTI, Brunswick. The PhD course is based on a modular system. In 2013, IAMO professors and staff helped organise academic events relating to the following modules:

- "Agent-based Modelling in Agricultural and Resource Economics" I
- "Efficiency and Productivity Analysis I – Deterministic Approaches"
- "Foundations of Agricultural Economics: Selected Topics"

- "Introduction to Geographic Information Systems and Spatial Data Analysis"
- "Topics in industrial organization"

### **Guests and fellowships at IAMO**

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The further training and education of academic scholars is one of IAMO's core tasks. As mentioned above, IAMO focuses chiefly on supporting young academics from its partner countries. Of great importance in this regard are study visits by researchers, which can range from a few weeks to two years. Besides being involved in joint publications, those who come for long-term visits also concentrate on their doctoral studies, financed by external and IAMO grants, and third-party funded projects. From October 2012 to September 2013, 23 fellows worked at IAMO, chiefly on their theses. At the same time 40 predominantly young visiting academics carried out research here. The fellows and visiting academics came from a total of 22 countries. By working together closely on international, third-party funded research projects, young researchers from partner countries integrate themselves into the international academic community. Former IAMO staff, both from Germany and partner countries, are now working in international organisations such as the EU and World Bank, or they have acquired management positions in their respective national agricultural administrations. An even larger number of them are continuing their academic careers back in their home countries.

## **"Pact for Research and Innovation" I: IAMO Graduate School**

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Under the "Pact for Research and Innovation", which is the equivalent of the Excellence Initiative of the federal administration and the *Länder* to promote science and research at German universities, IAMO set up a Graduate School in 2007 looking at the "Prospects of small-scale farm structures in the new Member States of the European Union". When Pact funding came to an end in 2010 the Graduate School continued because its work had been of such a high standard. It is now funded from the core budget and its area of focus is being developed further. The IAMO Graduate School has been opened up to all PhD students at the Institute and the content of research topics is no longer restricted to the IAMO research programme.

Besides its research activity, the IAMO Graduate School provides systematic support for young academics. This takes the form of structured training of doctoral students via participation in the Doctoral Certificate Programme in Agricultural Economics (see above), and the involvement of IAMO researchers who have successfully completed their PhDs. The latter will be given the opportunity to develop their research ideas further, and to acquire experience in research management. Since March 2012 the IAMO Graduate School has been a full member of the International Graduate Academy (InGrA) at Martin Luther University Halle-Wittenberg. InGrA supports the establishment of all forms of

structured doctoral programmes, coordinates the existing programmes and helps create a productive research environment while respecting the university's strategies of internationalisation and equality (<http://www.ingra.uni-halle.de/>).

## **"Pact for Research and Innovation" II: International China research group at IAMO**

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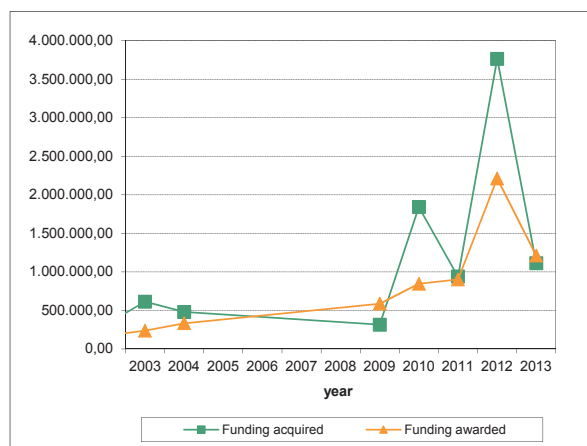
In 2008 the IAMO China Centre was set up as a fixed-term IAMO research group to investigate the topic of "Economic Growth and Social Equilibrium in Rural China". To begin with the group consisted only of IAMO staff. In 2011 these were joined by academic colleagues from Göttingen, Wageningen and Beijing. At the same time the Centre's future was secured when it received permanent funding from the budget. The range of topics covered by the 14 projects which had either concluded or were still ongoing in December 2013 includes environmental and legal aspects of land and water use, the impact of Chinese environmental programmes on rural living conditions, questions of agricultural business and productivity development, as well as socioeconomic questions, such as the integration of ethnic minorities, the development of rural education, non-agricultural labour markets, and the impact on welfare of agricultural foreign trade policy. There are also studies looking at the accuracy of social transfers in combating poverty.

The individual projects are helping to find approaches for addressing the sharp increase in social and ecological problems in rural China. The main issues here are

targeted policy measures and the shaping of a growth-inducing economic environment. In the period October 2012-September 2013 one member of the China group successfully completed their PhD. On 30 September 2013, six PhD projects on China were ongoing.

Since 2009 IAMO has been part of the "Rural Education Action Project" consortium (REAP), a collaboration between the Chinese Academy of Sciences and distinguished institutes in China and the USA, including Stanford University. REAP is not only investigating the quality of education in rural China, but is also involved in assessing and precisely targeting funding measures

#### **Development of third-party funding**



Source: Institute's own statistics.

Notes: Third-party funding obtained in 2012: IAMO still has 414,300 euros; 2,008,425 euros are being passed on to our partners. Third-party funding spent in 2012: 1,104,633.75 euros of this went to project partners.

for schools, grant programmes, and food and health programmes. Up till now IAMO staff have been (or still are) involved in sub-projects looking at the subsidisation of school fees and links between nutrition, anaemia and success at school.

More details can be found on the web page: <http://www.iamo.de/china-group.home.html>

#### **Development of third-party funding**

##### **Projects with third-party funding (October 2012-September 2013)**

##### **I. Newly approved research projects with third-party funding**

- Project title: The role of environmental, socio-economic, institutional, and land- cover/land-use change factors to explain the pattern and drivers of anthropogenic fires in post-Soviet Eastern Europe: A case study comparison of Belarus, European Russia, and Lithuania (Teilprojekt: Drivers of Anthropogenic Fires due to LCLUC in Post-Soviet Eastern Europe to NASA-ROSES, Kurztitel: NASA Fires)

Funding source: Michigan Technological University

- Project title: Exploring the potential for agricultural and biomass trade in the Commonwealth of Independent States (AGRICISTRADe)

Funding source: 7. Forschungsrahmenprogramm der EU

- Project title: Development of an analytical tool for long-term (2050+) projections and analysis of various scenarios related to food security, climate change, etc. (Case study 2050)

Funding source: EU

- Project title: RURAGRI: MULTAGRI – Governance ländlicher Entwicklung durch Maßnahmen zur multifunktionalen Nutzung landwirtschaftlicher Flächen (Teilprojekt: Landnutzungskonflikte und Auswirkungen landwirtschaftlicher Entwicklungspfade in unterschiedlichen ländlichen Gebieten, Kurztitel: MULTAGRI)

Funding source: Bundesministerium für Bildung und Forschung

- Project title: Deutsch-Ukrainischer Agrarpolitischer Dialog (APD Ukraine)

Funding source: Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz

- Project title: Seeing is Learning: Eyeglasses, Eye-facts and Improving Vision for Better Educational Outcomes (Eyeglasses)

Funding source: Stiftung Auge

## II. Ongoing projects with third-party funding

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- Project title: Institutional Analysis of Decentralization and Options of Stakeholders for Participation in Agro-rural Policy Design (Decentralization I+II)

Funding source: DFG Sachbeihilfe

- Project title: Between Path Dependence and Path Creation: The Impact of Farmers' Behavior and Policies on Structural Change in Agriculture – (Stru-WaMi)

Funding source: DFG Sachbeihilfe

- Project title: Econometric evaluation of CAP impacts in Germany (CAP Impacts)

Funding source: DFG Sachbeihilfe

- Project title: Market Structure and Organization in Agri-Food Value Chains: An Application to the German Dairy Sector (Dairy Struc)

Funding source: DFG Sachbeihilfe

- Project title: Fortfolgeantrag: Agroholdings im Agrar- und Ernährungssektor in GUS-Ländern: Entstehungsgründe, Funktionsweise und Entwicklungsperspektiven (Agroholdings II)

Funding source: DFG Sachbeihilfe

- Project title: Third sector organisations in rural development: A theoretical and empirical analysis – (VW Schumpeter)

Funding source: VW Stiftung Schumpeter Fellowship

- Project title: The Global Food Crisis – Impact on Wheat Markets and Trade in the Caucasus and Central Asia and the Role of Kazakhstan, Russia and Ukraine (VW MATRACC)

Funding source: Volkswagen Stiftung

- Project title: Implications and policies for South East Asia of Reducing Emissions from Deforestation and Forest Degradation – (I-REDD+)

Funding source: 7. Forschungsrahmenprogramm der EU

- Project title: International comparisons of product supply chains in the agri-food Sectors: Determinants of their competitiveness and performance on EU and international markets (COMPETE)

Funding source: 7. Forschungsrahmenprogramm der EU

- Project title: Economic and natural potentials of agricultural production and carbon trade-offs in Kazakhstan, Ukraine, and Russia (EPIKUR)

Funding source: WGL

- Project title: Leibniz-Forschungsverbund "Krisen einer globalisierten Welt"

Funding source: WGL

- Project title: Verbundvorhaben KULUNDA: Wie verhindert man die nächste "Global Dust Bowl"? – Ökologische und Ökonomische Strategien zur nachhaltigen Landnutzung in Russischen Steppen – (KULUNDA)

Funding source: Bundesministerium für Bildung und Forschung

- Project title: Analyse der Auswirkungen staatlicher Maßnahmen in der Landwirtschaft auf die Preise für landwirtschaftliche Erzeugnisse und Nahrungsmittel in Serbien (PPP Serbien)

Funding source: Bundesministerium für Bildung und Forschung via DAAD

- Project title: Globale Ernährungssicherung und die Getreidemärkte Russlands, der Ukraine und Kasachstans – (GERUKA)

Funding source: Bundesanstalt für Landwirtschaft und Ernährung

- Project title: Wissenschaftscampus Halle (Teilprojekt: Sekundäre Inhaltsstoffe in Getreidekaryopsen als Qualitätsmerkmal: Analyse potenzieller gesundheitsfördernder Effekte sowie Verbraucherakzeptanz und Zahlungsbereitschaft (WiCa Anthocyanin)

Funding source: Land Sachsen-Anhalt

- Project title: Wissenschaftscampus Halle (Teilprojekt: Pflanzenbasierte Innovationen und Klimawandel – Einschätzung und Bewertung risikobedingter unternehmerischer Anpassungsprozesse sowie ihre Wirkungen auf den Märkten (WiCa Innovationen)

Funding source: Land Sachsen-Anhalt



### III. Projects with third-party funding that finished in the period under review

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- Project title: Financial Deepening and Efficiency of Rural Financial Intermediation (Intermediation)  
Funding source: DFG Sachbeihilfe
- Projekettitel: Comparative Analysis of Factor Markets for Agriculture across the Member States (Factor Markets)  
Funding source: 7. Forschungsrahmenprogramm der EU
- Project title: Sozioökonomische Effekte des demographischen Wandels in ländlichen Räumen Sachsen-Anhalts (Demographie)  
Funding source: LSA Kultusministerium

#### Selected third-party funded projects

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Below are details of the most important new third-party funded projects. They show that IAMO's expertise in basic research and scientifically based policy advice is highly respected, and that IAMO is opening up new avenues of research collaboration which will help consolidate Halle's position as a leading scientific centre.

### Exploring the potential for agricultural and biomass trade in EU's Eastern Neighbours (AGRICISTRADE)

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This project is being financed by the EU as part of the 7<sup>th</sup> Research Framework Programme. It involves 17 institutions from 15 countries and is being coordinated by EUROQUALITY SARL (France). The duration of the project is three years. IAMO has obtained 187,000 out of a total of around 2 million euros. The background to this project are the negotiations on a free trade agreement between the EU, Armenia, Georgia, Moldova and Ukraine; Russia's entry into the WTO in 2012; and the customs union concluded in 2011 between Russia, Belarus and Kazakhstan. These varied attempts at trade liberalisation may result in an intensification of trade activity between the European Union and its Eastern neighbours. The aim of the AGRICISTRADE project is to monitor these developments scientifically. One task is to assess the potential impact on the foreign trade of the countries concerned; another is to identify the effects on the development of food, feed and biomass production in Armenia, Georgia, Azerbaijan, Belarus, Kazakhstan, Moldova, Russia and Ukraine. Taking a multidisciplinary approach, AGRICISTRADE is addressing the agro-environmental, socio-economic and institutional obstacles that stand in the way of the enormous agricultural potential of the CIS states. Methodologically, the project aims to improve on current biophysical and economic models as well expand the data basis, to allow more accurate prognoses to be made about the

development of agricultural output and potential demand in the CIS states.

**Development of an analytical tool for long-term (2050+) projections and analysis of various scenarios related to food security, climate change, etc. (Case study 2050)**

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Tenders for this project were put out by the Institute for Prospective Technological Studies (Seville) which is under the aegis of the EU. The consortium coordinated by IAMO also includes the Institute for Structural Studies (ISS), Warsaw, and Andrey Krasovskiy from the International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. Of the 60,000 euros of funding, IAMO will obtain 27,000. Against the backdrop of fundamental changes on global agricultural markets, uncertainty over the future development on these markets has risen substantially. Here we will merely mention the scarcity of natural resources at a time of continually increasing demands on agriculture, and the rise of new global players from emerging nations, which are affecting both the supply and demand side without there being any clarity over exactly what this impact is. Analysis will focus on whether further price shocks can be expected, and what the transmission of these shocks to national markets might look like. On a practical level, the project aims to generate findings than can be used for scientifically based policy advice on the following:

- Modelling the development of the agricultural and food economy in the EU up to 2050.

- Investigating the impact of fundamental determinants such as business, environment, climate and population on the supply, demand and trade in agricultural products within the EU.
- Analysing global food security with particular consideration of the vulnerability of the EU agricultural and food economy to negative environmental, climactic, demographic and economic changes.

Part of the project will be to devise and test the prototype of a model which can generate a prognosis of the development of the agricultural and food economy in the EU up to 2050. The aim is to design a general equilibrium model at a high level of aggregation, which uses methodologically innovative approaches of dynamic and stochastic modelling and goes beyond CGE standard modelling. The project will run for 12 months.

**German-Ukrainian agricultural policy dialogue (APD Ukraine)**

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The German-Ukrainian agriculture dialogue is being funded by the German Ministry of Agriculture to the tune of 654,000 euros. This collaborative project, which will run for three years, is being undertaken jointly by IAK Agrar Consulting GmbH and IAMO, with the former acting as lead partner. The aim of the project is to advise policymakers in Ukraine on reform of agricultural policy and the shaping of agricultural legislation. The project will focus on advising representatives from:

the Ministry of Agriculture, the agriculture and land committees of the Ukrainian parliament, the subordinate agricultural administrative authorities and the national land committee. There will be an emphasis on supporting both partners in developing strategies to improve the competitiveness of the Ukrainian agricultural and food sector, so as to create more transparent and reliable parameters. The study will include analyses of policy options, advice on questions of international agricultural trade, especially with the EU and within the WTO, and on questions of structuring the land market. Experts will also address the need for advice on business problems of agricultural management and vertical cooperation within supply chains, as well as on efficiency analyses. The same is true of all aspects of bioenergy and renewable raw materials, product and quality standards, veterinary science, food security and rural development. Another task of the project is the training of experts and managers, as well as advice on improving the structure of education and research.

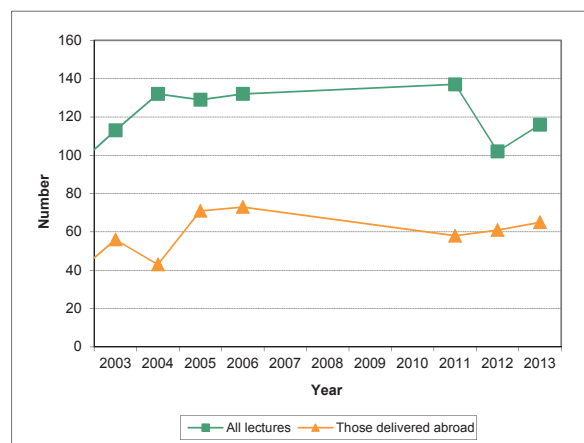
The APD is expanding its function as a link between representatives from politics, business and organisations of both countries. To support the economic relations between Germany and Ukraine in the agricultural and food sector, measures have been implemented in close cooperation with Ukrainian and German partners (e.g. the German Embassy in Kiev, the Ukrainian Agribusiness Club (UCAB), the Fachagentur für Nachwachsende Rohstoffe e.V. (Agency for Renewable Raw Materials), the German Plant Variety Office, the German Committee on Eastern European Economic Relations, and the

Bodenverwertungs- und -verwaltungs GmbH (Land evaluation and administration, BVVG) as well as various branch organisations to foster the bilateral dialogue. These include conferences, working group meetings, round table discussions, fact-finding visits relating to current questions of agricultural policy, and promoting partnerships.

### IAMO lecture activity

Besides publishing their work in journals, another important activity of IAMO staff is the presentation and discussion of research findings at national and international conferences, forums and workshops. A large proportion of lectures by IAMO staff are delivered at international events. Just over 50 % of lectures in 2013

#### Development of IAMO lectures



Source: Institute's own statistics.

were given abroad. The costs of 41 of the 94 lectures given in the period 1/1/13-30/09/13 were fully covered by the organisers (22), third parties (15), or other sources (4). There was mixed financing for nine lectures, while one lecture was paid for out of the speaker's own pocket. The expenses for 43 lectures were entirely covered by IAMO's budget.

### **Conferences and seminars**

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Conferences and seminars are essential for IAMO to be able to fulfil its third core task, which is to act as a forum for the exchange of scientific ideas in all questions of agricultural development in transition countries. The events organised by the Institute represent an important platform for scientific exchange, both on a national and international scale. Besides greater academic collaboration, the meeting of academics with decision-makers from the food industry and politics often provides an impetus for restructuring in the agricultural and food sectors in partner countries. Here we should also highlight the fact that in the field of agricultural economics IAMO makes an important contribution to so-called scientific "capacity building" in research and teaching in our partner countries, and has a crucial role in developing long-term viable networks. Below is an outline of the most important conferences, symposiums and workshops run by the Institute in 2013, besides the IAMO Forum.

### **IAMO expert panel at Green Week 2013**

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Russia, Ukraine and Kazakhstan are amongst the largest wheat exporters in the world. Their agricultural output can make a substantial contribution to both domestic economic development and global food security. Access for the agricultural sector to financing sources is an essential requirement if the potential of yield increases in the RUK countries is to be exploited. On 18 January 2013, at an expert panel on agricultural policy at the Global Forum for Food and Agriculture (GFFA) during Green Week, high-ranking representatives from politics, business and science discussed the possibilities of financing different business structures in the countries of Eastern Europe and Central Asia. The event, entitled "From microcredit to shareholder value: Access to financing sources in the agricultural sector in Eastern Europe and Central Asia", was organised jointly by IAMO and the German Committee on Eastern European Economic Relations. The expert panel attracted an audience of more than 200.

It was opened by the chair of the agriculture working group of the German Committee on Eastern European Economic Relations, Thomas Kirchberg. In his welcome, Kirchberg emphasised the significance of agricultural investment, which represents the key to safeguarding agricultural production and development in rural areas. Robert Kloos, Under-Secretary of the German Ministry of Food, Agriculture and Consumer Protection, followed this up in his welcome speech by highlighting the

fact that important foundations for agricultural investment and thus for dynamic agricultural development can be laid if the goal of combining the efforts of politics, business and science is achieved.

Martin Petrick of IAMO, acting as moderator, introduced the topic with a cross-country comparison of the dominant enterprise forms in the agricultural sector. Using IAMO analyses, he illustrated that a heterogeneous agricultural structure continues to exist in the Eastern European and Central Asian successor states to the Soviet Union. In Russia and Ukraine private farms are still underrepresented, whereas in Kazakhstan and the other Central Asian countries they are now making an appreciable contribution to agricultural output. In many countries of the region household farms contribute the largest share of agricultural output.

During the panel discussion the deputy ministers of agriculture present emphasised the strategic importance of the agricultural sector in Russia, Ukraine and Kazakhstan. In particular, the deputy ministers of the Russian Federation, Aleksandr Petrikov, and Kazakhstan, Gulmira Issayeva, explained that substantial investment assistance had been provided in their countries. Russia, Ukraine and Kazakhstan are also striving for an improvement in the credit infrastructure for agricultural producers in their respective countries. The Ukrainian Deputy Minister for Agricultural Policy, Oleksandr Sen, highlighted the expansion of the state controlled network of credit banks as well as the increasing importance of forward contracts. It was also emphasised that state

credit guarantees in Ukraine and Kazakhstan ought to play a greater role in the future.

Representing business, Heinz Strubenhoff, Agribusiness Program Manager of the International Finance Corporation (IFC), and Dirk Stratmann, the Ukraine spokesman for the agriculture working group of the German Committee on Eastern European Economic Relations were guests on the expert panel. During the discussion the question arose as to how the allocation of agricultural credit, administered or at least controlled centrally by the state, works in the RUK countries. It transpired that transparent evaluations of these measures do not usually occur. Strubenhoff explained that the bank workers in these countries frequently have inadequate knowledge of the agricultural sector to be able to allocate credit competently. There is also a lack of suitable IT solutions, benchmarking and measures to reduce bureaucratic costs. The experts added that there needs to be an improvement in current agronomic knowledge and banks must have better rights to take action against debtors who default on repayments in order to improve the investment climate and thus the circumstances of small and medium farms in particular. Stratmann also acknowledged that agricultural producers in the RUK countries with holdings larger than 5,000 hectares had great potential for development. By contrast there is a lack of technological solutions for smaller producers. "Access to financing depends substantially on the size of the agricultural enterprise. Although we cannot talk of a fundamental credit

crunch in agriculture, access to credit for small producers continues to be a problem," Stratmann said.

The panel engaged in a heated debate over the development possibilities in agriculture. What was clear was that the panellists thought only a fraction of the household farms would be capable of commercialising. The modernisation and stabilisation of agriculture is a key aim, but one which must encompass all existing business forms. To facilitate access to financing sources for smaller farms, too, it is necessary to find the right development strategies. For only a capital injection into improved technology and specialist training will allow greater efficiency and thereby the continued development of agricultural production.

### **Science in dialogue with the Bundestag and European Parliament**

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On 17 May 2013 in Berlin, Thomas Glauben and Sören Prehn from IAMO, and the business ethicists from the University of Halle-Wittenberg, Ingo Pies and Matthias Georg Will, presented their research findings on the subject of financial speculation with agricultural raw materials in discussion with about 20 Bundestag deputies from the CDU/CSU and FPD, as well as representatives from the German Ministry of Food, Agriculture and Consumer Protection (BMELV). On the basis of their study, the researchers established that "long-only" index funds are not responsible for rising prices on the markets for agricultural raw materials, but rather they

tend to stabilise prices. In discussion with the members of the Committee for Food, Agriculture and Consumer Protection, the researchers highlighted that strict measures of regulation would make futures markets function worse rather than better. On 10 July 2013 the researchers were invited to a hearing on the topic of "Trade and Food Security" in the Committee of International Trade of the European Parliament in Brussels.

### **Events scheduled for 2014**

#### **Expert panel on agricultural policy at International Green Week 2014**

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At the Global Forum for Food and Agriculture (GFFA) 2014 "Strengthen agriculture – Secure food", which is hosted by the German Ministry for Food, Agriculture and Consumer Protection during International Green Week in Berlin, IAMO in cooperation with the German Committee on Eastern European Economic Relations is organising an agricultural policy symposium. At the event, entitled "Eastern Europe as a key region for meeting the challenges of food security", international representatives from the political, academic and business communities will discuss ways of shaping agricultural policy so that the enormous agricultural potential of the large Eastern European territorial states can be exploited in a manner which is both profitable to business and environmentally sustainable. This will make a significant contribution to achieving the goal of global food security. The expert panel will take place on



*Expert panel on agricultural policy at International Green Week 2013*

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Friday 17 January 2014, from 13.00-15.00 in Hall 3 of the International Congress Centre ICC in Berlin.

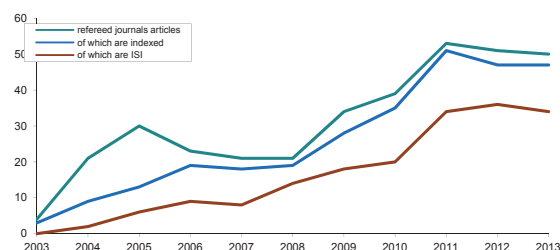
## IAMO Forum 2014

The topic of the next IAMO Forum will be: "The rise of the 'emerging economies': Towards functioning agricultural markets and trade relations?" It will be held from 25-27 June 2014 in Halle (Saale) and is being organised jointly by IAMO, the International Agricultural Trade Research Consortium (IATRC) and the Agricultural Applied Economics Association (AAEA). The focus of the IAMO Forum 2014 is on the functioning and effectiveness of agricultural factor and commodity markets, with particular reference to countries in transition and leading emerging nations. Although some of these countries have recently become more important in the global food trade, their role and what potential impact they can make remains a subject of controversial debate. Here, the Transatlantic Trade and Investment Partnership (TIIP) can help support the multiplicity of trade relations. The IAMO Forum 2014 will present current research findings on this topic. Other areas of focus are food security and the volatility of food prices, especially the question of how speculation impacts the functioning of agricultural markets. Up-to-date information on the IAMO Forum 2014 can be found on the Institute's web site (<http://www.iamo.de/forum/2014#.UnEt9VOWi8U>).

## Publications

Academic staff at IAMO publish their findings in scientific journals, monographs, anthologies and discussion papers. A complete list of publication can be found on IAMO's web site on the Internet ([www.iamo.de](http://www.iamo.de)). The graph below illustrates the development of numbers of refereed and listed articles published in journals by IAMO staff since 2003. From 2003-12, the number of refereed articles with an impact factor, which are listed on the Science Citation Index (SCI) and the Social Science Citation Index (SSCI), rose continually and remained at a high level in 2013. It is clear, therefore, that IAMO's internal quality management for publications continues to be effective.

### *Development of publications in refereed and indexed journals*



Source: *Institute's internal statistics.*

## Discussion papers

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The Discussion Paper series continued in 2013 with the following publications that can all be downloaded free in PDF format from the IAMO web site ([www.iamo.de/doc/##](http://www.iamo.de/doc/##)):

PREHN, S., GLAUBEN, T., PIES, I., WILL, M. G., LOY, J.-P. (2013): Betreiben Indexfonds Agrarspekulation? Erläuterungen zum Geschäftsmodell und zum weiteren Forschungsbedarf, *IAMO Discussion Paper No. 138*, Halle (Saale).

WOLZ, A. (2013): The Organisation of Agricultural Production in East Germany since World War II: Historical Roots and Present Situation, *IAMO Discussion Paper No. 139*, Halle (Saale).

MÖLLERS, J., MEYER, W., XHEMA, S., BUCHENRIEDER, G. (2013): A socio-economic picture of Kosovar migrants and their origin farm households, *IAMO Discussion Paper No. 140*, Halle (Saale).

PETRICK, M. (2013): Competition for land and labour among individual farms and agricultural enterprises: Evidence from Kazakhstan's grain region, *IAMO Discussion Paper No. 141*, Halle (Saale).

PREHN, S., GLAUBEN, T., LOY, J.-P., PIES, I., WILL, M. G. (2013): Der Einfluss von Long-only-Indexfonds auf die Preisfindung und das Marktergebnis an landwirtschaftlichen Warenterminmärkten, *IAMO Discussion Paper No. 142*, Halle (Saale).

WEISS, W., WOLZ, A., HERZFELD T., FRITZSCH, J. (2013): Sozial-ökonomische Effekte des demographischen Wandels in ländlichen Räumen Sachsen-Anhalts, *IAMO Discussion Paper No. 143*, Halle (Saale).

## Studies on the Agricultural and Food Sector in Central and Eastern Europe

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In the series of "Studies on the Agricultural and Food Sector in Central and Eastern Europe" IAMO publishes monographs and conference proceedings that deal with agro-economic issues in Central and Eastern Europe. All publications from volume 22 onwards can be downloaded from the internet free of charge <[www.iamo.de/dok/sr\\_vol##.pdf](http://www.iamo.de/dok/sr_vol##.pdf)>. Until now in the studies-series 29 conference proceedings and 44 monographies have been published. In 2013 the following volumes were published:

WIEBKE MEYER (2013): Motives for remitting from Germany to Kosovo, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 69*, Halle (Saale).

ELENA EPELSTEIN (2013): Effizienz russischer Geflügelfleischproduzenten – Entwicklung und Determinanten, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 70*, Halle (Saale).

PATRICK ZIER (2013): Econometric impact assessment of the Common Agricultural Policy in East German agriculture, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 71*, Halle (Saale).

DIANA TRAIKOVA (2013): Determinants of non-farm entrepreneurial intentions in a transitional context: Evidence from rural Bulgaria, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 72*, Halle (Saale).

BENTE CASTRO CAMPOS (2013): Human capital differences or labor market discrimination? The occupational outcomes of ethnic minorities in rural Guizhou (China), *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 73, Halle (Saale).

## Communication

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IAMO does not only present its work to the scientific community for discussion, but also advises the wider public about research findings and current trends, and provides information tailored for policymakers in business and politics.

The *Policy Brief* series, established in 2011, summarises – in no particular order and in layman's terms – socially relevant research findings by IAMO. The Policy Briefs are aimed at representatives from politics, business and the media, as well anyone with an interest in the subjects they cover. In 2013 we published "Funktionieren osteuropäische Agrarmärkte? Vorsicht vor staatlich verordneten Markteingriffen!" ("Are the Agricultural Markets of Eastern Europe Functioning? Beware of State Prescribed Market Interventions!" IAMO Policy Brief No. 11) and "Das Weizenexportverbot in Serbien. Sind Exportbeschränkungen ein wirksames Instrument zum Schutz gegen Nahrungsmittelpreisinflation?" ("The Wheat Export Ban in Serbia. Are Export Restrictions an Effective Tool for Protecting against Food Price Inflation?" IAMO Policy Brief No. 10.)

In addition to the two aforementioned events in the Bundestag and the European Parliament on agricultural speculation, on 15 May 2013 in Berlin, Daniel Müller and Florian Schierhorn from IAMO met the Bundestag deputy Josef Rief, member of the Committee for Food, Agriculture and Consumer Protection, as part of the event "Leibniz in the Bundestag", organised by the Leibniz Association. They discussed current research findings relating to the potential of agricultural production in Russia, Ukraine and Kazakhstan. On 4 June 2013 in Berlin, IAMO also presented its research on health-related topics as part of the Leibniz Association's Parliamentary Evening "Health and Demographic Change".

The IAMO Newsletter is sent out as an email four times per year, informing specialists and members of the public about new research projects, research visits, events, awards, successful PhDs and current publications. The Newsletter can also be read on our web site [www.iamo.de](http://www.iamo.de), where you can also subscribe to the Newsletter.

Besides hosting expert panels at the Global Forum for Food and Agriculture during International Green Week, Agrotechnica and EuroTier, every year on the Long Night of Science IAMO opens its doors to interested visitors from Halle and the surrounding area. By means of short lectures, on 5 July 2013 academics answered questions such as where milk comes from or what impact agricultural speculation has on food prices.

Our web site, [www.iamo.de](http://www.iamo.de), is currently undergoing thorough revision. The relaunch is planned for spring

2014. Those interested can search here for all important information relating to IAMO, and find out about the Institute's news, events, research projects and publications. All IAMO publications, including the "Studies on the Agricultural and Food Sector in Transition Economies", the Discussion Papers, the Annual Reports, the IAMO Yearbook and the IAMO Policy Briefs are available for download.

Last year IAMO had published 14 press releases by November 2013. These go to the media, ministries, universities and colleges, and organisations. By targeting topical debates and subjects such as agricultural speculation or the impact of the financial crisis on agriculture, our media resonance has increased significantly in recent times. A new resource on our web site [www.iamo.de](http://www.iamo.de) is a collection of links to selected articles from the mainstream and specialist press. These can be found by clicking on the heading "IAMO in the Media".





*View of inner courtyard at IAMO*

## How to find us

### » by car

**From the south:** Leave the A9 motorway at the Rippachtal junction, and take the A38 towards Merseburg. At the Halle-Süd triangle change onto the A143 and follow this road until the Halle-Neustadt/Halle-Zentrum exit. Then take the B80 for about 8km towards Halle until you get to Rennbahnkreuz. At the entrance into town get into the left-hand lane and go straight on along the B80 towards Kröllwitz/Universität. Turn left at the ice-rink and follow Blücherstraße to the end. Then turn right. At the end of the avenue turn left into Theodor-Lieser-Straße. IAMO is in the building on the right-hand side.

**From the north:** Take the A9 motorway (Berlin-Munich) as far as Halle/Brehna. Follow the B100 towards Halle until you reach the outskirts of the city (traffic lights at Dessauer Brücke). Get into the right-hand lane and turn left, still on the B100 to Zentrum and Magdeburg. Turn right immediately into the B6 towards Magdeburg and then take the next exit (Zoo, Wolfensteinstraße). Carry on along Wolfensteinstraße (underpass, several traffic lights, Reilstraße/Große Brunnenstraße crossing) until you reach Burgstraße. Turn right and take the next available left turning over Saalebrücke. Once over this bridge take the first right turning, drive back under the bridge and continue along the embankment of the Saale. Turn left at the next crossroads into Weinbergweg towards Universität, and follow the road until the next set of lights. Continue straight ahead into Walter-Hülse-Straße. The IAMO building is on the right-hand side. Turn right into Theodor-Lieser-Straße and IAMO is now in front of you.

**From the north-west:** Coming from Magdeburg take the A14 (direction Leipzig or Dresden) to the Halle-Peißen exit, then take the B100 to Halle. See "From the north" for further directions.

**From the west (on the B80):** Follow the B80 until the Rennbahnkreuz. At the entrance into town get into the left-hand lane and continue along the B80 towards Kröllwitz/Universität. Turn left at the ice-rink and follow Blücherstraße to the end. Then turn right. At the end of the avenue turn left into Theodor-Lieser-Straße. IAMO is in the building on the right-hand side.

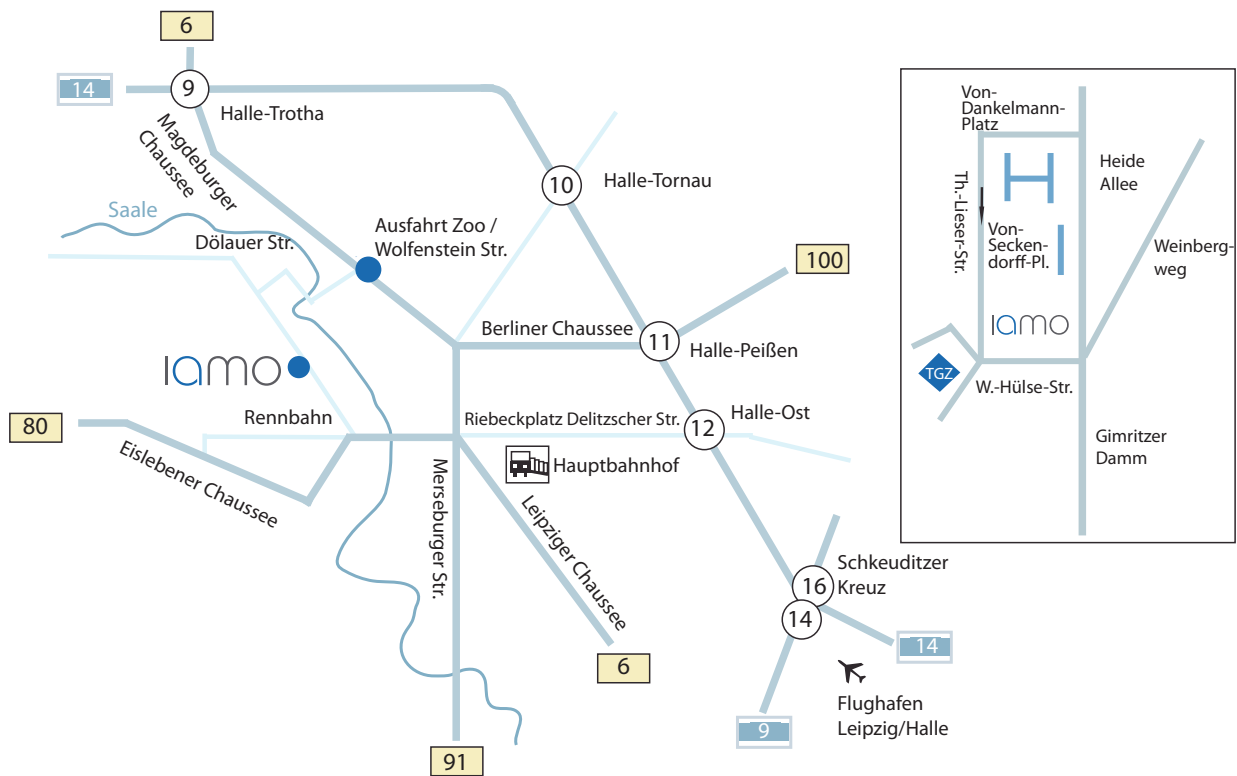
### » by train

Leave the station by the main exit and follow signs to the tram stop "Riebeckplatz/Hauptbahnhof". From here take tram number 4 towards Kröllwitz. Alight at the Weinberg Campus stop (about 15 minutes from the station). The Institute is on the left-hand side of the road as you get out.

### » by plane

Leipzig-Halle airport is 20km from Halle. A regular shuttle train takes you to the main station. See "By train" to find the way from there.







## Publisher's note

IAMO's publications also include the series of in-house *Discussion Papers*, the series *Studies on the Food Sector in Transition Economies*, and the *Institute's Annual Report*.

**Photos** MLU (S. 3), MICHAEL DEUTSCH (S. 9), TIMEA JUNG (21, 90) MARTIN PETRICK (22, 32, 36, 40), JUDITH MÖLERS (S. 50), ALEXANDER PRISHCHEPOV (S. 44, 58), YANJIE ZHANG (S. 60), EEFJE AARNOUTSE (68), PETER DEPES (70), ZHANLI SUN (78, 89), JOHANNES FINDEIS (96, 102), LIUDMILA CHATALOVA (98, 101, 103), ALEX LISSITSA (104, 128, 129), PETER HIMSEL (124)

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