



LEIBNIZ INSTITUTE OF AGRICULTURAL DEVELOPMENT  
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Leibniz Institute of Agricultural Development in  
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## Introduction

Ensuring global food security is the greatest challenge facing agriculture around the world. The growth in cereal production by an average of two per cent over recent years is not enough to feed the Earth's steadily increasing population. Given that farmland is becoming scarcer and that climate change is occurring throughout the world, it is crucial that we exploit all agricultural potential sustainably.

This is particularly the case for emerging economies such as those of Russia, Ukraine and Kazakhstan. In Russia currently huge swathes of arable land are lying fallow. Estimates of the total amount vary substantially, however, from 5 to 60 million hectares. What is more, a future-oriented exploitation of agricultural potential in Russia can only succeed with functioning markets and under favourable political circumstances.

The aim of research into agricultural economics is to determine as precisely as possible the agricultural reserves that exist, and highlight the business and political parameters that are necessary to achieve the targeted increases in productivity. Top research does not, therefore, take place in an ivory tower; it creates understanding and knowledge for practical purposes.

My ministry values IAMO's expertise in the events on global agricultural markets. The Institute is a great help to decision makers in politics and business. IAMO's support of young academics in its partner countries is also exemplary. I should like to thank all the staff for their unwavering commitment.

This publication provides information about the agricultural potential of 1,200 districts in European Russia up to 2030. Another key focus here is the impact of Russian, Ukrainian and Kazakhstani policy on agricultural markets during the two price hikes of 2007-08 and 2010.

I hope you enjoy reading this booklet!

*Ilse Aigner*



*Ilse Aigner, Federal Minister for Food, Agriculture and Consumer Protection*



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## Foreword

The rise in the world's population to nine billion by 2050 presents new challenges to our use of resources. The future of agriculture, world agricultural markets and global food security are key questions of the present day, which are no longer being addressed merely by agricultural experts. Highly volatile agricultural markets and increasing demands on agriculture are causing anxiety amongst the wider public around the world. We only need think of the boom in renewable resources and the lack of success in combating poverty especially in underdeveloped rural areas on one hand, and at the same time of the rapid growth in consumption of resource-intensive meat and dairy products by the urban middle classes in prospering emerging nations. Can agriculture satisfy all these demands in the critical decades up to 2050? Will we have open global markets? Can a productive agricultural and food sector develop in key countries with high agricultural potential to ensure the necessary increase in productivity? To what extent can a possible recultivation of fallow land in the countries of the former Soviet Union and Eastern Europe help? Will rural regions in our partner countries be noticeably left behind, without benefiting from the economic upswing of urban areas? With its decade and a half of research experience in countries which have become global players in world agriculture over the last few years – including the large CIS countries of Russia, Ukraine and Kazakhstan plus China – IAMO makes an important contribution to the search for solutions. Readers can discover this fact for themselves.

IAMO's expertise is recognised far beyond the bounds of agricultural economics. This year, for the first time, the IAMO Forum will be organised in conjunction with the Kiel Institute for the World Economy (IfW) and GIGA, the German Institute of Global and Area Studies. The topic of the IAMO Forum 2011, which will be held on 23 and 24 June is: "Will the BRICs decade continue? – Prospects for trade and growth." Emerging nations – with the BRIC countries Brazil, Russia, India and China leading the way – are well on track to becoming global economic powers. The large emerging nations will shape the agricultural development of the coming decades. The liberalisation of global agricultural trade is thus high up on their agendas. We must also ask what needs to happen in the BRICs to promote sustainable growth and to achieve food security across the globe in spite of rising demands on agricultural resources.

2010 was a successful year for IAMO, in two areas in particular: the raising of third-party funds and high quality publications. Vladislav Valentinov was successful in his application to the VW Foundation for a Schumpeter Fellowship. Since 2006 the Fellowship has been funding research projects in the economic, social and legal sciences, which break new ground and explore the boundaries of their particular discipline. With the 548,000 euros approved for his research project "Third sector organizations in rural development: A theoretical and empirical analysis", Valentinov intends to develop an economic theory of the rural third sector



*The IAMO Directorate (from r. to l.):*

*PD Dr Martin Petrick, Prof. Dr Alfons Balmann, Dipl. Ökon. Hannelore Zerjeski, Prof. Dr Thomas Glauben*

and to test this empirically over the next five years. The DFG also approved funding to the tune of 700,000 euros for IAMO subprojects by the research group "Structural change in the agricultural sector". The subproject "Market structure and organization in agri-food chains: An application to the German dairy sector" by Heinrich Hockmann and Vanessa von Schlippenbach (DIW) is examining structural changes and competitive positions in the value chain for milk. The proposed project by Alfons Balmann and Karin Larsén, "Between Path Dependence and Path Creation: The Impact of Farmers' Behaviour and Policies on Structural Change in Agriculture" deals with structural change and path dependencies. The subject of the project headed by Martin Petrick, entitled "Econometric evaluation of CAP impacts in Germany", is an analysis of agricultural policy measures and initiatives for rural areas.

The annual number of high-quality refereed articles remains at a high level, following big increases in 2008 and 2009. It is an ongoing challenge to all IAMO staff to maintain this positive trend over the coming years.

IAMO's good to excellent achievements in research, education of young academics and scientific exchange would not be possible without the extraordinary commitment of the administrative staff who, as in previous years, have overcome the varied challenges encountered by an international research institute facing stiff competition.

We could not have achieved all this success without the multifaceted support given to the Institute by, in particular, the Federal Ministry for Food, Agriculture and Consumer Protection, the Ministry of Education and Culture of the *Land* of Saxony-Anhalt,

the Ministry of Agriculture and Environment of the *Land* of Saxony-Anhalt, as well as the members of IAMO's board of trustees and scientific advisory board. At this point we should like to highlight the valuable and massive contributions from the ministries and IAMO's committees regarding the Institute's future direction given the backdrop of a global agricultural and food economy which is going through radical change.

This IAMO annual publication documents the key role played by the CIS states in global agricultural markets and explains why their national policies have a global impact on food security. At the same time it is clear that agriculture in transition countries can make important contributions to global food security. For this reason the two main articles in this publication look first at agricultural potential in Russia, approaching the subject with a scientific rigour and precision previously unmatched by any study in the world; and second at state crisis management in Russia, Kazakhstan and Ukraine during the food crisis of 2008, and its national and international impact. On a similar topic is a study of Serbian agricultural market policy during the 2008 food crisis. This is followed by new research findings on the efficiency of Ukrainian wheat production. The focus then switches to food consumption behaviour amongst the Russian population. The sixth article deals with the challenges of climate change for the agricultural administration. This is followed by new research findings on issues of business efficiency in the Eastern German dairy sector. We then look back at the IAMO Forum 2010. Finally, there are two articles dealing with south-west China. The first is on land use and reforestation; the second on ethnic minorities and rural employment.



# The agricultural potential of European Russia

FLORIAN SCHIERHORN, KONSTANTIN HAHLBROCK, DANIEL MÜLLER

## 1 Challenges facing global agriculture

Although massive production increases satisfied the rapidly growing demand for food and feed in the twentieth century, global agriculture still faces huge challenges in the coming decades. By 2050 the world's population will have risen from its current figure of around 7 billion to more than 9.5 billion. Moreover, given rising incomes and changing patterns of consumer behaviour it is expected that the demand for food and feed will double (WGBU, 2009). Further pressure on the demand side is resulting from the cultivation of biomass for energy and material use. In the future it is going to be even more difficult to continue to meet the rising demand with corresponding increases in supply. It seems improbable that there will be any significant rise in the amount of arable land. The best locations for farming are already being used (RAMANKUTTY et al., 2008) and transforming more land for agricultural purposes often comes at a high environmental cost in the form of increased greenhouse gas emissions and losses in biodiversity. In spite of this, there needs to be a significant long-term increase in global agricultural production. This challenge is even greater in view of the current decreases in crop yields in the major agricultural nations (FAOSTAT, 2010), the effects of climate change that are likely to lead to reductions in yields throughout the world (LOBELL and FIELD, 2007), and the constant shortage of water (SIEBERT and DÖLL, 2010). A crucial question of the twenty-first century, therefore, will be

how we can sustainably produce food, feed and energy for an increasing world population.

Within this larger question IAMO is focusing on European Russia.<sup>1</sup> This region (Figure 1a) will play a key role internationally in meeting the increasing demand for agricultural products. European Russia still has substantial agricultural production potential. Great hopes are being pinned on the large abandoned stretches of arable land, and the untapped yield potentials. We only have scant reliable data about the extent of abandoned agricultural land and yield gaps. This paper has used the agricultural statistics available to create the first spatially explicit analysis of the agricultural production potential in European Russia, taking into account the natural geographical conditions in the region.

We will start by looking at the seasonal and geographical heterogeneity of European Russia with reference to the development of total cropland and of crop yields. We will then explain the method used to calculate agricultural potential and present the first spatially explicit map of abandoned land, together with a quantitative assessment of the cropland potential of European Russia. We will finish by looking at prospects for the future and outlining the research that still needs to be carried out in this area.

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<sup>1</sup> We have limited our calculations to the areas of Russia within Europe, which accounts for the overwhelming majority of agricultural production.





*Huangguoshu Waterfall in Guizhou province (China)*

## 2 Post-socialist development paths of Russian agriculture

The abrupt collapse of the planned economy at the beginning of the 1990s was not followed by the development of functioning product and factor markets. Ownership structures are still uncertain today. The serious disruptions and inefficiencies at all levels of the Russian agricultural and food sector meant that, as globalisation progressed, the largest urban centres largely became supplied by imports. Within a few years, Russia's agricultural producers thus lost their most important markets. This serious deterioration in the overall situation of agriculture, together with rapidly sinking profit prospects, led to a massive decline in Russian agricultural production and a rapid increase in the amount of abandoned agricultural land. As a consequence, Russia currently has a substantial level of untapped agricultural potentials.

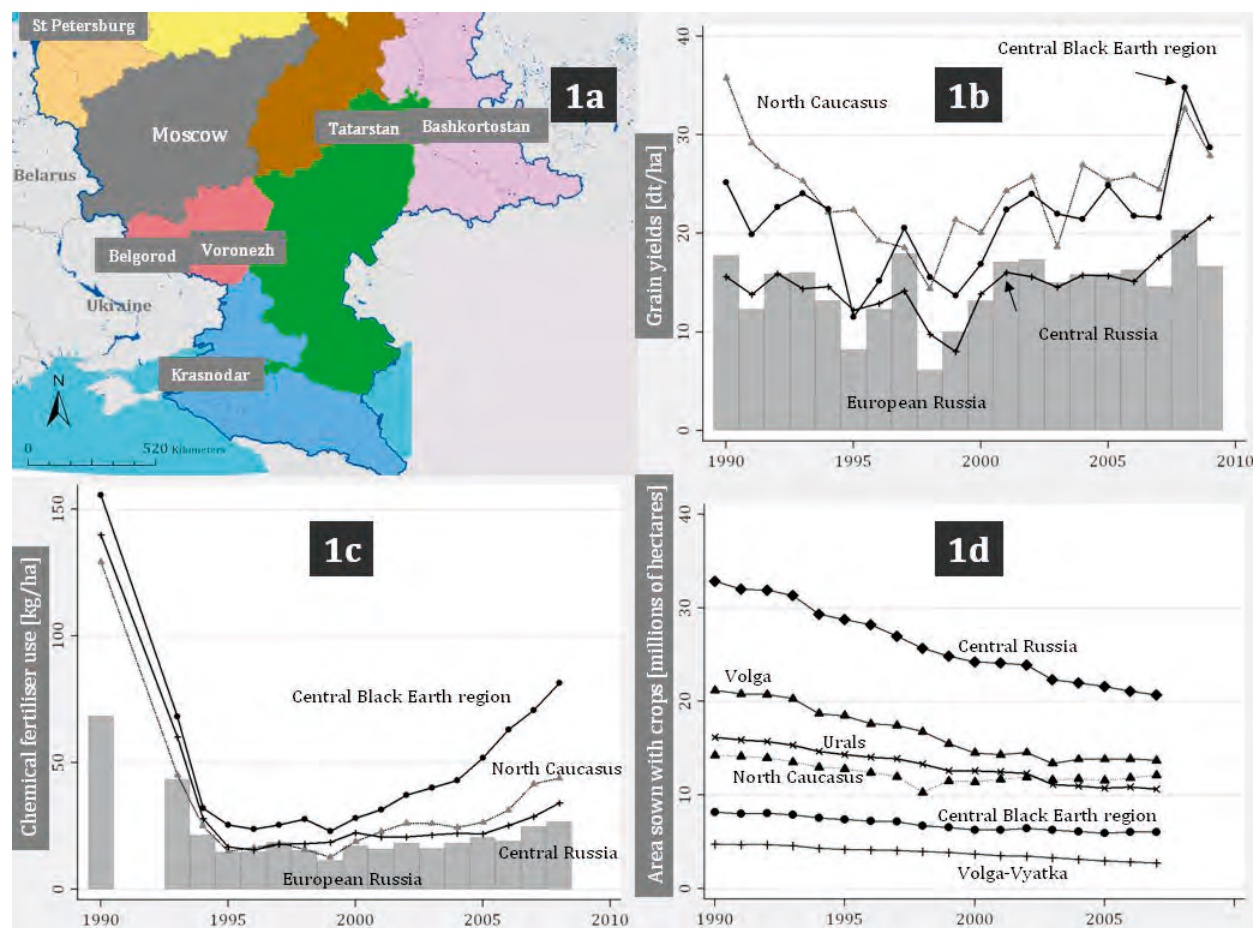
The decade following the collapse of the planned economy was marked by decreasing agricultural yields. The cause of this drastic decline in yields was the reduction in use of key inputs such as high-quality fertilisers, crop-protection products and seeds. In addition, the technological level of machinery and plant facilities was inadequate due to a lack of investment (BOKUSHEVA and HOCKMANN, 2006), while the available information systems with regard to production decisions, marketing, purchasing, organisation and economic management had not been sufficiently exploited (LERMAN, 2001). It is only since 1998 that yields have again been steadily on the increase; currently they have reached a level which is only just higher than that during the final years of the Soviet era. The level of crop production of the early 1980s has not yet been attained again since, however.

Figure 1b illustrates the differences in the volumes and trends of cereal yields in three geographically diverse regions, all of which are important for Russian agriculture. In Central Russia the cereal yields roughly follow the average values for European Russia as a whole (Fig. 1b). Between 1990 and 1995 the use of chemical fertilisers in this region fell dramatically, then rose steadily again, but is still far below the 1990 level (Fig. 1c). In the two southern areas there is a very different picture: over the past 20 years, yields in the Central Black Earth Region, which includes Voronezh and Belgorod, two of the highest-yielding Oblasts (districts) in Russia, have for the most part been far higher than average yields in European Russia overall. Although a negative trend can also be seen in the Central Black Earth region until 1999, yields in the past ten years have risen substantially, and in 2009 were above the 1990 level. In the last few years the use of chemical fertilisers per hectare has also increased significantly, and is currently at twice the level of that in Central Russia. The North Caucasus region is also registering above-average yields. Here, however, the yield levels of the 1980s have still not yet been attained. In comparison to the Central Black Earth region, fertiliser use is low, which suggests that potential yields are high. Given that the North Caucasus region has large amounts of arable land, the agricultural potential here is substantial.

The spatial distribution of abandoned agricultural land is also very heterogeneous (Fig. 1d). Between 1990 and 2007 around 27 million hectares in European Russia were abandoned (cf. section 3).<sup>2</sup> Almost half of this land is located in the region of

<sup>2</sup> We are assuming that abandoned arable land can be classified as long-term fallow land, as a large-scale alternative use of the land can be excluded.

**Figure 1: The development of agriculture in European Russia since 1990**



Source: Own depiction based on data from ROSSTAT (Federal State Statistics Service of Russia. GKS).

Notes: (1a) Regions in European Russia (following Russian Regions Today, 1994), the name of an Oblast is given if this Oblast is specifically referred to in the text; (1b) cereal yields from 1990 to 2009 in three regions (lines) and in European Russia overall (columns); (1c) chemical fertiliser use from 1990 to 2009 in three regions (lines) and in European Russia overall (columns); (1d) Total area sown with crops between 1990 and 2007 in all regions of European Russia.



Central Russia. It was in the 1990s that most land was taken out of production here. This trend has continued over the last ten years in Central Russia, albeit more slowly. In the Volga region, too, about 7 million hectares, or 35 % of cropland was abandoned between 1990 and 2003. Cropland use stabilised after this. In the North Caucasus and the Central Black Earth region, on the other hand, the amount of land taken out of production is negligible. In some instances, land which by the beginning of the 1990s had already been abandoned is now being farmed again. In parts of both regions the geographical conditions for cropping are excellent, and arable farming still represents the predominant land use. The two regions are Russia's most productive granaries.

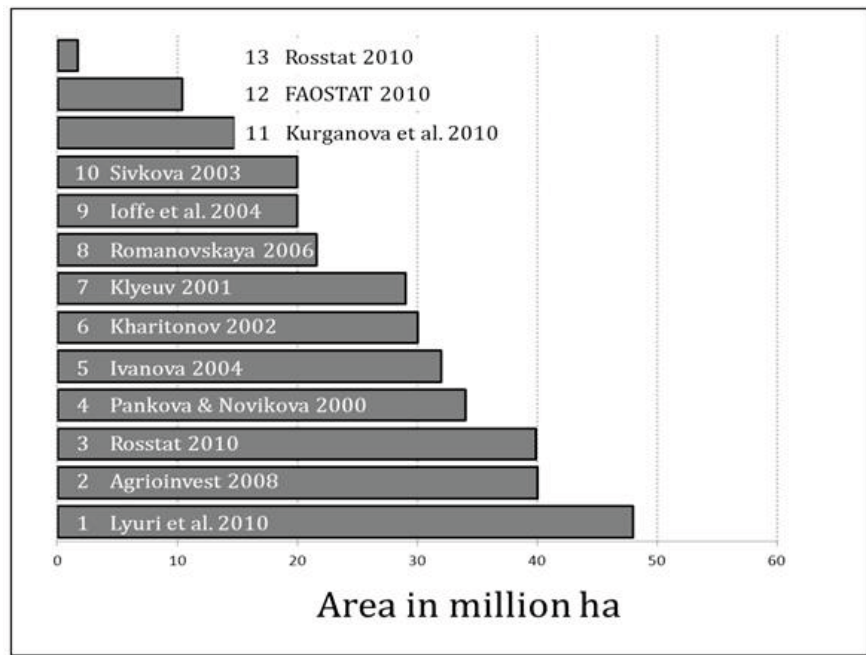
### 3 Analysis of changes in fallow land over time

The amount of land sown with crops in European Russia currently stands at 56 million hectares, thus exceeding the total cropland of all states within the European Union (ROSSTAT, 2010 and EUROSTAT, 2010). Just as striking – and significant with regard to the agricultural potential of this region – is the huge amount of former arable land which is not being used at present. The abandonment of agricultural land in the transition countries of Eastern Europe is one of the largest – and for human beings and the environment most significant – changes in land use of the twentieth century in the northern hemisphere (HENEERY, 2008). From the extant literature and official agricultural statistics, however, we can only paint an extremely diffuse picture of the extent and spatial features of agricultural land abandonment. The Russian land registry (2009) stated that in 2007 there were more than five million hectares of abandoned

arable land. The allocation formula for central government funding for capital and agricultural machinery – even though such benefits were drastically reduced after the end of the Soviet era – is still based on the amount of farmed land, however. It is thus not in the interest of regional policymakers to report correct figures for disused farmland. What happens is that former cropland is systematically put into the category of "grassland use", even though generally speaking the land is not used at all (IOFFE et al., 2004). After 1991 there was a dramatic reduction in the number of livestock; between 1992 and 2008 beef cattle fell by around 60 % (FAOSTAT, 2010). This has resulted in a corresponding drop in demand for pasture and animal feed, which does not square with the significant increase in grassland reported in the official statistics. Given this, the official Russian statistics relating to long-term fallow land must be interpreted with great caution. Selective field observations by IOFFE et al. (2004) and regional remote sensing analyses (HÖLZEL et al., 2002) support this hypothesis. IOFFE et al. (2004) also use the official statistics of the Russian land registry to calculate abandoned agricultural land, but they interpret the changes of arable land and land reportedly sown with crops<sup>3</sup> over time, and in this way estimate that by 2001 20 million hectares of formerly cultivated cropland had been taken out of crop production. Other sources, some of which provide no information as to how they have calculated their figures pertaining to abandoned agricultural land, and also refer to different time periods, estimate the total amount of abandoned agricultural land to be between 20 and 58 million hectares. Figure 2 brings together all the accessible sources

<sup>3</sup> IOFFE et al. (2004) state that the reported figures for land sown with crops are comparatively realistic at the level of the administrative district (Oblast).

**Figure 2: Calculations/estimates of the total amount of disused arable land in Russia**



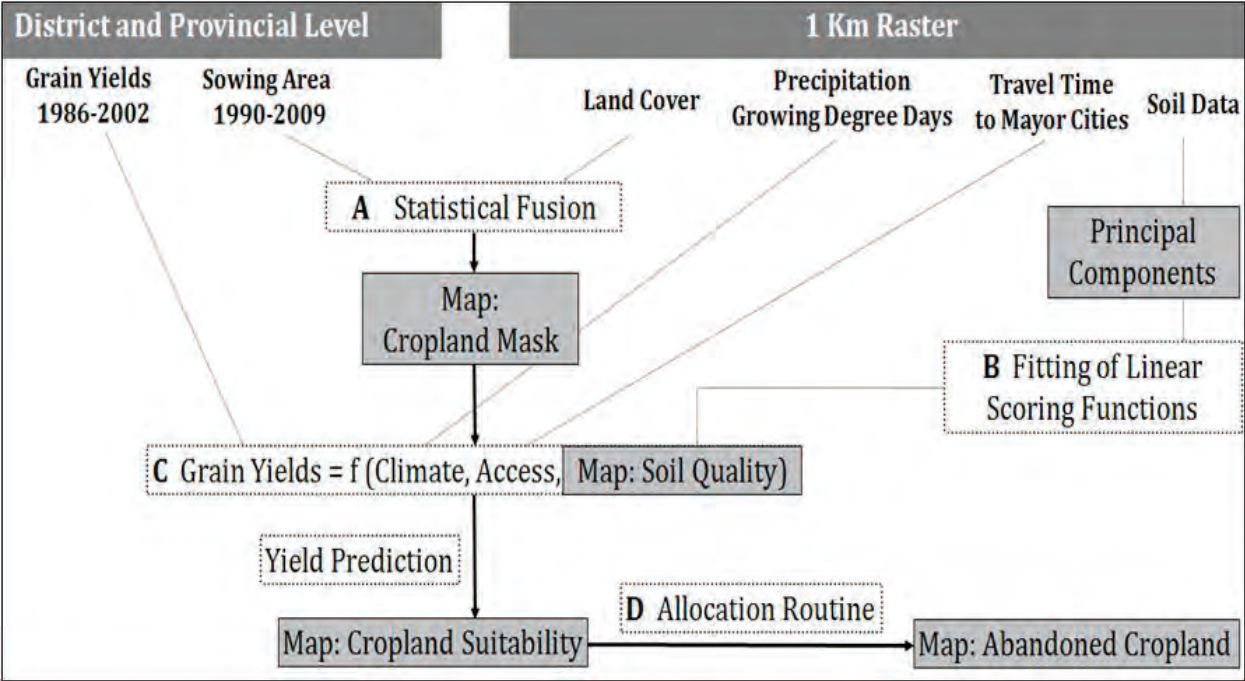
Source: Own depiction based on data from the sources listed.

that provide estimates of abandoned agricultural land in Russia, and illustrates the considerable discrepancy between the various estimates.

Official statistics relate to administrative units. Within these, however, the geographical conditions of the abandoned land are not known, nor is the time when the land was abandoned. This information is essential, however. Knowledge about how long land has lain fallow allows conclusions to be made about the succession of flora and fauna. This is important because the more the land is colonised by flora and fauna, the greater

the economic and environmental cost of conversion to agricultural land use (VUICHARD et al., 2008). The sustainability of recultivating abandoned agricultural land is dependent on, for example, the volume of carbon stored in the vegetation and soil of abandoned land, which would be released again through recultivation. The biodiversity of flora and fauna which has adapted to the abandoned land would also be negatively impacted. For these reasons, detailed, locally specific information is needed on the condition of abandoned land and how it is changing over time. This information will allow us to identify sustainable uses for abandoned agricultural land in European Russia.

Figure 3: Methods for mapping abandoned agricultural land



Source: Own depiction.

Notes: Sources relating to footnotes are: 1 RosSTAT, 2005; 2 RosSTAT, 2010; 3 GLOBCOVER/MODIS/GLC2000; 4 WORLDCLIM (HUMANS et al., 2005); 5 GAEZ, 2000 (IIASA); 6 Travel time to major cities (NELSON, 2008); 7 EUROPEAN SOIL DATABASE/SOIL TERRAIN DATABASE (SOTER).

### 3.1 Spatial allocation model

The model for mapping agricultural land abandonment is based on the assumption that cropland is mainly taken out of use in relatively marginal, i.e. poor yielding areas. The central function of the model is to combine official statistics and spatially explicit data which assess the suitability of a particular location for cropping (Figure 3). The location of cropland is determined by the suitability for cropping.

First of all, satellite-assisted land cover data delimit the rough location of cropland. Using mathematical procedures these data sources approximate the land cover at the time of recording by means of the spectral characteristics of each observation (or each cell in a geographical information system, GIS). There is, however, great uncertainty regarding the available land cover data, especially for classes such as grassland and cropland, which are similar spectrally.

Moreover, satellite images are limited in the information they can provide about actual land use. Given this, we are merging three frequently used global satellite pictures,<sup>4</sup> working on the assumption that land assigned to the same category of land cover by two or more images has a higher probability of being classified correctly. This approach provides us with a reference area of arable land. In a statistical regression analysis at district level the aggregated satellite-based land cover data could account for 92 % of the highest and 95 % of the lowest registered sowing area between 1990 and 2009.

In each year (1990 to 2009) and in all of the 52 Oblasts the reference area of arable land calculated must be larger than sowing area (cropland) registered in the statistics, so that the entire area of sowing land can be completely spread over the reference area of arable land. This land has the function of a rough spatial mask, whereby the distribution of sowing area within the reference area of arable land is organised corresponding to relative suitability of cropland. Thus we can determine that the reference area of cropland in all years and regions is at least 20 % larger than the highest registered area of cropland. In some regions, and especially for the early 1990s,<sup>5</sup> this surplus can only be attained if additional combinations of land cover are added to the base cropland.

In our model, the relative suitability of land for crop cultivation is determined by the specific natural conditions – a combination of soil and climate data – and the infrastructure connections of the cropland. Soil quality is assessed for its yield capacity

<sup>4</sup> See Figure 3 for the products used here.

<sup>5</sup> All the satellite images used here record the expansion of arable land after 2000, which means that, as expected, the high level of the early 1990s is underrepresented.

by means of a linear index which provides a spatially explicit definition of the soil conditions for the determined reference area of cropland. A principal component analysis is used for this. Such an analysis organises the numerous soil parameters of the *European Soil Database* and the *Soil Terrain Database (SOTER)*, which the literature asserts to have a proven influence on agricultural yields. The relative weighting of the principal components is carried out using a method developed by ANDREWS et al. (2002). Finally, the main components are given a specific function (the so-called "scoring function") which depicts the functional connection between the soil parameters and the yield level. The median of the district-wide values of the main components is then calculated, and linked graphically with the mean cereal yields of the roughly 1,200 local districts in European Russia. These scatter plots provide characteristic threshold values to which the empirical functions are adjusted. The calibration of the soil quality index is based solely on the cereal yields, and so does not cover the entire spectrum of agricultural products. Having said that, cereal cultivation is the most widespread type of farming and, according to expert opinion, this product provides an accurate reflection of the essential geographical contrasts of the soil conditions.

In order to estimate a cropland suitability index we statistically related grain yields with the soil quality, accessibility, and climate parameters at the district level in European Russia.

As its basic unit this model uses the combination of satellite-based land cover data. Depending on the statistical distribution of the parameters of the vector of independent variables, the median or mean at local district level is used as the independent variable. The regression coefficients of all independent variables

are highly significant and have the expected sign. The natural and infrastructural suitability explains 60 % of the variance of the cereal yields at local district level and thus seems very apposite for providing a spatially explicit description of land abandonment, too. In the next stage, the coefficients from the regression model (at local district level) are multiplied with the values of the independent variables (soil index, climate variables, as well as infrastructural connections to market centres) at the level of the cell in the GIS. The yield values calculated in this way are then turned into a linear index which depicts the cropland suitability in all of European Russia with a spatial resolution of one square kilometre.

The mapping of abandoned land is based on the assumption that, following the collapse of the Soviet Union, cropland was chiefly abandoned in those places which were relatively poor for farming crops. Starting from this assumption the registered sowing area for each year from 1990 to 2009 is distributed amongst those locations which are better suited for cropping. Land which during the period under observation entered a different land use category is defined as abandoned land. In addition, the year of this change in land use is identified for each cell, thus giving us the period of time the land has been abandoned. This is crucial for calculating the potential carbon emissions, for example, which would result from a recultivation of the abandoned land. Temporary fallowing, as part of agricultural rotation practices, as well as extensive grassland use of former cropland, are thus disregarded. We make the assumption, however, that the proportion of cropland which is left fallow is basically constant from year to year, and that the proportion of extensive pasture on former crop fields is insignificant. The abandonment of pastureland which was previously farmed is not captured here.<sup>6</sup>

<sup>6</sup> The reason for this is the assumption that land converted from pasture to arable cannot be classified as having sustainable agricultural potential.

### 3.2 Development and extent of abandoned land

This study provides the first map showing abandoned land for all of European Russia (Fig. 4), which is high resolution both spatially (the size of cells is 100 hectares) and temporally. The point in time at which arable land is taken out of use is documented for each year between 1990 and 2009. According to this mapping, abandoned land in 2009 amounted to just above 27.4 million hectares, a figure around the middle of those cited by various commentators (cf. section 3 and Fig. 2).<sup>7</sup>

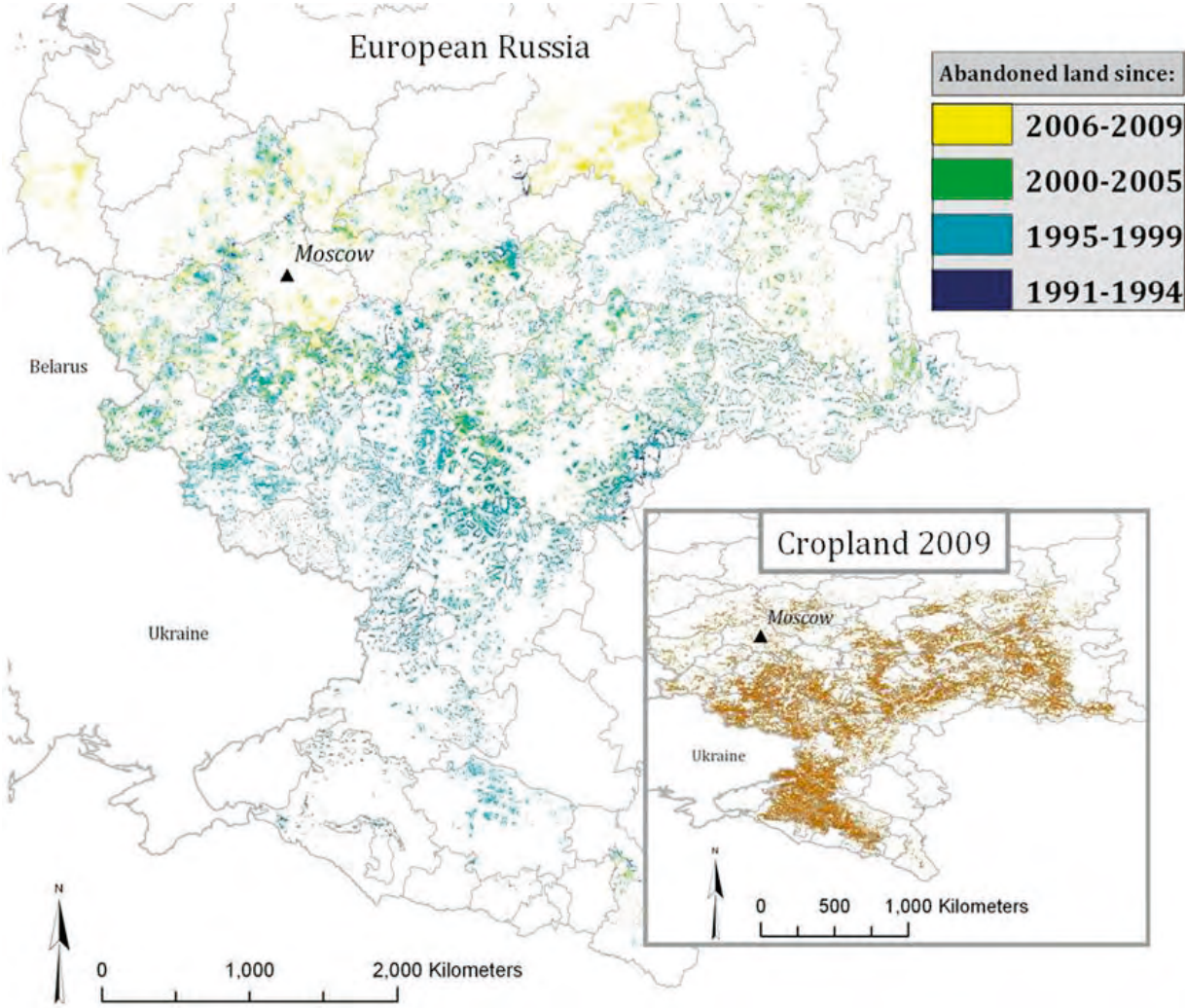
Figure 4 shows that abandoned land is mainly concentrated in areas which are disadvantageous for cropping. In the north the high proportion of abandoned land can be explained by the short growing seasons and unfavourable soil conditions. There is also a geographical concentration in central regions. Here there was a large-scale abandonment of agricultural land along a north-south oriented precipitation gradient with a geographical concentration in the dry steppe regions on the Russian-Kazakhstan border in the north-west. By contrast, regions which exhibit an above-average suitability for cropping are characterised by a low proportion of abandoned land. Districts such as Voronezh, Belgorod and Krasnodar have a variety of local advantages for cropping, in particular sufficient rainfall in normal years and fertile black soils. These places have obtained – and still do – the highest yields in Russia. Since the collapse of the planned economy, only small tracks of agricultural land have been abandoned in these favourable regions (cf. Fig. 1d).

As far as the time dimension is concerned it is conspicuous that almost 70 % of current abandoned land was taken out of

<sup>7</sup> Unlike the estimates in Figure 2, where figures given for the area of abandoned agricultural land refer to the whole of the Russian Federation, ours refer to abandoned agricultural land in European Russia only.



Figure 4: Abandoned agricultural land (2009)



Source: Own calculations and depiction.

agricultural use in the first ten years after the collapse of the Soviet Union. Especially in the southern and central regions the dynamic of land abandonment has largely come to a halt, whereas in more northerly regions smaller areas of land have been taken out of production even since 2000. Because of the massive abandonment of agricultural land as a direct reaction to the severe transition crisis at the start of the 1990s, large chunks of current abandoned land are at advanced stages of abandonment. For reasons of climate protection the recultivation of these areas is thus not sustainable, as the change would be likely to produce high levels of greenhouse gas emissions.

## **4 Identifying location-specific yield potential**

### **4.1 Spatially explicit efficiency analysis**

In European Russia agricultural potential is made up of abandoned land and regional yield potential. We are combining methods from classical agricultural economic efficiency analyses with spatially high-resolution biophysical and geophysical data. Our goal is a large-scale mapping of location-specific yield potential.<sup>8</sup> This approach is based on the assumption that crop yields are determined by both the location (soil and climate conditions as well as infrastructural connections) and the arable production level of the farms. We assume that local districts that are equally suitable for cropping will produce uniform yields given the same business efficiency. Thus yield differences between farms in same-quality locations are a result

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<sup>8</sup> We have yet to devise a crop growth model for European Russia, as we do not yet have a full set of the necessary production data such as regional figures for chemical fertiliser use. This means that it has not been possible to calculate location-specific and natural upper limits for yields or natural yield potentials.

of inefficiencies in the agricultural enterprises themselves. They can be minimised by standardising production techniques. Thus if we assume an equal suitability for cropping, yield differences at the local district level describe farm inefficiencies. A simple example illustrates this: with an equal suitability for cropping, district A achieves a wheat yield of 30dt/ha, district B produces 48dt/ha, and district C 60dt/ha. We will assume that currently district C has an almost optimal level of production. In this example, therefore, districts A and B are exploiting, respectively, 50 % and 80 % of their yield potential. Viewed in this way, districts A and B still have relative yield potentials of 50 % and 20 %, respectively.

All regions with the same suitability for cropping and the highest yield level together make up the maximum production-possibility curve, also known as the production-possibility frontier. As the relations between an increase in suitability for cropping and the yield level are not linear, to estimate this curve we use an econometric approach from the efficiency analysis – the so-called Stochastic Frontier Analysis (SFA). This approach goes back to AIGNER et al. (1977); it is a parametric approach which permits a robust estimation of inefficiency. A translog function is estimated as this is flexible and contains other functional forms as special cases. For analysing the existing data, this is preferable to a Data Envelopment Analysis (DEA), as stochastic effects cannot be verified in the DEA. The DEA cannot, therefore, provide a coherent picture of the data (COELLI et al., 2005).

### **4.2 Location-specific yield potentials**

Because of the geographical heterogeneity of European Russia, yield potentials of crops there need a differentiated examination

and interpretation. Figure 5 shows high relative (location-specific) yield potentials in the eastern and south-eastern Black Earth region (to the east and south-east of Voronezh Oblast). They are also widespread in the northern part of European Russia. Whereas in the south-eastern Black Earth region huge areas of cropland sit side by side with a large amount of abandoned agricultural land (cf. Fig. 4) and thus the agricultural potential is high, as we move north the proportion of all cropland falls, and the high relative yield potential of the cropland has only a limited effect on the agricultural potential of European Russia as a whole.

By undertaking an interregional yield adjustment, the model calculates low yield potentials for the Oblasts of Voronezh and Belgorod in the central Black Earth region, Moscow, St Petersburg, and Krasnodar in the southern North Caucasus, as well as for Baschkortostan in the Urals. These regions are characterised by a high intensity of agricultural production by Russian standards (cf. Fig. 1c). As far as suitability for cropping is concerned, and in an interregional comparison (with other districts in European Russia), they achieve above-average yield levels. It must be noted that yield increases in these high-yield Russian locations are expected, too, even though up till now the spatial *Stochastic Frontier Analysis* has not been able to depict these.<sup>9</sup>

<sup>9</sup> We do not have yield data for the entire period for all 1,200 districts. Complete data for the entire area under study only exist for some years. This means that we cannot at present calculate any concrete growth prognoses for high-yielding locations. We can, however, approximate the yield increase in our scenarios (cf. section 5). With translog functions it is possible to calculate the growth rates of the stochastic frontier and future calculations will aim to achieve this.

## 5 The agricultural potential of European Russia in 2030

The calculation of the agricultural potential of European Russia in 2030 is based on a synthesis of the mapping of abandoned agricultural land (section 3) and the spatial yield estimates (section 4). By taking into account sustainability criteria, abandoned land can be directly offset against agricultural potential.

Yield increases will mean that current levels of crop production can in the future be obtained on a smaller area of land. From a virtual perspective, therefore, land will be available for additional crop cultivation. To put it another way, we are identifying those areas of cropland which, as a result of yield increases, will not be needed to attain the current crop production level. We then define various yield scenarios for "surpluses" as well as the arable land currently being farmed, and finally calculate agricultural potential for 2030. The agricultural potential indicates the crop volumes that can be cultivated in addition to the current production level. These volumes are given in cereal equivalents.

### 5.1 Scenarios depicting future yields and abandoned land

The yield levels for cereals in 2030 are calculated in three scenarios:

#### Scenario 1:

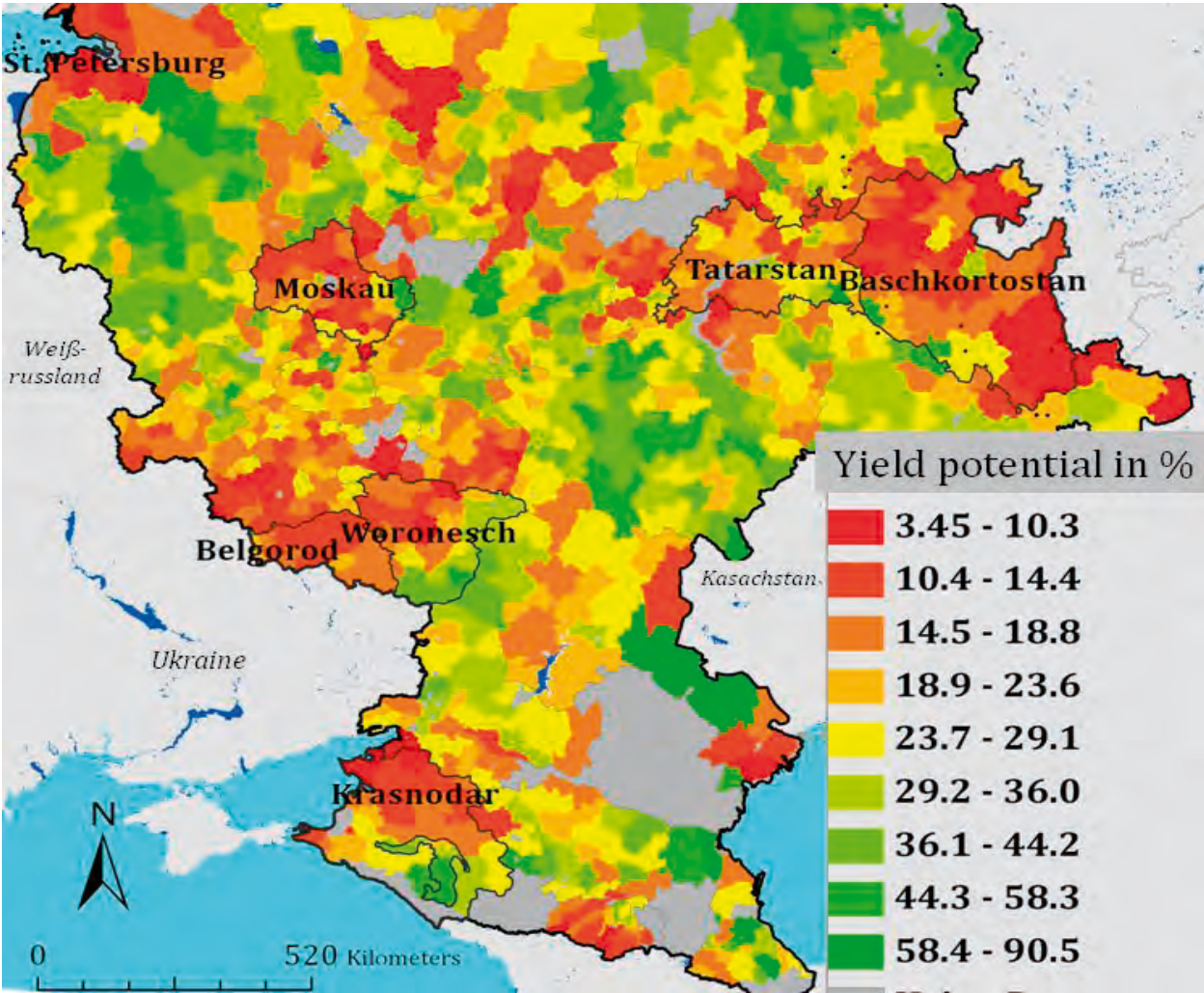
The location-specific yield potential is attained by overcoming the relative yield differences between locations with equal suitability (see section 4).

#### Scenario 2:

Technological progress of 2 % per year in all regions, approximated by an annual yield increase of 2 %.



Figure 5: Location-specific yield potentials at district level



Source: Own calculations and depiction.

Note: A yield potential of 3 % means that the location-specific yield potential in a particular district is currently exploited to 97 %.

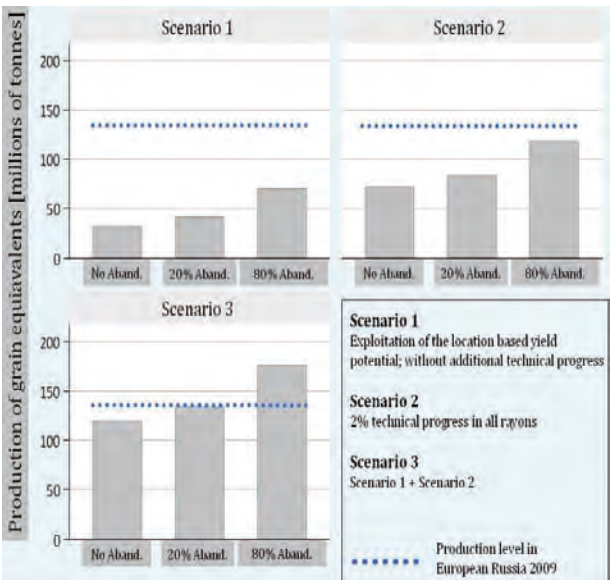
**Scenario 3:**

An aggregate of scenarios 1 and 2.

We are also assuming that the recultivation of abandoned land will mean that the current area of cropland will be increased by an unknown value  $A_x$ , and that an additional volume of crops will be produced on this land. We are assigning an equal yield potential to areas of abandoned agricultural land in 2009, but are working on the assumption that the virtual yields of disused land are 20 % lower than the yield level of the corresponding district in the base year (2009). This takes into account the fact that

abandoned agricultural land is of marginal agricultural value. According to our calculations, in 2009 more than 27 million hectares of cropland were abandoned, although it is unclear what proportion of this can be returned to agricultural production sustainably. The ongoing succession of flora and fauna, as well as the regenerating carbon reservoirs above and below the surface of the soil, restrict the amount of land that can be sustainably turned over to cropping. Given this, we have produced three scenarios in which 0 %, 20 % and 80 % of current abandoned agricultural land has been transformed into cropland. The allocation model starts by recultivating those areas of land which were abandoned in the most recent years before 2009, and then includes older areas of abandoned land until the threshold values for the proportion of current abandoned land (20 % and 80 %) are attained. We are taking into consideration the fact that the environmental-economic costs of recultivation increase over time due to natural processes of succession.

**Figure 6: Agricultural potential of European Russia**



Source: Own calculations and depiction.

Note: The dotted blue line marked in each scenario shows the current production level in European Russia and allows a comparative assessment of the different potentials.

**5.2 Production prognosis for 2030**

In relation to the available area of cropland and the regional yield potentials, the current level of crop production in European Russia is low. Our model thus forecasts a significant agricultural potential for 2030, in conservative as well as optimistic scenarios. Nonetheless, there is a huge variation in potentials, depending on how the yield develops and the amount of recultivated abandoned land (Fig. 6).

Taking the simulations in which 20 % of current abandoned agricultural land, or 5.5 million hectares, is recultivated by 2030, the growth in cereal equivalents in all yield scenarios is relatively low compared to the simulations in which none of today's abandoned land is included in potential farmland. As we must assume that to begin with it will be more recently abandoned

## 6 Conclusion and outlook

land which is brought back into production, and that this assumption is based on the spatial allocation model, a higher than average share of the land identified by our calculations will be from the northern regions. In these regions the absolute yield potential is limited by local natural factors, and thus the aggregate agricultural potential is correspondingly low.

The three yield scenarios produce substantial differences in the estimates of agricultural potential. Assuming a single interregional yield adjustment corresponding to the suitability of the location without any recultivation of abandoned agricultural land (scenario 1) the average annual yield increase in European Russia will be around 1 %. In view of an average yield increase rate of 3.3 % in Russia (2004-2009, FAOSTAT, 2010), this scenario must be seen as conservative. And yet, even with these very restrictive assumptions, and without any recultivation of abandoned land, crop production will increase by about 25 % by 2030, which is 36 million tonnes of cereal equivalents. A production increase of more than 50 % would be possible if there were a 2 % technological progress and if 20 % of current abandoned land were recultivated (scenario 2). If annual technological progress, or yield increase is 2 % and 80 % of abandoned land is recultivated, then the current level of crop production almost doubles. If a location-specific interregional yield adjustment occurs, accompanied by an additional 2 % annual yield increase in all regions (scenario 3), this production level can be attained almost without any conversion of long-term abandoned agricultural land. This corresponds roughly to the total cereal production of Canada, Australia and Ukraine in 2009.

Because of accelerated climate change and the fast pace of globalisation, the natural and economic parameters of global agriculture are currently undergoing radical change. Operating in substantially more difficult conditions and faced with increasing demands – think, for example, of the boom in renewable raw materials – agriculture has to supply a growing world population with food over the coming decades. This can only be achieved sustainably if we can find ways of minimising the way the agricultural sector impacts damagingly on the global climate system and ecosystem services. In the face of these challenges, Russia, with her huge natural potential to increase agricultural production, will play a key role.

This study provides the first statistically based, spatially explicit estimates of agricultural potential in European Russia. Using spatially explicit models, and basing our analysis on comprehensive and current agricultural statistics, as well as natural geographical data, we have been able to calculate the areas of cropland and abandoned agricultural land, and the corresponding yield potentials. The various future scenarios regarding yield development and recultivation of long-term abandoned land relate the agricultural potential to alternative agro-economic developments and demonstrate that, even taking conservative assumptions, crop production in European Russia will rise by about 25 % by 2030. A doubling of production is possible with higher growth rates of yields, or by recultivating a larger proportion of current abandoned agricultural land. This cannot take place without considerable efficiency and productivity increases in Russia's farms. Until now, however, even the most fundamental requirements of agricultural policy have been lacking, quite

apart from the lack of functioning markets. With improved conditions and parameters, Russia could massively increase her agricultural exports, achieve huge amounts of export income, and also reduce the price pressure on the global agricultural markets.

It is still uncertain to what extent these increases in production can be achieved sustainably. Further studies are therefore needed. Researchers at IAMO are working on the calibration of a spatial crop growth model, to enable the analysis of the impact of future regional climate change on crop yields. The modelling of carbon dynamics on abandoned agricultural land will also provide a more accurate estimation of greenhouse gas emissions produced by a recultivation of abandoned land. Finally, analyses of competition between various land uses should allow a more accurate appraisal of the associated costs and uses and thus provide major assistance for policymakers and investors in their efforts to develop sustainable land use.

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*Water wheel in Changan  
(Guizhou province, China)*

# Food crises and price surges on global wheat markets: Protectionism and market reactions in the East European "cereal nations"

LINDE GÖTZ, THOMAS GLAUBEN

## Introduction<sup>1</sup>

Although July and August 2010 saw short-term price increases on the global cereal markets similar to the price surges during the food crisis of 2007-08, cereal prices rose to a lower level than those during the 2007-08 food crisis (Fig. 1). In spite of slumps in the wheat harvest, particularly in Russia, Ukraine and Kazakhstan, it is estimated that global wheat production for 2010-11 will be around 5 % higher, and that global wheat stocks around 25 % higher than during the 2007-08 food crisis. The global wheat supply is thus deemed to be secure (FAO, 2009, 2010b; FAN, 2010).

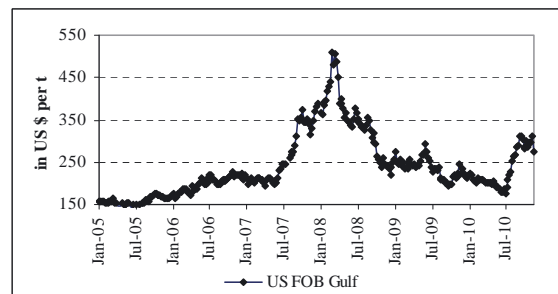
This notwithstanding, the Russian and Ukrainian governments have intervened in their markets, just as with the 2007-08 food crisis, and have either placed a temporary restriction on agricultural exports, or stopped them altogether. The imposition by Russia of an export ban, which Ukraine followed shortly afterwards with the introduction of an export quota, are seen as major reasons for the renewed price increase in 2010 (FAO, 2010a and 2010b; FAN, 2010).

The price boom on global wheat markets in 2007-08 was caused by a combination of different factors such as the rise in price of crude oil, the substantial devaluation of the US\$, historical lows in global cereal stocks, and the expansion of subsidised biogas

<sup>1</sup> This paper is based on the following studies: DJURIC, GLAUBEN, GÖTZ and PEREKHOZHUK (2010), and GÖTZ, GLAUBEN and BRÜMMER (2010).

production. By contrast, the most recent price hike is due to the extraordinary climatic conditions which led to major harvest failures, especially in Russia, Ukraine and Kazakhstan. The resulting market effects were exacerbated in particular by Russian and Ukrainian restrictions on wheat exports and also by speculative influences (FAO, 2010; FAN, 2010). The current price hike could develop into a food crisis if export bans and panic buying escalate and if there is exaggerated speculation on agricultural markets over further price increases (FAN, 2010).

**Figure 1: Development of global wheat prices January 2006-November 2010**



Source: FAO.

Restrictions on exports imposed by major exporters of cereals have a negative impact on food security in two ways. First, export bans reduce the supply on the global market, which means the global market price increases further and even more people fall into poverty as a result of rising agricultural and food prices,

or poor people become even poorer and hunger becomes a more serious problem in many regions of the world. Robert Zoellick, the president of the World Bank, talks about "seven lost years in the battle against poverty" in relation to the food crisis. More recent studies highlight the fact that these fears are not unjustified. DE HOYOS (2009), for example, estimates that up to 150 million people across the globe fell into extreme poverty (1.25 US\$ per day) as a result of the food crisis. Here we can expect to find both large differences between blocks of countries and gradual differences between rural and urban areas in the individual countries themselves. Thus Eastern Asia is the most severely affected, with around 100 million people who fell below the poverty line in the wake of the food crisis, whereas the number in Central and Eastern Europe, at 200,000, is comparatively low (DE HOYOS et al., 2009).

The second consequence of an export ban is an increase in the supply on the domestic market, which means that the internal price level falls below the global market price. This stifles investment and production incentives, thereby hindering agricultural development. In this regard we should note that increasing global market prices for agricultural goods are also associated with substantial opportunities, as Jack Diouf from the FAO explains: "Higher food prices are not just a threat, they offer opportunities". Rising prices for agricultural goods improve incomes in the agricultural sector and rural areas, in which 70 % of the world's poor live. Price-induced investment and production incentives also boost global food security in the medium and long term.

Greater use of previously "fallow" land and untapped productivity potential will mean that particularly large cereal exporters, such as Russia, Ukraine and Kazakhstan, but also Argentina

and many sub-Saharan African countries will become very important for increasing the global production of cereals, and for international trade in cereals.

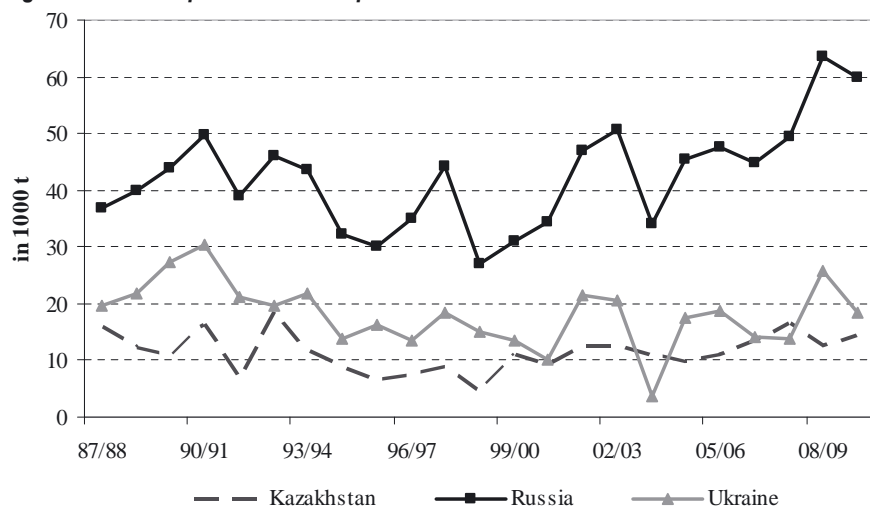
Crucial for "success", however, is that the increased global prices are reproduced on the national markets to trigger incentives for investment, production and export. The extent to which changes in world market prices are reflected on national or local markets determines the degree of integration into national and international markets. This depends overwhelmingly on national trade and agricultural policy, local market competition, and the competitive environment.

Owing to the imposition of export bans (Kazakhstan 2007-08, Russia 2010), export quotas (Ukraine 2007-08) and prohibitive export tariffs (Russia 2007-08), it is doubtful that the high international cereal prices are reproduced to any great extent in national and local markets in these countries, or that they give rise to any substantial production and export incentives. It is far more likely that the national markets have been isolated from price developments on global markets, exports prohibited, and domestic cereal markets significantly destabilised.

This is the starting point for the remainder of our paper. The following section illustrates the importance of Russia, Ukraine and Kazakhstan for the global wheat market and future food security. The section after that describes the panicky state interventions in national wheat markets, after which there will be a discussion of the impact of these on national wheat markets. Here the focus is on the consequences for stability, equilibrium and the integration of national cereal markets into global markets. The final section weighs up whether there was good crisis management in these countries.



**Figure 2: Development of wheat production 1987-2009**



Source: USDA PSD ONLINE (2009), own depiction.

### Importance for global wheat markets

Over the last few years Russia, Ukraine and Kazakhstan have greatly increased their wheat production and are now amongst the largest wheat exporters in the world. With its excellent soil quality and climate, the Black Sea region offers ideal conditions for cultivating wheat. Almost all of the territory of Ukraine and large areas of Russia, especially the southern and central regions of Russia, boast high-quality soil. By contrast, the soil quality in Kazakhstan is very low, and because they have extremely cold winters the high-yielding winter wheat cannot be farmed there. It is mainly summer wheat, therefore, which is farmed in the Kazakhstan steppe regions.

Good soil quality and the availability of unused areas of land in these three countries offer great potential for increasing wheat production, something which is not currently being exploited (EBRD/FAO, 2008).

In 2009-10 wheat production in Russia was around 60m tonnes, in Ukraine about 20m tonnes, and in Kazakhstan around 15m tonnes. This means that these three countries produce a total of almost 100m tonnes, which corresponds to 14 % of global wheat production. Russia is responsible for 9 % (like the USA), Ukraine 3 % and Kazakhstan 2 % of global wheat production (USDA PSD ONLINE, 2009).

The drop in cereal production during the transition crisis in the nineties was caused by the reduction in the amount of land used for wheat cultivation as well as large falls in productivity. In recent years, fallow land is increasingly being cultivated again and greater yields are being achieved.

In the opinion of many experts, productivity increases are the result of the rise of highly integrated large-scale enterprises, so-called agroholdings, which bring investment, new technologies and

better management structures to the sector (WANDEL, 2007). Many of these agroholdings are focusing on cereal or wheat production, not least because of the favourable export opportunities.

At present the area in the three countries given over to wheat farming comes to around 50m hectares, which corresponds to about a fifth of the total global area farmed with wheat. The 29m hectares farmed with wheat in Russia (13 % of the total global area) is even larger than that of the EU as a whole. In Ukraine and Kazakhstan the area farmed with wheat is 14m ha (9 % of global total) and 7m ha (6 % of global total) respectively. Average yields are: in Ukraine, 2.8t/ha; in Russia, 2.1t/ha; and in Kazakhstan, 1t/ha. By comparison, the average wheat yield in the EU is 5.2t/ha; in the USA, 2.8t/ha; and in Canada, 2.3t/ha. The global average is 2.9t/ha (USDA PSD ONLINE, 2009).

Given the positive developments since 2000, experts are predicting that wheat production in the three countries will rise by 50-100 % by 2020 to about 150-230 tonnes per year. This could be achieved by massively expanding the area of land given over to wheat farming, by about 11-13m ha, and by a significant increase in yield levels. According to estimates, Russian yield levels could reach those of Canada (2.3t/ha); Ukrainian yields those of France (6.3t/ha); and yields in Kazakhstan those of Australia (1.7t/ha) (EBRD/FAO, 2008).

During the period of transition, Russia, Ukraine and Kazakhstan all established themselves as important wheat exporters on the global market. Whereas the Soviet Union in its last years (1987-91) was a net importer of cereals by 35m tonnes, in 2009 the former states of the Soviet Union were net exporters of cereals by 55m

tonnes (LIEFERT, 2010). Besides the aforementioned increase in productivity and expansion of arable land, this is a result of the large drop in the highly subsidised and cost-intensive animal production of the past. After all, this was based on high levels of cereal feed imports. All the factors cited meant that there was a pronounced reduction in the domestic demand for cereals and that large volumes were available for export.

At present Russia is of the five largest net wheat exporters in the world, in second place below the USA with a share of around 13.1 % (18.2m tonnes) of global exports; while Ukraine with a share of 9.3 % (12.9m tonnes), and Kazakhstan with 3.9 % (5.4m tonnes) belong to the group of the ten biggest wheat exporters (Fig. 3). In 2008-09 the net wheat exports of Russia, Ukraine and Kazakhstan amounted to 26.3 % of global wheat exports. For all three countries the largest trading partner was Egypt. Russia also exports large volumes of wheat to Turkey, Pakistan and Azerbaijan; Ukraine to Spain, Israel and South Korea; whereas Kazakhstan's exports go to Turkey, Tunisia and Turkmenistan.

The exploitation of production and export potential in the wheat sector will depend largely on future competitiveness and the political parameters for producers and exporters, as well as how well the associated cereal markets function.

Even if policymakers in all three countries have in various statements and programmes signalled their support for a growth in cereal exports (LIEFERT et al., 2009), substantial infrastructural deficits still remain, e.g. in national storage systems, transport networks and ports of export, which can seriously hinder trade on markets. In addition, the development of functioning markets

is greatly hampered by ad hoc policy interventions in the wheat markets, which have thwarted "export-oriented" strategies.

Moreover, policy measures to revive the animal sector which shrank substantially during the transition period could hinder the growth of cereal exports, as an expansion of this sector would lead to an increase in the domestic demand for cereal-based feed. Linked to this are the restrictions imposed on cereal exports during the price hike in 2010 which could not be justified by a supply shortage. Instead, the reduction of exports should induce a fall in domestic grain prices with a positive effect on animal production.

### Restrictions on cereal exports

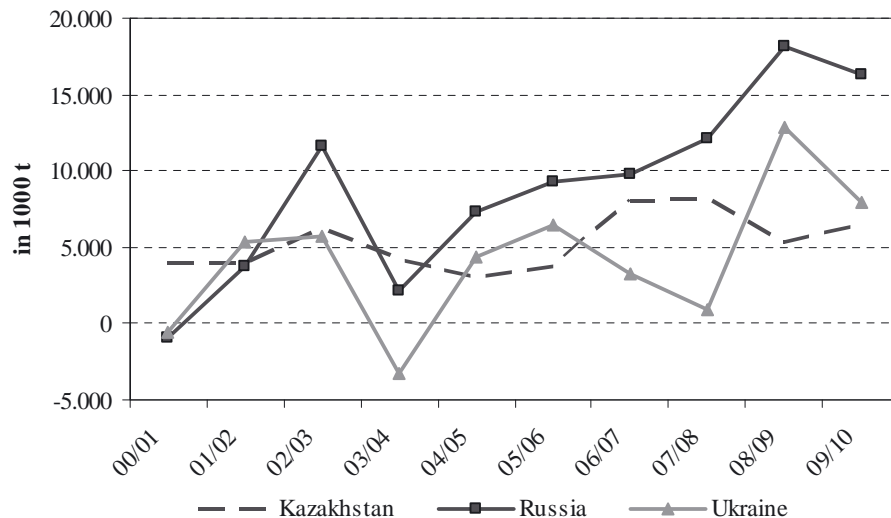
The governments of Russia, Ukraine and Kazakhstan reacted to the most recent price surges on the international agricultural

markets with measures to restrict wheat exports. These moves must be seen in the context of the fact that restrictions on wheat exports from the producing regions had been a chief element of Russian and Ukrainian cereal market policy since the start of transition (LIEFERT and LIEFERT, 2008; BRÜMMER et al., 2009).

In Russia, temporary export tariffs were introduced in 2007-08 for wheat, which for a time were up to 40 % and thus prohibitive. Then, in 2010, there was a total export ban on wheat and wheat flour. In both periods of high global prices export quotas were introduced in Ukraine, although the export quota in 2010 of 2.14m tonnes was considerably higher than that in 2007-08. In 2007-08 Kazakhstan simply introduced a ban on exports.

These market interventions are characterised by a high degree of political insecurity. A reason for this is that they are mostly implemented for a short period of time. As a result exporters

**Figure 3: Development of Russian, Ukrainian and Kazakhstani net wheat exports 2000-10**



Source: GTIS (2009), own depiction.

cannot fulfil existing supply contracts, which has a negative impact on their reputations as business partners. Furthermore, exporters are saddled with additional costs if, as a result of an export ban, ships that have already been loaded are unable to leave the harbour. These additional costs include expenses for transport to the harbour, for quality controls that have already been carried out, and for unloading the goods. For example, when an export quota for cereals was introduced in Ukraine in 2010, for fifteen days customs blocked all ships which had already been loaded before the export quota came into effect. As a result, 472,000 tonnes of cereals sat in storage temporarily on ships in Ukrainian harbours (APK INFORM, 2010).

The short-term nature of market interventions is aggravated by the fact that their implementation is subject to frequent adjustments, for example in the length of interventions, tariff levels and sizes of quotas. These make it more difficult to plan an export business and mean that greater flexibility is required, which leads to additional costs.

We will now give a detailed description of the individual policy measures around the imposition of the export quota in Ukraine and the export ban in Russia in 2007-08.

At the start of October 2006 Ukraine announced it was introducing a licence-based export quota for wheat, which in the middle of October was set at 400,000 tonnes for November and December 2006. In December 2006 the export quota for wheat was then substantially reduced to 3,000 tonnes for the period January-July 2007. In February 2007 it was announced that the quota would be increased almost tenfold to 230,000 tonnes, but this was never implemented. The export quota was then lifted

in May 2007. From that point on wheat could be exported again without restrictions. Given a serious drought, however, which affected 60 % of Ukrainian farmland where wheat was cultivated, the export quota was re-imposed in July 2007, and exports were restricted to 3,000 tonnes until the end of September. In addition, from July 2007 the retail sector was subject to price controls in the form of a stipulated maximum profit margin for bread. At the same time the government announced in July 2007 that it was buying up 700,000 tonnes of wheat. In September 2007, it was announced that the export quota would be increased by an extra 200,000 tonnes (almost tenfold), but this was not implemented. In March-April 2008 the quotas were increased by a further million tonnes. Finally, export restrictions were removed again in May 2008 in expectation of an above-average wheat harvest.

In Russia, the wheat markets were not subject to such pronounced policy interventions as in Ukraine. Those in charge of agricultural policy in Russia settled for export tariffs in conjunction with intervention buying.

In Russia, therefore, restrictions on wheat exports were in existence mainly between November 2007 and July 2008, the phase with the sharpest increases in global prices. After a long-term announcement on export restrictions for wheat, in October 2007 intervention buying by the state took around 60,000 tonnes of wheat from the market and put it in storage. In October 2007, too, retail prices for bread were controlled by fixing a 10-15 % retail profit margin. In November 2007 export tariffs of 10 % on wheat came into effect, which were supposed to last until April 2008. Already in December 2007, however, the export tariff was increased to 40 %. In February 2008 it was announced that the

export tariffs would be extended by a further three months to July 2008. In addition, in April 2008 the Russian government banned exports to other CIS countries (Belarus and the "STAN" countries). Also, from March to June 2008 around 1.3 million tonnes of wheat from state intervention storage was sold on the domestic market. In the end, however, the export tariffs and retail price controls for bread were lifted in May 2008.

As a result of the export restrictions, export volumes from both countries fell substantially. Figures 4 and 5 show the development of global market prices (f.o.b. price, wheat France, port Rouen) and producer prices in Ukraine (January 2006-May 2009) and Russia (January 2007-May 2009), as well as periods with actual export restrictions.

We can see that from January 2007 to January 2008 (with the exception of June 2007) Ukrainian wheat exports were very low. High levels of wheat exports are not seen until the lifting of the export tariffs in the middle of 2008.

As in Ukraine, wheat exports fell steadily in Russia with the introduction of the prohibitive export tariffs at the end of 2007, so that in the first half of 2008 there were no exports at all. When the export restrictions were lifted in May 2008, wheat exports rose again strongly (Fig. 5).

State interventions did not only have an impact on export volumes, but on domestic producer prices as well. This is demonstrated by comparing prices for wheat on the global markets (Rouen, France) and domestic producer prices.

When export restrictions and price controls were introduced in Ukraine, global prices and domestic producer prices increasingly drifted apart; the price gap between the two grew (Fig. 4). In the

period when export restrictions were temporarily lifted in mid-2007 the price gap narrowed, but grew again from August 2007 to March 2008. Although the price gap has narrowed again since the removal of restrictions in May 2008 – the period following the crisis – it has stabilised at a higher level than before the crisis.

In Russia, too, the gap between the global market price and the producer price rose considerably with the announcement and introduction of export restrictions in mid-2007 until these were lifted in mid-2008 (Fig. 5)

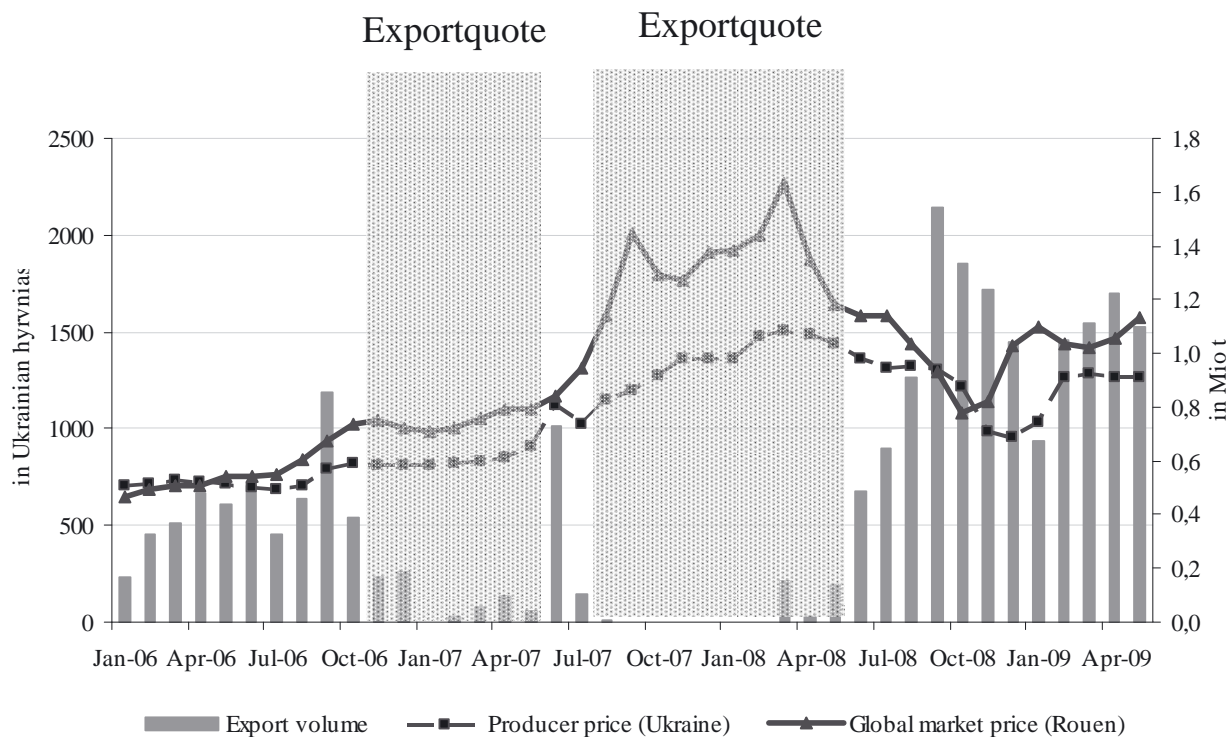
We could conclude, therefore, that in both Russia and Ukraine producer prices became significantly "decoupled" from the development of global market prices and that they did not follow the substantial increase in global market prices. There was a particularly large increase in price gap during the crisis, compared to the periods before and afterwards. We can infer from this that domestic producer prices during the crisis were below the market equilibrium level and thus too low. State interventions, therefore, appear to have produced domestic market conditions which differed radically from global market conditions.

### **Implications for national wheat markets**

To analyse the impact of export restrictions on the functionality of domestic markets, we have used an econometric time series analysis to examine the effects on market integration, market equilibrium and the stability of the markets. The data basis was provided by weekly global market and producer prices for the Ukrainian and Russian wheat markets.

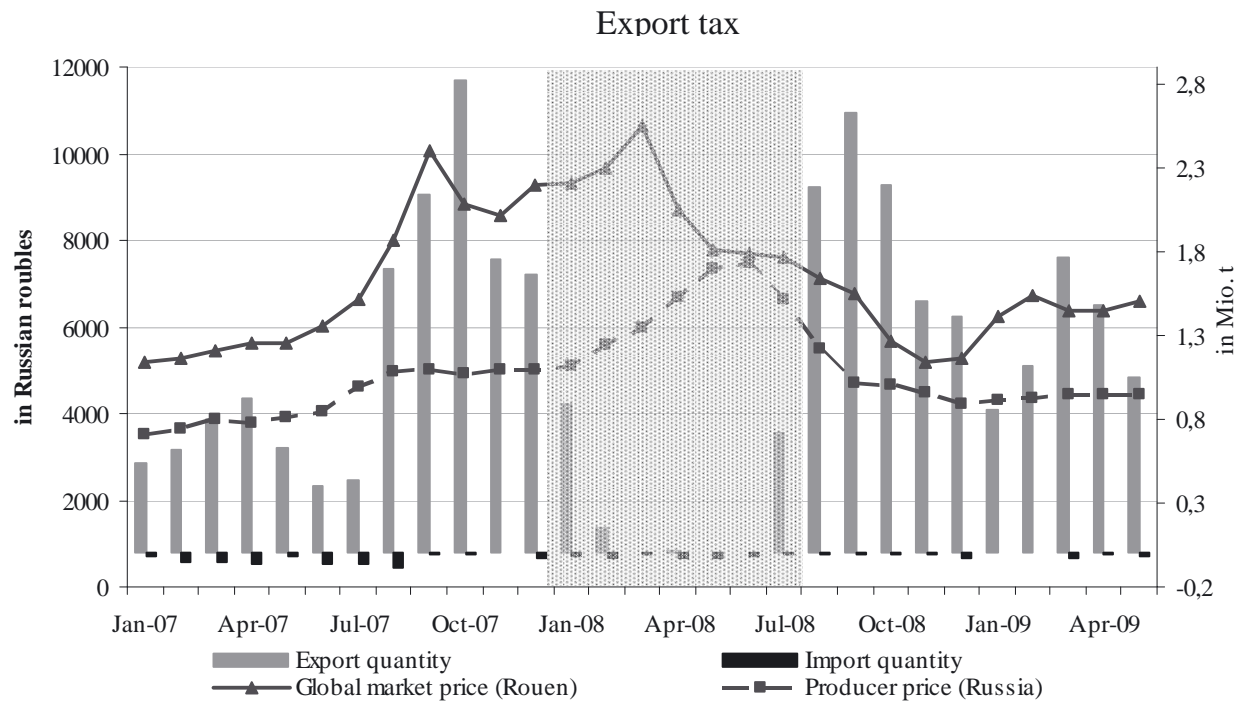
The analysis used a Markov-switching error correction model (KROLZIG, 2002), which makes it possible to identify period-specific

**Figure 4: Development of global prices, producer prices and wheat exports in Ukraine, 2006-09**



Sources: GTIS (2009), APK-INFORM (2009), HGCA (2009), own depiction.

**Figure 5: Development of global market prices, producer prices and wheat exports in Russia, 2007-09**



Sources: GTIS (2009), APK-INFORM (2009), HgCA (2009), own depiction.



market conditions or differentiate between market regimes. The interpretation of the estimated model parameters allows us to pinpoint the features of market conditions, especially the degree of market integration, the extent of market equilibrium, and stability, in periods marked by different policies.

The findings show that market conditions in Ukraine and Russia were different before the crisis (June 2004 to May 2006), during the crisis (June 2006 to June 2008) and after the crisis (July 2008 to May 2009).

The indicators also suggest that domestic markets during the crisis were more weakly integrated into the global markets than before the crisis. During the crisis the relative price differences were high and the degree of price transmission low. Likewise, the market equilibrium during the crisis was noticeably upset – producer prices were significantly below the equilibrium level and the speed of adjustment to the equilibrium was slow. The model findings also indicate that market conditions were less stable during the crisis period.

In addition, we can see that the markets in the "post-crisis period" have not returned to the same conditions they were in during the period before the crisis. Integration, equilibrium and stability are still weaker than they were prior to the crisis.

## Conclusions

To conclude we can say that the restrictions imposed on wheat exports by Russia, Ukraine and Kazakhstan as a response to the global price surges in 2007-08 and 2010, severely hampered the markets in these countries.

As a result of export restrictions, potential export revenues could not be realised, which in times of high prices on export

markets are especially large. State interventions also depressed producer prices, which meant that the increases in global market prices were only partially passed on to national markets. Domestic producer prices were thus below their equilibrium price. Correspondingly, the production and investment incentives which resulted from the high global market prices did not transfer in their entirety to the domestic markets.

Furthermore, the integration of markets into the global cereal markets became weaker and market equilibrium lost stability, or imbalances emerged.

Particularly in 2010, the export restrictions did not only have a negative impact on domestic cereals markets, but on global cereal markets, too. Although in 2010 Russia was responsible for only around 10 % of global wheat exports (FAN, 2010), the Russian export ban exacerbated the increase in global market prices. The Russian export ban also triggered export restrictions in other countries such as Ukraine and Tajikistan. The price increases on the global market led to decreases in prosperity in countries importing cereals, which together with rising food prices had a negative impact on poverty levels.

In response to the question of whether the governments of the large eastern "cereal nations" – Russia, Ukraine and Kazakhstan – managed the latest price surge well, we can state that the policy measures to achieve socio-political goals have probably been "costly". This has been accompanied by a large degree of political uncertainty owing to the unpredictability of state interventions, leading to a permanent disruption of market functions in the strategically important cereal sector of these countries. As a result the short-term crisis management in Russia, Ukraine and Kazakhstan has had a counter-productive effect on global food security.



Although in 2010 Russia and Ukraine imposed restrictions on exports using the pretext of food security, it is suspected that the actual goal of these measures was to benefit animal production by securing low feed prices. This suspicion becomes confirmed when we consider that, according to expert assessments in 2010, there were sufficient cereal stocks in both Russia and Ukraine to meet domestic demand (APK INFORM, 2010).

As far as the future is concerned, Russia, Ukraine and Kazakhstan will have substantial potential to be able to continue to guarantee the security of the global supply of cereals. This means first that these countries will be able to make a significant contribution to securing the global food supply, thereby combating the "world food problem" and other food crises. Second, in these countries there are substantial income and development potentials to be exploited in the agricultural sector and rural areas. To achieve this, however, an increase in competitiveness is needed, as are as reliable long-term agricultural policies. In addition a binding legal framework must also be established. Investment in infrastructure needs to be expanded and modern agricultural technologies must be introduced. Finally, it is crucial that education and training in these countries, as well as research into agriculture, receive greater support.

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# Agricultural policy measures during the global food crisis 2007/2008 in Serbia

IVAN DJURIC, LINDE GÖTZ, THOMAS GLAUBEN

## Introduction

The sharp upward trend in food prices during the last couple of years has raised serious concerns about food security and rising number of poor people around the world. In a combination with the global financial crisis 2007/2008 it became more serious problem for the national governments which needed to find the most appropriate policy solution to reduce the impact of the crisis.

According to FAO statistics more than 101 governments around the world made some kind of policy measures in order to stabilize their agricultural markets, diminish the impact of high food prices and to support the increase of food production (FAO, 2008a). Most of the policy measures were short-run and mainly made in emergency, mostly because of political reasons. A wide variety of different short-run policy measures were implemented as e.g. export restrictions, reduction of import tariffs, governmental food sales and domestic price controls (FAO, 2008b).

Serbia was one of the European countries which implemented policy measures in order to reduce the impact of soaring world market prices on domestic prices. The main focus was on placing the export ban on cereals in order to secure the critical amount for self consumption and to mitigate the significant increase of food prices.

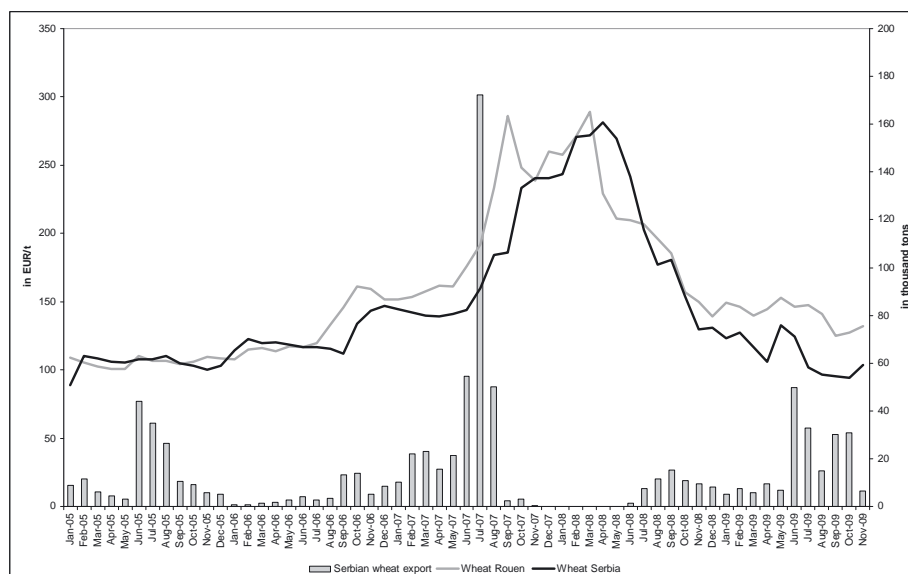
## The domestic impact of grain export ban in Serbia

The Serbian government imposed quantitative export controls on wheat and corn in August 2007, in order to prevent exports from Serbia and to secure supply for domestic consumption (DJURIC et al., 2009). The wheat export restriction was first announced to last for 3 months until December 2007, but in October 2007 the export restriction was extended until June 2008. Besides the extension of wheat export restriction, the government introduced export quotas for wheat flour.

As said before, because of extremely high wheat export in July 2007, demand for wheat increased significantly pushing the average wheat prices from 219 US Dollar/t in July to 251 US Dollar/t in August 2007 (Figure 1). Right after the introduction of the export ban the average wheat price stabilized until October 2007. At the same time, Serbian wheat export stopped completely because of the export ban. From October 2007 Serbian wheat prices started to rise very fast reaching the highest level of 450 US Dollar/t in May 2008. In this period Serbian wheat prices even exceeded the world wheat prices. After the government allowed import of 200,000 t of wheat free of import tariff in April 2008, Serbian wheat prices started to fall.

The following paragraphs describe the short-run impact of the political measures on the different participants in the wheat market:

**Figure 1: Monthly Serbian and world wheat prices and Serbian monthly wheat export quantities, 2005-2009**



Sources: Yugoslavian Grain Fund (Serbia) and AGPB (France), own illustration.

#### a) Wheat producers

To identify the effects of the particular high prices on the Serbian wheat producers it has to be distinguished between the farmers with and without access to storage facilities. According to experts, small wheat producers without access to storage facilities did not benefit from high domestic prices since they were forced to sell their wheat during the harvest, often at previously agreed relatively low prices.

Farmers with own storage facilities had the ability to achieve rather high profits. The highest possible profit was achieved when the Directorate of Commodity Reserves (DCR) announced in March 2008 that it would purchase about 40,500 t of wheat from the domestic market in a time period of extremely high prices

(between 420 and 450 US Dollar/t). All the producers who did not use this opportunity and instead kept their wheat expecting that the price would further increase experienced losses. As soon as it became evident that extraordinary high grain yields would be achieved in the harvest 2008, grain prices began to fall.

#### b) Exporters

The exporters experienced great losses due to the export ban. One reason is that the export ban was imposed overnight. This fact caused a great loss to some traders because they already had wheat loaded on trucks and invested into packing, quality control and transport. Besides the financial loss following from the fact that traders were not able to fulfill their obligations, they also lost their reputation in international trade.

In addition, exporters experienced losses because they could not sell their wheat on foreign markets. Though, exporters had the possibility to sell the wheat on domestic markets also at high prices. However, at the beginning exporters did not engage in the domestic wheat market since they expected that the export ban would be abolished after 3 months, as announced by the government. When the government announced the prolongation of the export ban, exporters had few possibilities to sell the wheat on the domestic market. Domestic demand for wheat was low in this time period since wheat was traded mainly during and directly after the harvest. Thus, exporters could only store the wheat until the export ban was lifted. When the export ban was removed in June 2008, Serbian wheat was not competitive on international markets anymore due to high storage costs.

#### c) Mills

In general, the mills benefitted from the export ban in two ways. First, mills who were selling wheat flour on domestic market were able to earn extra profit since wheat flour prices were following the increase of wheat prices on the domestic market. Even more, although wheat prices stabilized for few weeks after the implementation of the export ban the wheat flour prices continued to rise because the export ban did not refer to wheat flour. Thus, mills also benefited from exporting wheat flour to regional and world markets until the wheat export quota was implemented in October 2007.

There are some mills that might have experienced losses because they had miscalculated their wheat stocks and were forced to buy wheat from the domestic market at very high prices when the export ban was effective.

#### d) Consumers

Consumers did not benefit from the export ban although it was imposed especially with the aim to protect consumers against dramatically increasing food prices. Panic spread by the media that Serbia would be out of stocks needed for domestic wheat consumption exerted significant pressure on the government to protect the consumers. Though, prices for wheat continued to rise sharply even after the implementation of the export ban. This implied that the prices for wheat flour, bread and other processed wheat products also increased significantly. According to the Statistical Office of the Republic of Serbia, from July 2007 until July 2008 prices for wheat flour (1kg) and bread (0.5 kg) increased by 58 % and 111 %, respectively.

Summarizing, the policy measures were of rather limited success in achieving their aim to protect consumers from high food prices. The price dampening effect of the export restrictions prevailed only for a short period of time, and the Serbian wheat grower prices in consequence even increased above world market prices. This considerable price surge had a strong price increasing impact on prices for final products. The main beneficiaries of this policy were wheat producers with access to storage facilities which could bear the storage costs as well as mills selling wheat flour on the domestic and temporarily on foreign markets. Welfare losses were experienced by producers without access to storage facilities, exporters and consumers.

#### Alternative policy measures

In light of the above described experience with the export-oriented measures we suggest consumer-oriented policy measures as an alternative in a future food crisis which should cause smaller

welfare losses compared to trade oriented policy measures. In particular, price controls of key staple products could be implemented through a dual pricing system as one measure that may positively affect consumers during a future crisis.

By implementing price controls, the Serbian government would have to distribute a certain amount of key staple products through specialized governmental or private food shops where the goods should be sold at politically determined price. By introducing this policy measure the government can ensure an adequate food supply for the poor even when prices are high. The main problems inherent are the identification of target groups and the overall financing issue involved with the implementation of such a measure.

In the case that the government feels forced to introduce trade oriented policy measures the use of a progressive tax on Serbian grain exports is likely to be the superior trade-oriented policy measure compared to an export ban and an export quota system. First of all, the negative welfare effects are smaller. In addition, WTO rules are much more in favor of export taxes than of export quotas and export bans in particular; export taxes are more transparent and less susceptible to lobbying than a quota system. Export taxes may allow governments to gain additional budgetary income (PIERMARTINI, 2004). Domestic prices for the selected commodity will decrease, thereby leading to a reduction of inflationary pressure within the country. Also, it will have positive effects on the development of processing industries which are using grain as a raw material; last but not least, end consumers will benefit from lower prices for final products.

Nevertheless, during a crisis, government should implement adequate combination of policy measures which simultaneously

aim to protect vulnerable consumers and small wheat producers in order to achieve a stable supply of food and food prices during periods of crisis.

### **Summary**

During the food crisis 2007/2008 the Serbian government had implemented a wheat export ban in combination with a wheat flour export quota, the governmental buy-out of domestic wheat on the domestic market and the delayed removal of wheat import tariff. From our analysis we conclude that these policy measures were of rather limited success in achieving its aim to protect consumers from high food prices.

The main beneficiaries of this policy were wheat producers with access to storage facilities as well as mills selling wheat flour on the domestic and temporarily on foreign markets. The biggest losers are definitely small wheat producers. The losers are also consumers who faced high prices of final products made by processors in order to achieve their planned profits.

Taking in consideration the impact of wheat export ban we suggest consumer-oriented policy measures as an alternative in a future food crisis which should cause smaller welfare losses compared to trade oriented policy measures. In particular, price controls of key staple products could be implemented through a dual pricing system as one measure that may positively affect consumers during a future crisis. In the case that the government feels forced to introduce trade oriented policy measures the use of a progressive tax on Serbian grain exports is likely to be the superior trade-oriented policy measure compared to an export ban and an export quota system.

Finally, for achieving stable food supply and food prices in the long term it is necessary to focus on increasing agricultural productivity and production. It is very important not to compromise this goal by implementing emergency short-run policy measures that can have more negative effects than to contribute to the overall development.

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*Wheat field in the Ukraine*

# Efficiency of wheat production in Ukrainian agricultural enterprises

KARIN LARSÉN, ROMAN SLASTON, ALFONS BALMANN

## Introduction

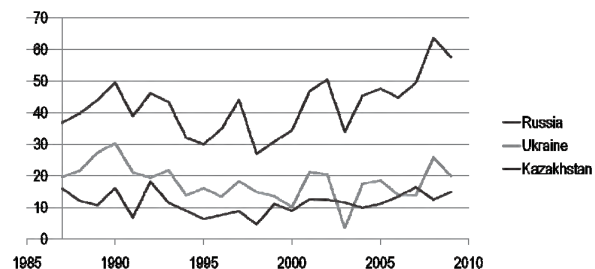
Production of cereals constitutes a significant part of Ukrainian agriculture; it corresponds to about 20 % of the gross production of the Ukrainian agrarian sector. Around 50 % of all produced grain consists of wheat which is cultivated in almost all agricultural enterprises of Ukraine. The conditions for wheat production in Ukraine are favorable with high-quality soils and good climate conditions. Moreover, Ukrainian enterprises are large in comparison to Western European farm structures with an average enterprise size of more than 1000 hectares. This implies possibilities for a high utilization of economies of size and scale. However, yield figures, as illustrated in Figure 1, tell another story. There has hardly been any growth in Ukrainian wheat yields during the last 20 years. This background raises the following questions:

- What is the potential for efficiency improvements in the Ukrainian wheat production?
- Why is Ukraine producing so little, even less than in 1990?
- What can Ukraine contribute to the world supply, particularly after the 2008 food crises?

In order to address these questions, this research aims at providing an overall picture of efficiency in Ukrainian wheat production. The analysis focuses on three Ukrainian regions with relatively similar natural conditions: Kiev, Poltava and Cherkasy.

The following section gives a short introduction to efficiency measurement. Thereafter, the utilized data and describes how the output input variables are defined. The empirical results are presented in the following section followed by discussion and conclusions.

**Figure 1: Development in wheat production (millions tons)**



## Efficiency measurement

This study uses technical efficiency as originally defined by FARELL (1957) to evaluate farm performance. An advantage of this performance measure is that it can consider several outputs and inputs at the same time. Technical efficiency is a relative measure where each observation (in this case farm) is compared to the best observations in the sample. There exist both parametric and non-parametric methods of obtaining efficiency

scores (an overview of these methods can be found in for example COELLI et. al., 2005). Both approaches are connected with advantages and disadvantages. The non-parametric approach does not require that a functional form for the production function is specified but does not allow for any noise in the data. The parametric approaches on the other hand require that a specific functional form is imposed but allows for a non-deterministic production frontier. This study reports efficiency scores derived using both the non-parametric Data Envelopment Analysis (DEA) and the Stochastic Frontier Analysis (SFA). The two approaches give efficiency scores with very similar ranking for the analyzed firms.

## Data

The utilized data consists of 2110 firm-year observations from the regions Kiev, Poltava and Cherkasy covering the years 2006-2008. It was provided by the association "Ukrainian Club of Agrarian Business". The three regions were chosen as they are located geographically close to each other and have similar production conditions. In 2008, these regions provided close to 20 percent of the total grain production in Ukraine.

The available data set consists of detailed information about utilized inputs for the different crops, and this study focuses on the production of wheat. In the efficiency calculations, one output and four inputs is considered. The output is the total quantity of produced wheat (in metric tons). The input variables represent the input usage attributable to the farms' wheat production. All inputs expressed in value terms (UAH)<sup>1</sup>. The inputs considered are: i) labor: basic and additional payments to the

<sup>1</sup> Ukrainian Hryvnia (UAH) official currency of Ukraine. 1000 UAH = appr. 85 Euro (August, 2009)

workers, servants, managers directly engaged in technological process of wheat production; ii) variable inputs: all material costs related to wheat production such as seed, fertilizers, pesticides, fungicides, herbicides and other variable inputs; iii) machinery: fuel, depreciation of machines and services of other companies used for wheat production; and iv) "other" costs: all costs which was not included in previous expenses like land rent, fixed agricultural tax, costs for missions, charges to social funds and other costs. Land was thus not included in the input set directly, but was implicitly taken into account in other costs as rent. Descriptive statistics of these variables as well as total land used for wheat, total farm size and share of total land used for what can be found in Table 1.

## Results

The results of the efficiency estimations are presented in Table 2. The three first columns in this table show DEA efficiency scores, bias-corrected DEA efficiency scores<sup>2</sup>, and scale efficiencies. Technical efficiency and scale elasticity obtained using SFA are shown in the last two columns. Average estimates for the whole sample as well as for groups stratified by region, legal form, size and year are presented.

The average DEA-efficiency score was found to be 0.57 indicating that there is large heterogeneity among the firms with large potential room for efficiency improvements for many of them.<sup>3</sup> The average SFA efficiency score is somewhat higher, 0.77.

<sup>2</sup> The bias correction suggested was conducted using the homogenous bootstrap suggested by SIMAR and WILSON (1998; 2000).

<sup>3</sup> It should also be kept in mind however that magnitude of the efficiency score is affected by factors such as the aggregation level of inputs and outputs (i.e. the number of inputs and outputs) and the total number of observations.

**Table 1: Description of data**

Variables	Mean	Standard deviation	Minimum	Maximum
<b>Output variable:</b>				
Production of wheat (m.t.)	1998	4160	36	135049
<b>Input variables:</b>				
Labor (ths. UAH)	125	260	0.97	8869
Variable inputs (ths. UAH)	530	1215	9.2	33697
Machinery (ths. UAH)	350	647	4.05	16807
Other costs (ths. UAH)	208	517	2.25	14136
<b>Some farm specific variables:</b>				
Land used for wheat (ha)	548	835	7	21485
Total farm size (ha)	2536	3504	71	70018
Share of total land used for wheat (%)	23	9.0	0.75	100

Source: Authors

A higher average efficiency SFA score is expected since DEA does not consider any noise in the data and all deviations from the frontier are considered as inefficiency. However, the correlation between the DEA and SFA efficiency scores are very high, 0.80. Thus, the ranking among the farm observations are very similar for the two methods which gives reliability to the results.

In the region of Poltava, technical efficiency scores are higher on average than for the other two regions. The lowest average technical efficiency scores were observed for the enterprises in Kiev. Scale efficiencies were high for all three regions and the scale elasticities are close to one indicating that the average firm is operating at a close to optimal scale.

Regarding the legal forms, the results suggest that technical efficiency of cooperatives is higher than for the other legal forms. An interesting question is: why are the cooperatives in our sample found more efficient than the other legal forms? One

explanation could be that in the cooperatives, as its organizational form is defined after the transition period, members of cooperatives are workers and owners at the same time. The profit is divided between the members and thus depending on their contribution in the production. Thus, a relatively lower degree of opportunistic behavior could be one possible explanation for the higher efficiency in the cooperative legal form.

Scale efficiency was found to be highest (close to full scale efficiency) for the farm size groups between 500 and 3500 hectares and somewhat lower for smaller and larger enterprises. Scale elasticity, on the other hand, was found to decrease somewhat with increasing farm size indicating that the largest farms (with more than 2500 hectares) operates under decreasing returns to scale.

The average efficiency was higher in 2008 which can be explained by the good weather conditions this year.

**Table 2: Efficiency scores**

Group of farms		DEA			SFA	
		TE – CRS	TE - Bias-corrected	Scale efficiency	TE	Scale elasticity
All (N=2100)		0.57	0.53	0.96	0.77	0.96
Region	Kiev (N=737)	0.54	0.49	0.96	0.74	0.96
	Poltava (N=702)	0.61	0.56	0.96	0.80	0.96
	Cherkasy (N=661)	0.57	0.53	0.96	0.77	0.96
Legal form	Limited liability company (N=1356)	0.57	0.52	0.96	0.76	0.96
	Private enterprise (N=435)	0.59	0.54	0.97	0.78	0.96
	Cooperative (N=113)	0.63	0.58	0.97	0.82	0.96
	Public / state enterprise (N=62)	0.51	0.47	0.96	0.74	0.95
	Farm (N=73)	0.62	0.56	0.97	0.78	0.97
	Other (N=61)	0.56	0.51	0.97	0.76	0.95
Size (total farm land)	0-500 (N=84)	0.54	0.48	0.86	0.70	1.01
	500 – 1500 (N=712)	0.57	0.53	0.97	0.75	0.98
	1500 – 2500 (N=680)	0.58	0.54	0.98	0.78	0.96
	2500 – 3500 (N=278)	0.57	0.53	0.98	0.78	0.94
	3500 - (N=346)	0.57	0.50	0.91	0.80	0.92
Year	2006 (N=639)	0.55	0.50	0.97	0.77	0.96
	2007 (N=698)	0.52	0.48	0.96	0.77	0.96
	2008 (N=763)	0.64	0.59	0.96	0.77	0.96

Source: Authors.

Notes: \* Average lower limit of 90 % confidence interval, \*\* Average upper limit of 90 % confidence interval, <sup>1</sup>Ce = Cost efficiency (as suggested by TONE, 2002) and <sup>††</sup> = Scale efficiency.

In order to further understand the reasons for inefficiency among many of the sample farms average actual and shadow cost shares was analyzed following COELLI and PRASADA RAO (2001). The shadow cost shares show the "optimal" cost shares for each of the production factors. It can be seen in Figure 2 that some disparities exist although these are rather small. LABOR was somewhat overused in 2006, less overused in 2007 and used "optimally" in 2008. The same is true for "other" and machinery. Variable inputs were on average underused in 2007 and 2008. Such difference in variable inputs shares is likely explained by a gap between the need and availability of some of them (especially fertilizers). This can be understood as an indicator of limited financial resources.

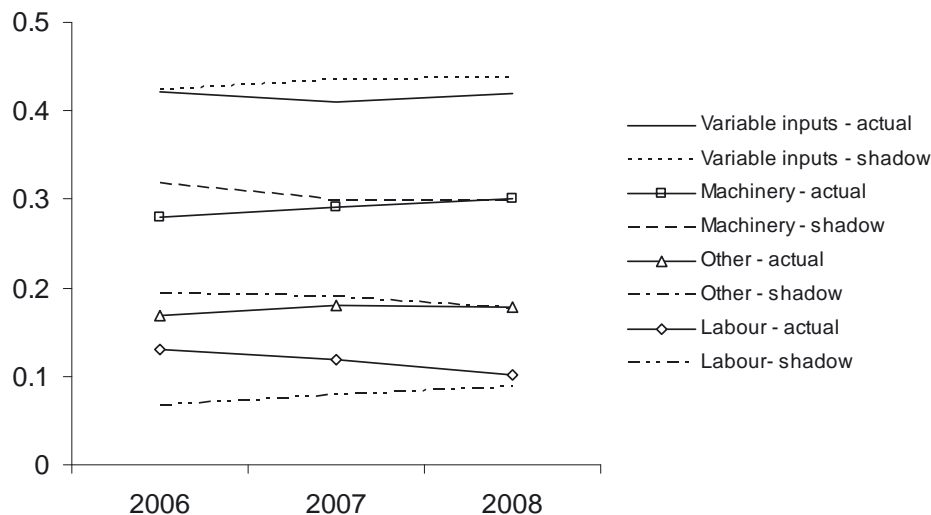
The impact of various factors on technical efficiency (DEA) was also analyzed using a Tobit (censored) regressions model. The

findings suggest that the level of specialization in crop production is negatively related to efficiency. This is likely explained by the fact that firms with no livestock only grow grain and oilseeds which leads to a suboptimal crop rotation. An additional reason may be that livestock producers produce and use organic fertilizers whereas crop farms mainly buy mineral fertilizers. The higher efficiency of cooperatives and in year 2008 was also confirmed in the second stage regression.

## Conclusions

The findings suggest that there are large variations in efficiency scores among agricultural enterprises, indicating large heterogeneity among the farms. It further suggests that there is substantial room for efficiency improvements in wheat growing among many of the analyzed enterprises. According to the efficiency

**Figure 2: Development of actual and shadow value share of inputs**



Source: Authors.



scores one may assume that the Ukrainian regions may increase production significantly just by overcoming technical inefficiency. According to the SFA the potential increase may be some 30 %. According to the DEA the increase may even be some 90 %, but this may be overestimated due to the sensitivity of DEA regarding noise in the data. As our result suggests that variable inputs (seed, fertilizers, etc.) were underused in 2007 and 2008, one reason may be a shortage of liquidity of many Ukrainian agricultural enterprises. Liquidity shortage is also a possible reason for the underuse of machinery in the first years. The overuse of labor in the first years may indicate that there is a hidden unemployment.

It was found that cooperative forms and private farms on average are more efficient than the other legal forms. We are only able to speculate about the reasons for the difference in efficiency between the legal forms, but the cooperative form may be suffering less from opportunistic behavior among the workers as worker in this case are co-owners/share-holders.

The possible reasons for inefficiency described above do however not explain the large heterogeneity among the enterprises in the sample. This may be due to differences in technologies and managerial practices. For example, some enterprises located

on or close to the production frontier may be applying precision farming. Ultimately, one should have a look at the some of the most efficient and less efficient enterprises in the sample as the available data do not contain information about managerial practices and technologies.

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# Diets in Russia: Consumer choice and determining factors

CHRISTINE BURGGRAF

## Introduction

Between 1999 and 2008 the gross domestic product of the Russian Federation grew constantly by 7 %. In spite of this exceptional positive economic development, the general health of the Russian population is still a cause for concern. The Russian Federation thus faces major challenges to its national health system which in the past has suffered from neglect. According to official statistics, the average life expectancy of the Russian population in 2007 was only 67.5 years. This average life expectancy is not only lower than that just prior to the collapse of the Soviet Union, it is 12.9 years lower than that of Russia's European neighbours.

The low level of life expectancy is principally due to chronic and non-communicable diseases (NCD) such as heart diseases, diabetes mellitus and cancers. Besides the health consequences of NCDs, there are also substantial social and economic burdens. Worldwide, the growing importance of NCDs can be explained by several demographic and epidemiological factors.<sup>1</sup> Among the most significant of these, besides increasingly aging populations, are changing diets and lifestyles. From the perspective of nutritional epidemiology, the causal link between a poorly balanced diet and the risk of suffering an NCD is beyond dispute. As far as the Russian Federation is concerned, there is

also excess alcohol and tobacco consumption as well as insufficient physical exercise.

In spite of this worrying development there are hardly any scientific analyses of Russian dietary behaviour and its determinants. The few studies that do examine Russian diets are chiefly based on a fairly unsystematic compilation of selected socio-demographic and socioeconomic factors. Psychological factors such as aptitudes, attitudes, anxieties and satisfaction have been totally ignored by the scientific literature looking at the diets of the Russian population. Future research on Russian diets should, therefore, include psychological factors as key determinants as well.

Taking this topic as a starting point, the aim of this study is to provide an analysis of the socioeconomic, socio-demographic and psychological factors that influence a healthy diet.<sup>2</sup> This examination of the factors determining a healthy diet in Russia is scientifically important for two reasons. First, it provides empirical findings regarding the dietary habits of the Russian population. Second, a consideration of psychological factors allows a significantly more thorough analysis than has been the case in previous studies.

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<sup>1</sup> Epidemiology deals with those factors that affect the health and diseases of individual and human populations.

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<sup>2</sup> We should like to thank the Deutsche Forschungsgemeinschaft (German Research Foundation, DFG) for its support (GZ: GL 329/3-1).



*Meat market in Moscow*

## Data basis

Empirical data from the Russian Longitudinal Monitoring Survey (RLMS)<sup>3</sup> of 2002 have been used as the data basis for this study. The RLMS data provide a variety of information about food consumption, own-consumption agricultural production, as well as many different socioeconomic, socio-demographic and psychological data (e.g. degree of satisfaction, anxieties). The comprehensive RLMS data exist both for household level and for the level of the individual and, for the period under consideration, they include information on a total of 4,668 households containing 10,499 adults and 2,024 children. Because of the necessary sample weightings and the fact that some figures were missing, we only used the data relating to 7,405 households and 7,877 adults.

## Food diversity in households

To permit an empirical analysis of the contribution of household production for a healthy diet, as well as of individual dietary habits and the factors influencing these, two models were created based on the household production model by BECKER (1965). In the first model the diversity of food bought and food produced by the household was regressed against various socio-demographic and socioeconomic household characteristics. The diversity of foods available in the household was defined as an index depicting the diversity and balance between the various food groups – fruit, vegetables, dairy products, fish/meat, cereals/potatoes, oils/fats – as well as the diversity within individual food groups. The results of the linear regression analysis are presented in Table 1.

<sup>3</sup> We should like to thank the Russia Longitudinal Monitoring Survey Phase 2, carried out by the Carolina Population Center and the Russian Institute of Sociology.

I will only discuss selected factors that influence the diversity of foodstuffs to be found in households. For example, the average age of the household has a positive effect on diversity of foods available in the household. This confirms findings from studies on other countries, according to which older household members pay greater attention to the benefits of a healthy and variable diet. Another positive influence on the diversity of foods on offer is the average education level of women over 16 in the household. There are three reasons why this positive influence of the average educational level of women is important. First, education is a clear indicator of the ability to seek out dietary information. Second, education suggests a greater capacity to anticipate the future benefits of a healthy diet. Third, experience teaches us that women are responsible for acquiring and preparing food.

Income, measured in the income classes of the so-called poverty grouping variables, has a positive influence on food diversity in households. Households with a household income of below 50 % of the Russian poverty threshold, therefore, can only provide a much more limited choice of foods than comparable households with, for example, an income greater than 200 % of the Russian poverty threshold. As a household can boost its food diversity by producing its own agricultural goods, there is a highly positive connection between producing one's own agricultural goods and food diversity. In the Russian Federation, however, household production of agricultural goods is not always dependent on living in rural areas. In fact, such household production is also carried out intensively by the urban population. This is how we arrive at the seemingly contradictory finding that a minimum level of own production increases diversity,

**Table 1: Influences on food diversity in Russian households**

Variable	Definition	Food diversity of households (HH)
<i>Socio-demographic variables</i>		
HH Age	Average age of household members	+ ***
HH Size	Number of household members	- ***
Urban/rural	With 1= rural	- **
Metropolitan areas	With 1= HH in Moskau or St. Petersburg	- *
Northern/North Western	With 1= HH in Northern and North Western part of Russia	
Western Siberian	With 1= HH in Western Siberian	- ***
Eastern Siberian/far Eastern	With 1= HH in Eastern Siberian and Far Eastern	
Volga	With 1= HH in Volga-Vaytski or Volga Basin Region	- ***
North Caucasian	With 1= HH in North Caucasian	+ ***
Ural	With 1= HH Ural Region	
Central/Central Black Earth	With 1= HH in Central and Central Black-Earth Region	
<i>Socioeconomic variables</i>		
Poverty-Group	Poverty Group Variable °	+ ***
Cultivation	With 1= HH uses private land for farming	+ ***
Price Index	Household specific price index for average Russian food basket	+ ***
Woman's Education	Average max. education level <sup>^</sup> of woman in the HH	+ ***
Constant		22,151***
Corrected R-Squared		0,334

Notes: + positive, - negative significant with  $\alpha=10\%$ ,  $5\%$  or  $1\%$ , represented as \*, \*\* and \*\*\* respectively.

° With '1' for household incomes below 50 % of the poverty threshold, '2' between 50-100 %, '3' between 100-150 %, '4' between 150-200 % and '5' for household incomes above 200 % of the Russian poverty threshold.

<sup>^</sup> With '1' for vocational training without high school diploma, '2' for high school diploma, '3' for vocational training plus high school diploma, '4' for study to Bachelor level, '5' for study to Master's level and research activity.

but living in rural areas has a negative impact on diversity. The crucial factor determining the negative influence of living in the country is that the market supply of food in rural areas is lower, as are incomes.

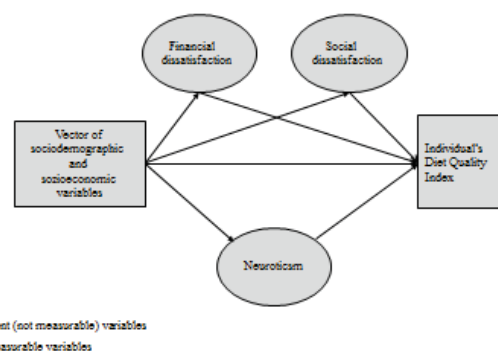
### The quality of individual diets

Going beyond the identification of specific foodstuffs available in the household, it is important to undertake a closer analysis of the actual quality of individual diets. To be able to analyse the influence of individual factors on a qualitatively healthy diet, we need an operationalisation of the target variable *healthy diet*. The operationalisation of a healthy diet proceeds by allocating the food and nutrients consumed to an individual diet index. Instead of a one-sided analysis of calorie intake this index should also take into account the diversity and balance of the diet. The Diet Quality Index-International (DQI-I), developed by KIM et al. (2003), is an appropriate operationalisation of the variable *healthy diet*. The DQI-I considers the current international and national dietary guidelines, the specifications of the diet pyramid, and information from a variety of dietary indices. It is made up of the following four components: (1) Variety of foodstuffs consumed, (2) Adequacy of nutrient intakes in respect to the recommended minimum intake levels, (3) Moderation of consumed nutrients and food items which are linked to certain chronic diseases, and (4) Overall balance of macronutrient and fatty acid ratios. Scores are calculated for each of these components which give an overall DQI-I from nought to 100.

Based on the calculated DQI-I, a second model was estimated and tested on the individual level. In this model the dependent variable DQI-I of each individual was linked to the measurable

socio-demographic and socioeconomic characteristics of the individual as well as its non-measurable (latent) explanatory characteristics – financial dissatisfaction, general dissatisfaction, and scepticism/anxiety about the future. Figure 1 gives a graphic illustration of the model.

**Figure 1: Structural model depicting the DQI-I**



In this study, the magnitude of influence of financial dissatisfaction – which cannot be measured directly – is determined by the indirectly measurable indicators: self-assessment of one's financial situation, current financial situation in comparison to the previous year, dissatisfaction with one's current financial situation etc. According to classical motivation theory, financial needs, given that they constitute material and professional (basic) needs, must be placed in the lower half of the Maslow needs pyramid. If these needs are not satisfied, diet primarily becomes an urgent matter of food intake, for purely physical reasons. In such cases diet does not have the task of addressing higher psychological needs – self-fulfilment, recognition and bodily perfection – because the lower levels of the needs pyramid must be satisfied first. Thus we had to test the

hypothesis (1) that a greater level of financial dissatisfaction goes hand in hand with a lower-quality diet.

General dissatisfaction contains additional needs and desires for things such as family, friends and education. Hypothesis (2), therefore, posits that a higher level of general dissatisfaction leads to a less healthy diet. Problems such as an unhappy family life seem to be more important than worrying about a healthy and balanced diet. The third non-directly measurable influence in this study is the construct scepticism/anxiety about the future. This construct encompasses the following measurable indicators: a self-assessment of the ability to solve future problems and bring about positive changes, the feeling of being a perpetual loser etc. Assuming that a person with a higher degree of scepticism and anxiety about the future is fundamentally more risk averse, this person will offset anticipated future outcomes with an additional risk premium and thus spend more time and money gathering as much information as possible about leading a long and healthy life. The corpus of knowledge associated with this leads to hypothesis (3) which states that a person with a higher degree of scepticism about the future will eat more healthily.

A structural equation analysis was carried out to enable an empirical assessment of this second model. The software used in this procedure was AMOS 7.0 with an asymptotically distribution-free estimation algorithm.

Selected findings from Table 2 will now be outlined and interpreted. The structural equation model confirms the positive influence of age on the quality of individual diets. There was no confirmation, however, of a statistical connection between gender and the quality of individual diets.

Whereas in the first model household size has a significantly negative influence on the diversity of foods present in the household, in this second model it has a positive effect on the diets of individual household members. This means that as the household size gets bigger, the quantitative diversity of foods available in the household decreases, but on the other hand the quality of the individual's diet increases due to social influences within the household. In other words, although larger households consume a lower diversity of foods, they pay more attention to the quality of diet. Income, measured as nominal household income divided by the all-Russia poverty line, also has a positive impact on the DQI-I. Higher incomes with respect to the poverty threshold mean individuals can afford a healthier range of foods. This can also be seen in the positive influence of a higher food price index on diet quality: people who spend more money on the same basket of foods tend to have healthier diets.

Although it would be plausible to assume that less exercise as well as higher alcohol and tobacco consumption go hand in hand with unhealthy diets, within the lifestyle variables it is only the "smoker" variable which has a significantly negative impact. Smokers place considerably more importance on immediate satisfaction than their future health (HUSTON, FINKE, 2003). In general they have unhealthier diets than non-smokers (MA et al., 2000). The empirical findings presented here support these assumptions.

As far as the psychological influences are concerned, the links on which we have based our hypotheses between the three selected explanatory variables (1) financial dissatisfaction (2) general dissatisfaction (3) scepticism and the comprehensive



**Table 2: Influences on diet quality of individuals**

Variable	Definition	Individuals Diet Quality Index (DQI-I)
<i>Socio-demographic variables</i>		
Age	Age of the individual	+ **
Gender	With 1= female	
HH Size	Number of household members	+ ***
Urban/rural	With 1= rural	- *
Volga	With 1= Volga-Vaytski or Volga Basin Region	- ***
<i>Socioeconomic variables</i>		
Poverty-Group	Poverty group variable	+ ***
Education	Maximum level of education	+ ***
Working Status	With 1= employed, including paid absence	
Price Index	Household specific price index for average Russian food basket	+ ***
<i>Lifestyle variables</i>		
Smoker	With 1= Smoker	- ***
Alcohol	Volume of alcohol drunk in 30 days (in 100% vol.)	
Sport	With 1= interviewee actively exercises physical activities	
<i>Psychological constructs</i>		
Financial Dissatisfaction	Construct of financial dissatisfaction	
Overall Dissatisfaction	Construct of general dissatisfaction	
Scepticism/Neuroticism	Construct of scepticism/anxiety about the future	
RMSEA		0,04 (PCLOSE=1)
GFI/AGFI		0,987/ 0,980

Notes: + positive, - negative significant with  $\alpha=10\%$ ,  $5\%$  or  $1\%$ , represented as \*, \*\* and \*\*\* respectively.

DQI-Index as a general benchmark for the dependent variable of diet quality cannot be proved empirically. If, however, instead of considering the diet index as a whole we examine individual aspects of diet quality as a target variable within the structural balance model, we can definitely identify significant connections to the selected psychological constructs. For example, the construct "scepticism/anxiety about the future" has a substantially positive influence on the proportion of energy intake which is in the form of fats. According to this, and in contradiction to our starting hypothesis, people with a high degree of scepticism and anxiety about the future eat considerably more fats and thus potentially have an unhealthier diet than people with a low level of scepticism. The same is true of the target variable total calorie intake per 24 hours. Here the personal degree of financial dissatisfaction has a significantly negative influence on total calorie intake.

### Summary

In the Russian Federation a variety of different socio-demographic and socioeconomic variables have an effect on both the diversity of foods available in households and on the individual diet quality. Whereas the directly measurable determinants that influence diets can be identified relatively easily, we cannot prove a significant connection between the psychological

influences that can only be measured indirectly and the individual diet index. If only separate aspects of the diet index are used as target variables, however, we can ascertain that the personal degree of scepticism, for example, has a positive influence on the proportion of calorie intake which is made up of fats. The findings in the structural equation model give grounds for a further analysis of the psychological determinants of a healthy diet.

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# Horizontal and vertical collaboration in the agricultural water sector: Examples of institutional initiatives to cope with climate change-induced challenges

OSCAR SCHMIDT, INSA THEESFELD

## Introduction

This study explores adaptation among organizations and administrative bodies active in the agricultural water sector. Examples of institutional initiatives presented in the following are drawn from a larger study conducted in collaboration with the German Development Institute (GDI) in Bonn in 2010 (THEESFELD et al., forthcoming 2010). The study supplements current conceptual papers on adaptation to climate change with empirical material about actual innovative institutions, describing political, governmental and organizational solutions among agricultural water agencies.

The empirical material is based on document analyses and interviews with experts and administrative staff. We explore three practical applications of institutional innovation by referring to the state of Brandenburg in Germany, the Ebro River Basin in Spain, and the state of California in the US. We find that adaptation is often triggered by a multitude of factors. We observe similar trends towards integrated solutions, such as interdisciplinary collaboration and cross-agency working groups. Apart from horizontal collaborations, recently also vertical collaboration comes into play. Factors which hamper institutional innovation include bureaucratic inertia and path dependencies.

## Institutional initiatives in Brandenburg

Brandenburg is characterized by a negative water balance, and increasingly frequent and severe droughts. WECHSUNG et al. (2008) predict the future reduction of water availability in Brandenburg to lead to a 15 % decrease in crop yields by 2046.

The severe spring drought in 2000 which led to 153 Mio Euro losses to agriculture motivated the Federal Ministry of Agriculture, Environment and Regional Planning (MLUR) to establish an interdisciplinary Working Group "Landscape Water Regime" (SCHLEYER, forthcoming 2010). The Landscape Water Regime Group comprised staff members of the Environmental Agency of Brandenburg (Landesumweltamt), the MLUR, non-political stakeholders and experts from the fields of water management, agriculture, regional planning, biology, wetland restoration and forestry. This group represents an innovative form of horizontal cross-agency collaboration which refers to cooperative efforts among agencies and stakeholders at the same administrative level. The group aimed to: 1) Clarify the impact of climate change on the state's landscape water regime and 2) Develop options for adaptive measures for a sustainable use of water under climate change.

Based on the assessment the "State-wide program for stabilising and improving the landscape water regime" was launched by the MLUR in 2001 and extended in 2004 and 2009. By promoting measures for habitat restoration, land use change, and

the modernisation of existing reclamation infrastructure, this program aimed at improving the watershed's retention capacity. The tasks of designing concrete measures, applying for funds, and implementing the program measures were delegated to local water and soil associations (WSA), thus, creating a range of new adaptation oriented assignments to be handled by those associations. Going along with this, is the empowerment of the WSA. The measure implementation in collaboration with the respective local WSA represents a form of vertical collaboration, i.e. cooperative efforts among macro-level and local-level agencies and stakeholders.

Funding for those measures is largely coming from the EU-EAGGF budget. By the end of 2007, 400 local projects totalling 70 million Euros had been implemented (SCHÖFER, 2008). To implement the Funding Program three regional expert groups were established to assess the submitted project proposals. Despite the fact that the Working Group "Landscape Water Regime" was suspended in spring 2003, those three regional working groups have continued their work, which shows the long-term effect of this institutional initiative.

### **Institutional initiatives in Spain (Ebro River Basin)**

The Ebro River Basin in Spain, which irrigates more than 784,000 hectares of land, is projected to receive 5 to 15 % less of precipitation by 2050 (IPCC, 2007). The consequences are decreasing replenishment of groundwater basins and also a decreasing river runoff, both of which are important sources for irrigation agriculture. The Spanish part of the Ebro River Basin is administered by the "Ebro Hydrographic Confederation" (EHC in the following). Founded in 1926, the EHC has seen several

phases of organisational change. Today, the EHC oversees 85.534 km<sup>2</sup> of territory which stretches into nine Autonomous Communities, and incorporates 18 provinces and 1.717 municipalities.

Recently, the EHC introduced a number of innovative measures to fight the increasing threat of climate change induced droughts. A "Special Plan of Action in Cases of Possible Drought Alert" (Ebro Drought Plan) was issued as a supplement to the general Ebro River Basin Management Plan.

Drafted by the EHC throughout 2006, the Ebro Drought Plan was subject to proposals by the confederation's members and external interest groups, such as the Oficina Espanola de Cambio Climatico, the World Wide Fund for Nature and the National Ministry of Environment (MINISTERIO DE MEDIO AMBIENTE, 2007). Agriculture constituted the largest stakeholder group, including five Irrigation Communities. The plan's final version was submitted to the EHC's Water Council in 2007.

The Ebro Drought Plan includes a comprehensive analysis of the causes and effects of drought. Climate change is addressed as one out of various drivers for an increase of such events. The irrigation sector is repeatedly assessed as disproportionately vulnerable and, to deserve special attention and emergency assistance (ibid.).

The plan proposes a catalogue of drastic alert measures to which the EHC's members may refer in times of acute water crisis. In sum, the plan offers concrete regulative measures; many of which directed to irrigators. Yet, the Irrigation Communities are asked to take strong adaptive measures and alert actions themselves (ibid.).

The plan's implementation and administration is assigned to a Permanent Commission on Droughts (Comision Permanente de la Sequia), which was set up in 2008. The commission represents horizontal and vertical collaboration, as it is led by the EHC's president, comprises of a number of EHC staff members, and bureaucrats from the National Ministry of Agriculture, Fisheries and Alimentation and the National Ministry of Industry, Tourism and Commerce. The commission further includes representatives of environmental interest groups and agriculture.

### **Institutional initiatives in California**

California is exceedingly vulnerable to climate change, mainly to droughts from changing precipitation patterns and rising temperatures (IPCC, 2007). By 2050, up to 40 percent of the Sierra snowpack may disappear, resulting in decreased runoff that will impact water supply for urban, agricultural and environmental uses (GOVERNMENT OF CALIFORNIA, 2009b).

Californian water agencies have started to develop different forms of vertical and horizontal collaboration. The California Department of Water Resources (DWR) recognizes Integrated Water Resources Management (IWRM) as "a critical framework to address climate change" (GOVERNMENT OF CALIFORNIA, 2009a). California therefore supports the introduction of IWRM by funding and technical assistance. Altogether, more than \$ 5 billion have been spent for IWRM projects (ibid.). The design of IWRM plans rests with the local water agencies. The DWR, however, has set specific criteria to evaluate IWRM plans on their conformity with the Californian water legislation and its grant programs. Climate change adaptation is increasingly recognized within regional funding agreements. The DWR thus proposes such measures

to be included in applications. By 2011, climate change adaptation will become a formal requirement in all IRWM plans.

A worthwhile example of simultaneous horizontal and vertical collaboration is the Upper Kings IWRM Plan. The Upper Kings basin is located in the Californian Central Valley the state's most important agricultural region. Water provision within the basin is operated by more than twenty independent local-level agencies, including three large irrigation districts, county water departments, city water departments and private corporations. In the past, all decisions on water provision were limited to single-agency operations.

In 2001, an early horizontal collaborative initiative was started. Four large local water agencies, the Kings River Conservation District, the Alta Irrigation District, the Consolidated Irrigation District, and the Fresno Irrigation District formed the Basin Advisory Panel (BAP). The BAP signed a memorandum of understanding and sought technical and financial support from the DWR. The BAP solicited wider stakeholder participation until in 2004 the Upper Kings Water Forum was formed. The Forum today comprises 34 member organisations including local water agencies, city and municipality representatives, research organisations and environmentalists. In addition, also the DWR, the California Department of Fish & Game and the Regional Water Resources Control Board joined the Forum.

In 2005, the Water Forum developed an IWRM Plan to "reduce conflicts and ensure sustainable resource management through regional cooperation" (WRIME, 2007: 3). The development of the plan included a wide range of technical studies, a surface water model, a community affairs process and stakeholder meetings (ibid.). The Forum's members identify global warming

as a major challenge to reaching the common goal. In 2007 the Upper Kings IWRM Plan was submitted to the DWR in request of funding.

## Conclusion

The three examples from the case study regions show how water agencies at different administrative levels introduce a variety of institutional initiatives to adapt agricultural water management to climate change. The main trends in adaptation can be subsumed as follows: Besides horizontal agency collaboration which often underlines an interdisciplinary character, also vertical collaboration for instance through stakeholder involvement is becoming popular. The three countries recognize the need for broad social inclusion to meet with the multi-scalar dimension of climate change (PAAVOLA and ADGER, 2006). Initiatives are seldom undertaken in response to climate change forecasts alone. They are part of reactions to extreme weather events, like heat waves and floods; of broader sectoral initiatives which pursue different water-related goals; or an increasing public awareness for environmental issues and the understanding that coordination across jurisdictional boundaries is required. Yet, all initiatives share some degree of inherent administrative problems. One is the problem of interplay, which occurs whenever vertical interaction within the political and administrative hierarchy at national, federal and regional level and also horizontal interaction across different sectoral units and organizations is required (Moss, 2003). Here, ambiguity often exists on the definition and distribution of responsibilities. Likewise, bureaucratic inertia and path dependencies (THEESFELD et al., 2010) hamper institutional change when civil servants foresee high transaction costs in becoming acquainted to substantial procedural changes. Such

hampering factors have to be taken care of with particularly designed measures in order to let the institutional adaptation in the administrative bodies to become effective.

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*Dairy cows in the meadow*

# Is large-scale milk production competitive? Simulation-supported analyses for Saxony-Anhalt

FRANZISKA APPEL, ALFONS BALMANN, ARLETTE OSTERMEYER

## Introduction

The conditions of the location, the size of farmland holdings and the labour capacity in Saxony-Anhalt all provide a good basis for agricultural production. Since the *Wende*, very heterogeneous but broadly stable and highly productive farms have become established, and these represent an important economic factor in rural areas. Whereas arable farms in Saxony-Anhalt are exploiting their potential, "by comparison, processing and feed-producing enterprises are not yet sufficiently competitive" (MLU, 2009, p. 48). Although a stable structure of dairy farms and dairies does now exist, in times of crisis with low milk prices many dairy producers are faced with the decision of whether they should quit milk production. Limited equity as well as a high proportion of outside labour and leased farmland all lead to instability. Given low unit prices for milk, considerable price fluctuations, a further liberalisation of the dairy market and an anticipated reduction in direct payments, the dairy sector faces substantial additional challenges. The question is: Are large-scale structures in dairy production competitive in the long term? To find this out we have carried out simulations with various price scenarios for the Altmark region in the north of Saxony-Anhalt, an area where there is a large amount of dairy farming.

## The region

The Altmark region is made up of the two districts of Stendal and Altmarkkreis Salzwedel. It is home to around 40 % of the dairy cows and 53 % of specialist dairy businesses in Saxony-Anhalt. At 26.4 %, the proportion of the Altmark which is pasture land is high compared to Saxony-Anhalt as a whole.

The most important livestock in the Altmark are fattening pigs and dairy cows. Although animal production is at a much lower level than in the leading German processing regions, it is clearly dominated by large enterprises. Fattening pigs are predominantly to be found in holdings of over 1,000 animals, and dairy cows in herds of 100-200 animals, sometimes more than 500. The large-scale farm structures are also reflected by the farmland holdings. Although most farms are in the groups of 0-30 hectares and 200-500 hectares, the majority of land is farmed by enterprises with more than 500 hectares. Grazing livestock farms, mixed farms and dairy farms account for about 68 % of the land and are thus dominant. Pure processing businesses, on the other hand, only play a minor role.

## The model

Simulated calculations have been carried out using the model AgriPoliS (Agricultural Policy Simulator) to analyse the competitiveness of large farm structures in dairy production. AgriPoliS is an agent-based model in which a large number of individual

agents, i.e. farms, interact. A detailed description of the current version of AgriPoliS can be found in KELLERMANN et al. (2008).

To depict the regional agricultural structure as a model region it is necessary to set the regional data from the statistics against the corresponding indicators of individual farms on the basis of data from the farm accountancy data network (FADN). With an extrapolation approach it is possible to identify typical farms from a large number of individual farms and to weight them. At the same time a selection is made of the farms which best depict, i.e. represent the region.

The depiction of the farm organisation is based on a mixed integer linear programming model. This looks at individual data regarding factor provision (buildings, machinery, labour force, equity, soil, quota etc.) for the farms identified as typical, as well as a variety of production and investment alternatives from which the farms can choose to exploit their factor endowment optimally.

**Table 1: Scenarios to determine competitiveness**

Name	Description
Price scenarios	Complete implementation of the 2003 CAP reform and the "Heath Check" resolutions: Abolition of the milk quota in 2015, 'soft landing' until then (from 2010).
20 cents/kg milk	Gross margin: 339 €/cow from 2010
25 cents/kg milk	Gross margin: 739 €/cow from 2010
27 cents/kg milk	Gross margin: 899 €/cow from 2010
30 cents/kg milk	Gross margin: 1,139 €/cow from 2010
32 cents/kg milk	Gross margin: 1,299 €/cow from 2010

Source: Own deliberations, gross margins according to MLUV, 2008 (Milk income adjusted to the milk prices of the corresponding price scenario).

**Price scenarios**

To ascertain the conditions under which large-scale farm structures in dairy production are competitive, the first thing we have to examine is how different milk price levels influence the farms and their milk production. The aim is to work out the development paths of agricultural enterprises in varying price scenarios and if the quota is removed.

All price scenarios assume the complete implementation of the last reform of the Common Agricultural Policy (CAP) in 2003 as well as the resolutions of the EU's so-called "Health Check" in 2008. The model considers the degression of direct payments as well as a harmonisation of premiums for pasture and arable land.

The price scenarios are based on assumed milk prices of 20, 25, 27, 30 and 32 cents/kg milk, which are reflected in various gross margins in dairy farming (see Table 1). In addition the variable costs are changed from farm to farm to account for a range of management skills amongst farm managers. In our model the variable costs fluctuated by  $\pm 20\%$ . All milk price

scenarios have the initial assumption that the milk price does not change between 2006 and 2009 but has a starting level of 29 cents/kg milk (following WOHLFAHRT et al., 2008). It is only with the phasing out of quotas, i.e. the start of the "soft landing" process, that the milk prices change, as illustrated in Table 1.

### **The impact of different milk price levels**

Figure 1 shows that in the 27 cent/kg scenario dairy cows will still be kept in the long term, although the trend does decrease. In the 25 cent/kg scenario there will also continue to be milk producers (see Figure 2), but there will be no (re)investment measures such as those that occur in the 27 cent scenario. With a milk price of 20 cents/kg from 2010 all model farms quit milk production. In the 30 and 32 cent scenarios, on the other hand, there is a steep rise in the number of dairy cows.

At the outset there is the following connection between milk price level and profits: the higher the milk price, the higher the profit per hectare (Figure 3). The differences between the 20, 25 and 27 cent scenarios are small, however. This highlights the fact that within a business or within an agricultural region losses in the dairy sector are compensated for by other farm branches and rationalisation measures. The differences at the beginning between the 27, 30 and 32 scenarios are more marked.

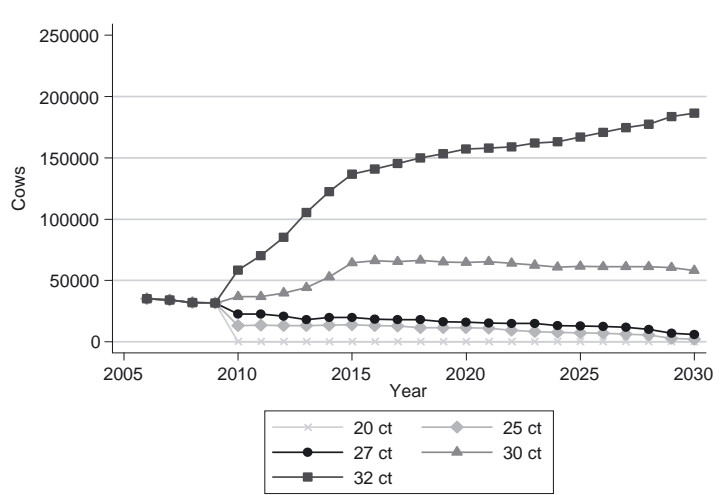
With higher milk prices, farms make greater profits. Over time, however, the profit advantage of the higher price scenarios declines. A cause of this is the development of the rental prices (see Figure 4). In the 32 cent scenario, for example, there is a heavy increase in the rental prices of pasture land. The reason for this is that dairy farming is not independent of land, but needs pasture and arable land as the basis for the animals' feed. The

model farms are thus forced to surrender a not insignificant part of their profits to the landowners. This even reaches the point where, in the end, the profits in the 32 cent scenario are lower than those in the 20 cent scenario (see Figure 3), because in the latter the enterprises are forced from the outset to switch to other types of production or to quit farming. Besides the rental prices we must also consider that dairy production is incredibly labour intensive. With an annual increase in wages of 1.1 % the proportion of labour costs rises in addition to the rental prices. Because of the behavioural assumptions of the agents they cannot make long-term predictions about rises in rental prices or wages. They thus make greater investments in cowsheds, as they probably would do if they could predict these developments. As these investment costs are assumed to be sunken costs, a reorientation of production is very expensive.

### **Competitiveness of milk production**

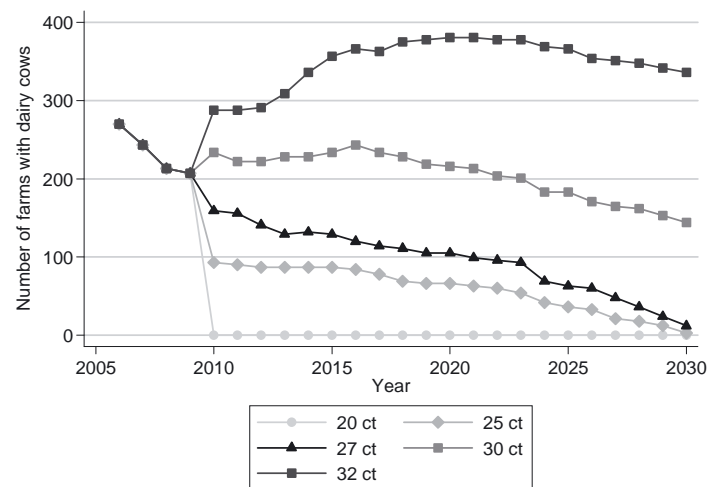
What are the general conclusions that can be drawn from the simulations of the competitiveness of large-scale milk production in the Altmark? The number of farms by itself says little about competitiveness, because it shows a progressive structural change which allows the farms that remain in production to increase their size. It may well be that a large number of farms quit production, but that the few farms which continue help generate the production volumes of those who have quit. We have therefore given a more precise definition to competitiveness of dairy farming: the competitiveness of milk production is the capacity of the dairy sector to compete with other sectors of agricultural production. Following this definition we can say that milk production in the model region is competitive when average prices are 30 cents/kg and above. From this milk price level

**Figure 1: Development of cow numbers in the region at different milk price levels**



Source: Own simulations.

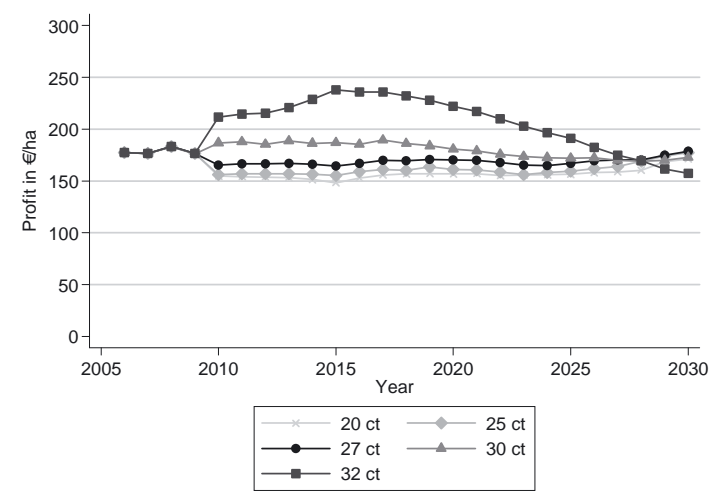
**Figure 2: Number of farms with dairy cows at different milk price levels**



Source: Own simulations.

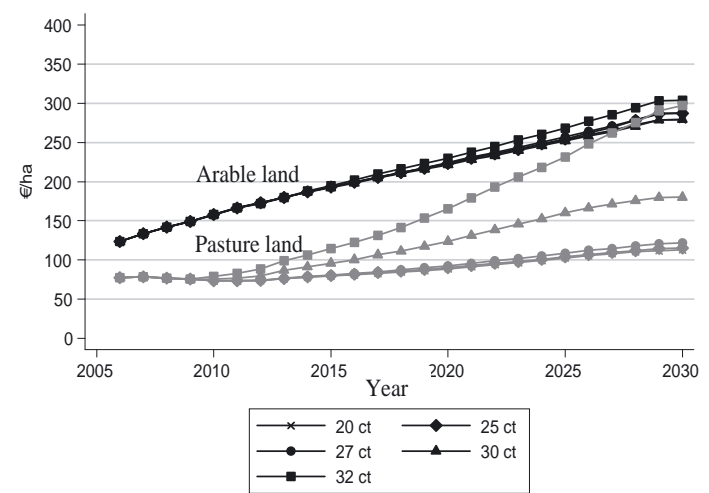


**Figure 3: Development of profits per hectare at different milk price levels**



Source: Own simulations.

**Figure 4: Development of rental prices for arable and pasture land at different milk price levels**



Source: Own simulations.

production is relatively constant. At lower prices in the model we see a cutback in dairy farming, sometimes large, sometimes less so. In these scenarios only a few dairy farms remain competitive (cf. Fig. 2). These farms take over only some, or even none of the market share of those farms quitting milk production.

What distinguishes the competitive farms from the less competitive ones? Table 2 gives us a more detailed look at the characteristics of farms which continue to produce milk at 27 cents/kg until the end of the scenario. There are four types of farms that are still producing milk in 2030 in the 27 cent scenario. Of the 273 model farms with dairy cow holdings at the outset, only 4.4 % are still producing at the end with a price level of 27 cents/kg milk.

The first thing we notice about these farms is that they have a very good management factor. The result of this is that the variable costs of all production processes are 16-20 % lower than in an average farm (management factor=1). The farms are also heavily specialised in keeping dairy cows. Only farm type no. 27 keeps mother cows alongside dairy cows. Amongst other things this is due to the very high proportion of pasture land of this farm type. Whereas the equity share in 2030 is slightly lower than the average of all farms, we can see from the profit per farm that it is up to 2.2 times higher than the average. Three of the four farm types that keep dairy cows have lower per hectare profits of between 73 and 152€/ha compared to the average per hectare profit of around 239 euros. But the reason why the overall profit of these farms is higher is down to their size. The model farms have on average 445ha of farmland.

**Table 2: Indicators of farms with dairy cows in 2030 in the 27 cent scenario**

<b>Farm no.</b>	<b>Business orientation in 2030</b>	<b>Legal form<sup>1)</sup></b>	<b>Management factor<sup>2)</sup></b>	<b>Dairy cows</b>	<b>Land in ha</b>	<b>Proportion of pasture land</b>
27	Grazing livestock	LP	0.81	720	1,125	63 %
29	Mixed	NP/MO	0.80	240	825	27 %
32	Mixed	LP	0.84	480	1,250	35 %
33	Grazing livestock	NP/MO	0.80	480	860	51 %
Ø <sup>3)</sup>	-	-	1.00	9	445	33 %

Continuation of Table 2

<b>Farm no.</b>	<b>Profit</b>	<b>Equity share</b>	<b>Proportion of rented land</b>	<b>Total labour force (of which is family)</b>	<b>Labour force/ 100 ha</b>	<b>Profit/ worker</b>
27	81,601 €	85 %	91 %	18.0 (0.0)	1.61	4,534 €
29	230,246 €	78 %	91 %	9.0 (2.0)	1.11	25,583 €
32	167,586 €	64 %	89 %	12.5 (0.0)	1.01	13,407 €
33	130,967 €	66 %	95 %	14.0 (2.0)	1.63	9,354 €
Ø <sup>3)</sup>	105,916 €	89 %	92 %	2.7 (1.1)	0.95	37,120 €

Source: Own simulations.

Notes: <sup>1)</sup> LP: Legal person; NP/MO: Natural person in their main occupation.

<sup>2)</sup> A management factor of 0.8 means that the business only has 80 % of the variable production costs.

<sup>3)</sup> Average of all farms operating in 2030.

Farms nos. 27, 29, 32 and 33 all have more land and can exploit economies of scale. Farm type no. 29 can attain a profit of 279€/ha and thus is somewhat more successful than the average. Farm type no. 29 can also turn a greater profit in 2030 than the other farms with dairy cows in relation to labour force numbers. For each worker it generates around a 25,600 euro profit, whereas the other farm types generate between 4,500-13,400 euros profit per worker. Overall, however, the profit per worker is far below the average in the region (around 37,120 euros).

### Summary

In conclusion, the analyses presented here suggest that the Altmark has a competitive agricultural structure and that milk production is competitive when average prices are at around 30 cents/kg or higher. But if the milk prices drop permanently to between 20-25 cents/kg, dairy farms can no longer operate sustainably. The development of farms with dairy cows is not exclusively dependent on the milk price level, however. The general structural change to fewer and larger farm units will also continue over the next few years. Different price levels and the future shape of the EU's Common Agricultural Policy will strengthen or weaken this development but will not stop it.

Even at low milk prices some farms with dairy cows can remain competitive. Those farms which are still producing in the 27 cent scenario are large farms with an above-average business

organisation, i.e. they are characterised by lower variable costs, they specialise in dairy farming, and have more land than the average farm. The question is: To what extent can first-rate farms and farmers withstand such price pressure? They need to structure themselves financially and organisationally so that they can also make use of the opportunities which arise in a liberalised and competition-oriented environment.

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*The field trip highlighted questions of regional and structural development taking the example of Halle on the River Saale*

# Findings of the IAMO Forum 2010: "Institutions in Transition – Challenges for New Modes of Governance"

BRITTA PAASCHE, STEFAN WEGENER, MARTIN PETRICK

From 16-18 June 2010 the Leibniz Institute of Agricultural Development in Central Eastern Europe (IAMO) held the IAMO Forum 2010. A total of 112 participants from 22 countries came to the international conference in Halle to discuss "Institutions in Transition – Challenges for New Modes of Governance". In the political economy we understand by institutions – from contract law and networks to administration, cooperations and markets – those things that constitute the rules of a society, or of part of it such as agriculture.

"One of the most important institutions in the transition process of European agriculture is the EU's Common Agricultural Policy (CAP) itself," said Martin Petrick, concluding the conference. Another finding of the conference was that many of the global challenges currently being debated are turning up as old questions in new guises. For example, the phenomenon of "land grabbing", defined for the present day as large-scale land purchasing or leasing by foreign investors, predominantly in developing countries, has a great influence over future resource use in a country. Crucial here is whether agricultural development in the country affected is to be dominated by small family farms or industrialised large enterprises. And yet this question was already at the heart of agropolitical debate at the start of the twentieth century, and has intensively engaged agricultural economics ever since. As long as small-scale farm structures dominate, the question of cooperation opportunities between farms to overcome this fragmentation will crop up again and again.

In addition to the three plenary sessions, in which six keynote lectures were given, participants delivered eighteen papers and nine poster presentations. Individual topics ranged from the interplay between income, networks and social stigma, and contracts in the Hungarian dairy sector, to the effect of bioenergy production on rural development and employment in Finland. The plenary lectures dealt with "Governance in natural resource management", "Formulation and design of policies," and "New theoretical developments in analysing rural institutions." There was also a special seminar on the management of state-owned farmland, and one on the topic: "What about Korea: the next transition candidate?" The academic debates were rounded off by a podium discussion on the subject: "The Common Agricultural Policy – Does one size fit all?"

## Plenary session and podium discussion on the European Union's Common Agricultural Policy

A highlight of the conference was the plenary session on the "Formulation and design of policies" with Dr Tassos Haniotis, head of the directorate "Economic Analysis, Perspectives and Evaluations" of the Directorate-General for Agriculture of the European Commission, and Prof. Dr Emil Erjavec, Chair of Agricultural Policy at Ljubljana University, Slovenia. At the Commission Haniotis is responsible for evaluating agricultural policy measures and, amongst other roles, was a member of Franz Fischler's cabinet. In his lecture, "The CAP reform process in perspective:



*Dr Tassos Haniotis (European Commission) and Prof. Dr Emil Erjavec (Ljubljana University) were two of the speakers at the IAMO Forum 2010*



Issues of the post-2013 debate", he explained the forthcoming CAP reforms. Haniotis made it clear that the three spheres of action of the CAP – markets, direct payments and rural development – have been impacted by the budget restrictions of the Commission, the economic crisis, and the challenges of climate change. Of key importance for ongoing reform were the institutional changes which the principal goals of the CAP could secure in the long term: stabilisation of agricultural incomes, provision of public goods, and assisting structural change in the agricultural sector. He said, however, that it was becoming more and more difficult to implement changes as the differences between the Member States were huge. As a former member of various expert groups as well as of Slovenia's negotiation team for the agriculture chapter for his country's EU accession, Erjavec has a great deal of expertise in European agricultural policy. In his lecture "Determinants, discourses and dilemmas of EU Common Agricultural Policy: A political economy approach", he pointed out that the objectives of the Common Agricultural Policy were often not clear to the broader public. He expects that, although after 2013 the budget for agricultural measures will be proportionately smaller relative to the EU's overall budget, in absolute figures it will have hardly been reduced. As far as direct payments are concerned, Erjavec predicts a gradual adjustment to the effect that the individual Member States will have more leeway when distributing funds. He fundamentally questioned traditional measures of furthering rural development. Instead, the requirements of the EU's new Member States and the aim of combating poverty should get higher priority.

In addition to the plenary sessions, a podium discussion also dealt with the EU's Common Agricultural Policy. On the podium

were Prof. Dr Lubica Bartova from the Slovak University of Agriculture in Nitra, Prof. Dr Emil Erjavec, Dr Matthew Gorton from Newcastle University in Great Britain, and Prof. Dr Alfons Balmann from IAMO. All of the speakers responded to the central question of the podium discussion – whether the CAP measures should satisfy all Member States – in the negative. What they said was necessary was a development policy agenda which would help the poorest regions of the EU become more prosperous. Alfons Balmann emphasised the need to fundamentally rethink the CAP. He highlighted the problem that some subsidies benefited landowners rather than farmers by means of higher lease prices. This effect could be further reduced by a consistent policy of decoupling. He added that agricultural policy should better tailored to the specific problems of the agricultural sector, and that it should seek to attain its goals with as little money as possible. Matthew Gorton stated that the wide-ranging transferral of the CAP to the new Member States when they joined the EU had not sufficiently taken into consideration their specific socio-economic circumstances and problems. Lubica Bartova underlined the particular characteristics of the structure of Slovenian agriculture which is largely dominated by large farms and cooperatives. She was critical of the fact that the current subsidy structure was slowing structural change excessively and sending the wrong signals to farmers. Emil Erjavec discussed the specific problems of rural development in the new Member States and emphasised that current agricultural policy did not offer sufficient opportunities for particularly the Baltic states, eastern Poland, Bulgaria and Romania to combat poverty in the rural areas of their countries.

### **Plenary session on the management of natural resources and theoretical approaches of institution analysis**

There were two lectures in the plenary session "Governance in natural resource management". The first, by Dr Regina Birner (International Food Policy Research Institute – IFPRI, Washington D.C.) discussed "New challenges for land governance in 21<sup>st</sup> century"; while the second, by Dr Insa Theesfeld (IAMO), looked at "Groundwater governance – the upcoming challenge". Regina Birner emphasised that questions of political land management were becoming increasingly important. A rising

demand for food and bioenergy, as well as the impact of climate change on agricultural production, would result in increased competition on land markets and lead to conflicts, too. She also discussed problems of small farmers and the conditions in which small farm structures would be able to be competitive on markets. In her lecture, Insa Theesfeld underlined the growing importance of groundwater. A large proportion of research in the past has looked at irrigation, but has underestimated the role of groundwater use. The chief characteristics of groundwater as a communal resource, such as the difficulty of drawing boundaries between users as well as people using water beyond



*IAMO Forum 2010*

their boundaries, require a specific system of regulations. Key elements of such a system of regulations were that people abided by the rules voluntarily, and the special role of the administration which should follow the principle of subsidiarity.

In the plenary session "New theoretical developments in analysing rural institutions", Dr Eric Coleman (Florida State University) gave a lecture on the "Implications of external validity for research on polycentric and complex adaptive systems", while Prof. Dr Dr h.c. Konrad Hagedorn (Humboldt University, Berlin) gave a second lecture on "Analytical frameworks for institutional analysis of socio-ecological systems". In his lecture, Eric Coleman discussed methodological approaches for analysing environmental and development policies, in which there is an interplay between the natural environment and the institutional parameters of resource use. He set qualitative case studies, *pace* Elinor Ostrom, against the more quantitative approaches for evaluating cost efficiency, with randomised comparisons *pace* Ester Dufo. Using two case studies he illustrated the following problem: it is difficult to make generalisations from the connections identified by a detailed analysis of a particular system; often they are only valid for the system being analysed. In his lecture Konrad Hagedorn looked at various existing theoretical analytical frameworks for examining socio-ecological systems. He came to the conclusion that each of the various analytical frameworks could only examine certain parts of the system under investigation, and frequently did not sufficiently take into account knowledge from agricultural economics. The analytical framework "Institutions of Sustainability" could integrate various approaches, however, and also offer the possibility to consider individual transactions and the interplay with other policy levels.

## **Special session on state-owned land management and Korea**

At this IAMO Forum there was also a special session on the successful management of state-owned farmland with four presentations followed by a podium discussion. The importance and challenges of solid and effective state-owned land management were highlighted against a backdrop of diverse external factors such as climate change, rising global competition for agricultural raw materials, migration and demographic development. The special session was organised by BVVG (Society for Land Use and Planning) GmbH, the German Society for Technical Cooperation (GTZ) GmbH and IAMO. The session addressed the complex question of state-owned land management in transition countries. There was a discussion looking back at the land reforms that have been carried out, as well as of the advantages and disadvantages of the different paths taken. The objectives and impact of measures in state-owned land management were illustrated by using examples from Lithuania, Ukraine, Mongolia and Eastern Germany. The session included a presentation by Harald Finkelmeyer of the GTZ project in Mongolia, while Katja Dells from BVVG outlined the privatisation process of state-owned farmland in Eastern Germany as well as the management of the remaining state-owned land. The participants highlighted the management of contaminated land and combating land degradation as the key problems of land management. They considered that the main challenge for the future was to improve national land legislation and policy. In addition, aspects of environmental protection needed to be taken into account and the creation of functioning markets had to be secured.

At the extra session on the topic "Korea – the next transition candidate?" academics from South Korea, from Kangwon National University Korea (KNU), Korea Rural Economic Institute (KREI) and Ewha Womans University addressed the current state of agriculture in North and South Korea. Amongst other things they emphasised that, since the late 1990s, the North Korean government has been trying to solve its economic problems and guarantee food security for its citizens by undertaking reforms and improving its relations with the outside world. Until now these policies have only met with partial success, however. Instead it was apparent that socialist North Korea continues to be tightly sealed off. As a possible future scenario the academics believed that the economic problems could continue to grow, that a collapse of North Korea was thus more likely, and that a rapid process of integration between North and South Korea might take place. Given this, the researchers thought that the example of Germany was helpful to start addressing now the expected economic and social challenges which the agricultural sector would face, too.

### **Regional structural development**

As in previous years, the conference was concluded with a field trip. Taking the city of Halle on the River Saale as an example,

there was discussion of questions of regional and structural development from a historical and current perspective. The main focus was the natural resource of salt as the motor of structural development in the region. Until the 18<sup>th</sup> century the salt springs ensured that Halle enjoyed an important position within Germany. With industrialisation the region became a centre of mechanical engineering and later of the chemical industry. In his lecture, Dr Rainer Lüdigg of the Halle-based Institute of Structural Policy and Economic Development addressed a current problem of future structural development. As a result of demographic change the region will see a significant drop in the number of people of working age. This is a development which will have an impact on the economic and structural development of the region, too. Smart strategies and innovative ideas are needed to keep well-educated young people in the region. The theme of the Forum about the interplay between institutions and processes of transition processes will be something that will continue to engage the Halle region, too.

The papers given at the IAMO Forum can be accessed at the conference web site <http://forum2010.iamo.de> and also at AgEcon (<http://ageconsearch.umn.edu/handle/59821>), an open access repository covering the subjects of agriculture and economics.



*One of the destinations on the field trip was the saltworks museum in Halle*





*Figure 1: Erosion damage in Longyang*



# The impact of agri-environmental programmes on land use and household income in south-west China

JENS FRAYER, DANIEL MÜLLER

## Introduction

Already during the Great Leap Forward (1958-61), the growing need for firewood and timber which accompanied China's accelerated industrial growth led to large-scale deforestation and forest degradation. The decrease in the area and quality of forest land is seen as having been responsible for past and present problems of soil erosion. These are a result of increased surface runoff where vegetation is lacking and poor water retention of degraded land. Intensive logging during the Cultural Revolution (1966-76) continued this trend. It was not until the beginning of the 1980s that an active policy of forest management halted the loss of natural forest and initiated an increase of forestation in the country. In spite of this, the rapid increase in the number of rural households, in particular, and the accompanying rise in demand for timber and firewood continued to put considerable pressure on forest land. Between 1986 and 2000 the number of households grew three times faster than the population, while the average household size dropped from 4.5 to 3.5 persons. Even though the amount of forest land has increased again since, in many cases the quality of reforested woodland remains low, and in some regions has become even lower due to the planting of non-native species and pest infestations in monocultures (WILSON, 2006).

The natural catastrophes which occurred towards the end of the 1990s, culminating in the drying up of the Yellow River in

1997 and the floods of the Yangtze in 1998, brought about a change in Chinese environmental policy. In 1998, to combat the causes of these environmental catastrophes, the first major national reforestation and agricultural environment programmes, including the Natural Forest Protection Plan (NFPP),<sup>1</sup> were adopted, followed shortly after in 1999 by one of the largest agricultural environment programmes in the world, the Sloping Land Conversion Programme (SLCP). Both of these two programmes were implemented in large parts of China, and protection measures or reforestation have been undertaken in almost every province (see Figure 1).

## The Sloping Land Conversion Programme (SLCP)

The SLCP is a programme of compensation payments for ecosystem services whose main goal is to take 32 million hectares of arable land on slopes greater than 15° out of production and reforest it by 2010, in order to mitigate the environmental impact of forest degradation. As an incentive for voluntarily taking their land out of production, farmers receive an annual compensation payment of 4,250 Yuan<sup>2</sup> for each hectare of converted land for up to eight years, as well as free saplings for reforestation. In 2007 the length of compensation payments was extended

<sup>1</sup> Key elements of the NFPP are a ban on deforestation, regulations for use of forest land, reforestation of national forest land and subsidies for forestry enterprises to undertake restructuring.

<sup>2</sup> 10 Yuan or Renminbi (RMB) is roughly equivalent to 1€ (as of early 2010).

## Payments for ecosystem services as socio-ecological interaction in land use

by a further eight years, meaning that the maximum length of payments rose to 16 years, dependent on the objective of reforestation. In transforming this land into ecological forest it is mostly local species such as native pines (*Pinus yunnanensis*) or alders (*Alnus nepalensis*) which are being used, and they are being planted in high density. In the case of economic forest, priority is given to its commercial value. This is achieved by planting trees which either produce marketable fruits such as walnuts or Sichuan pepper, or provide usable wood and permit extensive agriculture between the permanent crops. Where arable land is to be transformed into economic forests, compensation is paid for a maximum of 12 years; for ecological forests it is a maximum of 16 years. Besides restoring the ecological balance, another key objective of the programme is to boost the local economy and reduce rural poverty.

By 2006, 21 million hectares of arable land, i.e. 70 % of the target, had been reforested. Studies show that 60 % of households surveyed took part in the SLCP voluntarily. Furthermore, the soil quality of the converted land has increased and erosion has stopped, or been substantially reduced (XU et al., 2005; LIU et al., 2008). On the other hand, these positive developments have also been accompanied by negative trends. A proportion of the participating farmers, for example, talked of forced participation in the programme, problems in receiving compensation payments, inefficient choice of land, and insufficient consideration of local conditions (WEYERHAEUSER et al., 2005; TRAC et al., 2007).

The instrument of payments for ecosystem services aims to internalise market externalities by inducing the user of a service to create incentives to the supplier for providing it. With respect to land use, such instruments are based on financial incentives with the goal of influencing land-use decisions to ensure the provision of certain ecosystem services.

The decision-making of a land-use actor is location-specific and determined by a number of influences (see Figure 3). For instance, culture and history are reflected in prevailing traditions, available technology only permits certain possibilities in land use, current policy sets legal parameters, and the socioeconomic status defines the needs and scope for action of a land user. Besides these factors, the decision-maker is tied to the natural conditions of the ecosystem in which he lives and acts. The soil quality, the climate, and the natural conditions determine decisions regarding land use. Of key importance in this land-use system is the interplay between the individual subsystems. Over generations, traditions and technologies have adapted to the local conditions. At the same time, human beings modify these conditions by their slight or substantial interventions in nature, thereby changing the quantity and quality of the ecological services which in turn have an influence on land use. Correspondingly, a land-use actor is strongly influenced by the close combination of socioeconomic and ecological factors.

Within the SLCP farmers should be influenced in their land-use decisions by compensation payments and induced to carry out extensive land use and reforestation of areas in danger of erosion. State incentives specifically aim at reducing soil erosion

Figure 2: Extent of SLCP and NFPP in China



Source: Own modification based on Liu et al., 2008.

and surface runoff of rainwater, thus providing the ecosystem services of reducing the danger of flooding and sediment transport.

### Data collection

The conceptual framework in Figure 3 is used to investigate the effectiveness and efficiency of the SLCP at household level. Of key importance here are the precise reasons why individual households decide to participate in the SLCP, the impact of participation on the daily lives and socioeconomic status of households, as well as the effects of the SLCP on land use. A collection of quantitative and qualitative data has taken place to allow a comprehensive analysis. A standardised survey of more than 500 villages was conducted in ten villages in each of the two regions under study. The survey collected data about the demographic and socioeconomic development of households,

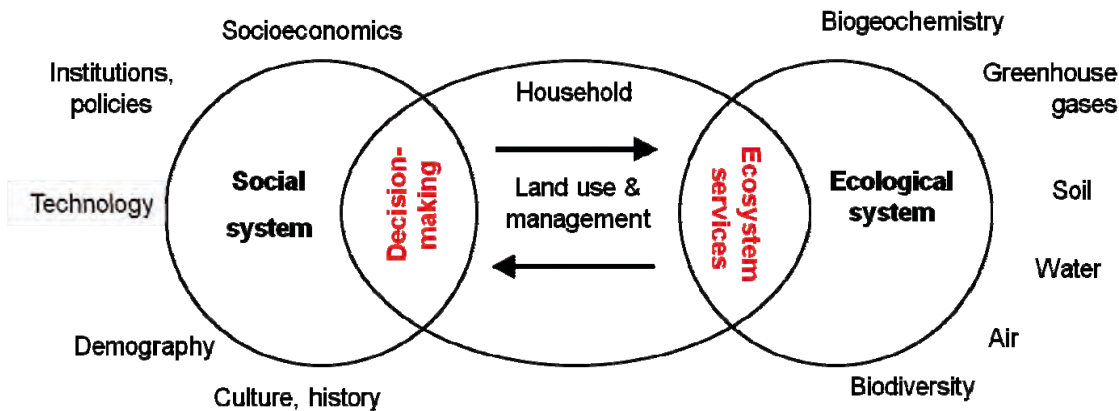
changes in agricultural and forestry land use, the SLCP and related policies. The villages were stratified by market access, and we selected villages participating in the programme as well as those not involved in the SLCP. Participatory land use mapping, which allowed a deeper understanding of land-use decisions in the ten villages under investigation, and group discussions enhanced the quantitative survey data. The studies were carried out in the south-western Chinese province of Yunnan, in the two districts of Yulong and Longyang which are in the north and north-west of that province (see Figures 4 to 6).

### Findings

#### 1 Reason for participation

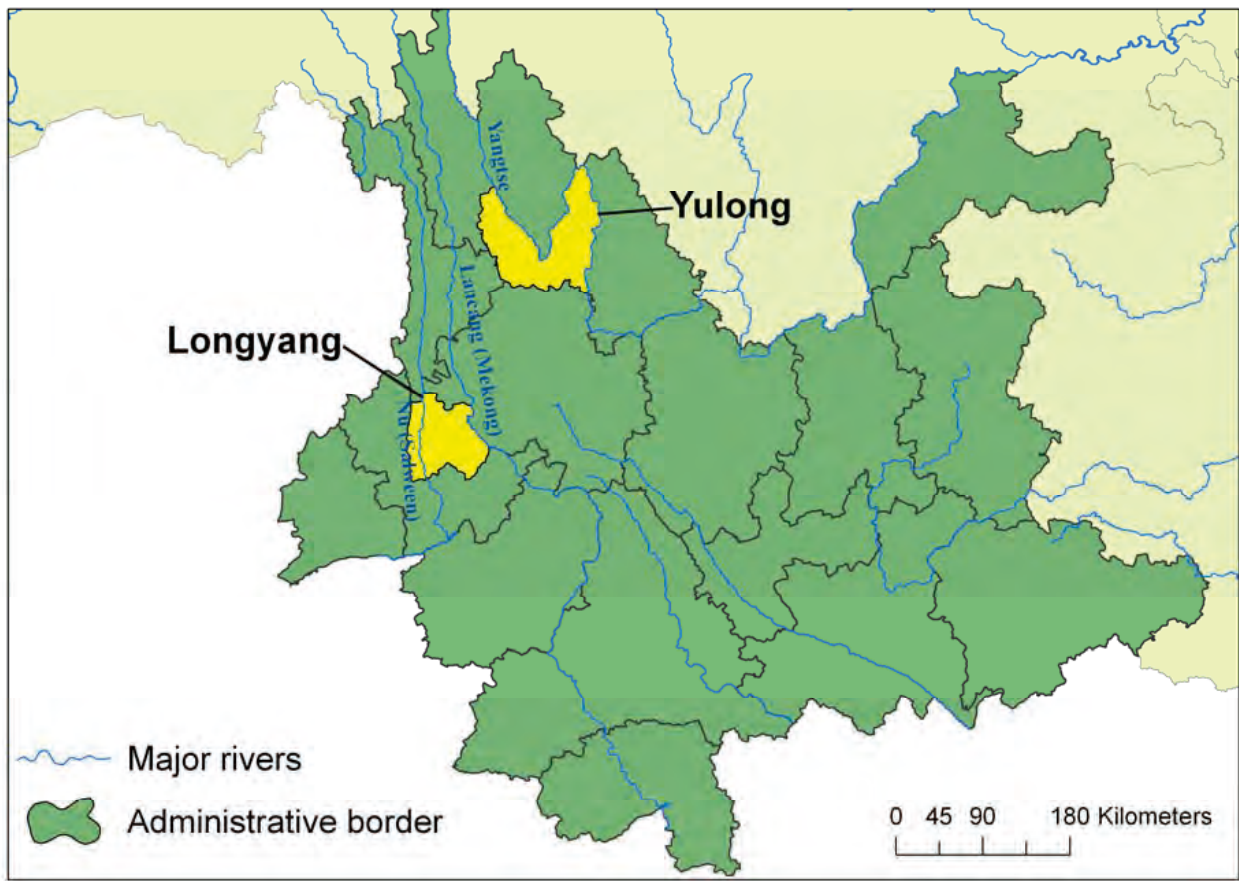
The chief motivation for taking part in the SLCP, and thus no longer using a proportion of one's farmland for crop cultivation, was the financial compensation on offer. 53 % of participants

**Figure 3: Land-use decisions as socio-ecological interaction**



Source: Own modification based on GLP, 2005.

Figure 4: The province of Yunnan with the two areas under investigation



Sources: Own depiction, FRAYER





**Figure 5:** *Terraced fields in Shitoucheng (Ylong)*



**Figure 6:** *Typical land use in Longyang*



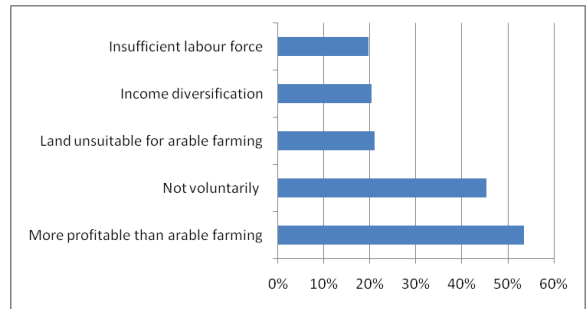
take part in the SLCP because of the compensation payments. For many households, the revenue combined with the labour-saving factor seems more attractive than continuing to farm the land intensively (see Figure 7).

In addition, there are less obvious factors influencing the decisions of small farmers. For example, there is a positive link between the size of a farm and participation in the SLCP, as the probability of obtaining a comparative cost advantage by participating in the programme rises as the size of a farm increases (see Figure 8).

## 2 Changes in land use

Demography and tourism have a large impact on current land use and a household's socioeconomic status. As the size of households decreases, families have less labour at their disposal. This development is being accelerated by the migration of many young household members who take on seasonal work in nearby towns and cities in tourism and gastronomy, as construction workers or harvest helpers in large agricultural enterprises.

**Figure 7: Reasons for participation in SLCP (multiple answers possible)**

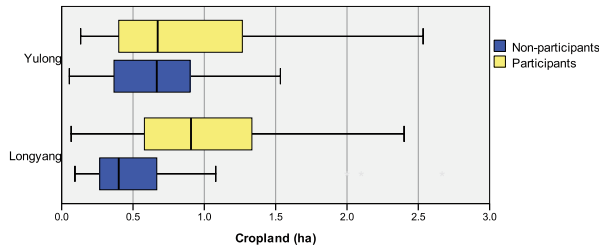


Source: Own household interviews, 2009.

This lack of labour favours taking marginal land out of production. Taking land out of production or extensification is made possible or encouraged by participation in the SLCP and the compensation payments that accompany it, and indirectly the SLCP promotes migration. The planting of fruit trees or walnuts by the terms of the programme also offers an important additional source of income.

Growing tourism, which offers employment opportunities for workers released by a change in land use, also has a direct impact on land use in the regions concerned. For example, the demand for water in the city of Lijiang has risen massively as a result of the many tourists who visit there. This demand can only be satisfied by diverting existing water channels, which has led to water shortages in some surrounding agricultural areas. Farmers are thus obliged to adapt their cultivation to these conditions, and so instead of vegetables and cereals they are increasingly farming more fruit trees, as these can tap into groundwater at deeper levels. Not all permanent crops, therefore, have been planted through the initiative of the SLCP. What

**Figure 8: Link between total arable land and participation in SLCP**



Source: Own household interviews, 2009.



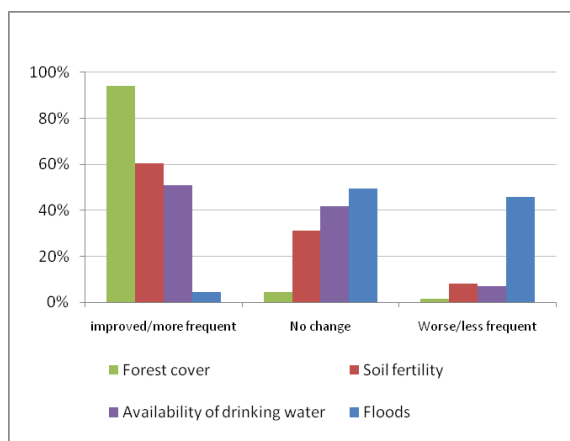
**Figure 9: Young walnut trees in Wawutang (Longyang)**

is more, the promising income potential of walnut trees has led some farmers to invest independently in agro-forestry without receiving compensation payments via the SLCP or other programmes (see Figure 9).

### 3 Environmental effects

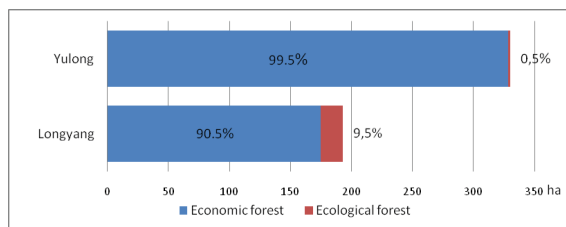
Those households surveyed confirmed the positive effects on the environment and ecological improvements. 86 % said that the SLCP had a positive impact on the environment, and 50 % of those questioned noted a positive trend in soil and water quality as well as the availability of drinking water following participation in the SLCP (see Figure 10). An examination of the reforested woodland shows that only a minimal proportion of land is being reforested as ecological forests. Farmers clearly favour extensive land use over taking the land out of production completely (see Figure 11).

**Figure 10: Effects of the SLCP on various environmental indicators**



Source: Own household interviews, 2009.

**Figure 11: Types of reforestation**

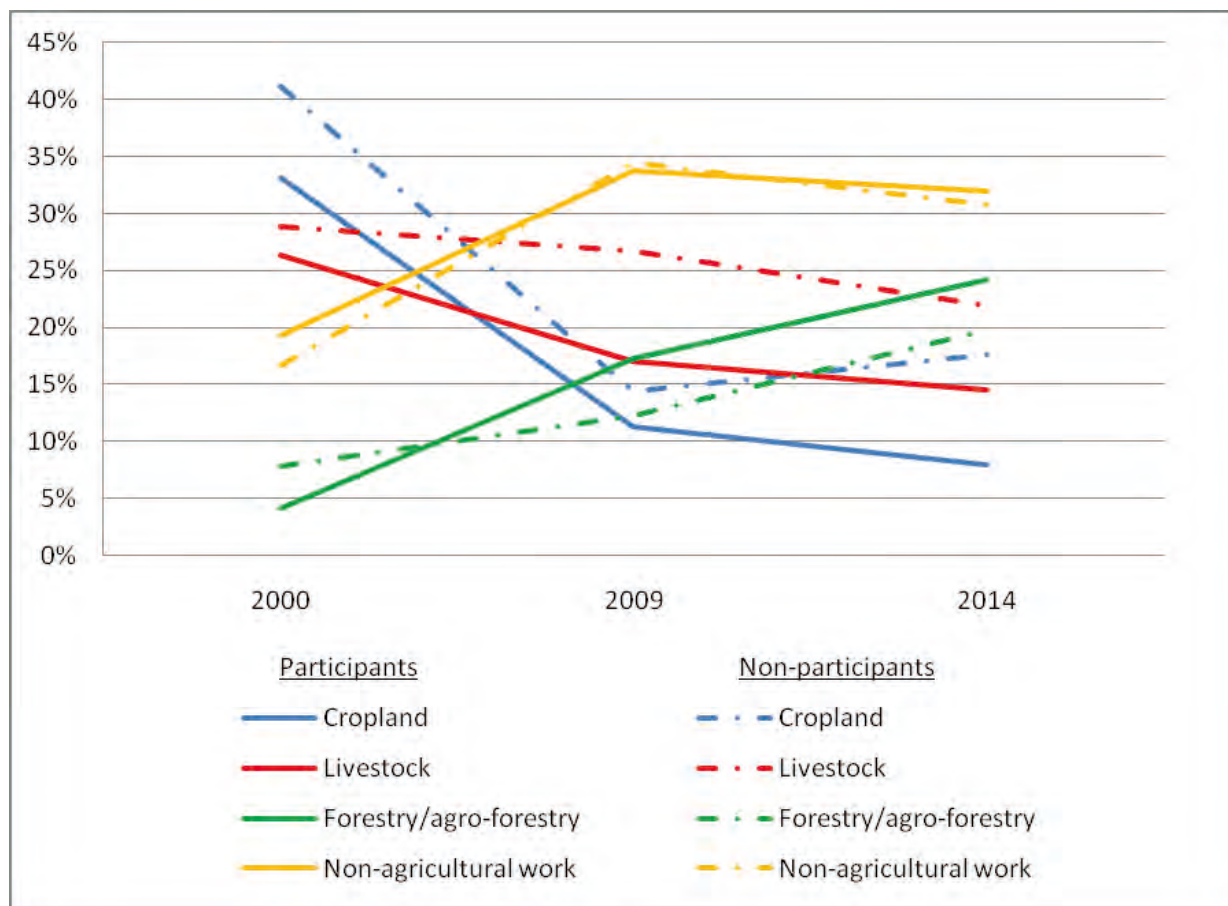


Source: Own household survey, 2009.

### 4 Change in income structure

In 2000, arable and livestock farming were the most important sources of income for all households surveyed. Nine years later it is non-agricultural employment. It is noticeable that, for participants in the SLCP, forestry and agro-forestry have become far more important, and farmers expect these to be even more important in the future, too. This can be explained by the additional income from compensation payments and the sale of fruits. When the data collection took place, most permanent crops had not yet reached the age where they produce the largest harvests. Income from the sale of fruits such as walnuts and Sichuan pepper may well increase substantially in the future. Arable farming, by contrast, has become significantly less important and, particularly for participants in the SLCP, will in the future generate the largest share of income only for few families. The considerable differences in the importance of livestock farming suggest differences between households in the focus of production. Families that obtain the largest share of their income from livestock farming, especially from pigs, need all their land to produce maize as animal feed, and thus would not gain any financial advantage through participation in the SLCP (see Figure 12).

**Figure 12: Importance of income sources for the household income of participants and non-participants in the SLCP**



Source: Own household interviews, 2009.

## Summary

Nine years after the introduction of the Sloping Land Conversion Programme, its impact on the environment can be judged as positive. Reforestation has led to an improvement in water and soil quality, increased the amount of forest land, and flooding is now quite rare. As the trees that have been planted continue to grow, erosion protection will improve further. It must also be noted, however, that reforestation with a poor diversity of species fulfils these basic functions only. There has been a very limited increase in species diversity.

Compensation payments as an additional source of monetary income and the growing importance of forestry and agro-forestry are direct results of participation in the programme. There are also indirect results, however, such as widespread voluntary planting of fruit and nut trees to generate income, often copying successful tree crops planted by other farmers. The growing importance of non-agricultural income sources is influenced by

a diversity of factors. Further research is needed to determine the extent to which this development is a result of demographic change, a rise in tourism or ongoing economic development in China's rural regions.

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*Landscape in Guizhou province (China)*



# Ethnic minorities and rural employment in Guizhou (China)

BENTE CASTRO CAMPOS

## Introduction

China's socio-political reorientation at the end of the 1970s, and the associated economic reforms were without doubt the motor of the industrial boom in the "Middle Kingdom". In the last few years the People's Republic has grown to become an economic powerhouse; in 2009 it was already the third largest economy in the world. The new prosperity is concentrated in metropolises and urban areas, however, and passes the majority of the 1.3 billion inhabitants by. Around 55 per cent of the population live in rural areas, where there is a much lower income level than in China's cities. "Inequality between farmers and urban residents is the biggest problem China faces," warns Joachim von Braun, former Director General of the International Food Policy Research Institute in Washington. Experience from around the world shows that income rises are predominantly a result of structural change in the agricultural sector: rural households decide to undertake non-agricultural work, which provides the remaining farmers with an opportunity for growth.

The agricultural sector is the main source of income for ethnic minorities in rural China, whereas their labour market participation in all other employment sectors is very low. To support their integration into the labour market, the central government early on implemented support measures to benefit ethnic minorities. Since 1949 these have gradually been adapted to the prevailing

political and economic conditions. In January 2008 the Employment Promotion Law came into force, which stipulates equal employment opportunities for ethnic minorities and the majority Han Chinese. If these measures are successful in favour of the ethnic minorities, it might be expected that, given equal suitability of those concerned, there would be no differences in labour market participation between ethnic minorities and the Han majority.

Past knowledge suggests, however, that discrimination still exists. This is also shown by the increase in ethnic riots over the last few years in China. In my PhD thesis I am examining the differences in occupation distribution between the ethnic groups in rural Guizhou, and identifying the key reasons for these differences. Guizhou is a province in south-western China with many ethnic minorities. Only about 60 % of the population of Guizhou is Han Chinese. The theoretical basis of the analysis is the "Occupational Exclusion" theory by JOHNSON & STAFFORD (1998). So far, I have reviewed the literature and analysed quantitative secondary data with discrete choice models in the empirical phase of the thesis. Initial findings show a higher level of participation in agriculture of the two largest minorities considered in the analysis, the Bouyei and Miao, compared with the Han Chinese. In March-April 2010 I then carried out field studies in Guizhou, to identify possible alternatives besides agriculture for these two ethnic groups in the labour market.



*Scenes from rural life in Guizhou  
province (China)*





## Current knowledge

Previous research on the labour market participation of ethnic minorities in rural China has shown their high level of participation in agriculture. What has also come to light, however, are the clear differences in labour market participation and in welfare levels between minorities in different regions. In Xinjiang, for example, ethnic minorities mostly work in agriculture. Compared with 1982 and 1990, however, we can see an increase in their labour participation in the service sector, although they continued to be highly underrepresented in all other sectors. According to these findings, education represents the most important opportunity for accessing other occupations. We can see similar results for Tibet. The problem of competition in the labour market between Tibetans and better-educated migrant workers from other provinces even extends to the important tourism sector. In Yunnan and Guizhou, on the other hand, a comparison between 1988 and 1995 shows that tourism and increasing border trade have played a more important role for ethnic minorities than for the Han majority (GUSTAFSSON & LI, 2004). The problem in Tibet is probably not systematic discrimination against Tibetans, but a lack of necessary qualifications amongst the Tibetan labour force. ZANG (2008) compared employment in 2001 between the Han majority and Hui minority in the state sector in Lanzhou (Gansu), and showed that here it was very much the case that the Hui's minority status was the main reason for discrimination against them in the labour market. Zang worked out that minority labour force protection was not successful, contrary to the promises of central government and in spite of support measures during the market reforms. Furthermore, the ongoing market reforms have led to a fall in the proportion of

state-owned enterprises and rise in private ones, which may have resulted in weaker protection of the minority labour force and thus discrimination against ethnic minorities in the private sector (BHALLA & QUI, 2006). Other researchers even suspect that ethnic minorities in remote areas have low expectations of finding a job because of discrimination against them, and thus the opportunity costs of a decision to educate their children are very high. On the other hand, members of ethnic minorities with better education are definitely in a position to find an appropriate job, but because of the better job prospects they prefer to migrate to urban areas. In sum we can say that the differences in poverty and income between ethnic minorities and the Han majority in rural China are chiefly a result of geographical location and the household situation of individuals. Poverty is heavily concentrated in the western provinces and villages with low average incomes. Villages in north-eastern China inhabited by minorities are to a certain degree in a better economic position than average villages with a Han Chinese population; while the minority villages in the south-west are in weaker economic situations than average majority ones.

## Own preliminary work and first empirical findings

The study is analysing differences in the distribution of occupations between ethnic groups in rural Guizhou, and identifying the main factors that determine these by means of discrete choice models. Since the pioneering work by SCHMIDT & STRAUSS (1975) the Multinomial Logit Model (MNL) has played a key role in occupational choice analysis. It is assumed that an individual chooses an occupation from a variety of alternatives such as agriculture, blue collar and white collar. According to the assumptions an individual maximises his utility function by



comparing all job alternatives and choosing the one with the greatest utility for themselves. The alternatives have discrete values and represent the dependent variable in the regression. The independent individual-specific variables are, for example, ethnic status, length of schooling and training, age, gender, family status and control variables for years and communities. The MNL calculates coefficients for each independent variable per alternative. To use the MNL model it is necessary to determine a base category from the three alternatives. It is standard practice to choose the alternative with the most observations, in this case agriculture. The relative changes in the other alternatives can then be measured in relation to the base category.

The MNL modelling was carried out using household data from the China Health and Nutrition Survey (CHNS, see <https://www.cpc.unc.edu/projects/china>) in 1993, 1997, 2000, 2004 and 2006 for rural regions in Guizhou province. Preliminary findings show that the Bouyei and Miao both have higher

probabilities of working in agriculture than the Han Chinese. The Bouyei have a lower probability than the Han of working in blue-collar jobs, and in white-collar occupations both the Bouyei and Miao have a lower probability of finding work than the Han. According to SCHMIDT & STRAUSS (1975), a significantly negative coefficient of ethnic status can either be a result of discrimination or different preferences of ethnic groups.

Field studies carried out in March-April 2010 have provided some initial impressions of the labour situation in the autonomous regions of the Bouyei and Miao in Guizhou. The occupations practised have chiefly come about as a result of the existing labour opportunities in each region. In a Bouyei village in the Qiannan Bouyei and Miao autonomous prefecture, for example, a higher income has often been obtained by migrating for work, i.e. going to Guangdong for a year or two. A large number of new houses bear witness to the new prosperity. In other villages,

**Figure 1: Example of employment possibilities in the autonomous Bouyei-Miao regions of rural Guizhou province**



Source: Author.



*Ethnic minority people of Guizhou province (China)*





on the other hand, traditional houses are tourist attractions and thus offer additional income opportunities in this area. Overall we can identify work in agriculture, road and house construction, tourism and the service sector. Besides these categories Bouyei and Miao also often work in tailoring and other manual jobs. The photos in Figure 1 show a selection of employment possibilities in the autonomous Bouyei and Miao areas in rural Guizhou. In the first row, the following occupations are depicted (from left to right): 1) Street workers securing a protective net to prevent falling rocks, 2) A carpenter cutting boards with a circular saw, 3) A tea picker, 4) Transporting stones with the whole family. In the second row we can see the following jobs: 1) Workers in a tile factory, 2) A farmer ploughing his field in the traditional way using an ox, 3) A Miao embroiderer, 4) A farmer checking the size of his fish in his rice field.

### Conclusions and future research

In spite of all measures implemented to support the labour market integration of ethnic minorities, agriculture still represents the main profession for these groups in the rural areas of western and south-western China. Preliminary findings of the MNL modelling of the household data from the CHNS show that the Bouyei and Miao have a higher probability of working in agriculture than

the Han. The next stage of the thesis aims, on the basis of the available literature and conversations with experts, to obtain information about the preferences for certain occupations among the different ethnic groups, in order to form a priori assumptions about these preferences, which can serve as an explanatory basis in the theoretical model.

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*Landscape in Guizhou province (China)*



*IAMO building*



## IAMO – A brief portrait

### Aims and tasks

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 is still far behind that of Western industrial nations, and some of them are following their own, very specific development paths. Furthermore, a huge gap 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. We need to determine what has to happen in these countries to promote sustainable growth and ensure global food security in spite of the growing demands being placed on agricultural resources. 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. It 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**

IAMO's threefold research structure with the departments *Agricultural policy*, *Agricultural markets* and *Structural development* (these are short 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.

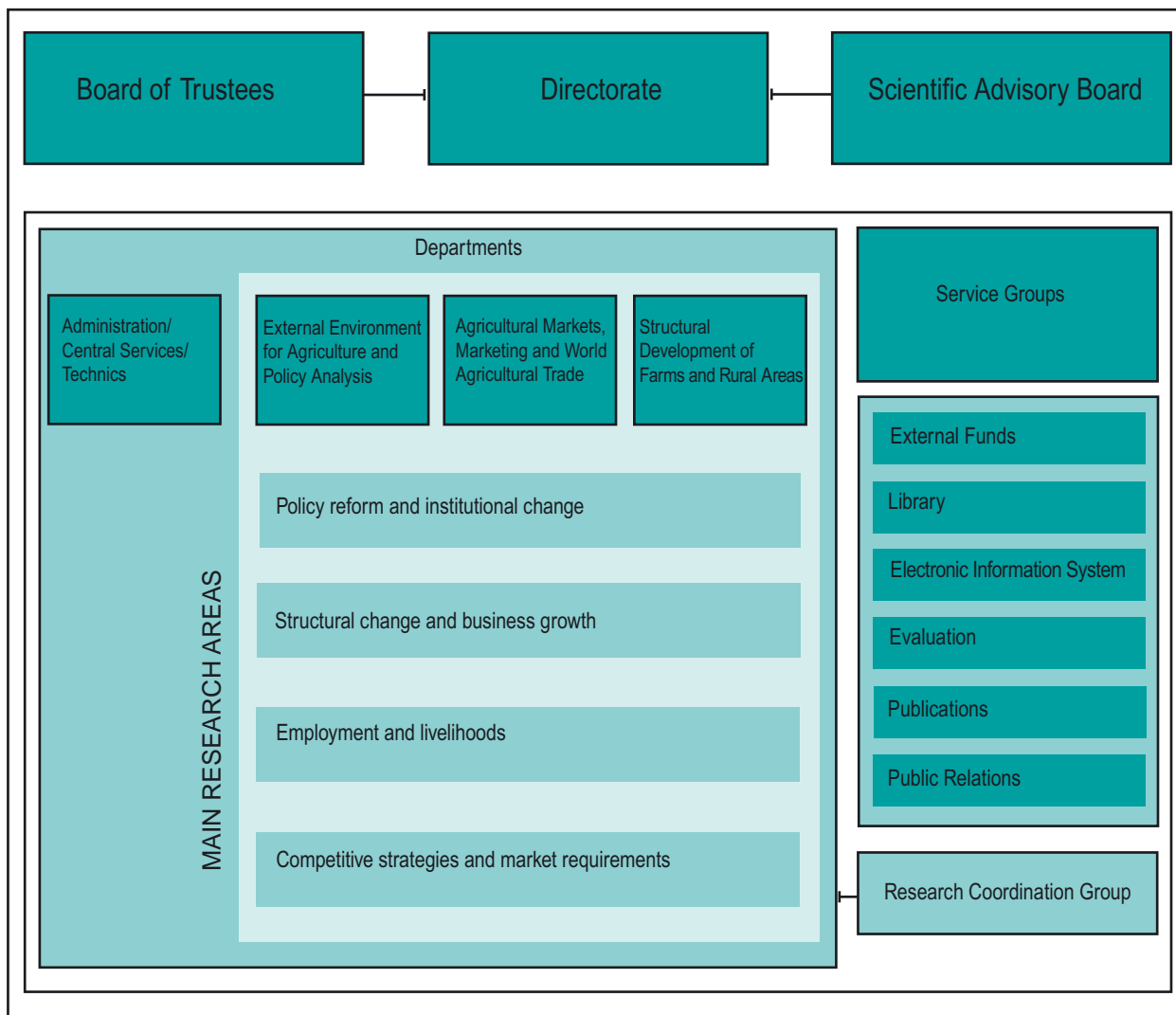
The idea behind the new medium-term agenda (2008-2015), which came into effect at the start of 2008, was to adapt the key research areas to the changing problems in those regions of the world studied by IAMO. Increasingly, it is general questions of agricultural development in the context of globalisation 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 new medium-term agenda, in effect since January 2008, 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**

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





Organigram of the Leibniz Institute of Agricultural Development in Central and Eastern Europe

- External Environment for Agriculture and Policy Analysis; head of department is currently PD Dr Martin Petrick
- 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 1 January 2009, IAMO's Executive Director has been Prof. Dr Thomas Glauben.

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 1/1/2011 the following individuals were members of the board of trustees: MinDirig. Dr Joachim Welz (Chairman; Ministry of Culture and Education of the *Land* of Saxony-Anhalt), MinR. Dr Rudolf Wendt (Deputy Chairman; German Ministry of Food, Agriculture and Consumer Protection), MinR. Dr Ulrich Neubauer (German Ministry of Food, Agriculture and Consumer Protection), Under-secretary Jürgen Stadelmann (Ministry of Agriculture and the Environment of the Land of Saxony-Anhalt), 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 1/1/2011, 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. Michael Grings (Martin Luther University, Halle-Wittenberg), Prof. Dr Ernst Berg (Rhineland Friedrich Wilhelm University, Bonn), Prof. Dr Martina Brockmeier (Hohenheim University), Prof. Dr Joachim von Braun (Center for Development Research, ZEF), Prof. Dr Emil Erjavec (University of Ljubljana), Prof. Dr Ewa Rabinowicz (AgriFood Economics Centre, Lund, Sweden), Prof. Dr Dr h.c. Ulrich Koester (Christian Albrecht University, Kiel), Prof. Ph. P. Johan Swinnen (Catholic University, Leuven, Belgium), and Prof. Dr Stefan Tangermann (Georg August University, Göttingen).

### **Cooperation with university institutions**

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 a nationwide PhD student programme. At the personnel level the 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.

IAMO also works closely in 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. history. As far as our partners in Germany are concerned, we have strong links with Berlin, Bonn, Hohenheim, Kiel, Göttingen and Münster. There are also close relationships with chairs of agricultural economics and institutes at agricultural and economics colleges and universities in our partner countries.

Amongst our partner universities we should particularly cite the National University of Life and Environmental Sciences of Ukraine (NUBiP) and the National University "Kyiv Mohyla Academy", both in Kiev; the Higher School of Economics in Moscow; the State University in Pinsk, Belarus; Warsaw University of Life Sciences (SGGW); Corvinus University, Budapest and Gödöllő University of Agricultural Sciences, both in Hungary; and the University of National and World Economy in Sofia, Bulgaria. We should also mention the Center for Agricultural and Rural Development (CARD) at Zhejiang University in China, and Hanoi Agricultural University in Vietnam. In addition, IAMO exchanges a wide range of scientific ideas with the Institute for Agro-economics and the LICOS-Centre for Institutions and Economic Performance at the Catholic University in Leuven, Belgium; Wageningen University in the Netherlands; the Swedish University of Agricultural Sciences (SLU) in Uppsala; and the University of Kent in Canterbury. In the USA we have close contacts with Stanford University, Ohio State University, Pennsylvania State University, Georgia State University, the University of Wisconsin in Madison, and with the "Workshop in Theory and Policy Analysis" at Indiana University, a co-chair of which is Elinor Ostrom, the 2009 Nobel laureate in economic sciences.

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

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, Federal Research Institute for Rural Areas, Forestry and Fisheries), the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg, the Leibniz Institute for Regional Geography (IfL) in Leipzig, the Potsdam Institute for Climate Impact Research (PIK), and the German Biomass Research Centre (DBFZ) in Leipzig. There are close relations with many non-university research institutions in Central and Eastern Europe. Of note here are: in the Czech Republic, the Institute of Agricultural Economics and Information in Prague (ÚZEI); in Slovakia, the Research Institute of Agricultural and Food Economics in Bratislava (VÚEPP); in Hungary, the Research and Information Institute for Agricultural Economics (AKI) in Budapest; in Russia, the Russian Scientific Institute for Agricultural Economics (VNIIESH) and the All-Russian Institute for Agrarian Problems and Information Theory (VIAPI), both in Moscow; in Ukraine, the Institute for Economics and Forecasting at the National Academy of Sciences in Kiev; 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. IAMO's partners in Western and Northern Europe are: in Belgium, the Centre for European Policy Studies (CEPS) 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

One of the three core tasks of IAMO is to help develop the next generation of researchers. In particular, therefore, the Institute supports the study for doctoral and post-doctoral degrees. At the start of 2011, 44 theses are being supervised at IAMO, and three members of staff are working on their post-doctoral degrees (*Habilitation*). Last year, five long-term IAMO staff submitted the following theses to Martin Luther University, and successfully defended them:

- "The Spatial Dimension of Pricing and Competition in Agricultural Markets" (Martin Graubner)
- "The Role and Influence of Knowledge on the Adoption of Conservation Tillage in an Arable Region of North-East Bulgaria" (Sven-Oliver Jungklaus)
- "Improving the Functioning of Rural Financial Markets of Armenia: A Social Capital Perspective" (Milada Kasarjyan)
- "The WTO Agricultural Negotiations during the Doha Round: Interests, Options, Possible Results" (Ildiko Lajtos)
- "The Integration of Ukraine into the WTO: Consequences for the Agricultural Sector" (Inna Levkovych)

## Training for doctoral students: Seminars and PhD programme

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. In addition, the agro-economic coffee meetings at IAMO provide an opportunity to discuss early, often provisional 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 in existence 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 their 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 the Christian Albrecht University in Kiel, the Faculty of Agriculture and Horticulture at the Humboldt University in Berlin, IAMO, the Institute of Agricultural and Food Sciences at MLU, the Faculty of Agricultural Sciences at the Georg August University in Göttingen, and vTi, Brunswick. The PhD course is based on a modular system. In 2010, IAMO professors and staff helped organise academic events relating to the following modules:

- "Household behaviour: Theory and Applications";
- "Topics in Industrial Organization";
- "Agent-based Modelling in Agricultural and Resource Economics";
- "Introduction to Geographic Information Systems and spatial data analysis";

- "Foundations of agricultural economics";
- "Efficiency and productivity analysis I – Deterministic approaches".

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

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 engaged in long-term visits also concentrate on their doctoral studies, financed by external and IAMO grants, and third-party funded projects. From October 2009 to September 2010, 21 fellows worked at IAMO, chiefly on their theses. At the same time 28 predominantly young visiting academics carried out research here. The fellows and visiting academics came from a total of 21 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**

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 which looks at the "Prospects of small-scale farm structures in the new Member States of the European Union". Many farms in the new EU Member States cannot measure up to the demands of modernising value chains for food and increased competition within the enlarged Union. We must, therefore, ask whether and how the farm structure deficits that exist in many regions can be overcome, how agriculture in these regions can be successfully integrated into changing food sector value chains, and how the social problems thrown up by the necessary structural change can be solved. Six German and two PhD students from Hungary and Albania are currently working on particular research projects. You can find further information on our web site under the heading "research". In November 2010, Sven-Oliver Jungklaus successfully defended his thesis on "The Role and Influence of Knowledge on the Adoption of Conservation Tillage in an Arable Region of North-East Bulgaria", the first occurrence of this from within the graduate school.

The ongoing research projects are focusing on the following topic fields:

- Change in the agricultural sector and business adjustment strategies
- Inter-enterprise and cooperative adjustment strategies in relation to the demands of supply chains
- Institutional parameters and implications for (regional) policy

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



*Landscape in Guizhou province (China)*



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.

In 2010 the graduate school again offered a module which was tailor-made for the specific needs of PhD students, and which was also open to those on the Doctoral Certificate Programme. Following the high-quality week-long modules in 2008 and 2009, in March 2010 Prof. Dr Dr h.c. Ulrich Koester taught on the topic "Principles of Agricultural Economics".

Research findings from the graduate school were presented to a broader public in two lectures given by Hauke Schnicke and by Diana Traikova, together with Judith Möllers and Gertrud Buchenrieder at the "118th EAAE Seminar on Rural Development: Governance, Policy Design and Delivery" in Ljubljana, Slovenia.

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

The research group "Economic Dynamics and Social Equilibrium in Rural China", which was set up at IAMO in 2008, is currently working on eight sub-projects. The breadth of topics ranges from the impact of cooperation between farms and land consolidation measures on farm development, questions of rural education and the economic integration of ethnic minorities, to the effects of Chinese environmental programmes and international trade policy on rural living conditions in China.

The individual projects are helping to find approaches for addressing the radical 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. Findings by Lili Jia and Martin Petrick, for example, show that the consolidation of agricultural land really can influence labour productivity and thus employment potential in both directions. The consequence of this is that regional particularities must be taken into account when analysing consolidation schemes.

In the project by Tursinbek Sultan and Karin Larsén, an analysis of the surveys undertaken in 2009 has provided some initial answers to the question of what expectations Chinese farmers have of cooperative organisations. Whereas farmers in the structurally weak province of Sichuan are hoping chiefly that cooperatives will provide them with public funds to make infrastructural investments that will benefit the cooperative set-up (e.g. storage and market facilities), those in prospering Zhejiang anticipate that integration will strengthen the economic position of the individual in relation to their market partners. In addition to these economic motives, in both provinces the expectation of improved social integration is an incentive for joining a cooperative.

Since 2009 IAMO has been part of the "Rural Education Action Project" consortium (REAP), a collaboration between the Chinese Academy of Sciences and renowned institutes in China and the USA, including Stanford University. Under the aegis of REAP a new research project was launched in 2010, looking at the links between nutrition, iron deficiency and the educational accomplishments of elementary school children.

Since 2008 the research group has been funded by money from the "Pact for Research and Innovation", which at the non-university research institute level corresponds to the Excellence

Initiative of the German federal government and the *Länder* to promote science and research at German universities and colleges. More details on the research group 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 2010 (October 2009-September 2010)**

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

###### **I. Neu bewilligte drittmittelfinanzierte Forschungsprojekte**

- Project title: Third sector organisations in rural development: A theoretical and empirical analysis

Funded by: VW Stiftung Schumpeter Fellowship

- Project title: Institutional Analysis of Decentralization and Options of Stakeholders for Participation in Agro-rural Policy Design

Funded by: DFG-Sachbeihilfe

- Project title: Structural Change in Agriculture, Teilprojekt 5: Between Path Dependence and Path Creation: The Impact of Farmers Behavior and Policies on Structural Change in Agriculture

Funded by: DFG-Sachbeihilfe

- Project title: Structural Change in Agriculture, Teilprojekt 9: Econometric evaluation of CAP impacts in Germany

Funded by: DFG-Sachbeihilfe

- Project title: Structural Change in Agriculture, Teilprojekt 4: Market Structure and Organization in Agri-Food Value Chains: An Application to the German Dairy Sector

Funded by: DFG-Sachbeihilfe

- Project title: Implications and policies for South East Asia of Reducing Emissions from Deforestation and Forest Degradation

Funded by: 7. Forschungsrahmenprogramm der EU

- Project title: ROMANIA Rural Pensions (Economic and Sector Work, ESW)

Funded by: The World Bank Group

- Project title: Functional Reviews of the Romanian Public Administration

Funded by: The World Bank Group

- Project title: Analyse der Wettbewerbsfähigkeit der Milch-erzeugung und -verarbeitung in Sachsen-Anhalt zur Ermittlung geeigneter Politikmaßnahmen und Politikoptionen in Rahmen des EPLR

Funded by: Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt

- Project title: Sozioökonomische Effekte des demographischen Wandels in ländlichen Räumen Sachsen-Anhalts

Funded by: Kultusministerium des Landes Sachsen-Anhalt

- Project title: Die Gemeinsame Agrarpolitik (GAP) der Europäischen Union nach 2013 – Wirkungen alternativer Reformszenarien der Gemeinsamen Agrarpolitik der EU nach 2013: Simulationsanalysen für ausgewählte Regionen in Deutschland, Frankreich und Tschechien

Funded by: Edmund Rehwinkel Stiftung

##### **II. Ongoing projects with third-party funding**

- Project title: Werte als Motive von Konsumententscheidungen – Ein interkultureller Vergleich

Funded by: DFG-Sachbeihilfe

- Project title: Agroholdings im Agrar- und Ernährungssektor in Russland: Entstehungsgründe, Funktionsweise und Entwicklungsperspektiven  
Funded by: DFG-Sachbeihilfe
- Project title: Ökonometrische Wirkungsanalysen von Fördermaßnahmen für die ländliche Entwicklung  
Funded by: DFG-Sachbeihilfe
- Project title: Modelle betrieblichen Strukturwandels  
Funded by: DFG-Sachbeihilfe
- Project title: Preisbildung und Einkaufsverhalten im Lebensmittel Einzelhandel  
Funded by: DFG-Sachbeihilfe
- Project title: Financial Deepening and Efficiency of Rural Financial Intermediation  
Funded by: DFG-Sachbeihilfe
- Project title: Das Wachstum der sächsischen Landwirtschaft 1750-1880  
Funded by: DFG-Sachbeihilfe
- Project title: Market power modelling issues and identification problems. An investigation of selected Hungarian food chains  
Funded by: DFG-Sachbeihilfe
- Project title: Trade, Agricultural Policies and Structural Changes in India's Agrifood System (TAPSIM)  
Funded by: 7. Forschungsrahmenprogramm der EU
- Project title: Prototypical Policy Impacts on Multifunctional Activities in rural municipalities (PRIMA)  
Funded by: 7. Forschungsrahmenprogramm der EU

- Project title: Comparative Analysis of Factor Markets for Agriculture across the Member States (Factor Markets)  
Funded by: 7. Forschungsrahmenprogramm der EU
- Project title: Nachhaltige europäische Biomethanstrategie  
Funded by: Bundesministerium für Bildung und Forschung, Forschungszentrum Jülich
- Project title: Die zukünftige Bedeutung und Funktionen von Genossenschaften in einem vertikalisierten Agri-Food Business  
Funded by: DZ Bank-Stiftung
- Project title: Biomasse als Energierohstoff in regionalen Wirtschaftskreisläufen der Region Burgenlandkreis  
Funded by: Burgenlandkreis

### **III. Projects with third-party funding that finished in 2010**

- Project title: Social capital and informal social networks in a changing natural and institutional environment  
Funded by: DFG-Sachbeihilfe
- Project title: Preisbildung und Wettbewerb auf räumlich differenzierten Märkten – Simulation und Analyse komplexer Marktstrukturen am Beispiel des Rohmilchmarktes  
Funded by: DFG-Sachbeihilfe
- Project title: Enlargement Network for Agripolicy Analysis (AgriPolicy)  
Funded by: 7. Forschungsrahmenprogramm der EU
- Project title: Modern Agriculture in Central and Eastern Europe: Tools for the Analysis and Management of Rural Change (MACE)  
Funded by: 6. Forschungsrahmenprogramm der EU

- Project title: Structural Change in Agriculture and Rural Livelihoods (SCARLED)

Funded by: 6. Forschungsrahmenprogramm der EU

- Project title: Vereinbarung über die Gewährung einer Finanzhilfe für eine LEONARDO DA VINCI Partnerschaft im Programm für lebenslanges Lernen

Funded by: EU GD Bildung/Kultur, Bildung für Europa

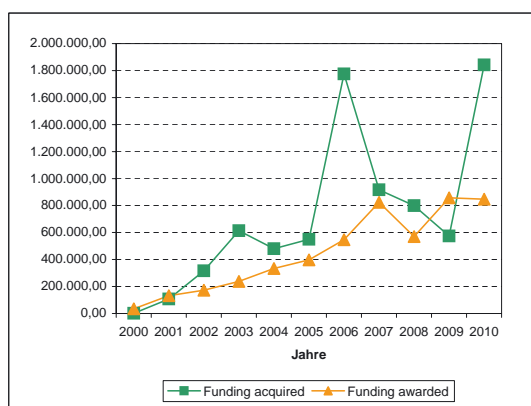
- Project title: Auswirkungen des Einsatzes moderner Landtechnik in Großbetrieben auf sozioökonomische Entwicklungen in ländlichen Räumen Nordostchinas

Funded by: Bundesanstalt für Landwirtschaft und Ernährung

### Selected third-party funded projects

IAMO had a large increase in third-party funding in 2010. We should emphasise that this is due to additional DFG funding and a high-value research grant. Below is an outline of the three most important projects for which new third-party funding was obtained. They show that IAMO's expertise is highly valued, both in basic research and in scientifically based policy advice.

### Development of funding



Source: Institute's own statistics.

### Volkswagen Foundation Schumpeter Fellowship obtained

Vladislav Valentinov was successful in his application to the Volkswagen Foundation for a Schumpeter Fellowship. Since 2006 the Foundation has been funding research projects in the economic, social and legal sciences, which break new ground and explore the boundaries of their particular discipline. A total of 32 applications were made to the Foundation in the most recent round. Valentinov's research proposal was one of the eight to receive funding in 2010. With the 548,000 euros he has secured, Valentinov intends to establish a project team and, over the coming five years, develop an economic theory of the rural third sector and to test this empirically. "Third sector organizations in rural development: A theoretical and empirical analysis" is the full title of his research project. Until now there has been a lack of basic research on this key area of rural development.

In many parts of the world the development of rural areas is supported by third sector organisations such as farmers' interest groups, rural partnerships or cooperatives. Although their importance has been fundamentally recognised, there is no economic theory of the third sector which does justice to the particularities of the rural context. Valentinov's research project aims to fill this hole. His starting thesis is: certain conditions in rural areas give rise to structural transaction costs of economic, cultural and social activities, and thus lead to the creation and importance of rural third sector organisations. Examples of such particularities are low population density and weak infrastructure. The project will seek to explain why third sector organisations are differently structured in urban and rural areas, and why they act differently. The theoretical ideas will be tested empirically by data the researchers plan to collect in Germany, the Czech Republic and Ukraine.

## **IAMO subproject led by the DFG research group "Structural change in the agricultural sector"**

The research group "Structural change in the agricultural sector" (SiAg) has been funded since 2008. In 2010 the German Research Foundation (DFG) approved funding for a further three years. Academics from the Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) are in charge of three of the eleven subprojects. The amount of funding approved for IAMO comes to around 700,000 euros.

The SiAg research group focuses on structural change in agriculture in developed economies. The objective is to build on, develop and integrate existing theoretical and methodological approaches towards the analysis of processes of change in the agricultural sector. This will produce a sharper picture of structural change in agriculture, allowing a better understanding of the causal links between exogenous factors, policy instruments and business decisions. Of crucial importance here is the ability to forecast structural change and steer it towards achieving social goals. Members of the research group include academics from the Humboldt University in Berlin, Hohenheim University (Stuttgart), Georg August University in Göttingen, the German Institute for Economic Research (DIW, Berlin), and IAMO.

IAMO academics are leading three subprojects. The subproject "Market structure and organization in agri-food value chains" is being run jointly by Heinrich Hockmann (IAMO) and Vanessa von Schlippenbach (DIW). The project is examining the interplay between far-reaching structural changes in the value chains for milk and the increasingly unequal distribution of negotiating power of actors at individual stages of the value chain. The analyses are

focusing on developments in milk processing. Also looking at milk processing is the subproject being carried out by Alfons Balmann, Karin Larsén, Franziska Appel and Arlette Ostermeyer: "Between Path Dependence and Path Creation: The Impact of Farmers' Behaviour and Policies on Structural Change in Agriculture". They are investigating whether regional heterogeneity, agglomeration effects, suboptimal business sizes and income disparities, which characterise the agricultural structure in Germany, are the result of path-dependent structural change, examining which determinants play a role here, and how path dependency might be overcome. The methodological basis of the project is provided by experimental and participatory applications of the agent-based simulation model AgriPoliS. Martin Petrick is in charge of the third subproject: "Econometric evaluation of CAP impacts in Germany." The aim here is to develop and apply regression models, the use of which allows an analysis of the effects of agricultural policy measures and of those for rural areas on agricultural enterprises in Germany. As the study is based on area units (districts), the project can also look at instruments which are not geared directly towards agricultural enterprises. An example of these are measures to renovate villages, something which is of particular importance in Eastern Germany.

## **DFG project on participation in agricultural policy decision-making processes**

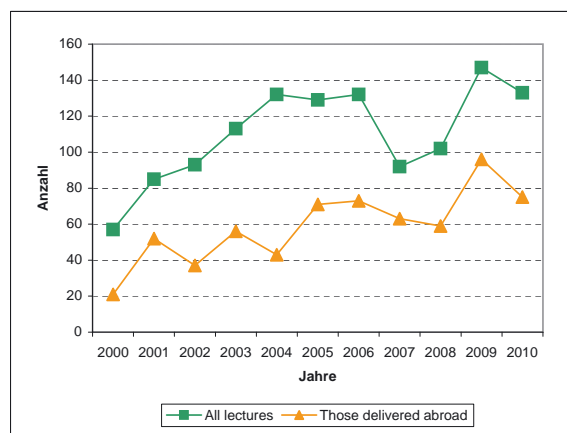
A new DFG research project is carrying out an institutional analysis of the impact of decentralisation on the possible participation of actors in the agricultural policy decision-making process. This project, run by Gertrud Buchenrieder and Insa Theesfeld, and funded to the tune of 204,000 euros, will use the example

of Thailand to look at the participation of the agricultural-rural population in agricultural policy decision-making processes. Together with Tom Dufhues, the post-doctoral researcher on the project, they are seeking to discover the extent to which decentralisation favours or impedes the participation of farmers in decisions about agricultural policy. They are starting from the hypothesis that participation of actors leads to the drafting and implementation of better policy measures. This starting hypothesis gives rise to the following three questions:

- Does the form of the decentralisation process in Thailand take into account informal rules of social interaction in the local administration and do the targeted participation processes factor in the rules and behaviour of the local population?
- Can effects of the current decentralisation process on the form of agricultural-rural policies and their subsequent implementation be identified?
- What needs to happen for local administrative organisations such as the municipal administration (Tambon Administration Organization) and so-called "Agricultural Technology Transfer Centers" (ATTACs) to help the farming population become more involved?

The empirical analysis is using the "Institutional Analysis and Development (IAD) Framework" developed by the Nobel Prize laureate Elinor Ostrom. Our research partners are Kasetsart University in Bangkok, Martin Luther University Halle-Wittenberg, and the collaborative research centre "Research for Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia – The Upland Program" at Hohenheim University.

### Development of IAMO lectures



Source: Institute's own statistics.

### Development of 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. More than half of lectures in 2010 were given abroad. The costs of 75 out of the 133 lectures were either met by the organisers (32) or fully funded by third parties (27). The expenses for 53 lectures came solely from IAMO's budget. The rest were part funded or paid for in other ways.

### Conferences and seminars

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 academic 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. Below is an outline of the most important conferences, symposiums and workshops run by the Institute in 2010.

### **Agricultural policy symposium at Green Week 2010**

As part of the Forum for Food and Agriculture hosted by the BMELV (German Ministry of Food, Agriculture and Consumer Protection) at the International Green Week 2010, the Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) organised a symposium on 15 January 2010, entitled "Climate – Water – Agriculture". The subject of discussion was the impact of climate change and population growth on global water resources, and what this means for agriculture and global food security.

After an introduction by Astrid Jakobs de Pádua, head of the BMELV's department of International Organisations, World Food and Sustainable Development, Dr Insa Theesfeld from IAMO introduced the topic. Referring to the theories of the 2009 Nobel Prize laureate, Prof. Elinor Ostrom, Theesfeld argued that a polycentric approach, i.e. a multi-layered system of coordination mechanisms and self-accountable forms of organisation at local, regional, national and international level, were necessary to be able to use water as a resource sustainably. Dr Hermann Lotze-Campen, head of the land-use change work group belonging to the research department Earth Systems Analysis at

Potsdam Institute for Climate Impact Research, pointed out that water shortages were often a problem of management. Climate change would exacerbate the problems that already existed, he said. In spite of all the uncertainties in forecasting, we had to assume that extreme events such as droughts and floods would become more frequent. Prof. Wilhelm Struckmeier, Director of the Federal Institute for Geo-Sciences and Raw Materials, agreed that water shortages were in many cases not the result of a physical problem but bad management. The hydrologist called for better administration of groundwater reservoirs in particular. Small farmers must come to terms with the fact that their indigenous knowledge about natural and weather events will become increasingly unreliable. This was one of the effects that climate change was having on small farmers in Kenya and other African countries, explained Dr Chinwe Ifejika Speranza, geographer and specialist in geographical information systems at the German Institute for Development Policy. Dr Elisabeth van den Akker, senior planner for "Water in agriculture" at the German Society for Technical Cooperation (GTZ), emphasised that besides the climate aspect, the economic relationships had to be considered, too. Even if small farmers can produce their goods with artificial watering, what they needed just as much was a market for their products.

To meet the increasing demand for food and energy of a growing world population, agriculture in the future will need more water than in the past. Even leaving out climate change, water resources for agriculture will become scarcer. In spite of this, the experts at the IAMO symposium did not want to talk of "global doom". There were a large number of options for adaptation.

But one thing consumers in Germany must be aware of: huge volumes of water are needed for food production. Each German drinks between only two and five litres of water per day, and uses between 100 and 200 litres of water for other purposes. By contrast several thousand litres of water are necessary to produce the food consumed per day. One litre of water is needed to produce one kilocalorie, explained Catrin Hahn, editor of *Neue Landwirtschaft*, closing the symposium.

### **Meeting of experts in Brussels and EAAE seminar on the conclusion of SCARLED**

The international research project SCARLED (Structural Change in Agriculture and Rural Livelihoods), which IAMO coordinated, came to a successful end with a concluding event in Brussels organised specially for political decision-makers. The invitees were officials from the European Commission's Directorates General for Agriculture and Research. There was an animated discussion of the project's findings amongst the 20 or so participants. It became apparent that the project had worked on topics and delivered results which will serve as a useful basis for future decision-making processes. The participants called for further dissemination of policy-relevant findings throughout the Commission. The project coordinators, Judith Möllers and Gertrud Buchenrieder, highlighted that the researchers involved were still interested in SCARLED topics following the official conclusion of the project in September and that they would be very willing to enter further discussions with the Commission. The focus of SCARLED was structural change in agriculture and the associated far-reaching changes in work and living conditions in rural areas of the new EU Member States.

The 118th EAAE seminar "Rural Development: Government, Policy Design and Delivery" was another forum for discussing the SCARLED findings. More than 120 academics and representatives of public institutions from 21 countries throughout the world participated in the seminar organised by the European Association of Agricultural Economists, which took place on 25-27 August 2010 in Ljubljana, Slovenia. The goal of the seminar was to present current research findings relating to social, economic and political aspects of rural development, and at the same time allow academics and practitioners in this field to exchange opinions and experiences.

Researchers from the SCARLED project, which was coordinated by IAMO, presented the key findings in nine papers. At the core of SCARLED is structural change in agriculture and the associated far-reaching changes in work and living conditions in rural areas of the new EU Member States. On the first day of the conference Gertrud Buchenrieder gave a plenary lecture on this project. The subject of her lecture was the diversification of employment outside the agricultural sector in the five new Member States – Poland, Bulgaria, Romania, Slovenia and Hungary – which SCARLED analysed empirically. Amongst other things, Buchenrieder showed that supplementary non-agricultural work can help reduce poverty in farming households.

The 118th EAAE seminar was jointly organised by the Institute of Biotechnology at Ljubljana University, the Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) and the Slovenian Association of Agricultural Economists (DAES).

## Events scheduled for 2011

### Agricultural policy symposium at Green Week 2010

The Global Forum for Food and Agriculture ([www.gffa-berlin.de](http://www.gffa-berlin.de)), which is being organised at the International Green Week in Berlin by the German Ministry of Food, Agriculture and Consumer Protection together with a number of partners, is entitled "Trade and Global Food Security: Global – Regional – Local". As part of this forum, IAMO is organising a symposium on Friday 21 January, from 13.00-15.00, in room 44 of the ICC: "The agri-giants Russia and China and global food security". Over the coming decades China and Russia will have a strategic importance for the development of world agricultural markets, both on the supply and demand side. Closely related to this is the issue of global food security. Over the last few years short-term food crises have increased dramatically around the world. Over the coming decades huge efforts need to be made so that agriculture can meet the growing demands. For this to succeed, the vast agricultural potential of Russia, where currently there are large swathes of fallow land, must be exploited to the full. But China, too, has a large scope to increase productivity. If China fails to achieve this, the world markets will come under great pressure due to Chinese demand which is expanding constantly. How national and international agricultural (market) policy is formulated by governments and the WTO will play a key role in the pursuit of sufficient agricultural growth and, in an era of climate change, ensuring that this happens sustainably. Events on world agricultural markets and questions of agricultural production will thus continue to be the subject of intense discussion amongst academics, politicians and the public at large, with a sharp focus on Russia and China.

## IAMO Forum 2011

"Will the 'BRICs Decade' continue? – Prospects for trade and growth". This is the topic of the next IAMO Forum. It will take place on 23 and 24 June in Halle (Saale), and is being organised by IAMO in conjunction with the Institute for the World Economy in Kiel (IfW) and the German Institute of Global and Area Studies (GIGA) in Hamburg. Emerging nations, particularly the BRIC countries – Brazil, Russia, India and China – are well on the way to becoming global economic powers. But do the BRIC countries really have the potential to move up to become "engines of the global economy", leading the way in technological progress and developing the institutions of free global trade? What is certain is that the large emerging nations will shape global agricultural development over the coming decades. For this reason, the liberalisation of world agricultural trade is high on their agendas. This international conference will also look at the question of what has to happen in the BRIC countries to promote sustainable growth and achieve global food security in spite of rising demands on agricultural resources.

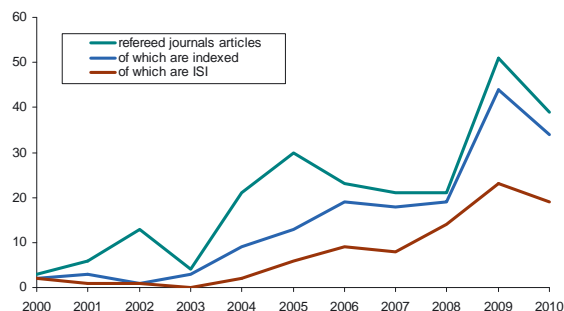
### Publications

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 diagram below illustrates the development of numbers of refereed and listed articles published in journals by IAMO staff since 2000. Since 2009, 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), has stabilised at a level twice as high as that in



*18 papers and nine poster presentations were given at IAMO Forum 2010*

### Development of numbers of articles published in refereed and indexed journals



Source: Institute's own statistics.

2007. IAMO's internal quality management for publications has thus had a significant impact.

### Discussion papers

The Discussion Paper series continued in 2010 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/###)):

WANDEL, J. (2010): The cluster-based development strategy in Kazakhstan's agro-food sector: A critical assessment from an "Austrian" perspective, *IAMO Discussion Paper No. 128*, Halle (Saale).

MÖLLER, L., HENTER, S. H., KELLERMANN, K., RÖDER, N., SAHRBACHER, C., ZIRNBAUER, M. (2010): Impact of the Introduction of Decoupled Payments on Functioning of the German Land Market. Country Report of the EU Tender: "Study on the Functioning of Land Markets in those EU Member States Influenced by Measures Applied under the Common Agricultural Policy", *IAMO Discussion Paper No. 129*, Halle (Saale).

WOLZ, A., BUCHENRIEDER, G., MARKUS, R. (2010): Renewable energy and its impact on agricultural and rural development: Findings of a comparative study in Central, Eastern and Southern Europe, *IAMO Discussion Paper No. 130*, Halle (Saale).

KOESTER, U., PETRICK, M. (2010): Embedded institutions and the persistence of large farms in Russia, *IAMO Discussion Paper No. 131*, Halle (Saale).

PETRICK, M. (2010): Zur institutionellen Steuerbarkeit von produktivem Unternehmertum im Transformationsprozess Russlands, *IAMO Discussion Paper No. 132*, Halle (Saale).

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

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 26 conference proceedings and 31 monographies have been published. In 2009 the following volumes were published:

MIKHAIL RAMANOVICH (2010): Zur Bestimmung der Wettbewerbsfähigkeit des weißrussischen Milchsektors. Aussagefähigkeit von Wettbewerbsindikatoren und Entwicklung eines kohärenten Messungskonzepts, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 53*, Halle (Saale).

HENRIETTE STANGE (2010): Die Internationalisierung landwirtschaftlicher Unternehmen. Das Beispiel deutscher, dänischer und niederländischer Direktinvestitionen in den ukrainischen Agrarsektor, *Studies on the Agricultural and Food Sector in Central and Eastern Europe, Vol. 54*, Halle (Saale).

ILDIKO LAJTOS (2010): Verhandlungsverhalten und Anpassungsanpassung im internationalen Verhandlungsprozess: Die WTO-Agrarverhandlungen zum Abbau exportwettbewerbsfördernder Maßnahmen, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 55, Halle (Saale).

KELLY LABAR, MARTIN PETRICK, GERTRUD BUCHENRIEDER (eds.) (2010): Challenges of education and innovation. Proceedings of the Fourth Green Week Scientific Conference, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 56, Halle (Saale).

TINA VOLK (ed.) (2010): Agriculture in the Western Balkan Countries, *Studies on the Agricultural and Food Sector in Central and Eastern Europe*, Vol. 57, Halle (Saale).

### IAMO on the Internet

The Institute's Internet presence ([www.iamo.de](http://www.iamo.de)) aims to provide outsiders and interested users with a quick overview of IAMO's core tasks and aims, as well as of staff research topics, findings and publications. Our Internet presence is based on the Open Source Content Management System TYP03.

Each member of staff has the opportunity to maintain and update the content of their individual pages independently. This ensures that the site is very much up to date. The web site also aims to achieve the goal of maximum accessibility. The advantages of an accessible-to-all, standard compatible web site are: Access for all users, easy maintenance and smaller file sizes. From the home page, which gives information on news, events and the most recent publications, users can access information from the Institute, Research, Events, Publications and Portal categories. The Institute menu leads to information about IAMO's core tasks, institutional structure, staff and library.

Via the library page, online searches of the library catalogue can be made using OPAC. Current job vacancies can also be found

via the Institute menu. The Research menu leads to information about current research projects, with short project descriptions and details of the staff involved, select publications, and research cooperation with other institutes. The Events menu provides details of the annual events either organised by the Institute, or in which IAMO is taking part. These include the IAMO Forum, the PhD workshop, as well as seminars and workshops on a variety of possible topics.

Here, users can find out about programmes and speakers in advance, and view papers that have been submitted. The online service also provides access to all in-house publications (IAMO Series, IAMO Discussion Papers, IAMO Annual Reports and IAMO Annual). Publications by staff members can either be viewed in the complete publication list, or directly on the individual staff pages. The Portal menu contains a comprehensive and structured collection of links.

Since October 2007 the IAMO web site also has its own alumni homepage <<http://www.iamo.de/alumni/index.html>>.

[alumni@iamo.de](mailto:alumni@iamo.de) is the communication and service network for former IAMO staff members and visiting researchers. It provides a large number of activities to help alumnae and alumni keep in contact and share their experiences, and thus maintain a life-long connection with each other.







*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 Central and Eastern Europe*, and the *Institute's Annual Report*.

*Photos* BMELV/Bildschön (S. 3), Tímea Török (pp. 8, 74, 76, 78, 81, 122), Bente Castro Campos (pp. 12, 28, 94, 96, 97, 99, 100, 101, 103, 112), Karin Larsén, (p. 46), Christine Burggraf (p. 54), Franziska Appel (p. 66), Jens Frayer (pp. 82, 88, 90), Alexej Lissitsa (pp. 104, 124, 125).

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