Towards a greener agrifood sector
Preliminary assessment of investment opportunities in EBRD’s countries of operation
The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) or the European Bank for Reconstruction and Development (EBRD) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO or the EBRD in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO or the EBRD.

© FAO, 2013

FAO encourages the use, reproduction and dissemination of material in this information product. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, provided that appropriate acknowledgement of FAO as the source and copyright holder is given and that FAO’s endorsement of users’ views, products or services is not implied in any way.

All requests for translation and adaptation rights, and for resale and other commercial use rights should be made via www.fao.org/contact-us/licence-request or addressed to copyright@fao.org.

FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org.

For further information please contact:
Director
Investment Centre Division
FAO
Viale delle Terme di Caracalla, 00153 Rome, Italy
or by e-mail to: Investment-Centre@fao.org

All photos by © Dreamstime
2 Foreword
3 Introduction
8 Green growth and economic efficiency
19 Green growth linkages within the agrifood supply chain
21 Key issues to be addressed in the region
27 Entry points for the EBRD
Foreword

This note was prepared by FAO’s Investment Centre under the cooperation between FAO and the European Bank for Reconstruction and Development (EBRD). Its main authors were Wilfrid Legg and Zsolt Gemesi, Agricultural Economists. It was reviewed by Iride Ceccacci, Economist, Office of the Chief Economist, EBRD; Gianpiero Nacci, Senior Engineer, Energy Efficiency and Climate Change, EBRD; Emmanuel Hidier, Senior Economist, Investment Centre Division, FAO; Nuno Santos, Economist, Investment Centre Division, FAO; Arianna Carità, Economist, Investment Centre Division, FAO; and Genevieve Joy, Project Support/Communications, Investment Centre Division, FAO. The publication aims to inform policy dialogue and to provide broad investment recommendations to the EBRD and other potential investors in the region.
Introduction
Green growth

“Green growth is about fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. It is also about fostering investment and innovation which will underpin sustained growth and give rise to new economic opportunities.” Organisation for Economic Co-operation and Development (OECD) (2011) “Towards Green Growth”.

Green growth is an economic growth path that focuses on enhancing productivity through technological improvements and dissemination of knowledge, taking into account environmental impacts and the conservation of natural resources. Economic growth can thus be the key driver of sustainable development. The private sector has the potential to be the main vehicle for sustainable solutions to green growth, but it will only invest and adopt green growth strategies if businesses view this as a profitable enterprise that will help them gain a competitive advantage, and if policies and institutions are in place at the government level to support sustainable growth.

Green growth is a way to maximize synergies through the reconciliation of short-term costs with long-term economic and environmental benefits, which can help to enhance social and political acceptance of environmental policies. Improving the efficiency of resource use and promoting circular economy pathways\(^1\) are win-win approaches for both profitability and the environment. But given that this incurs costs in the short run and can be risky, businesses need to be convinced that this is a worthwhile market opportunity with long run financial returns. Green growth approaches should thus be incorporated as soon as possible into country framework and production system strategies; otherwise, countries will be locked into economic and ecological paths that will be prohibitively expensive and complex to change.

---

\(^1\) The circular economy is a generic term for an industrial economy that is restorative and in which material flows are designed to re-enter the biosphere safely. The efficiency with which businesses use raw materials is important to assessing the risks they incur and the production chains in which they operate.
Current growth patterns are not sustainable. Since the 2008 global crisis many countries and businesses have recognized that “greening” economic growth is the way forward to exit the crisis in the short run while encouraging the sustainable use of scarce resources in the long run. To do this, a green growth strategy must encourage investment and innovation that will underpin sustained growth and give rise to new economic opportunities, generating employment and the sustainable management of natural resources. This requires a combination of market incentives, policies to foster green business responses, and removal of those policies that impede economic growth and environmental and ecological sustainability\textsuperscript{2}. The achievement of sustainable long-term economic growth depends on minimizing environmental damage and economizing on resource use, while the results of economic growth tend to increase the demand for environmental and ecological stewardship – and provide the means to achieve it.

The critical challenge is thus to increase productivity, maintain business profitability, and constrain the environmental impact of necessary growth in the agrifood sector. In brief, green growth emphasizes the opportunity of increasing competitive advantage through cost reductions and technology and aims to mutually reinforce economic and environmental policies and business actions.\textsuperscript{3}

The rationale for the adoption of the green growth model in the agrifood sector

The agrifood sector is a major user of natural resources and a significant source of greenhouse gas emissions and water pollution; and yet with its potential to increase productivity growth\textsuperscript{4}, the sector

\textsuperscript{2} The International Association for Ecological Economics, founded in 1989, seeks to advance understanding of the relationships among ecological, social, and economic systems and the application of this understanding to the mutual well-being of nature and people, especially of the most vulnerable, including future generations.

\textsuperscript{3} In January 2012, the Global Green Growth Institute (GGGI), OECD, United Nations Environment Programme (UNEP), and World Bank signed a Memorandum of Understanding (MOU) to formally launch the Green Growth Knowledge Platform (GGKP). The aim is to enhance and address major knowledge gaps in green growth theory and practice, and to help countries design and implement policies to move towards a green economy.

\textsuperscript{4} OECD (2011), \textit{Fostering Productivity and Competitiveness in Agriculture}. 
has an important role to play in contributing to green growth.\textsuperscript{5} The challenge is for governments to put in place policy measures aimed at greening economic recovery and for businesses to undertake actions that contribute to long run sustainable profitability. The opportunity, particularly in the Europe and Central Asia (ECA) region, given that there is untapped potential for both agrifood production and efficiency, is to take green actions now to improve economic performance. Investments in renewable energy, efficient use of natural resources, and other green growth-related initiatives can be long-term drivers of economic growth through, for example, investing in renewable energy, improving efficiency in the energy and natural resource use, and reducing waste. OECD countries\textsuperscript{6} are at the forefront of this transition to green growth through their investments in alternative green energy sources and reduction of waste and environmental pollution.

The worldwide demand for food and agricultural products is expected to increase substantially due to population and income growth and associated dietary changes – in particular, higher consumption of animal proteins, which require longer value chains and more processing. Additional demands are likely to be placed on the sector for the supply of biomass for energy and non-food raw materials, which require investments to shift away from standard business practices. The United Nations projects that by 2050 the global population will increase by 2 billion from current levels, to over 9 billion. It is estimated that in order to maintain global average food availability of 3 130 kilocalories (kcal) per person per day by 2050, an additional 1 billion tonnes of cereals and 200 million tonnes of meat would need to be produced annually (compared to levels in 2005-2007)\textsuperscript{7}. The growth in global population and incomes – including in ECA countries – will increase pressure on the agrifood sector to supply food and other raw materials while placing additional demands on energy, land and water resources.

\textsuperscript{5} OECD (2011), Food and Agriculture, OECD Green Growth Studies.

\textsuperscript{6} Twenty countries originally signed the Convention on the Organisation for Economic Co-operation and Development on 14 December 1960. Since then 14 countries have become members of the Organisation. The list of countries can be found at the following link: http://www.oecd.org/governance/listofoecdmemberscountriestratificationoftheconventionontheoecd.htm.

\textsuperscript{7} Paper presented by Jelle Bruinsma at the FAO Expert Meeting on “How to Feed the World in 2050”, June 2009.
There is a need to reduce the environmental footprint of the agrifood sector, in particular because there is increasing pressure on scarce land and water resources\(^8\). While the agricultural part of the sector (production of crops and livestock) alone accounts for less than 6 percent of the world’s gross domestic product (GDP), it occupies 38 percent of the land area and accounts for 70 percent of global water usage. Agriculture also directly accounts for an estimated 10-12 percent of global emissions of greenhouse gases (GHGs). Although it is difficult to determine the total environmental impact of the agrifood sector it has been estimated that, as a whole, it contributes to some 23 percent of global resource use, 18 percent of greenhouse gas emissions and 31 percent of acidifying emissions\(^9\). There is insufficient data to assess this issue for ECA countries specifically. The following table shows data on sectoral greenhouse gas emissions associated with agriculture for selected ECA countries and the European Union in 1990 and 2010:

**Table 1: Share of greenhouse gases from agriculture in total country emissions (%)**\(^a\)

<table>
<thead>
<tr>
<th>Country</th>
<th>1990</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union(b)</td>
<td>10.2</td>
<td>9.7</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>10.6</td>
<td>7.8</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>9.5</td>
<td>6.4</td>
</tr>
<tr>
<td>Serbia</td>
<td>14.6</td>
<td>14.3(c)</td>
</tr>
<tr>
<td>Turkey</td>
<td>16.1</td>
<td>6.7</td>
</tr>
<tr>
<td>Ukraine</td>
<td>11.1</td>
<td>9.0</td>
</tr>
</tbody>
</table>

\(a\) Total GHGs in CO2 equivalents, excluding Land Use and Land Use Changes and Forestry in total GHG emissions.  
\(b\) EU-15.  
\(c\) 1998.  
Source: UN Framework Convention on Climate Change database.

\(^8\) FAO. 2011. The state of the world’s land and water resources for food and agriculture (SOLAW) – Managing systems at risk.  
\(^9\) Garnett T. 2011. Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food Policy* 36:23–32.
Green growth and economic efficiency
Towards a greener agrifood sector

Agriculture in ECA countries, on average, accounts for a greater share of GDP and employment than in the European Union (and other OECD countries), as shown in Table 2. This is owing to differences in the stages of development, agricultural structures and policies, and relative efficiencies. If the trends in ECA countries follow those in OECD countries, then the shares will tend to decrease over the long-term. Such a trajectory will depend on the capacity of the rest of the economy to absorb surplus labour shed from agriculture, the pattern of comparative advantages, and policies designed to favour agrifood activity and employment. Given the importance of agrifood in the economies of most ECA countries, green growth strategies for the sector can be expected to have a significant impact on the overall economy. The EU has recognized this by identifying green growth as an important element of the EU 2020 strategy for economic growth, “Europe 2020”. The transition to the bioeconomy\textsuperscript{10} is also a key component of the post-recession strategies formulated in the United States of America (USA) also given that the biobased product sector brings together two of the most important economic engines for rural America: agriculture and manufacturing, which are essential for growth\textsuperscript{11}.

Table 2: Share of agriculture in GDP and employment in ECA countries and the European Union (%)

<table>
<thead>
<tr>
<th>Country</th>
<th>% GDP</th>
<th>% Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>1.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>5.1</td>
<td>26.5</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>4.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Serbia</td>
<td>9.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Turkey</td>
<td>9.2</td>
<td>25.5</td>
</tr>
<tr>
<td>Ukraine</td>
<td>9.6</td>
<td>16.8</td>
</tr>
</tbody>
</table>

Source: World Bank\textsuperscript{12}.

\textsuperscript{10} The term “bioeconomy” generally refers to an economy that is based on ecologically sensitive products and services produced by the use of biotechnology and renewable energy sources.

\textsuperscript{11} Milken Institute (2013), \textit{Unleasing the Power of the Bioeconomy}.

\textsuperscript{12} World Bank: http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS (last accessed 30.06.13).
Since the 1960s, the share of value added to agricultural production from primary agriculture increased in rich and middle income countries. This was initially the case in many OECD countries and was later a trend in ECA countries including Kazakhstan, the Russian Federation, Serbia, Turkey and Ukraine. Nevertheless, food processing, retail and transportation currently account for one-half to two-thirds of consumer expenditure on food. Green growth is thus needed at all stages of the value chain and these three segments in particular can play a role in greening the economy by acting as catalysts for agribusiness investment.

Increasing incomes, demographic changes, participation of women in the labour force, and changes in lifestyle have led to a higher demand for quality, safety, convenience and presentation of food. As a result, the share of value added from processing, retail and transportation in the whole food chain has risen over time. Agrifood producers who meet these evolving demands while undertaking green investments may find themselves faced with increased costs, at least in the short run, that are not covered by sufficient returns since consumers’ willingness to pay a premium depends on different factors and varies by country.

Efforts are needed to tackle supply-side impediments in the upstream and downstream industries in ECA countries to meet changing consumer demands, reduce waste, and limit the environmental impacts of energy and water use, while ensuring the profitability of agrifood businesses. Improvements in productivity play a key role in this regard, providing means and incentives to producers to improve performance. Since the agrifood sector is likely to face higher prices for energy and water in the future, it will need to find ways to adapt to the pressure that this will exert on profitability. Globally, investment in “clean energy”, for example, has increased more than six-fold since 2004.\textsuperscript{13}

Roles of private initiatives and public-private partnerships

In market economies, the key imperative for the private sector is profitability. For individual firms it is vital to protect owner and shareholder value. Firms that are unprofitable are unlikely to be able to innovate and respond to the changing needs of the marketplace and thus are unlikely to survive over the long-term. The challenge facing individual firms is how to keep abreast of competitors while simultaneously satisfying growing public demand to operate in a socially responsible manner. Business activities should conform to existing laws and regulations, but beyond that it is not always apparent what is required to meet non-legislated standards or public expectations.

Provided that increasing scarcity is reflected in the price of resources, businesses will be forced to economize on their use. Successful farms and agrifood companies in OECD countries have tapped into new and growing green-output markets (such as premiums for organic foods, biofuels, and renewable energy sources including wind and solar) with more efficient production technologies. The agrifood sector has demonstrated a significant propensity to innovate; and green research and development (R&D) can play a major role in facilitating adaptation to resource scarcity and in providing environmental protection. With the right enabling framework, protection of intellectual property rights, appropriate public policies, and market incentives, this innovative tendency could be replicated in the ECA region but would require both public and private investment, enabling policies and institutions, and protection of property rights.

There is also a role for public-private partnerships (PPPs) in facilitating green growth in the sector, particularly through support to relevant R&D, the provision and dissemination of information, and possibly by underwriting risky investments. While scarcity can provide necessary incentives for more efficient resource use, markets will only provide similar incentives for improvements in environmental quality if businesses receive some commensurate remuneration or if they are dissuaded from generating harmful environmental effects through policy, economic or social pressures.

Private sector responses to the challenges of greening can be enhanced if firms are able to benefit from the business opportunities that this process can create. Policy-driven awareness campaigns and work undertaken through PPPs with the contribution and guidance of international governmental organizations (IGOs) and international non-governmental organizations (NGOs) such as UNEP, IUCN or the World Wildlife Fund (WWF), can help to make progress on tackling key issues with private sector buy-in. As average incomes rise in ECA countries, consumers will have the financial ability to pay a premium for green products. As a result, firms are likely to respond by reducing the environmental footprint of their food products so they can advertise accordingly.

Eco-labeling, which can be initiated or facilitated through public sustainability policies, can play an important role in helping firms signal desirable environmental characteristics to consumers; but there is further need for cooperation between the public and private sectors to avoid potential confusion about the meaning and validity of eco-labels. For example, carbon labeling (i.e. consumer information about the carbon emissions associated with the product life-cycle) can be further enhanced by regional, small-scale carbon offsetting initiatives involving producers who can participate in soil carbon credits-based trading. In its early stages, carbon credits are purchased mostly for corporate social responsibility purposes, but if the market is adaptive, farmer revenues can be generated and used to fund greening compliance measures. Other labeling practices such as date stamping foods can increase the efficiency of resource use by reducing food waste at the consumer level.

All of these developments in ECA countries are behind those in the richer OECD countries. While environmental legislation is being put in place in ECA countries (often based on existing legislation in the European Union), implementation often falls short of intentions and budgetary funds are scarce. In brief, the priorities in ECA countries are mainly to increase production, preserve rural jobs and keep prices low for consumers, rather than protect the environment.15

15 See, for example, country chapters on Kazakhstan, Russian Federation, Turkey and Ukraine in OECD (2013), Agricultural Policy Monitoring and Evaluation 2013: OECD Countries and Emerging Economies.
Actions by the private sector to overcome barriers to investment in green growth

The private sector\(^{16}\) has a crucial role to play in order for green growth to realize its full potential. The sector can be expected to adopt green growth strategies if it will benefit financially. If there is little return from such strategies in the short run and the returns in the long run appear uncertain or risky, then actions will be limited, even if such actions by agrifood businesses would be in the public interest. This would also occur if individual businesses determine that their own actions incur costs that may benefit other businesses that do not incur such costs (“free riders”). However, there is a lack of information on potential financial benefits of greener business models in the longer term, so enterprises may be unwilling to risk green investments with known start-up costs but uncertain long-term benefits.

Many of the businesses in the agrifood sector are also aware of the importance of conserving natural resources, especially energy and water, when these resources are linked to their long-term financial viability. Good environmental stewardship can discourage the imposition of potentially costly regulations by governments. Long-term goodwill and reputation can be built up through fostering a reputation of good environmental stewardship and corporate social responsibility, ultimately securing a bigger market share.

The agrifood sector in ECA countries needs to improve in a number of important areas: primarily to increase production efficiency and competitiveness; tackle environmental pollution; develop niche markets for green products; and monitor environmental life-cycle performance. In concrete terms, the private sector in ECA countries could therefore focus on the following actions:

(i) Leveraging resources – making significant investments\(^{17}\) and innovations throughout the food chain will be necessary to

\(^{16}\) 24 April 2013, OECD/BIAC Workshop, “Green Growth in the Agro-food Chain: What Role for the Private Sector?”.

improve farm and food business structures and infrastructures (including irrigation, transport and storage facilities, R&D\textsuperscript{18} and technologies, and knowledge dissemination), which will require a combination of public and private efforts.

(ii) Mainstreaming resource efficiency – applying existing yield-increasing technologies throughout the agrifood chain, the improving management and resource conservation practices, the reorganizing production processes to reduce waste, and developing worker skills are all necessary to raise total factor productivity.

(iii) Promoting green food products – selecting products with lower environmental footprints and using marketing strategies such as environmental labeling and premium pricing for organic and foods produced and processed in ways that reduce waste and respect the environment will all respond to consumer concerns for environmentally-friendly foods.

(iv) Tracking performance, valuing green capital – developing and using indicators to track green growth performance, identifying problem areas such as resource use inefficiencies (especially of energy, water and waste) and environmental pollution; benchmarking and peer reviews; illustrating the financial benefits undertaken by the leading agrifood businesses in the sector; requiring public and private cooperation in order to assess the stages of the production processes where savings can be made in energy (greenhouse gas emissions); water use and in recycling/waste reduction, such as life cycle analysis.

Given that an important constraint on undertaking such green investments – particularly by cautious entrepreneurs – is the uncertainty and risk that they entail, information dissemination,

demonstration projects, and the pooling and underwriting of risk can help in this regard. These are all actions that can be facilitated or provided by governments.19

Role for public sector policy support

In order to achieve green economic growth through raising productivity in the agrifood sector it is vital that appropriate price signals be transmitted to producers and consumers to induce greater efficiency in the use of all resources. In ECA countries the agrifood sector is subsidized20, either explicitly through taxpayer funded payments on inputs or outputs and tax relief and cheap credit to producers, or implicitly through consumer-funded market price support, input subsidies and trade protection21. In some countries (such as the Russian Federation and Turkey), consumers have also benefitted from subsidies that lower the cost of basic foods. These efforts have caused prices of natural resources such as water to be kept artificially low; and producers are usually not charged for the environmental pollution or greenhouse gas emissions that they generate. These consumer subsidies, which are usually intended to increase self-sufficiency or address rural employment and social equity issues, rarely achieve these objectives (or only do so at a higher cost than necessary), distort price signals, and have harmful environmental consequences.


21 Producer Support Estimates (PSEs) (subsidies) calculated by the OECD for agriculture in selected ECA countries tend to be somewhat lower than those for the European Union (the PSE for Turkey is higher, but for Ukraine is much lower), they are heavily dependent on policy measures that are potentially the most market distorting (output and input subsidies), are much more volatile over time, and rarely include measures to improve the environment in agriculture. Whereas less than a quarter of the PSE for the EU is potentially distorting, it is estimated to be around four-fifths of the PSE in ECA countries.
Governments need to reduce or eliminate those subsidies that are economically and environmentally harmful and shift towards those that raise productivity and competitiveness in the long run, benefit the environment, and are socially acceptable. This should induce firms to develop and adopt new green technologies, release budgetary funds to support green R&D, and make greener decisions on resource use through a greater reliance on market mechanisms. But in situations where markets are absent or weak, as they are for water or greenhouse gas emissions, where environmental impacts are not taken into account by the private sector, or where information or infrastructure is lacking, there is also a role for public policy. This includes regulations, charges and taxes to take into account (“internalize”) the external environmental effects of production and consumption decisions.

A supportive public policy framework for green investment may be necessary to encourage the private sector to adopt green growth strategies. This could be the case when there is no private benefit to business from undertaking green growth strategies because they would either generate public goods and services not remunerated in the market, or because pollution from that particular business activity is not accounted for; when the costs of undertaking such strategies are incurred in the short run but the benefits accrue in the long run; or when businesses assess that the risks involved are too costly.

The main government policy actions that can help agrifood businesses move towards green growth include: (i) reforming policies to shift towards taxes and subsidies, as well as investment and regulatory regimes, that reward unremunerated green growth actions and deter or penalize environmentally unfriendly practices; (ii) fostering green growth-oriented R&D and technologies, including in universities, as well as the development of green labour skills (through education and training) that have the potential to provide public environmental benefits but which agrifood businesses do not have an incentive to undertake; (iii) providing good information, not only on actions that have the potential to enhance financial performance but also on decision-making, and identifying and measuring environmental footprints along the food

---

supply chain (which requires undertaking life cycle assessments of greenhouse gas emissions and water footprints throughout the agrifood chain); and (iv) underwriting risk to encourage business investment. Table 3 illustrates some policy instruments that can address the main challenges facing the agrifood sector.23

Table 3: Selected policy instruments to address challenges facing the agrifood sector

<table>
<thead>
<tr>
<th>Policy instrument</th>
<th>Green growth agrifood policy challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulations and standards</td>
<td>Enact controls on excessive use of agrochemicals in production</td>
</tr>
<tr>
<td></td>
<td>Strengthen rules and standards for water quality and land management</td>
</tr>
<tr>
<td></td>
<td>Improve enforcement of environmental regulations in the agrifood sector</td>
</tr>
<tr>
<td></td>
<td>Introduce/strengthen traceability standards</td>
</tr>
<tr>
<td>Budgetary support measures</td>
<td>Decouple farm income support from production levels and prices</td>
</tr>
<tr>
<td></td>
<td>Increase support for environmental practices and provision of waste/recycling facilities</td>
</tr>
<tr>
<td></td>
<td>Extend environmental cross-compliance measures</td>
</tr>
<tr>
<td>Economic instruments</td>
<td>Clarify property and user rights in the agrifood sector</td>
</tr>
<tr>
<td></td>
<td>Impose charges on excess use of environmentally-damaging inputs</td>
</tr>
<tr>
<td></td>
<td>Implement trading schemes for water rights</td>
</tr>
<tr>
<td></td>
<td>Introduce carbon trading schemes for GHGs</td>
</tr>
<tr>
<td>Trade measures</td>
<td>Lower tariff and non-tariff barriers to agricultural trade</td>
</tr>
<tr>
<td></td>
<td>Reduce export subsidies to agricultural products</td>
</tr>
<tr>
<td></td>
<td>Include agrifood in bilateral trade agreements</td>
</tr>
<tr>
<td>Research and development</td>
<td>Increase public research on green agricultural technologies</td>
</tr>
<tr>
<td></td>
<td>Promote private agricultural R&amp;D through grants and tax credits</td>
</tr>
<tr>
<td></td>
<td>Undertake public/private partnerships for green agricultural research</td>
</tr>
</tbody>
</table>

Consideration also needs to be given to overall sectoral characteristics given that the structures, and the size and number of individual enterprises, exert an important influence on sectoral efficiency and, in turn, on economic and environmental performance. As countries become richer, consolidation of enterprises results in economies of scale, savings in resource use, and a greater ability to tackle environmental issues. Thus structural adjustment is seen as part of the strategy to move towards green growth.

Policy coherence is also needed to achieve green growth objectives in the agrifood sector. Public policy measures that promote the increased use of scarce resources in an inefficient way need to be eliminated in view of the availability of more effective policy measures aimed at achieving greater efficiency in resource use. The role of subsidies that aim to promote greening needs to be evaluated carefully, since not subsidies may prove to be not domestically costly but also problematic through their effects on international trade. Other issues, such as the application of environmental standards for traded products and the use of import restrictions for non-conforming products, have the potential to generate trade conflicts.
Towards a greener agrifood sector

Green growth linkages within the agrifood supply chain
The agrifood supply chain includes all the value-added activities from input suppliers, primary agricultural production, food processing, wholesaling and distribution, and retailing to consumers. Increasingly, agrifood chains in ECA countries, which are less developed than those in the richer OECD countries, rely on purchases of foreign and domestic goods and services from outside the chain. At the same time, sales of the agrifood goods and services generated along the chain are destined for both domestic and foreign markets. While the largest share of inputs in agriculture was formerly provided by agriculture itself, such as animal feed and fertilizer, the majority is now increasingly purchased off farm. Currently in the United States of America, for example, farmers only contribute around 20-25 percent of value-added at the farm gate through the use of their own land, labour and capital.

This implies that a green growth strategy for the ECA agrifood sector needs to be developed with an awareness of these various linkages; and if the environmental footprint of the agrifood system is to be reduced, a major part of the effort in terms of saving energy and water resources must focus on upstream and downstream industries. In addition, as key drivers in the production process, the way that upstream and downstream industries interface with the farming component of the food system will affect the ability of production agriculture to reduce its own environmental footprint. The challenge of meeting the expanding food needs of a growing and increasingly affluent global population, while simultaneously limiting environmental impact, is not one that faces the agricultural producers alone but involves all the actors in the agrifood system.

Meeting the expanding and changing needs of consumers will thus require increased productivity in food processing and delivery, not only at the farm level. In summary, the critical challenge is to increase domestic output and productivity, maintain profitability, and constrain the negative environmental impact of the sector.

---

Towards a greener agrifood sector

Key issues to be addressed in the region
In the five selected ECA countries (Kazakhstan, Russian Federation, Serbia, Turkey and Ukraine) the share of primary agriculture in GDP varies considerably, but is on average higher than the OECD average of around 2 percent. Adding the contribution of input industries, the processing and retailing sectors, probably doubles or triples the share of the overall agrifood chain in GDP. In some ECA countries, in particular Kazakhstan and Turkey, the share of employment in the agrifood sector is considerably higher than the share of GDP. There is potential for the agrifood sector in these countries to increase food production and there are considerable untapped gains to be reaped from improving productivity. In particular, there is significant grain production potential, especially in the Russian Federation, Kazakhstan and Ukraine. In the pig meat and poultry sectors, which are the fastest growing sources of animal protein, there is potential for rationalization of production and processing structures. Given the importance of the agrifood chain in the GDP and employment of the ECA countries, the potential for pursuing green growth strategies is therefore significant.

The economic performance in ECA agrifood chains varies across countries and commodity sectors, which makes it difficult to generalize. There is a wide range of structures from small family farms and agrifood businesses to large, commercial enterprises. However, the longer-term tendency has been towards consolidation and rationalization in the overall agrifood sector, especially in food processing. This partly reflects the demand-side pressure emanating from overall economic growth, urbanization and changing consumer preferences, and partly from supply-side competitive pressure, in particular that which is emanating from opening domestic markets due to WTO accession (such as in Ukraine, but not yet in the Russian Federation).

Nevertheless, there are serious problems of competitiveness in some countries and sectors such as the Russian meat sector, where output has grown (particularly of pig meat and poultry) but this has been achieved behind a wall of protectionist measures that has impeded producers from fully developing their potential in terms of productivity.

of productivity and price competitiveness. There is thus potential to reduce production and distribution costs throughout the agrifood chain, improve management skills, and focus more on quality.

The environmental performance in ECA agrifood chains is mixed. Available indicators of environmental performance in the five selected ECA countries are scarce and patchy, in particular for the post-farm segments of the agrifood chain, but tend to show that:

(i) Inefficient and often excessive use of water and energy resources is commonplace throughout the agrifood sector as a result of subsidized prices that do not fully reflect scarcity values in a sector accounting for a relatively large share of GDP. Examples include diversion for irrigation and other uses that have gradually led to the Aral Sea, formerly the world’s fourth largest lake, to lose 90 percent of its surface. It was preceded by an increase in salinity and concentration of chemicals, limiting fish catches and subsequently water use. Although energy use has declined substantially in absolute terms since the Soviet era, the Russian Federation still has one of the most energy-intensive economies in the world. This is the result of relatively abundant supplies of cheap energy. The clearest imperative is to remove government interventions that result in below-market prices of energy and to introduce policy instruments so that negative externalities associated with fossil fuel combustion (air pollution and GHG emissions) are reflected in prices. These will reduce market barriers to the production of feedstock as well as the on-farm use of biofuels and bioenergy, which will in turn impact on the greening of the entire value chain.

(ii) Widespread water pollution in agricultural areas is due to over-use or untimely application of fertilizers and production of manure from animal feedlots, leading to nutrient enrichment in water courses, and yet farmers are often not held to account through pollution charges or regulations. Hypoxia in the Black Sea is linked to nutrient inputs from agricultural regions in the drained watersheds. While

---

26 This is also a problem for OECD countries in respect of some environmental issues such as soil and water quality, as well as the environmental performance of the post-farm segment of the agrifood chain.
water pollution caused by agriculture is generally considered to be lower in the study countries compared to OECD countries where intensive agriculture is practiced, in some regions the pressure on water quality from farming is high, especially in the Aegean and Mediterranean regions, which are the most intensively farmed. Evidence suggests that the uptake of nutrient management practices is low, since many farmers have limited access to the necessary capital for investing in manure storage and other manure-treatment technologies, and knowledge of nutrient management practices is limited. At the same time proven low-cost practices to mitigate eutrophication do exist. These include planting perennial crops in critical parts of the basin where high erosion rates contribute to sediment borne nutrient runoff. In addition to filtering nutrients in surface and subsurface flows, the biomass produced can generate additional revenue streams for farmers, provide impetus for locally sourced bioenergy value chains while increasing landscape level biodiversity. Such win-win scenarios are dependent on knowledge transfer and a supportive local policy.

(iii) Environmental pressures related to biodiversity and soil erosion are generally location-specific in primary agriculture. Available data and evidence show that in more arid environments, such as in Kazakhstan, soil erosion is one of the main threats to soil quality and productivity (desertification). There is also evidence that the rich chernozem soils in Serbia and in Ukraine are being eroded in excess of tolerable soil loss rates due to intensive production, row cropping, and mechanization practices that focus more on short-term production gains than on long-term sustainability. Technology improvements, conservation tillage, drought tolerant varieties are accessible adaptation options. Better data, information and knowledge transfer are needed to ensure the uptake of greener options in these countries.

(iv) GHG emissions are significant due to excessive energy and fertilizer use and manure production in a relatively large sector. In Serbia, large co-operatives have intensive livestock operations without adequate manure management and the open lagoon
storage entailing numerous environmental risks, including the emission of methane into the atmosphere. Anaerobic digestion of this by-product (biogas) could provide an alternative source of energy and income for farm operations and increase their competitiveness. Adapting conservation tillage practices in the Ukraine could significantly reduce erosion and emissions in conjunction with lower fuel use and soil carbon release. Similar practices on comparable Mollisols, soils formed under the prairie grasslands of Eastern Europe and the Midwest of the United States, have yielded quantified and verified reductions in GHG emissions. Machinery-related emissions in the production phase of study countries is limited, but significant efficiency gains can be realized in the post production phases of transportation and storage.

(v) Post-harvest losses, waste generation and its management are issues of concern throughout the agrifood chain.

(vi) Broadly speaking, ECA countries are making efforts to replicate European Union environmental legislation but often with inadequate implementation, monitoring and policing in practice.

The policy performance relating to ECA agrifood chains is variable. In some cases it reflects a goal of greater levels of self-sufficiency in agriculture and food products (e.g. Russian Federation); in others it reflects concerns to protect large rural populations (e.g. Turkey), or to add value to existing comparative advantage (e.g. Ukraine). In general, the rate of subsidy to agriculture – as measured by Producer Support Estimates (PSEs) (which measures the share of support due to policies in overall farm revenues) or Nominal Protection Coefficients (NPCs) (which measures average domestic producer prices for agricultural commodities relative to those at the country’s border) – vary across countries, but tend to be lower in non-OECD ECA countries, as shown by Table 4 below, for countries monitored by the OECD.27

Table 4: Producer Support Estimates in European Union and selected ECA countries

<table>
<thead>
<tr>
<th>Country</th>
<th>PSE (%)</th>
<th>NPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>19</td>
<td>1.05</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>15</td>
<td>1.09</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>13</td>
<td>1.08</td>
</tr>
<tr>
<td>Turkey</td>
<td>22</td>
<td>1.09</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Source: OECD PSE database.

Despite the relatively low levels of overall support, in general an evaluation of policy developments in ECA countries tends to show that:

- policies have hindered rather than helped competitiveness because they have targeted quantitative output objectives (often with scant regard to costs and benefits) rather than efficiency-improving ones;
- too little attention has been paid to measures to improve or facilitate longer-term productivity improvements such as skills, management, R&D, technology transfer, structural adjustment, risk management and infrastructure;
- where outside pressures (such as increasing domestic consumer demands for foods of better quality, safety, variety, and convenience – as a result of growing wealth or urbanization – or international obligations under the WTO or bilateral trade agreements) have been significant, this has been a key driver to spur competitiveness and higher productivity;
- environmental protection measures are weak and poorly enforced; and
- there is rather weak governance, accountability, transparency, and stakeholder involvement in policy formation.
Entry points for the EBRD
The EBRD is able to leverage its investor position when engaging with policy makers with agrifood firms to show consumers the efforts they are making to address public concerns about greening through economizing on energy and water resources, reducing waste, or green labelling of foods (such as carbon and water footprints). Agribusiness would incur extra costs, affecting profitability, although the net effect will be determined by how much additional cost is involved in greening a firm’s activities relative to the additional revenue that can be obtain from increasing the volume of sales and/or the ability to pass on the costs of greening to consumers through higher prices. The latter factor relates crucially to the ability of the firm to differentiate green products from their non-green alternatives, and the willingness of consumers to pay a price premium for green products.

Areas where the EBRD could play a supportive role in helping ECA countries and agribusiness move towards green growth include the following.

**Funding investments in green growth for the agrifood sector**

**Incentivize investment schemes for companies that lead to resource efficiency gains**

Such incentives could be provided for example through capital investments in energy efficient and environmentally sustainable operations that increase the resilience, profitability and environmental credentials of agricultural businesses. To help companies in the region to capture these commercial benefits the EBRD has created the Agribusiness Sustainable Investment Facility (ASIF) and expanded it in 2013 through the AgriREF, a financing facility to fund a wide range of energy efficiency, environmental and social projects within the agribusiness sector. Where financing is needed, the EBRD will lend or invest on commercial terms supported by limited technical cooperation grants for improvements in resource efficiency.
Funding green research also through financing to companies that invest in research
Research that focuses on resource savings and reductions in GHG emissions and development through environmentally-focused investment vehicles, such as green mutual funds (those specializing in companies judged to have positive environmental attributes), can provide a source of funding for companies wishing to raise capital to invest in green R&D. The main area for funding is in renewable energy sources. Many of these either use agricultural biomass feedstocks for ethanol, biogas and biodiesel production, or agricultural land for wind farms.

Funding R&D through the development of PPPs for infrastructure projects
PPPs are increasingly being used in OECD countries in the food and agricultural area for R&D activities involving publicly funded research institutions, such as government research agencies and universities. There are a number of advantages in using PPPs to stimulate green R&D in the agrifood sector. They can help to align societal interests with private interests by providing funding for projects that might be difficult to justify on the basis of a purely private benefit/cost calculation, or because smaller firms may not be large enough to attract support for investment in R&D of a sufficiently large scale. PPPs can help to leverage scarce public funds by encouraging firms to devote their own resources to a joint research effort or by making it easier for them to attract outside investors to support R&D.

28 A number of commercial companies provide research and information for companies and investors in green technologies. There is evidence that investor interest in environmental projects is expanding beyond renewable energy, toward a broader range of issues and technologies and this may open possibilities for securing capital for a range of environmental projects in the agrifood sector.


30 This is particularly important when the final outcome of research may be uncertain. Private firms tend not to embark on research that has uncertain outcomes or whose contribution to profitability is unclear. PPPs can take advantage of private sector knowledge in developing new technologies and the opportunity to “field test” these in a commercial environment. To the extent that social and private objectives can be aligned, PPPs are likely to result in tangible outcomes that will actually be applied by industry.
Investing in improving production processes of agribusiness companies

Production processes that can be improved include project screening to assess technical and commercial viability; energy audits; activities that assess facilities in detail and recommend the most cost-effective energy efficiency measure; market studies for different technologies; feasibility studies and implementation support for companies.

Funding education and training

Investing in education and training can overcome the lack of skilled managers and technical professionals throughout the agrifood chain. Disseminating available technical and economic knowledge and best business practices would add value to improving productivity and reducing resource pressure, environmental damage and waste. For example, this could be done through comparative case studies and benchmarking. Areas where investments (credits, grants or loans) might be cost-effective could include the installation of water and energy use meters, wastewater treatment and food waste recycling facilities, and providing environmental food labeling and traceability software.

At the regulatory level, engagement in policy dialogue activities to implement legislative and regulatory reforms can lead to green growth outcomes. Coordination between government agencies and private sector is essential to ensure information dissemination.

Implementing market creation and facilitation projects

Greater competition in the project sector

Projects can be a way to promote greater competition in sectors of activity. Increased competitive pressure is likely to improve the efficiency with which resources are used, demand is satisfied, in particular for food with higher quality characteristics, and innovation is stimulated.
Expansion of competitive market interactions in other sectors

Expansion of competitive market interaction can be achieved through projects to improve competitive relationships of agriculture with vertical linkages upstream (input suppliers) and downstream (processors, distribution, retailers) businesses and horizontal linkages to integrate economic activities into the national or international economy, in particular by reaping economies of scale and lowering transactions costs.

Expanding private ownership

Private ownership can be expanded through privatization projects or new private provision of goods and services. This can generally be expected to strengthen market-oriented behavior, innovation, the pool of entrepreneurship and more generally, commitment to the transition to green growth. Private ownership is also in itself part of the transition objective. With the appropriate business standards and codes of practice, regulation and the legal environment, private ownership is complementary to, and often a condition for, the expansion and improvement of markets.

Institution building, design and enforcement of property rights, and policy formation to promote market functioning and efficiency

This can be done through projects to create or reform government (i.e. public) or private institutions, and practices to enhance entrepreneurship, and the efficiency of resource allocation. This is particularly relevant where not only the project entity itself but also other economic activities benefit. Four types of contribution are of particular importance here: the creation/strengthening of public and private institutions that support the efficiency of markets; improvements in the functioning of regulatory entities and practices; improvements in public policy formation, competition advocacy, predictability and transparency; and contributions to laws that strengthen the private sector and the open economy.
Transfer and dispersion of skills
Transfer and dispersion of skills can be achieved through projects that contribute to providing and improving the skills required for well-functioning market economies. This may include management, procurement, marketing, financial and banking skills. Such a transfer represents a relevant transition impact if the skills are likely to be spread to also benefit non-project entities. Skill transfer is often complementary to other transition-related project impacts such as institution building, market expansion, and demonstration effects, including compliance with international environmental standards.

Demonstration of practices and activities that can be replicated
Such demonstrations can be done through projects that show other participants in the sector what is feasible and profitable and thereby potentially replicable. The types of demonstration effect that are of particular importance here are demonstration of products and processes which are new to the economy; demonstration to both domestic and foreign financiers of ways and instruments to finance activities; and demonstration of new environmental technologies and practices.

Setting standards for corporate governance and business conduct
Standards for corporate governance and business context should be set through projects that set and implement high standards of corporate governance and business conduct in entities supported by the EBRD, which may contribute to increase pressure on behavior and attitudes that enhance the legitimacy and functioning of the market economy. This is a form of demonstration effect based on benchmarking. Where role models for business conduct and corporate governance are rare, such pressures are less likely to materialize. There is a wide range of areas where this applies, including shareholder agreements, financial disclosure and transparency, strategic guidance and improved board procedures, compliance with environmental standards, and improvements of corporate governance standards.
The private sector in OECD countries – sometimes in tandem with policy – has experience in market creation, in particular in generating price premiums for organic food production (typically from 10-40 percent above the conventional product); in developing markets for biomass production for energy (in particular in Germany and Austria); in developing market-driven research and innovation; and in recycling food residues to reduce waste (such as in The Netherlands).

In 2011 the Dutch government initiated a new enterprise “top sector policy”, with the ideas for innovation put forward by the agrifood industry and knowledge institutes instead of by the government. In 2012, the top team turned the action plan into an innovation contract, which provides direction to market-driven top-quality research and innovation. An important objective of the innovation contract for the agrifood sector is “more with less” by the development of sustainable, innovative food systems. The challenge is to realize twice the added value with half of the input. This requires improvement in efficiency, recycling and re-use by: (i) individual actors in the agrifood chain; (ii) chains as a whole (system changes); and (iii) between the different chains (bio-based economy). Examples of sustainable innovation ambitions are: added-value from side streams (including manure) and increased utilization of green raw materials (such as biorefinery); increase of resource efficiency (to prevent the waste of food, water, energy, land, raw materials and manure); and the promotion of animal welfare and animal health as part of sustainable stock farming.\(^\text{31}\)

**Monitoring and engaging in policy dialogue on green growth strategies for agrifood businesses**

**Tracking green growth progress**

Monitoring green growth progress requires the development of proper/specified performance indicators, in particular the indicators of economic performance, energy and water use, water pollution and greenhouse gas emissions. For example, OECD, International

Energy Agency (IEA), UNEP, FAO, EUROSTAT, and the European Environment Agency (EEA) – as well as government research organizations and large agribusinesses – have extensively worked on methodologies, data collection, and analysis. The Global Research Alliance on Agricultural Greenhouse Gases brings together research on increasing food production but minimizing GHG emissions from agriculture. An inventory of “who is doing what” with respect to key data provision and case studies (including on Life Cycle Analyses on water, energy use and carbon emissions) concerning the agrifood chains in ECA countries would be useful. Two sets of green growth indicators need to be developed for the ECA agrifood chain. One “business” set would be developed by the post farm processing and retailing sector, which would essentially monitor progress in key areas (such as financial performance, employment, energy and water use, waste management, and greenhouse gas emissions). A second “public” set of resource intensity indicators would be developed by governments, which would essentially monitor progress for the agrifood sector as a whole from the perspective of the public interest in economic efficiency, environmental protection, environmental externalities and resource depletion. This could be complemented with a series of in-depth case studies of specific agrifood sectors in ECA countries (such as dairy, meat, cereal products, fruit and vegetable processing).

Sharing experiences among ECA and OECD countries in addressing green growth policy issues

Experiences to be shared between ECA and OECD countries would include raising productivity, structural adjustments, tackling environmental issues, and governance. One of the aims of the policy dialogue could be to engage stakeholders to obtain “buy-in” from politicians, businesses and the general public in order to

---

32 Several countries are in various stages of developing sustainability indicators and/or attempting to measure natural assets, based on OECD guidelines, including the Netherlands, France and the United Kingdom. See also, Green Growth Knowledge Platform (2013) Moving towards a Common Approach on Green Growth Indicators: A Green Growth Knowledge Platform Scoping Paper.
Towards a greener agrifood sector

ease the transition to green growth strategies. The timing and the trajectory identifying the short-term/long-term costs and benefits in moving towards green growth – in the context of the increasing demand for more “quality” characteristics of food in ECA countries – is an important area for policy dialogue. In many cases, where there would be lower costs and/or higher revenues from applying knowledge to reduce waste, energy and water use in the sector, then businesses have incentives to undertake action. However, it is often the lack of information or perceived risk of such actions that is the impediment to the adoption of these practices; this information could be disseminated with the assistance of government. Policy dialogue could also focus on how to transmit and secure take-up of such information.

Setting up a platform between the EBRD and agrifood business companies

A platform for communication between EBRD and agribusiness could facilitate knowledge sharing on R&D adoption, identification of where EBRD investments could be most cost-effective, and exchange of best business practices to reduce water and energy use and improve waste management, eco-labeling and life cycle analysis. The private sector has experience in sharing information

33 A recent study by the OECD (Andrea Beltramello, Linda Haie-Fayle and Dirk Pilat (2013), OECD Green Growth Papers, 2013-01) argued that new business models can make an important contribution to the transition to green growth, but their development of is affected by a range of barriers, many of which can be addressed by well-designed policies. Key areas for policy action include:

- strengthening market demand for green products and services by providing long-term and stable incentives for firms to internalize the environment and natural resources in their decision making, including through a well-designed regulatory framework and supportive demand-side policies;
- enhancing access to financing, including risk capital, by supporting market development for risk financing and the development of entrepreneurial skills;
- removing perverse subsidies support for existing business models and incumbent firms, such as energy subsidies; reducing the barriers to entry, exit and growth of new firms and business models; and improving the regulatory environment for start-up firms and new business models;
- reducing the costs of intellectual property rights, in particular for small and start-up firms;
- supporting skills development, including for existing workers;
- supporting R&D and innovation, including testing, demonstration and verification;
- improving governance, to ensure that national and regional policies for green growth are well aligned.
on sustainable management practices and codes of good conduct in the agrifood industry through groups such as The Sustainability Consortium, The Keystone Alliance for Sustainable Agriculture, and AgBalance. It may be worth considering a regional demonstration site with high-end, so called “blue-green technology” coupled with a more widespread introduction and application of low-technology green solutions (e.g. anaerobic digestion of wastewater sludge and food waste).

**Engaging in discussions on policy reform**

There are many weaknesses in the formulation and implementation of environmental legislation in ECA countries. For institutional, technical, and juridical reasons, the legislation is often incomplete and in many cases it is enacted at different judicial levels. Environmental legislation in the region tends to be repetitive, bureaucratic, and is difficult to monitor. It is important to move away from policies that are environmentally harmful, hamper productivity, and are economically distorting, and to shift to those that are proactive in promoting green growth. For many ECA countries, accession to the WTO will represent an important occasion for re-thinking trade and related domestic policy disciplines that impact agricultural productivity, economic growth, and the environment, while addressing transitional problems.

Sharing and discussing best policy practices in this area would be a useful area for policy dialogue. Much work has been undertaken in analyzing such policies in the primary agricultural sector of OECD and selected non-OECD countries, and proposing changes, particularly in relation to reducing economic and trade distortions. ECA countries for which such studies have been done include Kazakhstan, Turkey, the Russian Federation and Ukraine (see references in footnote 8). Important techniques to learn from include shifting towards payments for public goods (“user provides” principle) and structural adjustment, facilitating green investments, pricing natural resources (i.e. water) to reflect their scarcity value,

---

accounting for environmental impacts, especially greenhouse gas emissions (through taxing or charging), and enforcing regulations relating to environmental damage (“polluter pays” principle). EBRD could provide a platform to share the experiences of countries like Ukraine and the Russian Federation with Kazakhstan and Tajikistan, which are expected to join WTO in 2013.