THE WORLD BANK
WORLD BANK GROUP

Program
RURALNOG RAZVOJA

Operativni program
ZA POMORSTVO
I RIBARSTVO

MINISTARSTVO POLJOPRIVREDE

Sector Diagnostic and Analysis of Public Spending in Agriculture and Rural Development

May 2019

SUFINANCIRANO SREDSTVIMA EUROPSKE UNIJE

EUROPSKI POLJOPRIVREDNI FOND ZA RURALNI RAZVOJ:
EUROPA ULAŽE U RURALNA PODRUČJA MJERA TEHNIČKA POMOĆ

EUROPSKI FOND ZA POMORSTVO I RIBARSTVO
MJERA VII.1. TEHNIČKA POMOĆ

Sector Diagnostic and Analysis[1] of Public Spending in Agriculture and Rural Development

Output 1, Structural Transformation in Agriculture and Rural Space (STARS) RAS

May 2019

1 This report was prepared by a World Bank Group technical team of staff and consultants lead by Svetlana Edmeades and comprising Demetris Psaltopoulos, David Lee, Kostas Tsekouras, Panos Varangis, Miroslav Božić, Hrvoje Horvat, Philip van der Celen, Erika Felix, Ana Bucher, Blair Lapres and Jela Bilandzija. The report was prepared under the guidance of Julian Lampietti, World Bank Practice Manager for Agriculture Global Practice (Europe and Central Asia region) and Elisabetta Capannelli, World Bank Country Manager (Croatia).

TABLE OF CONTENTS

OBJECTIVE

1. **The purpose of this diagnostic report is to establish an analytical basis for defining strategic priorities in agriculture and rural development in Croatia,** as the country prepares its National Agriculture and Rural Development Strategy and formulates its Strategic Plan for the European Union's (EU) Common Agricultural Policy (CAP) for the next programming period (2021-2027). The diagnostic report assesses country-specific strengths, weaknesses, opportunities and threats (challenges) in the context of the macro-trends and issues affecting Croatian agriculture today, the ongoing EU CAP reform process, and broader national development directions.

2. **This diagnostic report is based on a series of background documents prepared by the World Bank as key inputs.** Both advanced economic analysis and qualitative assessments were carried out as part of an evidence-based process for sector strategy development and policy guidance. Specifically, the analysis focuses on a range of strategic themes related to agriculture and rural development in Croatia, including (i) Croatian agricultural policy and the current CAP; (ii) the efficiency, effectiveness, and equity of current public spending on agriculture and rural development; (iii) the subsidy intensity of income for different farm types, (iv) backward and forward economic linkages of the agriculture and food processing sectors; (v) economy-wide impacts of agriculture and rural development support measures; (vi) agriculture finance and risk management solutions; (vii) the agricultural knowledge and innovation system (AKIS); (viii) food safety, sanitary and phytosanitary (FS&SPS) policies; (ix) trade and strategic market segmentation; (x) agroecological and climate aspects; and (xi) the development of sustainable and circular bio-economies in Croatia. In addition, this report brings forward some key elements of an in-depth sectoral review and policy analysis carried out as an input to the ongoing formulation of Croatia's broader National Development Strategy (NDS).

3. **The diagnostic report is the first step in the process of developing a strategic vision for post-2020 agriculture and rural development in Croatia.** It supports the formulation of strategic directions for agriculture and rural development in Croatia by providing an analytical basis for identifying critical challenges that the sector faces and possible response options. These critical challenges and response options, in turn, have informed the design and content of a priority-setting exercise, as a second step in the process. Using a theory of change framework, a broad group of sector stakeholders (both through in-person consultations and an anonymous online national survey[2]) were asked to evaluate the different challenges and response options based on objective evaluation criteria linked to the 9 newly

2 https://poljoprivreda.gov.hr/

emerging EU CAP objectives[3]. The national strategic priorities established in this manner will contribute to forming the National Agriculture and Rural Development Strategy of Croatia and thus enable the Ministry of Agriculture to formulate its National CAP Strategic Plan for 2021-2027.

4. **This strategy development process is aligned with the programming requirements of the new CAP architecture.** Although details are still under discussion, CAP Strategic Plans developed by each EU Member State must define a strategy (based on a SWOT analysis and clearly defined national priorities) and explain how national priorities and actions will contribute towards reaching common EU policy objectives. The Strategic Plans will also set targets for reaching the 9 common policy objectives, with annual monitoring of progress towards achieving these targets through standardized performance indicators.

3 The future CAP will focus on *nine general objectives* with "modernizing the sector by fostering and sharing of knowledge, innovation and digitalization in agriculture and rural areas, and encouraging their uptake" pursued as a *cross-cutting objective*: (i) Support *viable farm income and resilience* across the Union to enhance food security; (ii) Enhance *market orientation and increase competitiveness*, including greater focus on research, technology and digitalization; (iii) Improve *farmers' position in the value chain*; (iv) Contribute to *climate change mitigation and adaptation*, as well as sustainable energy; (v) Foster *sustainable development and efficient management of natural resources* such as water, soil and air; (vi) Contribute to the *protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes*; (vii) *Attract and sustain young farmers and facilitate business development* in rural areas; (viii) Promote *employment, growth, social inclusion and local development* in rural areas, including bio-economy and sustainable forestry; (ix) Improve the response of EU agriculture to societal demands on *food and health*, including safe and nutritious food produced in a sustainable way, as well as animal welfare.

OVERVIEW

5. **Croatia has a vast potential to transform its agri-food sector into a modern industry that drives economic growth, generates jobs and provides income to rural communities.** The agri-food sector is an important contributor to the economy and rural incomes in Croatia. The sector benefits from a number of competitive advantages, which could be leveraged for increased growth and development, including unrestricted access to EU markets, access to investment support under the CAP, diverse agro-ecological conditions, quality land and abundant water resources, comparatively low agricultural labor costs, good roads infrastructure, as well as a growing domestic tourism industry. Croatia's agri-food sector is therefore endowed with many of the key assets necessary to seize growth opportunities on the EU and domestic markets.

6. **Structural constraints to agricultural competitiveness must be addressed, however, to realize this potential.** Croatia is currently a net importer of agri-food products and faces growing agri-food trade imbalances. Strengthening the competitive position of the agri-food sector will require improvements in the (i) land and labor productivity of the primary sector, including its modernization and diversification towards value addition and greater reliance on knowledge and innovation; (ii) improved capability of agri-food supply chains to respond cost-effectively to growth opportunities in domestic and international markets, while enabling broader sector integration; and (iii) the capacity to manage increasing climate and market risks. In this context, Croatia's fragmented production structure, perceived as a major impediment to building a competitive agri-food sector, can also be transformed into a value proposition for diversified agricultural production, provided an adequate enabling environment. Regulatory and administrative reforms for improving the business climate and enabling investment opportunities are a necessary condition. Investment incentives need to be better aligned with strategic priorities and market needs and better targeted.

7. **Investing in agriculture in Croatia makes economic sense.** Although the contribution of primary agriculture to the economy is declining, as the sector is converging with other EU countries in the process of structural transformation, the economy-wide effects of the broader agri-food sector in Croatia are significant. Investing US$1 million in agricultural production is estimated to generate an increase of US$5.19 million of total output in the economy (including the effects of consumer spending). When forward and backward linkages are considered, the broad agri-food sector currently contributes close to 15% to the Croatian economy. For the economy-wide effects of the agri-food sector to fully materialize in Croatia, improvements in both agricultural factor productivity and value chain integration are paramount. Improving productivity is more than just raising yields or decreasing costs; it also relates to raising food quality

and moving into higher value products. This could reduce the large trade deficits of both primary and processed food and improve the utilization of productive capacity of the country, while generating economic opportunities in rural areas.

8. **But agricultural investments need to be prioritized to achieve the desired impacts.** Agricultural capital stock and innovation (e.g., research and development) are found to be key drivers for improving agricultural labor productivity in Croatia. Today, however, agricultural labor productivity levels are less than 20% of the levels achieved in the EU-15. Croatia's agri-food sector is currently characterized by very low capital formation (almost 4 times lower) and very limited spending on research and development (3 times lower) compared to EU averages. Hence, increasing public and private spending on agricultural knowledge and innovation, while also improving access to productive capital, could bring about a much-needed boost in agricultural labor productivity in Croatia. Closing half of the gap in the stock of agricultural capital per worker relative to EU-28 levels would increase agricultural labor productivity by 25% in Croatia. Similarly, increasing R&D investment (as % of GDP) to close half of the R&D gap relative to EU-28 levels would increase agricultural labor productivity 12% in Croatia.

9. **Croatia devotes a lot of public resources to agriculture.** Public support to agriculture in Croatia is currently around 1.3% of GDP, double that of the EU-28 average, with the share of EU funding in total support to farmers at around 65%. The high share of public spending in agriculture is part of the CAP integration process followed by new EU member states. Although greater part (58%) of Croatia's current CAP expenditures are channeled towards rural development measures (Pillar 2), Croatia has opted to transfer 15% of the rural development budget towards Pillar 1 direct payments by 2019. This is driven by an intention to optimize national co-financing of direct payments (in a tight fiscal environment) as well as by income stabilization needs of agricultural producers in Croatia, as they transition towards the Common Agricultural Policy and markets. Income support (via direct payments) represents 40% of farm net value added in Croatia, compared to the 30% EU-28 average. Meanwhile, Croatia is slightly behind (at 33%) the absorption of rural development funds compared to the EU average (at 42%) and ahead of some new and old EU member states.

10. **The agricultural sector in Croatia is highly dependent on income support that is not equitably distributed.** Many farms in Croatia (60% of farms in the farm register, representing 94% of the standard output of Croatian agriculture) benefit from direct payments (close to 101,000 beneficiaries in 2017). The incomes of farm types that constitute the backbone of Croatian agriculture rank very high in terms of their dependence on direct payments (among them olives, livestock, milk, wine). These are also found to exhibit lower technical efficiencies. Although most of the income support (80%) is decoupled (area-based), coupled (to production) support is still widely used in Croatia. It targets agricultural products with the largest trade deficits and it is highly concentrated (65% of coupled support) on two sub-sectors: beef and milk. However, the intended income smoothing and risk mitigating effects of income transfers are offset by their (mis)allocation, with more than a third of direct payments going to the largest farms in Croatia (6.5% of registered farms in 2016). This is a third of the income support envelope that does not contribute towards diversification and productivity improvements of small/poor and medium-sized producers, while generating rents for larger/well-off farmers, thus slowing down the structural transformation process of Croatian agriculture.

11. **The effects of income support in agriculture in Croatia are mixed.** Agricultural labor productivity, defined as growth in agricultural value added per worker, has been found to be positively associated with decoupled payments and rural development support, particularly in new EU Member States. Improvements in productivity stem, in part, from the ability of producers to reduce income risks and credit constraints, which leads them to invest more and diversify away from low value crops, thus generating greater income by focusing on higher value agriculture. There is evidence that in Croatia cropping patterns are changing following EU accession, although the shift away from low-value production is not yet evident, and more needs to be done to translate income support into higher on-farm productivity. In

this context, the economic analysis points towards the limited capacity of decoupled payments to induce efficiency improvements in Croatia, perhaps because of the lack of proper targeting of this particular type of support, but also because of other factors that affect the production input/output ratios (e.g. advisory services, technology choices), including adjustment costs which could be mainly attributed to organizational and human resource factors.

12. **Supporting the uptake of rural development investments in Croatia is a step in the right direction.** The economy-wide effects of rural development support in Croatia are strong with a multiplier effect of 3.43 for output, 2.81 for value added and 9.39 for job creation. Furthermore, the most technically efficient farms in Croatia are those receiving rural development support on investments, signaling its relevance for improving the economic performance and technology choices of productive units that have access to these resources. Rural development support for investments also positively affects total factor productivity (TFP) growth, including technical change and technical efficiency growth. Thus far, the largest share of the rural development budget (29%) has been used for investments in physical assets, which has contributed towards much needed capital accumulation in the sector. However, wide variations in the uptake of different rural development measures remain, and measures that are critical for enabling higher productivity and value chain integration are at risk of not being fully utilized (e.g. knowledge transfer and advisory services, co-operation and producer organizations) and are currently found to be associated with efficiency losses. Analytical findings confirm the benefits of innovation-inducing support on productivity and technical efficiency growth.

13. **Aligning public spending in Croatia with sector needs will require some rethinking of the agricultural policy mix.** There has been an increase in TFP of Croatian farms between 2014 and 2016 (4.5% per year), mainly due to an increase in technical efficiency (3.2% per year) and in scale efficiency (2.6% per year), while much-needed technical change seems to have regressed (-1.1% per year). Improving the targeting of income support and the absorption of rural development support across different measures could help accelerate the transformation of agriculture in Croatia. Reducing the disparities in the distribution of income support should be an integral part of the changes in the agricultural policy mix. In particular, targeting small, commercially oriented producers, who are found to be the most technically efficient in Croatia, would be fundamental to diversifying the agri-food sector towards higher value production. However, structural constraints, including limited access to finance, modern technology, linkages to markets, as well as limited entrepreneurial capacity and knowledge, hinder the transformation of small farms into efficient, medium-size production units. Medium size farms are found to be the least technically efficient among all farms in Croatia. The difficulty in gradually scaling up technical efficiency of small farms inhibits the process of transformation and exacerbates the duality of agriculture in Croatia. Improving the absorption capacity of rural development support by the small and medium producers in Croatia would also be critical to broadening the economy-wide effects of public support to agriculture. This may require the rethinking of eligibility and selection criteria, to ensure inclusion, as well as the re-balancing of built-in incentives for investment priorities (e.g. shifting investment from equipment, e.g. tractors, towards more integrated support for enabling linkages between producers and markets). It also requires a re-directing of the focus of agricultural policy towards measuring results (for evidence-based strategic planning) rather than inputs (amount of support).

14. **Croatia can better leverage EU CAP resources to mainstream climate change into production decisions and develop its bioeconomy.** Although Croatia is one of the EU Member States with the lowest share of physical area under agri-environment and climate measures (less than 1%) and has limited access to irrigation water, the total area under organic farming is steadily increasing, faster than the EU-average. Close to 40% of the overall CAP post-2020 budget is expected to focus on climate and environment action. Income support will be made conditional on enhanced environment and climate-friendly farming practices. In addition, an "eco-schemes" system, will be mandatory for EU Member States to offer (but voluntary to farmers) and funded from national direct payment allocations as each EU Member State can design its own system. EU Member States will also be required to dedicate at least 30% of their rural development budget to environment and climate measures. In this context, there is an opportunity to generate

more integrated and circular (bio-economy) value chains that support increased resource use efficiencies, increase and diversify producer incomes, and bring economic diversification opportunities to rural areas. Mainstreaming climate change concerns in agricultural policies and programs would help incentivize behavioral change of farmers, while facilitating access to resources for enhancing productivity sustainably and maximizing synergies between adaptation and mitigation actions. It would also support behavioral change in public agricultural institutions by shifting the emphasis from reactive management to proactive planning on the basis of a longer term vision.

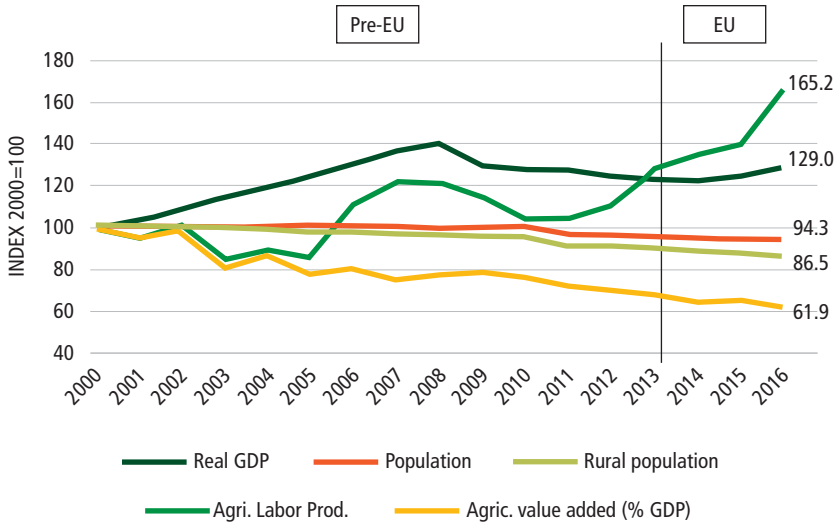
15. **Digital acceleration can further support the process of agricultural transformation in Croatia.** Digital technologies can significantly improve efficiencies on- and off-farm, while reducing costs, facilitating the reallocation of productive resources, improving productivity, enabling innovation and capital-intensification of production, improving the environmental footprint of agriculture, and connecting producers with buyers. The potential is vast, and Croatia is well suited to benefit from it, especially in the agricultural sector, where economies of scale can be achieved through new technologies, suited to small farms, reducing the effects of fragmentation on sector growth, and the linkages between a diverse set of producers and high tourism (and domestic market) demands can be modernized and streamlined. For this to materialize, adapting digital technologies to Croatia's needs will be as important as strengthening the digital skills in the labor market in Croatia. And the young can play a critical role in this process, including in the agri-food sector.

SECTOR CONTEXT

Economic Performance

16. **Croatia's agriculture is undergoing a process of structural transformation, which explains observed economic trends.** The process of structural transformation is, in principle, marked by the modernization of agriculture, significant increases in labor productivity, rural-urban migration, a reduction in the share of agriculture in total employment and in GDP, and an agricultural sector no longer strongly associated with poverty. Half of the EU Member States have completed this process. The structural transformation of the agri-food system in Croatia has been steadily progressing as part of its integration process with the EU (Figure 1). Agricultural value added, as a share of GDP, is declining, while the importance of agriculture in the economy is becoming more broad-based, including primary production,

Figure 1. The structural transformation of Croatia's agri-food system has progressed steadily



Source: Based on data from the World Development Indicators.
Note: Real GDP, agricultural value added, and agricultural labor productivity (agriculture value added per worker) are adjusted for inflation.

agro-processing, and services. An increase in agricultural labor productivity is combined with a sharp increase in rural-urban migration, and a decline in the share of the rural population in Croatia.

17. **The structural transformation of Croatia's agriculture sector, although on a path of convergence, is still incomplete** (Figure 2). Today, the contribution of the sector to the economy exceeds that of the EU-28[4] and it employs a higher share of people than other EU countries[5]. However, the agricultural sector in Croatia has experienced continuous negative growth in terms of both gross value-added and gross output[6] over the past decade, as the sector has had difficulties adapting to the new economic circumstances post-EU accession. In addition, rural areas in Croatia are characterized by a lower labor force participation rate than in other EU countries[7] with many people engaging informally in the rural economy. At the same time, there are growing concerns regarding shortages[8] of agricultural labor in Croatia. Access to the EU labor market and the ongoing structural transformation of the agri-food system have led to significant migration from rural areas, in particular among the young, which has reduced labor availability and is leading to increasing labor costs[9]. The availability of seasonal labor has been affected by job opportunities out of agriculture, including seasonal tourism-driven jobs along the Adriatic coast and in EU countries, where wages are much higher. As a result, the age composition of agricultural labor is skewed towards the elderly. Finally, rural areas where primary agriculture accounts for a large share of land use (and livelihood) continue to be closely associated with high poverty rates – 27% of the rural population[10] in Croatia is at risk of poverty, compared to 16% of those who live in towns and 12% of those who live in cities.

18. **Key structural challenges remain, inhibiting the process of structural transformation.** Improvement in agricultural productivity since EU accession has been slow in Croatia and the productivity gap with other EU countries remains large (Figures 3 and 4). Various factors continue to constrain agricultural land markets in Croatia, including the process of reallocation of state-owned land. Although most of the agricultural land is privately owned, a significant share of agricultural land (around 30%) remains publicly owned and is typically assigned to long-term leases and rarely sold. Effective land governance and mobilization of agricultural land for investments in Croatia is currently constrained by institutional fragmentation, sector-based land policies and spatial planning, multiple legal regimes governing land status and ownership restrictions, weak enforcement of contractual obligations, ambiguous land classification rules, and incomplete and outdated land management systems[11]. In particular, the allocation of state-owned agricultural land suffers from inefficient and lengthy administrative procedures mainly due to inconsistencies

---

4 The gross value added (GVA) of the primary sector (including fisheries and forestry) accounted for 3.9% of Croatia's total GVA in 2017, which is much higher than the 1.6% of GVA of the EU-28. Meanwhile, the overall value added generated by Croatia's food, beverage, and tobacco manufacturing industry accounted for 3.3% of GDP in 2015 compared to EU-12 and EU-28 averages of 2.3% and 1.8% respectively (FAOSTAT, 2018).

5 In 2017, Croatia's agriculture sector employed an estimated 7.5% of the workforce compared to 6.7% in the EU12 and 4.25% in the EU28.

6 GVA in the agricultural sector declined by 4.3% each year, on average, between 2008 and 2017, while gross agricultural output declined by 3.7% each year, on average, during the same period. The agriculture sector in the rest of the EU displayed generally positive growth trends for both indicators.

7 In 2017, 43% of the Croatian population lived in rural areas compared to 19.2% in the EU-28. In 2014, labor force participation in rural areas in Croatia was 51% compared to 56.7% in the EU28 and 55% in the EU13.

8 Measured in AWU there is 17% less agricultural work unit in 2017 compared to 2007. However, there were also many other EU member states with strong decrease of AG labor in the same period. For instance, Bulgaria and Slovakia 52%, Estonia 38%, Romania 32%, Portugal 31%, Finland 30%, Poland 27%, etc. NMS on average 29% and old member states on average 13%.

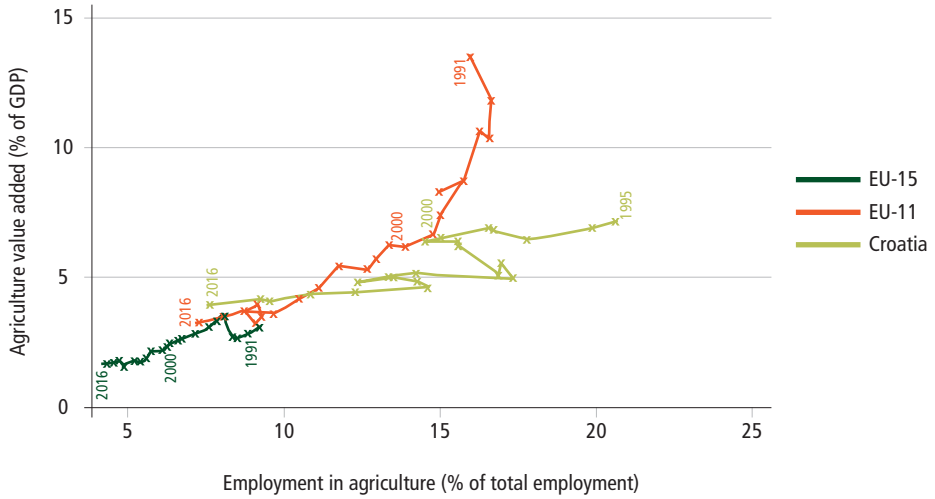
9 Agricultural wages paid per annual working unit in Croatia have increased by 87%, in real terms, between 2014 and 2016, to an average of EUR 11,296 in 2016. The increasing rate of agricultural wages is converging to wage rates in other European countries – it is almost at par with that in Slovenia, for example, and higher than the one in Greece (by 30%). However, it is much lower than the agricultural wage rates in Germany (by 129%), Austria (by 94%), France (by 105%) and Italy (by 79%).

10 In 2017, 43% of the Croatian population lived in rural areas compared to 19.2% in the EU-28. European Commission (May 2018): *Statistical Factsheet – Croatia,* available at: https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/factsheets/pdf/hr_en.pdf

11 It is expected that the new Law on Agricultural Land, in force since March 2018, would improve the process of allocation of land (reducing the time of administrative procedures), as well as the maintenance and protection of agricultural land, resulting in its increased use for productive purposes.

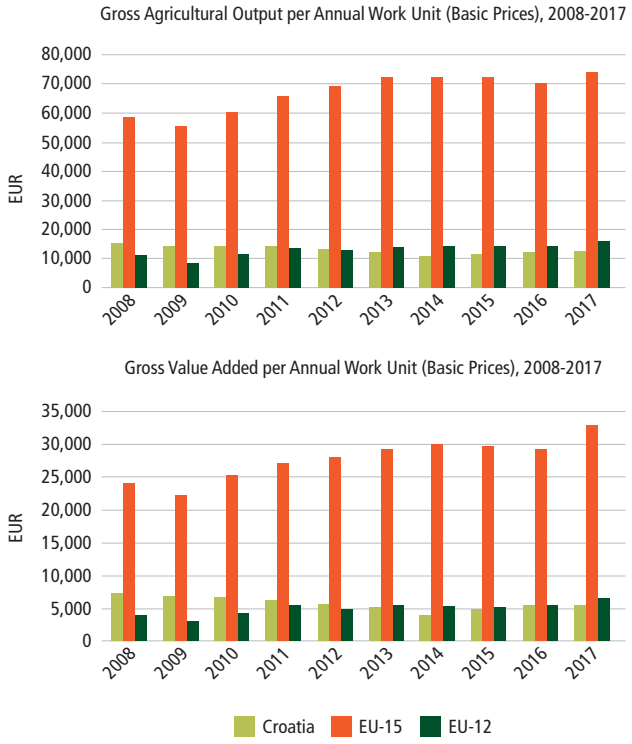
between land cadaster and land registration information. Moreover, restrictive selection criteria are often applied, including requirement regarding land protection, farm practices, and even type of agricultural activity. At the same time, however, ex-post controls to verify whether the restrictive selection criteria are actually adhered to once state-owned agricultural land has been allocated remain weak.

Figure 2. The structural transformation of Croatia's agri-food sector is on a path of convergence



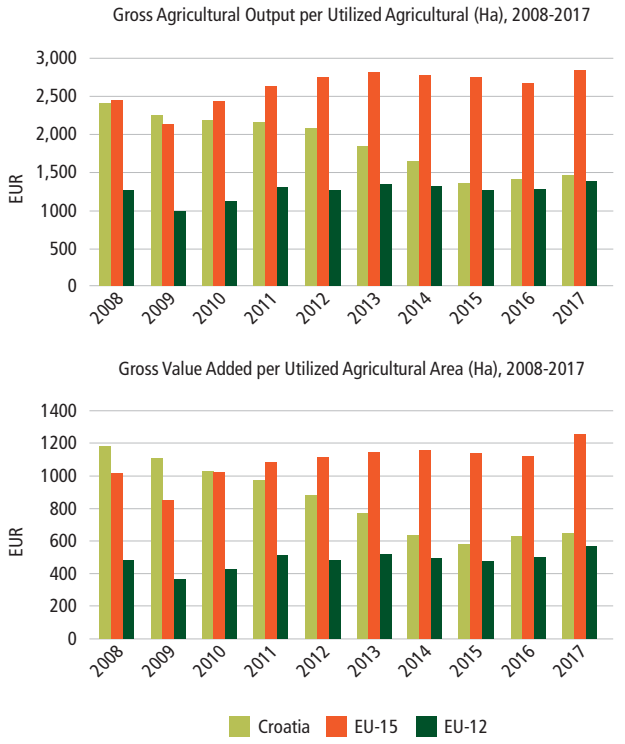
Source: World Bank staff using data from WDI.

Figure 3. Labor Productivity Trends in Croatia (2008-2017)



Source: World Bank staff using data from Eurostat (2018)

Figure 4. Land Productivity Trends in Croatia (2008-2017)



Source: World Bank staff using data from Eurostat (2018)

19. **Land productivity decline is linked to the composition of production and input use.** Land productivity in Croatia declined by 5.2% and 6.2% per year on average between 2008 and 2017 when measured by gross agriculture output and gross value added per utilized agricultural area, respectively. That said, Croatia's land productivity levels remain higher than the level of EU12, while the yield gap is closing with the EU-15 for a limited number of agricultural products, including vegetables, maize, and wheat. In general, land productivity in Croatia is constrained by the prominence of low value commodities in Croatia's production structure, with about two thirds of the arable land in the country devoted to low value cereal production. This points to the need for rethinking the production mix of agriculture. Furthermore, soil health is under threat – an estimated 23% of agricultural land is at high risk of soil erosion, gross nitrogen and phosphorus balances have been steadily declining since 2010, while stabilizing in other EU countries[12], and average carbon content in the top soil is lower compared to other EU countries. Despite the availability of abundant fresh water resources, agricultural producers have limited access to irrigation water, and in vulnerable parts of the country, fresh water quality is a concern due to agricultural (mostly nitrogen) runoff. At the time of EU accession, less than 1% of agricultural land and less than 10% of potentially irrigable land, respectively, was irrigated.

20. **Agricultural labor productivity is low, offsetting the lower labor costs (wages) of agriculture in Croatia.** While gradually increasing across the EU, labor productivity in Croatia's agri-food sector declined by 1.9% per year on average between 2008 and 2017 when measured by gross agriculture output per annual work unit and by 2.6% per year on average when measured by gross value added per annual work unit. Although on the rise in real terms (as shown in Figure 1), Croatia's labor productivity levels are less than 20% of the levels achieved in the EU-15. For example, while the agriculture value added per worker has grown 20% since Croatia joined the EU in 2013, it remains almost a third lower than the same metric for Austria. The marginal improvements in labor productivity in Croatia have been partly driven by a significant reduction in the number of people employed in agriculture due to rural out-migration and related labor shortages. Low labor productivity offsets the (still) low labor costs in Croatia. As a result, this cost advantage has not translated into comparative advantage, particularly for agricultural trade.

21. **Low productivity levels contribute to the weakening of the competitive position of Croatia's agricultural sector.** Improving productivity is more than just raising yields or decreasing costs; it also relates to raising food quality and moving into higher value products[13]. Despite the broader EU market opportunities[14], agri-food trade deficits are large and growing. While export values of agri-food products have increased in aggregate, Croatia's agri-food trade balance in primary products and, especially, in processed food and beverage products, has been worsening over the past decade[15] (Figure 5). Except for commodities, Croatia has experienced trade deficits across all major agri-food product categories[16]. The agri-food trade deficit is large with EU countries, while Croatia enjoys trade surpluses with non-EU countries[17]. Croatia is currently competitive in mainly low value, primary agricultural products[18], including cereals

12 While Croatian agriculture is characterized by low pesticide use compared to other EU countries, fertilizer use remains slightly above EU averages (207 kg/ha in Croatia compared to 166 kg/ha in EU28) despite important reductions in (nitrogen) fertilizer use achieved since 2008.

13 World Bank. 2019. Harvesting Prosperity: Technology and productivity Growth in Agriculture.

14 Croatia's trade flows in agri-food products have increasingly been gravitating towards other EU countries. In 2017, 56% of agri-food exports were destined for EU countries (compared to 42% in 2008), whereas 86% of agri-food imports originated from EU countries (compared to 68% in 2017).

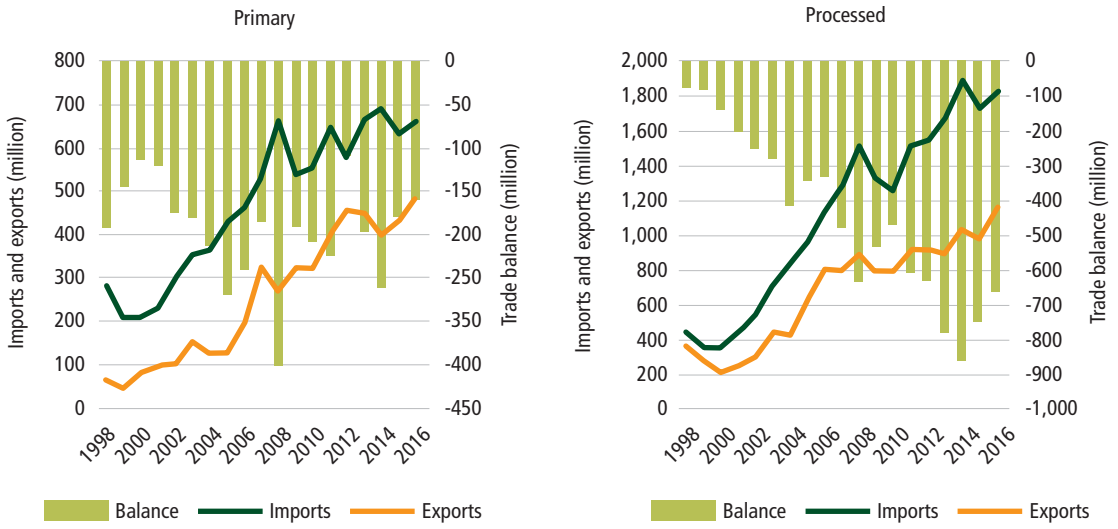
15 In 2017, Croatia recorded a deficit of EUR 975.2 million (European Commission, May 2018).

16 In 2017 the agri-food product categories recording the largest trade deficits include "meat" (EUR 298.1 million); "dairy produce, eggs, honey, and edible meat products" (EUR 173.9 million); "prepared animal fodder" (EUR 140.9 million); "vegetables and certain roots and tubers" (EUR 84.6 million); "preparations of vegetables, fruit, nuts or other parts of plants" (EUR 87.2 million); and "preparations of cereals, flour, starch or milk, including pastrycooks' products" (EUR 74.3 million) (UN Comtrade, 2018) and also "edible fruit and nuts; peel of citrus fruits or melons", where the deficit is traditionally very high. According to MoA official data the top 5 items in agri-food export in period 2015-2017 are: 1) sugar, 2) corn, 3) soybeans, 4) seasonings and 5) wheat - the main exported items are low value-added products except 'seasonings', which include the brand product "VEGETA"!

17 The agri-food trade deficit with EU countries is EUR 1.38 billion in 2017 and surplus with non-EU countries is EUR 406 million in 2017.

18 A quarter of all direct payments in 2016 supported these crops, although there is a decline from 2014 when more than 40% was allocated to oilseeds and protein crops and other field crops.

Figure 5. Agriculture trade balance, primary and processed food and beverage products, Croatia, 1998-2016



Source: World Bank staff using data from U.N. Comtrade.

and oilseeds (sunflower, soybean), with competitiveness in high value production systems limited to relatively few horticultural and livestock products[19]. This makes the sector vulnerable to fluctuations in, and a general declining trend of, commodity prices, with traditional smallholder farmers no longer being competitive and shifting commodity production towards large farms.

22. **Investment gaps in capital, technology, and R&D persist in Croatia's agricultural sector, further inhibiting productivity.** The capital intensity of Croatia's agri-food sector remains low compared to EU countries[20]. Gross fixed capital formation per agricultural worker and per hectare of agricultural land has largely remained the same since 2000 (Figure 6). Overall R&D expenditures in Croatia are low, at 0.81% of GDP (with the business sector accounting for 0.41%), compared to 2% in the EU and 2.4% in the OECD. Importantly, Croatia also lags behind its main regional and global competitors in agricultural R&D[21]. Under the current programming period, only 2% of the total rural development envelope of Croatia is programmed for knowledge transfer and advisory services, just over almost half of the EU average (of 3.6%). Croatia's Agriculture Knowledge and Innovation System (AKIS) is essential to support producers and agribusinesses through training, technical advice, and critical information regarding production management systems and regulatory compliance. Despite the strong research capacity of Croatian entities, AKIS actors in Croatia are poorly connected and there is no systematic and effective exchange of research findings, knowledge, information, and innovation, hence limiting their economic impact. In general, publicly funded entities dominate Croatia's AKIS, with civil society actors (e.g. farmer associations, NGOs) and private advisors playing a limited role in knowledge transfer.

23. **Croatia's fragmented production structure constrains market access for smaller producers and agri-businesses.** Croatia's agri-food sector is characterized by many small producers and weak producer organization[22], with limited linkages to markets. Small producers in Croatia participate mainly in short value chains that typically end at local

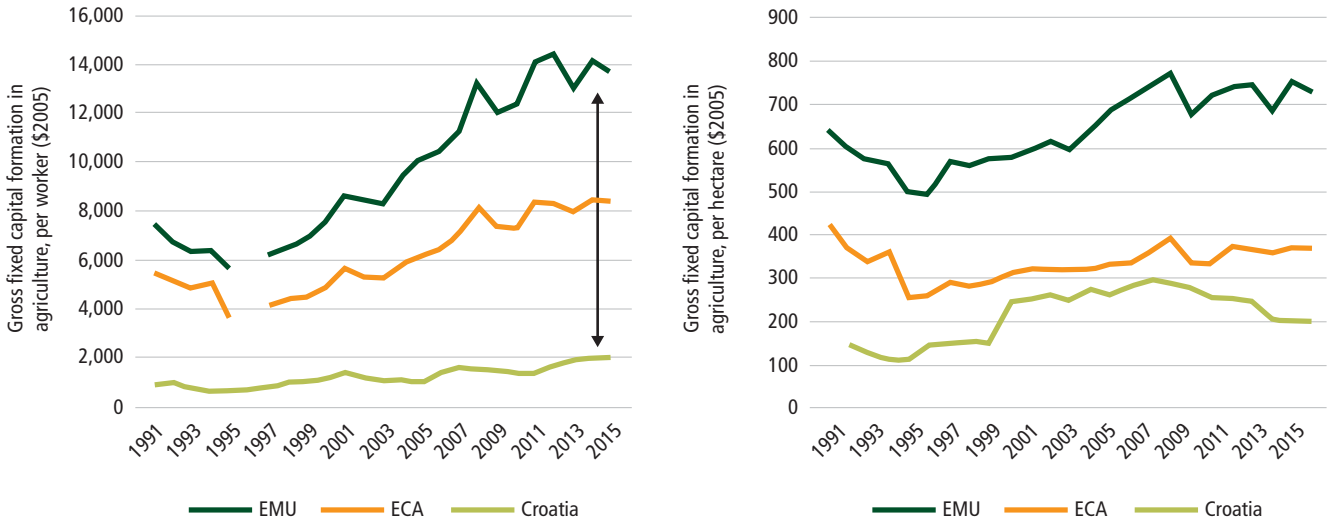
19 Including raspberry, sour cherry, and hazelnut (among fruit), peppers (in vegetables), as well as pigs, pig meat, and sheep meat (in the livestock sector). The main export to non-Eu countries are live animals (17.6% in value in 2017).

20 The net capital stock per worker in Croatia was 4 times lower that of the EU28, during the period 2011-2015.

21 In 2016, Croatia spent EUR 2 per inhabitant on R&D in agriculture, compared to an average of EUR 6 in the EU-28, EUR 7.6 in the U.S., EUR 15.5 in South Korea, and EUR 50 in Norway.

22 In Croatia, 70% of the farms manage less than 5ha and 0.23% of registered producers (in 2016) were organized into cooperatives.

Figure 6. Gross Fixed Capital Formation in Agriculture, per worker and per hectare (1991-2015)



Source: World Bank staff using data from FAOSTAT.

green or wholesale markets. On the other hand, the agri-food processing industry is very concentrated[23]. By raising transactions costs and weakening the negotiation position of smaller producers, fragmentation of production and the focus on low value commodities, combined with limited competition in agri-food processing, constrains the development and expansion of well-functioning agri-food value chains in Croatia, which are crucial to facilitating access to high value markets. Meanwhile, the lack of access to sufficiently large volumes of products with uniform quality at competitive prices constrains the market position of agri-food processors. Well-functioning value chains are further constrained by the lack of modern logistics support services. It is often these services that help create the most value in the agri-food sector, facilitating linkages between producers, producer groups/clusters and markets.

24. **Market access is further constrained by weak connectivity of rural areas.** Recent accessibility analysis conducted by the World Bank, which considers both travel times to national and international markets and the size of those markets that can be accessed, shows that market accessibility is relatively constrained for producers in the Dalmatia and, to a lesser extent, Slavonia regions, which increases transaction costs for producers operating in these regions with extensive crop lands[24]. Meanwhile, a recent study prepared by the European Commission indicated that Croatia continued to lag behind the EU average in Next Generation Access (NGA) broadband coverage both at national and (especially) rural levels[25].

25. **Smaller producers and agri-businesses remain excluded from investment financing opportunities.** Despite the high levels of liquidity in Croatia's banking system and relatively low commercial rates (3-5%) for agricultural loans, access to capital by many agri-food producers and processors in Croatia is limited, especially for small and medium ones, and is concentrated in two sub-sectors (81%) - pigs and poultry and field crops[26]. On the one hand, small producers require greater agri-finance literacy and entrepreneurial capacity to enable them to manage their production in financially viable ways. On the other hand, the risk profile of agriculture, in general, and smallholder agriculture,

23 62% of total revenues are generated by 1.26% of enterprises.

24 World Bank (2018), *Defining Functional Regions in Croatia,* Washington DC, 45pp.

25 European Commission (2017) *Broadband Coverage in Europe,* Brussels, 206pp.

26 Per farm loans for pigs and poultry are on average EUR 45,000 (with EUR 10,000 for working capital and the remainder for investments). Per farm loans for field crops are much smaller – EUR 20,000 (with 2/3 in short term capital and the rest in long term capital).

in particular, is high[27]. The lack of equity capital and the fact that guarantee programs demand collateral, add to the constraints on small producers. The Rural Development Program remains the main source of funds, allocated through the public financial institutions[28] at favorable rates (as low as 1%)[29], including micro and small loans. RDP financial instruments (guarantees and loans with working capital component) have been launched in 2018 to enable access to finance for SMEs in the agricultural sector. Preliminary information suggests that most of these loans have been used for the investments in assets related to agricultural production, acquisition of new machinery and equipment, restructuring and modernization of farms, including purchase of animals[30]. Moreover, newly launched RDP individual guarantee scheme aims to address primarily the lack of collateral of agricultural holdings (small and medium producers and processors), by reducing collateral demand and interest rates for borrowers, reducing a significant part of the risk for commercial banks on their lending. Although agri-financing programs focus largely on making credit cheap (thus stimulating the demand side), effective risk sharing mechanisms between the financial institutions and commercial banks to mobilize more lending are missing[31], with banks taking the full risk on the funds they lend. This reduces financial inclusion for small farmers as it restricts their access to private financial instruments.

26. **Climate variability is important for agricultural productivity in Croatia.** As one of the EU Member States with the lowest share of physical area under agri-environment and climate measures (less than 1%) and limited access to irrigation water, Croatia faces important climate change vulnerabilities. In particular, reduced precipitation and increasing warming trends for much of the country's agricultural areas are expected to result in an increasing number of consecutive dry days[32] by 2050. Adverse climate events (including drought, hail, flood, frost, etc.) may impact the production of key agricultural commodities in Croatia such as winter wheat and maize. At the same time, diminished surface runoff may affect groundwater levels, affecting drinking water supplies as well as water availability for irrigation. However, there may be advantages as well. Changing climate conditions for the country (hotter and drier, reduced precipitation) may result in changing crop rotations in farming areas and create suitable areas for orchards, vineyards and olive groves. Areas currently unsuitable for agriculture may become more attractive, while increased temperatures coupled with the capability to provide adequate water (irrigation) could bring about increases in yields, especially for winter crops, due to milder winter conditions.

27. **Despite these challenges, Croatia's agri-food system is on a path of convergence** (Figure 2 above) to improve agricultural productivity, reduce its dependence on the primary sector, and relax the linkages between poverty and agriculture. Although this process will take time, there are significant opportunities to accelerate the structural transformation of Croatia's agriculture. This would create better jobs and incomes in rural areas, while increasing the overall competitiveness of the agri-food system in Croatia. However, this transformation will not be possible without an agricultural policy mix that provides smart incentives for improved development impacts and overall sector growth.

---

27 Combined with their small scale, low productivity, poor record keeping, weak business planning and management and insufficient collateral and linkages with value chains, small producers and agri-businesses are perceived as high-risk, low return investment opportunities by commercial lending institutions.

28 The Croatian Bank for Reconstruction and Development (HBOR) and the Croatian Agency for SMEs and Investments (HAMAG-BICRO). EUR 70 million of RDP funds is allocated to Financial Institutions: a) to HBOR (EUR 35 million) for investment loans (between EUR 50,001 and up to EUR 1 million); HBOR does not lend directly the RDP funds but through private commercial banks that blend their own funds with the preferential funds from RDP and offer the client a blended finance rate which is below the market rate, and b) EUR 35 million to HAMAG-BICRO, half of which for micro and small loans (up to EUR 25,000 is micro and between EUR 25,000 to 50,000 is small) and half of which for individual guarantees; HAMAG-BICRO uses the RDP funds to provide loans directly to beneficiaries at rates ranging from 0.5-1% (well below market rates).

29 By the end of April 2019, HBOR disbursed 152 loans amounting to 997.3 million HRK for rural development, fisheries and wine programs beneficiaries. The average interest rate for most approved loans to SMEs (97%) was 0,59%.

30 511 animals purchased with RDP loans disbursed by end of April 2019.

31 RDP guarantee (in its initial implementation stage) is intended and designed to stimulate lending by addressing the collateral requirements; up to 80% of the principal can be covered, enabling (stimulating) banks to approve loans to those that otherwise would not be bankable.

32 CCKP, 2018. http://worldbank.habitatseven.work/country/croatia/climate-sector-agriculture

Agricultural Policy

28. **Croatia devotes a lot of public resources to the agri-food sector.** Combining both CAP inflows from the EU (EAGF and EAFRD[33]) and national funds (i.e. co-financing of rural development, complementary national direct payments, state aids and public services), public support to agriculture in Croatia is currently around 1.3% of GDP (average for period 2014-2017), which puts the country at the top of EU spenders (more than twice as high compared to the EU-28). While agriculture spending in the EU is continuously decreasing, from 0.8% of GDP in 2008 to an estimated 0.36% in 2020, this trend is not yet evident in Croatia. In fact, considering that direct payments in Croatia are still being phased in over a 10-year transitional period, the share of public spending on agriculture will likely remain high until 2022, as part of the CAP integration process followed by new EU Member States. The share of EU funding in total support to farmers is progressively increasing and amounts to, an average of 65% for the period 2014–2017, while slightly more than one-third is financed from the national budget. It is important to note that expenditures for public services[34] in agriculture increased more than four times and at a much faster rate than the average increase of public spending in Croatia (an increase of 47% of the entire state budget for the period 2004–2017). Expenditures for public services in agriculture represented nearly one fifth of all budgetary transfers during the period after accession to the EU. This high operational cost of the sector is likely related to institutional adjustments required by EU accession.

29. **Croatia has opted to steer both EU and national funds towards direct payments[35].** Croatia's overall financial envelope under the current CAP is nearly EUR 3.4 billion, and generally favors rural development support. Unlike most EU Member States, where direct payments (Pillar 1) represent an average of 76% of CAP expenditures, a large part (58%) of Croatia's current CAP expenditures are channeled towards rural development measures (Pillar 2), 40.5% go to direct payments[36], and 2.1% to common market measures. The smaller allocation to Pillar 1 is mainly explained by the phasing-in of Pillar 1 direct payments. Croatia is one of five EU Member States that has opted to transfer 15% of their rural development budget towards Pillar 1 direct payments by 2019 (a transfer of EUR 50 million annually) and also uses top-up payments from its national budget to minimize the gap in income support compared to the EU-28 average. By reducing the envelope for Pillar 2, the transfer also reduces the overall agriculture budget for Croatian agriculture due to the co-financing of rural development budget with national funds. Due to these transfers from Pillar 2, combined with savings of national funds for financing top-ups[37], the average share of EU funding of direct payments increased to 53% throughout period 2013-2017. EU funding of rural development measures remained at 85%, with the remaining 15% being national co-financing. When top-up payments from the national budget are considered, rural development expenditures represent only 26% of total public agricultural expenditures.

---

33 The European Agricultural Guarantee Fund (EAGF) primarily finances direct payments to farmers and measures regulating or supporting agricultural markets. The European Agricultural Fund for Rural Development (EAFRD) finances the EU's contribution to rural development programmes.

34 Public services in agriculture refer to budget expenses for administration and management of the Ministry of Agriculture (MoA) and other services under the Ministry: Agency for Payments in Agriculture, Fisheries and Rural Development; the Croatian Agency for Agriculture and Food; expenses for veterinary and food safety services.

35 EU Member states have flexibility on the implementation of direct payments: (i) they have the option to introduce a number of voluntary schemes and to choose, within limits, how much to spend on them; (ii) they can transfer resources, within limits, between the two CAP pillars; (iii) they can define the beneficiaries of direct payments, decide on the allocation of entitlements and choose the implementation model for the basic payment and the greening payment.

36 The number of direct payment beneficiaries in Croatia in 2017 was 100,719 (around 60% of the total number of farms in the farm register), with eligibility condition set at the minimum physical area of 1 ha. Hence, nearly 40% of farms are not covered by payment statistics, as they are below EUR 4,000 in economic size. However, this 40% of farms accounts for only 6% of standard output of Croatian agriculture.

37 Transfer of 15% of Pillar 2 funds increased the annual financial envelope for direct payments for the period 2014 – 2019 to EUR 432 million. However, due to budgetary constraints, the Government decided to limit CNDP payments to two thirds, on average, of the possible ceiling during the period of the first 5 years of Croatia's EU membership (2013-2017).

30. **The share of direct payments in farm incomes in Croatia is high.** In 2016, direct payments represented 40% of farm net value added (FNVA) in Croatia, compared to the 30% EU-28 average. In particular, the incomes of farm types[38] that constitute the backbone of Croatian agriculture rely heavily on direct payments. This high share of direct support indicates a heavy dependence of Croatian agriculture on pure income transfers. This dependence is not surprising, considering the income smoothing effects[39] direct payments are supposed to bring to new EU Member States. For many farms in Croatia, policy support has gradually been providing a pathway towards income stabilization. Meanwhile, subsidy intensity of income has been declining for farm types[40], which together correspond to over 55% of farm net value added generated over the period 2013-2016 and nearly 60% of the farm population in Croatia. This decline is attributed more to increases in farm net value added than to reductions in support for these farm types. Evidence suggests that stabilizing income can help improve productivity, especially for incomplete transformers, such as Croatia, where the association between agriculture and poverty is still strong[41]. However, the composition and targeting of income support is critical to achieve the expected productivity increases, which are not yet fully evident in Croatia.

31. **Most of the income support in Croatia is decoupled[42].** Agricultural labor productivity, defined as growth in agricultural value added per worker, has been found to be positively associated with decoupled payments and rural development support, particularly in new EU Member States. A 10% increase in decoupled payments and rural development support can increase agricultural labor productivity growth in new EU Member States between 3% to 5% per year, much higher than the effect of 1.3% to 1.6% in old EU Member States (World Bank, 2017[43]). Improvements in productivity stem from the ability of producers to reduce income risks and credit constraints, which leads them to invest more and diversify away from low value crops, thus generating greater income by focusing on higher value agriculture. There is evidence that cropping patterns in Croatia are changing following EU accession[44], although the shift away from low-value production is not yet evident, and much more needs to be done to fully turn income support into higher productivity.

32. **However, coupled support is still widely used in Croatia.** The Voluntary Coupled Scheme (VCS)[45], which absorbs 15% of the national envelope for direct payments and targets specific sub-sectors, has been complemented with

---

38 Over the period 2013-2016 Croatian farms rank very high across the EU Member States in terms of their dependence of income on direct payment for farms specializing in olives (1st amongst 28 EU MS), combined permanent crops (1st), mixed livestock (3rd), mixed crops and livestock (4th), milk (4th), wine (4th), horticulture (7th), cereals (7th) and fruit (8th). These farms account for over 50 percent of FNVA generated over the 2013-2016 period and 76 percent of the farm population.

39 Direct payments (coupled (to production) and decoupled (area-based)) are income transfers intended to stabilize farm incomes by compensating farmers for risks (e.g. price volatility, weather variability, input costs) and relieving certain credit constraints, while conditioning support on compliance with broader public goods (environment, animal welfare, food safety).

40 These include farms that specialize in cereals, other field crops, granivores, mixed crops and mixed crops and livestock.

41 World Bank. 2017. Thinking CAP: Supporting Agricultural Jobs and Income in the EU. EU Regular Economic Report 4.

42 Direct payments are mainly comprised by decoupled payments. In 2013, the share of decoupled payments in total direct payments comprising also fully financed direct payments from the national budget was 87.09%; in 2014 – 88.69%; in 2015 – 79.84%; in 2016 – 77.92% and for production year 2017 – 78.35%.

43 World Bank. 2017. Thinking CAP: Supporting Agricultural Jobs and Income in the EU. EU Regular Economic Report 4.

44 Between 2013 and 2017, there is a decrease in the production volume of cereals (-3% annual average), an increase in the volume of industrial crops - sugar beet (+13%) and in oilseeds (+13%) - and in vegetables (+3%) and a decrease in the volume of fruit, especially since 2016 (-12%). The area under permanent pastures has increased, while the size of the livestock sector has significantly decreased (EUROSTAT).

45 VCS may only be granted to the extent necessary to create an incentive to maintain current levels of production. Support can be granted within defined quantitative limits and be based on fixed areas and yields or on a fixed number of animals. In Croatia, VCS applies to the production of beef (milking cows and beef fattening), milk, fruits and vegetables, protein crops, sheep and goats and sugar beets. Coupled payments for beef and milk represent the largest share of coupled support - 65% in the period 2017-2019. Protein crops make 13%, sugar beet - 8%, sheep and goats - 8%, fruits and vegetables - 7%. Furthermore, very similar schemes of additional coupled support continued to be implemented in Croatia, firstly as transitional state aid during the 3 years after accession then as *de minimis* support for the following products: tobacco, olive oil, breeding saws and dairy cows (marked in national legislation as 'sensitive products'). Aggregate annual envelope for this additional coupled support fully financed from the national budget amounted to nearly EUR 20 million during the period 2014-2017, nearly doubling its share in direct support from 11.3% in 2014 to 21.7% in 2017.

various coupled state aid schemes financed from the national budget. As a result, Croatia ranks very high among EU Member States in applying one of the most distortionary elements of farm support. The actual share of coupled payments in total direct support in Croatia is 22%, including both EU (15% country limit) and national VCS.

33. **Absorption of EU rural development funds, although below the EU average, has considerably improved in the last two years.** Absorption of funds is slow, but improving, and prioritization (within and across measures) could be better aligned to market needs to ensure commitment[46]. Moreover, implementation mechanisms could be further simplified to ensure uptake from small and medium producers. Croatia's Rural Development Program (RDP 2014-2020) currently covers a total of 18 (out of 20) measures[47] in support of all 6 EU rural development priorities and all 3 cross-cutting objectives of innovation, environment, and climate change mitigation and adaptation. However, rural development expenditures have not yet enabled on-farm capital accumulation or the provision of public goods in a manner that improves sector competitiveness, innovation, and sustainability. With the current EU budget program cycle reaching its end-phase (the deadline is 2023), Croatia is ranked 22nd in the EU-28, slightly behind the absorption of rural development funds compared to the EU average (paid amounts in Croatia from EAFRD including interim payments are at 33% of the national envelope for the programming period 2014-2020 vs. 42% for the EU as a whole, as of March 2019). That said, Croatia is doing better than some other EU Member States which were among the best performers in the previous programing period (Bulgaria, Netherlands, Poland, Italy and Hungary). Variations in the uptake of different rural development measures are evident[48]. The progress in implementation of investment measures[49] and rural development IACS measures[50] indicate that financial resources will be fully utilized. However, for some non-investment measures there is a risk that not all available rural development funds will be committed, including for co-operation (M16), producer organizations (M9), knowledge transfer (M1) and agriculture and forestry advisory services (M1).

46 Mid-way through the programming period, Croatia had committed only 30% and spent only 17.6% of the EUR 2.4 billion budget for rural development under Pillar II during the 2014-2020 programming cycle. Since then, however, EU fund absorption has accelerated significantly to the point where the EAFRD compares very favorably to other ESIF programs in Croatia. At the start of 2018 Q4, Croatia had signed contracts for rural development projects worth more than EUR 1.2 billion, which represents more than 50% of the total rural development budget. In addition, more than 50% of the committed rural development funds had been paid, which means that 30% of the total program allocation has now been disbursed.

47 The four largest rural development measures in budgetary terms under the RDP 2014-2020 are investments in physical assets (28.7%), payments in areas facing natural or other specific constraints (13.5%), basic services and village renewal (11.2%), and farm and business development (11%).

48 Variations in the uptake of rural development funds can be partly justified by the fact that Croatia is the only EU Member State implementing Rural Development Programme for the first time. Experience from the pre-accession period and IPARD implementation was limited to only a few measures, mostly investments in physical assets. This experience proved to be useful since overall progress for investment type of rural support measures seems to be successful in the current programming period.

49 Investment measures include: Investments in physical assets (M04), Farm and business development (M06) and Basic services and village renewal in rural areas (M07). M04 aims at improving the overall performance and sustainability of the agricultural holdings, M06 focuses on farm structures that finance entry, exit or diversification (outside agriculture) strategy, M07 relates mostly to investments in physical assets in public infrastructure (main beneficiaries are local governments). The first two measures are oriented towards private investments with only one sub-measure related to investment in public infrastructure for irrigation.

50 Within RD measures there are five measures usually named RD IACS measures, given similarities to Pillar 1 type of support regarding the application process and the type of control (like direct payments): Agri-environment and climate (M10), Organic farming (M11), Natura 2000 and Water Framework Directive payments (M12), Payments to areas facing natural or other specific constraints (M13) and Animal welfare (M14). Croatia is implementing all of these except Natura 2000 payments. M18 – complementary national direct payments (CNDP) – is a specific measure applied only in Croatia in the current financial framework (in the period 2015-2017); it relates to the transfer of funds to Pillar 1 to better leverage EU and national funds. By its nature it is entirely equal to direct payments and serves essentially to top-up payments due to gradual increase of EU funding for direct payments.

Efficiency, Effectiveness and Equity of Spending in Agriculture

34. **The technical efficiency[51] of Croatian farms is low, despite the evidence of high scale efficiency.** Croatian farms are characterized by significant technical inefficiency, with a mean efficiency score of 0.30, i.e. the average farm in the FADN[52] sample can produce the same output using 70% fewer inputs, given the available production technology. A cluster of 20 farms (1.5% of the sample) are utilizing their production capabilities well (a technical efficiency score around 0.80). At the same time, farms operate very well in terms of the returns to scale of technology – the mean scale efficiency score is 0.82, i.e. the average farm in the sample can operate at the optimal scale by adjusting its scale by only 18%, hence exploiting the full potential of the currently employed technology. Over 50% of the sampled farms have a scale efficiency score exceeding 0.90.

35. **Agricultural policy instruments matter for farm technical efficiency.** Subsidized farms are found to underperform non-subsidized ones. The technical efficiency scores of farms receiving subsidies (direct payments and rural development support, excluding investments) are comparatively lower (0.29) compared to non-subsidized farms (0.48). There is evidence of the limited capacity of decoupled payments to induce efficiency improvements of farms in Croatia. Farms receiving direct (decoupled and coupled) payments are not associated with superior productive performance through improved resource allocation (this being one of the main objectives of this support measure). When rural development support on investments is considered, farms receiving this type of support are found to be more efficient (0.46) than those that do not receive it (0.30). These are the "champions" of technical efficiency in Croatian agriculture. This signals the importance of rural development support that targets investments for improving the farm economic performance and technology choices. On the other hand, rural development support excluding investments (i.e. directed towards environmental measures, training, advisory services, product quality), which constitutes around 36% of the rural development envelope of Croatia for the 2014-2020 period, is associated with efficiency losses. This signals reservations about the targeting of these measures and on the eligibility and selection criteria, as well as the type of support granted.

36. **Farm characteristics are also important in explaining farm technical efficiency.** Very small (micro) and large farms exhibit superior productive performance in terms of technical efficiency (scores of 0.35). Small producers are also found to have more diversified production systems. The age of farm managers and technical efficiency scores are inversely correlated, with younger farmers being more technically efficient than older ones. Regional differences in technical efficiency are also observed, with farms in the Continental region performing better than those in the Adriatic region. Farms in the Continental region have attracted the largest share of rural development payments in Croatia (40% in 2017), while the share of total subsidies received by farms in the Adriatic region has nearly doubled (17% in 2017). Specialization in granivores (including pig and poultry), horticulture and wine is associated with higher technical efficiency, while farms specializing in other field crops, cereals and mixed production are characterized by significant inefficiencies. Farm types suffering from efficiency losses are also characterized by a relatively high dependence of their income on direct payments, while for those with higher technical efficiency the share of public support is low.

---

51 Technical efficiency analysis is based on the estimation of a production frontier defined by the most efficient farms in the 2016 FADN sample of farms in Croatia (1,298 farms).

52 Farm Accountancy Data Network dataset for the period 2014-2016. FADN is an instrument for evaluating the income of agricultural holdings and the impacts of the CAP. The FADN is a representative sample, drawn annually, of the farm population. Three criteria for sample stratification are used: region, economic size and type of farming. The number of farms in each stratum is derived from the Farm Structure Survey (FSS). FADN defines a threshold based on economic size and draws the sample for farms over this threshold, which for Croatia is EUR 4,000. Hence, FADN sample is representative of all farms above this threshold (and only farms above this threshold define the FADN population in every given year). For example, in 2016, FADN sample represented 81,000 farms from a total of 134,460 (identified in FSS); hence 40% of all farms in Croatia were not represented, as they all are below EUR 4,000 in economic size. However, this 40% of farms account for 6.3% of standard output of Croatian agriculture. Therefore, in 2016, through FADN, we analyse 60% of farms, which correspond to nearly 94% of standard output.

37. **The transition from small, economically viable, farms into larger production units is a challenge.** Although micro farms are technical efficiency "champions" in Croatia (and in other countries in the region), they are not able to become scale efficient in the absence of enabling factors exogenous to them. They currently exploit all their competencies and capabilities from a managerial point of view. However, structural constraints - limited access to finance, modern technology, linkages to markets, limited entrepreneurial capacity and technical knowledge - hinder their transformation to efficient, medium-size production units. Medium size farms are the least technically efficient in Croatia. This inability to gradually scale up technical efficiency further exacerbates the duality between large and small producers in Croatia's agricultural sector.

38. **The effectiveness of public spending[53] in Croatia can be improved by stimulating technical change.** There has been an increase in TFP of Croatian farms between 2014 and 2016 (4.5% per year). However, this growth is mainly due to an increase in technical efficiency (3.2% per year) and in scale efficiency (2.6% per year), while much-needed technical change seems to have regressed (-1.1% per year). Polarization underpins this positive development, as TFP has improved over time for 50% of farms and skyrocketed for 22% of farms, with the latter attaining improvements of over 20%. In contrast, around 40% of farms have recorded a decline of TFP. In particular, farms specializing in fruit/olives/permanent crops, cattle, milk, horticulture/wine and granivores attain higher TFP growth rates compared to farms specializing in cereals. In addition, farms which employ capital more intensively than labor exhibit higher TFP growth rates. No significant regional TFP growth differentials are found. Importantly, in terms of technical change, only 42% of farms exploit technological opportunities, with the majority of farms (57%) exhibiting technical regress. This suggests that there remains significant scope for research, development and innovation policies in Croatian agriculture to support improvements in total factor productivity. Evidence suggests that younger farmers embed knowledge in their production processes faster, which is a critical factor for inducing innovative activity.

39. **Not all agricultural support matters for spending effectiveness.** Rural development support for investments positively affects TFP growth, including technical change and technical efficiency growth. Analytical findings also confirm the benefits of innovation-inducing support on productivity and technical efficiency growth. No other type of subsidy appears to affect growth in TFP. In general, decoupled support seems to promote much-needed technical change in Croatian agriculture. However, the positive effect of decoupled support on technical change is not yet capable to inducing positive effects on total factor productivity growth, including technical efficiency and scale efficiency growth. Here it is likely that adjustment costs, mainly attributable to organizational and human resource factors, could play a role. Croatian agriculture thus needs time to adjust and policy measures aimed at reducing adjustment costs could be helpful.

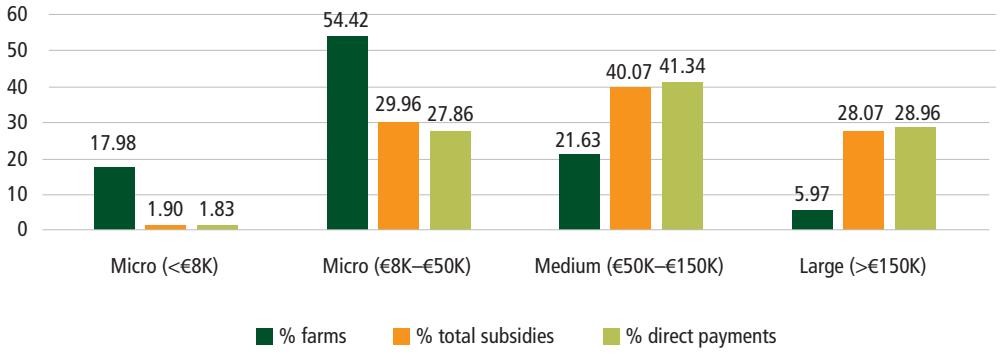
40. **Public agricultural spending in Croatia has important economy-wide impacts.** Together, the two types of policy interventions (Pillar 1 and 2) increase economy-wide output by an estimated 1.55%, value added by 2.93% and employment by 1.49% per year. Considering that in almost the same period (2014-2017), annual average agricultural policy spending represented nearly 1.1% of national value added, agricultural support has had a multiplier effect of 2.67. However, the effects of rural development measures are much stronger. Rural development projects generate broader economic impacts by strengthening structural linkages between primary agriculture and other economic sub-sectors. As a result, 1 million Kuna spent on Pillar 1 generates an extra output of 2.21 million Kuna, while the output impact of 1 million Kuna spent on rural development is 3.43 million Kuna. In terms of value added, unit spending impacts are 2.18

53 The effectiveness of spending is assessed through a combination of methods: i) growth in total factor productivity (TFP) between 2014 and 2015 and 2015 and 2016, decomposing by technical change, technical efficiency change, and scale efficiency change; ii) drivers for each component links between technical efficiency and TFP performance at farm level. The FADN dataset used for this analysis includes 995 farms for 3 years (2014, 2015 and 2016), that is 2,985 observations in total.

and 2.81 million Kuna, respectively, while in the case of job creation, impacts are much higher for Pillar 2, as 9.39 jobs are generated per every million Kuna spent, compared to 5.90 for Pillar 1[54].

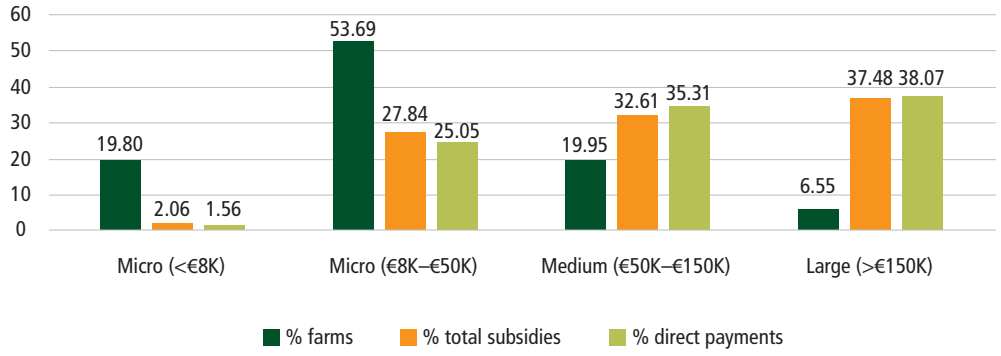
41. **Public support in agriculture is not equitably distributed.** The distribution of direct payments in Croatia favors very large farms. Since 2014 large farms have recorded significant gains in their shares of both total subsidies and direct payments (Figures 7 and 8). This appears to have been at the expense of medium-sized farms, a category of farms that has recorded considerable losses in both types of support. In general, medium-sized farms appear to attract a higher share of direct payments (compared to their share on total subsidies), while the opposite is observed for micro and small farms. Out of the EUR 377.8 million approved for direct payments for production year 2017 (EU and national funds), 1,264 farms with more than 100 ha (0.7% of registered farms) received EUR 109.7 million or 29% of total payments. In addition, 45 large farms with more than 750 ha (less than 0.03% of registered farms) received 11% of total

Figure 7. Distribution of total subsidies and direct payments by farm economic size, 2014 (%)



Source: World Bank staff calculations based on FADN data.

Figure 8. Distribution of total subsidies and direct payments by farm economic size, 2016 (%)

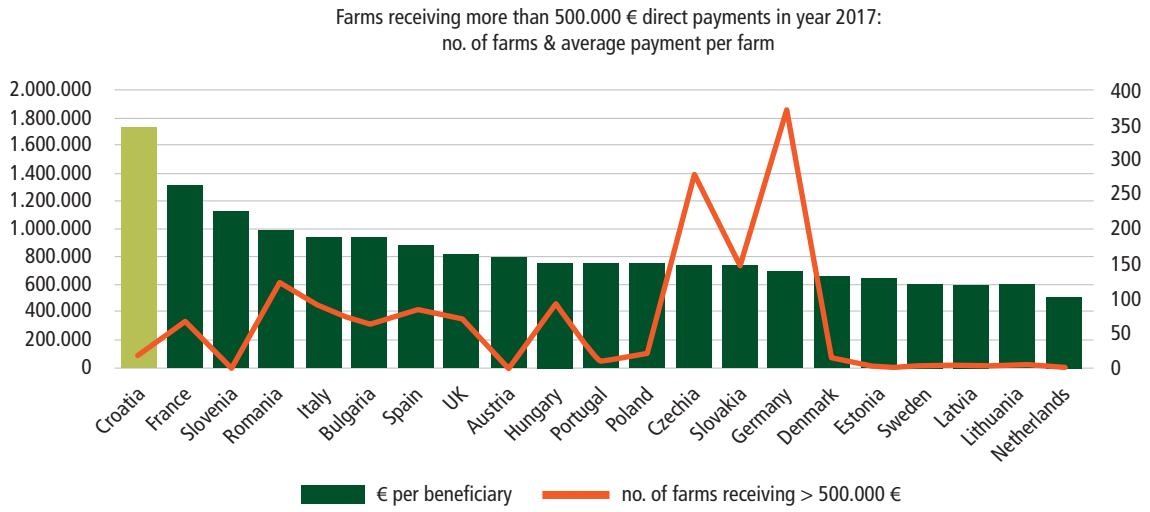


Source: World Bank staff calculations based on FADN data.

54 Seemingly high (Type II) multipliers are observed because all types of farm incomes (wages and salaries + value added) were included in their estimation. Type II multipliers (compared to Type I ones) indicate the economic impact of household consumption. The usual practice for estimating them is to close the model with regards to household income from employment (i.e. only with wages & salaries). However, this is not suitable for most EU (and Western Balkan) countries' agriculture, where many farmers are self-employed. Hence, as the aim is to estimate impacts on value-added generated, profits made by farmers (denoted in the IO table as Value-Added) are included in the modeling and added to the income from wages and salaries.

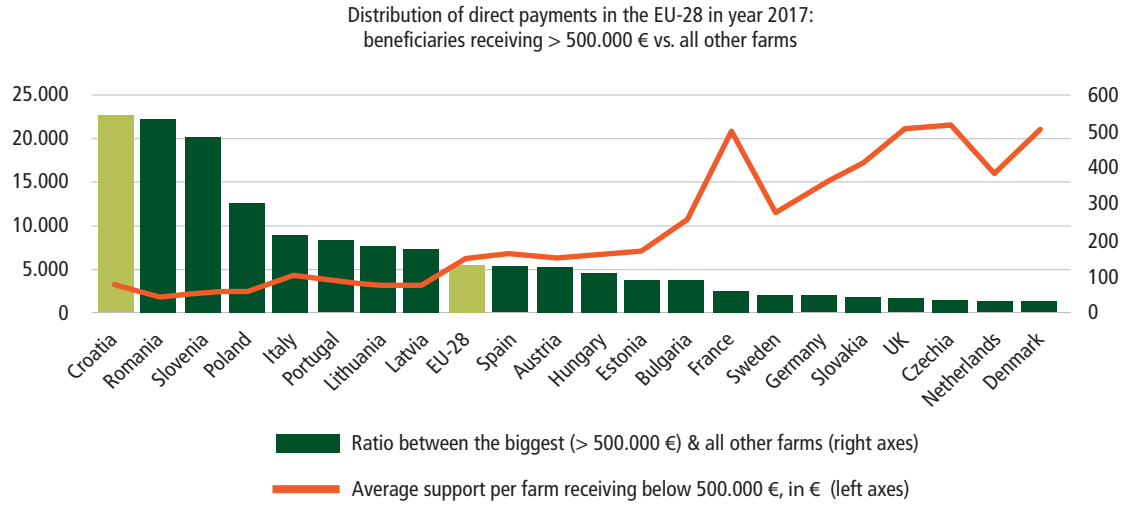
payments. Croatia is ranked third among the EU-28 for financial year 2017 (after Slovakia and the Czech Republic) by the share of the total direct payments' envelope directed towards beneficiaries receiving more than EUR 500,000. Moreover, the average payment per farm in that small group of largest holdings (EUR 1.73 million) puts Croatia in the lead among EU Member States both in terms of the difference in average payments per farm between the largest farms and all other beneficiaries of direct payments (Figure 9) and in absolute terms (Figure 10). One reason for this is the highly polarized farm structure in Croatia, compared to other EU Member States, with a much larger portion of agricultural land used by only few very big holdings (0.7% of registered farms have 31% of land according to the Croatian LPIS system). As the distribution of CAP Pillar 1 funds is largely area-based, it is not surprising that large landholdings capture a significant amount of money from the EU budget.

Figure 9. Croatia's lead position in the EU in uneven distribution of direct payments



Source: World Bank staff calculations based on EC data on direct payments - Financial Year 2017.

Figure 10. EU beneficiaries receiving more than 500.000 EUR of direct payments



Source: World Bank staff calculations based on EC data on direct payments - Financial Year 2017. For Croatia: Paying Agency data (top-ups included), April 2019.

42. **This signals critical problems with the targeting of area-based support** as it appears to be associated with rent-seeking behavior of well-off producers rather than the intended (by the policy) income-smoothing of poorer ones. Setting a relevant (to this incentive) threshold above which such payments are reduced would help to reduce the extraction of rents, as large farmers can resort to private solutions for risk reduction, such as credit, insurance, and diversification strategies. Allocating 37% of direct payments (in 2016) to only 2% of the largest producers in Croatia inhibits the productivity-enhancing effects that income transfers are supposed to bring about and slows down considerably the structural transformation of Croatian agriculture.

43. **Public support in Croatia does not seem to target counties with low GDP per capita, nor counties with comparatively high shares of population at risk of poverty.** Per capita public support on Pillar 1 appears to be more equitable at the county level than that on Pillar 2[55]. This could be explained by the higher capacity of absorption of Pillar 2 support in richer areas (better human capital, stronger institutions, etc.). Moreover, rural development projects supported by the EU (under Pillar 2) are competitive (many apply but the "best" get support), while Pillar 1 support is solely an income transfer, subject to fulfilling basic conditions of conducting agricultural activity. Since 2016, however, efforts have been made to better target poorer areas in the country under Croatia's current rural development (Pillar 2) program.

44. **Total agricultural and rural development support appears to be geographically concentrated.** In 2017, seven counties accounted for 60% of total Pillar 1 and 2 support. The counties receiving the largest shares of total support are Osijek-Baranja (16.5%), Vukovar-Sirmium (8.9%), Virovitica-Podravina (7.8%) and Bjelovar-Bilogora (7.2%). Altogether, these counties account for over 40% of public transfers in agriculture and rural development. Meanwhile, the county-specific distribution of Pillar 2 rural development support is less concentrated than Pillar 1 and total support. Five counties[56] accounted for 44% of total Pillar 2 support in 2017.

45. **The distribution of total farm subsidies[57] and direct payments has shifted from favoring cereals and other field crops to favoring specialist dairy and livestock farms[58] and on-farm diversification.** Compared to 2014, in 2016 the shares of total farm support[59] have increased for specialist milk, sheep and goats and cattle farms. A notable increase in the share of support is observed for specialist mixed crop farms, which signals a shift towards greater support for on-farm diversification. In contrast, support distribution to specialist cereals, oilseeds and protein crops (COP) and other field crops farms (including root crops, field vegetables, tobacco, cotton) has significantly declined[60]. Furthermore, direct payments share for farms specializing in COP, other field crops, milk and mixed crop and livestock production are higher compared to their total subsidy shares in 2016 (Figures 11 and 12). The opposite is observed in the case of sheep and goats, cattle and mixed crops farms. This suggests that the increase in total support for these farms is associated with an increase in non-direct payment support.

46. **Coupled payments tend to be more concentrated than decoupled payments.** While VCS may assist in the maintenance of critical level of production in rural areas, there is evidence of high concentration of this type of support among

---

55 Pearson correlation coefficients (a measure of the strength of the association) between per capita support and GDP per capita are weak: -0.52 for Pillar 1 and -0.35 for Pillar 2. Pearson correlation coefficients between per capita support and percentage of population at risk of poverty are estimated at 0.49 for Pillar 1 and 0.22 for Pillar 2.

56 These are: Osijek-Baranja (12.6%), Lika-Senj (9.1%), Sisak-Moslavina (8.3%), Virovitica-Podravina (7.5%) and City of Zagreb (6.7%).

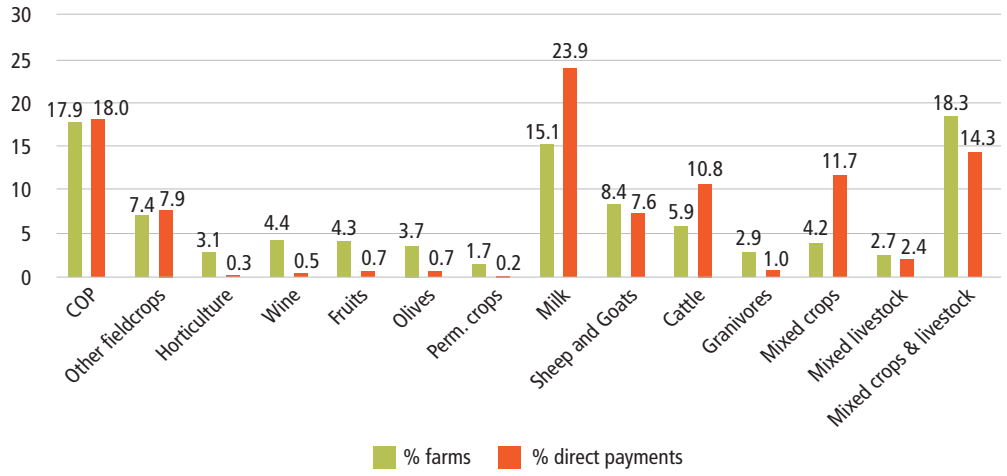
57 Total Subsidies excluding investments are subsidies on current operations linked to production. The variable includes direct payments (coupled and decoupled), total support for rural development (excluding investments), subsidies on intermediate consumption, on external factors (wages, rents and interest) and other subsidies (e.g. grants and subsidies on disasters)

58 For more information on farm typologies see: http://ec.europa.eu/agriculture/rica/detailtf_en.cfm?TF=TF14&Version=13185

59 The shares of support are calculated as total subsidies for farm type x / total subsidies for all farm types. Increases are in percentage points: for specialist milk (0.7), sheep and goats (5) and cattle farms (2). For specialist mixed crop farms the increase is 11 percentage points.

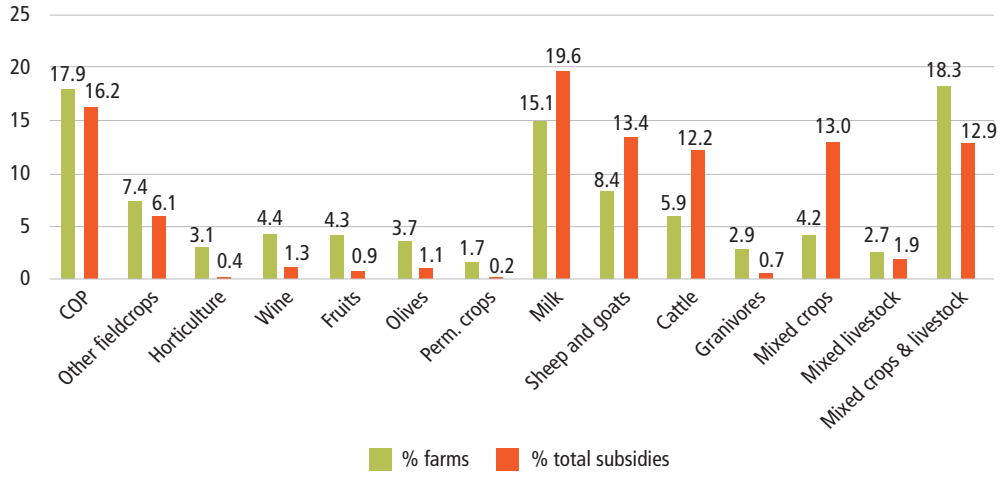
60 Reductions are in percentage points: for COP (13.6) and for other field crops (5.1).

Figure 11. Distribution of direct payments by farm type, 2016 (%)



Source: World Bank staff calculations based on FADN data.

Figure 12. Distribution of total subsidies by farm type, 2016 (%)



Source: World Bank staff calculations based on FADN data.

certain types of farms and production systems. For example, 1% of the largest farms in the beef sector received 62% of the total support aimed at beef fattening, while 40% of the coupled support to sugar beet sector was absorbed by the biggest 1% beet growers. However, only 4% of total coupled support was allocated to the largest vegetable producers and 3% to the fruit largest producers, due to capping introduced in these sectors.

47. **Furthermore, total subsidies appear to be associated with increases in land prices[61].** Increasing land prices makes it harder for potential new farmers, including the young and the asset-poor to enter agriculture and for existing farms to grow through renting or purchasing land. In new EU Member States, in particular, the capitalization rate of decoupled area payments is projected to be over 70%, i.e. 1 EUR of payments results in a 0.70 EUR increase in the land rental

61 World Bank. 2017. Thinking CAP: Supporting Agricultural Jobs and Income in the EU. EU Regular Economic Report 4.

price. Although Croatia is estimated to have among the lowest average price levels for arable land in the EU (with only Romania and Estonia recording lower levels in 2016), arable land prices have risen between 8-10% between 2015 and 2017, especially in the Continental region (EUROSTAT). Due to these land price dynamics, a large share of CAP subsidies (close to a quarter) does not reach the intended beneficiaries, but rather benefits non-farming land owners (including the elderly for whom payments provide a safety net) and investors. The amount of farm land rented in the EU is on average 54% (higher for new EU Member States). In Croatia, arable land rental prices have declined by 20% since 2013 (EUROSTAT).

POTENTIAL

48. **Investing in agriculture in Croatia makes economic sense.** Thanks to agriculture's backward (demand for inputs, capital, and labor) and forward linkages (supplying inputs to other sectors) to the general economy, agricultural sector growth has a significant effect on economic activity in manufacturing of food products and beverage, transport, wholesale and retail trade, the hospitality industry (hotels and restaurants), and research and development. The production of US$1 million of primary agricultural output leads to an estimated increase of US$1.65 million of total output in the economy (in 2014). When total effects are considered (including the effects of consumer spending), US$1 million in agricultural production generates an increase of US$5.19 million of total output in the economy. Hence, improving agricultural productivity is critical for sector growth and a successful transformation of the broader agri-food system.

49. **Growth in agricultural output and food processing has strong economy-wide multiplier effects in Croatia.** Maximizing the economy-wide effects of agricultural factor productivity growth depends on building closer economic linkages across the agri-food value chain and beyond. Improving the direct and indirect multipliers and value-added coefficients of primary production and food processing constitutes an important opportunity area due to their intra- and extra-sectoral linkages[62]. In particular, the food processing industry in Croatia has demonstrated a strong potential to generate economy-wide effects on value addition and employment creation. The expanded value added of food processing accounts for 8.5%[63] of total output in the economy, while that of agriculture accounts for 6.5% (in 2014). However, backward linkages, although sizable (a multiplier of 1.79 and of 4.93, including wage spending effects), have declined by 10% in a decade and forward linkages are weak. This is mainly attributed to the decrease of food processing purchases from domestic primary agriculture and the weak integration of agri-food value chains in Croatia. Meanwhile, although value-added segments of the agri-food sector (i.e. food and beverage, manufacturing) account for an increasing share of total paid sector employment, the total number of people in paid employment in the sector declined by 10% (to 55,748) between 2008 and 2013. For the economy-wide effects of the agri-food sector to fully materialize in Croatia, an improvement in both agricultural factor productivity and value chain integration is

62 For agriculture: through forward linkages – with food processing, forestry, wholesale trade; through backward linkages - with retail trade and repair and installation of machinery and equipment. For food processing: through forward linkages – with accommodation and food service activities; through backward linkages – with primary agriculture, wholesale trade, consultancy activities.

63 In 2014, the value added of agriculture was 3.40%, with forward linkages adding 1.75% and backward linkages another 1.31% to the total expanded value added of the sector. For food processing these numbers are, respectively – 4.29%, 1.45% and 2.76%.

paramount. This could reverse the large trade deficits of both primary and processed food and improve the utilization of productive capacity of the country.

50. **Reducing the costs of doing business could further strengthen the economy-wide effects across the agri-food system.** The enabling environment for primary agriculture and food processing is shaped by a broad range of factors which influence the degree of integration and overall competitiveness of the agri-food system. In general, Croatia performs relatively well (as compared to the EU15) with respect to business security, market openness and access to inputs, agricultural budget support, access to capital, and food safety, but it underperforms in risk management and availability and cost of labor[64]. Improving agricultural risk management is an opportunity to build resilience of the sector vis-à-vis climate variability. Expanding awareness, the penetration and scope of agricultural insurance is one way of approaching this issue. Despite the generous subsidization of agricultural insurance premiums in Croatia, only 8% of registered farmers are insured, covering approximately 50% of total production[65]. The labor dimension is complex and requires the rethinking of several factors, including the composition of agricultural production in Croatia to respond to labor shortages and market requirements (moving towards more capital intensive, higher value products), labor skills (significantly improving labor productivity and entrepreneurial capacity), and incentives for youth retention[66]. In general, reducing the length and complexity of administrative procedures would further improve sector performance. Empowering women in rural areas could also contribute to boost entrepreneurship, employment and innovation in Croatian agriculture. In fact, the proportion of women working in agriculture in Croatia, though higher than the EU-28 average, is smaller than their share of the total working population (around 38% against 46% in 2016). Moreover, although data for Croatia is not available, less than one third (27.9%) of farm managers were women at EU-28 levels in 2013[67].

51. **Improving value chain organization and integration could help smaller producers seize new market opportunities, considering Croatia's well developed roads infrastructure.** Weak horizontal (among producers) and vertical (between producers and agri-food processing industry) integration constrains the development and expansion of well-functioning agri-food value chains in Croatia. Although agricultural producers and processors benefit from unrestricted access to EU product and input markets, domestic producers face increasing competition from agri-food imports. With 30% of household expenses in Croatia going to food and beverage consumption, and with a large and growing tourism industry[68], there are ample opportunities for responding to domestic demand[69]. Development of short value chains for higher value perishable or fresh convenience products could be an opportunity for linking small and medium scale producers to local markets given that they often do not have the resources to store and transport their production to consumers and agro-processors further away. Incentives for aggregation of output would be need-

---

64 The competitiveness indicators are organized in the following dimensions: (i) *Business environment* for farming and agribusiness, including rule of law, business security and macroeconomic conditions; (ii) *Labor*: Cost, availability and quality of labor; (iii) *Agrarian budget*: The size, and quality in programming, implementation and budget predictability; (iv) *Market development*: market openness, accessibility to producers, and market organizations; (v) *Risk management*: risk factors that affect agriculture and how a country is equipped to mitigate those risks including irrigation infrastructure and insurance market; (vi) *Institutions:* Development of institutions important for agribusiness including those that manage food safety and phytosanitary rules, research, and extension; (vii) *Access to capital:* Interest rates, loan availability, maturity, and collateral.

65 Agricultural risk management is directly supported through two measures under the current Rural Development Program: Measure 17 of the Rural Development Program provides 70% premium subsidy for agricultural insurance and Measure 5 deals with catastrophic events and natural disasters. Agricultural insurance currently benefits large farmers, livestock producers and large aquafarms. In terms of market shares, crops cover about 50% of premium volumes, 30% is fisheries and 20% is livestock. Banks do not require insurance for agriculture clients. Droughts are not covered by agricultural insurance.

66 According to Farm Structure Survey (FSS) for Croatia, in 2016 the share of young farmers up to 40 years of age is 10.5% and up to 45 years of age is 17.7%. These numbers are only slightly above those recorded in 2013, which signals some effectiveness in retention efforts.

67 https://ec.europa.eu/eurostat/documents/3217494/8538823/KS-FK-17-001-EN-N.pdf/c7957b31-be5c-4260-8f61-988b9c7f2316

68 In 2018, 18.4 million tourists visited Croatia, which represents a 20% increase from 2017.

69 The 2018 tax reform brought a reduction of the VAT from 25% to 13% on several agri-food products (meat, fruit, and vegetables), making these domestic products more affordable for consumers in Croatia.

ed to ensure volume and uniformity of product quality. These may span from formation of producer groups to investments in storage and packing facilities. However, the location of markets vis-a-vis the production of fresh products in Croatia requires cold chain technologies and just-in-time linkages all along the value chain. This brings opportunities for the development of distribution capacities of chilled products through third party logistic providers. Improving logistics performance, access to market information and behavior change is needed on the part of both farms and firms which have typically handled logistics internally rather than as an outsourced function. A mixture of investment, policy reform and training may be needed to improve logistics provider performance and enable closer market coordination. Moreover, strengthening the linkages between economic clusters of smallholder farmers and lead buying firms could improve access to technologies, inputs, markets and finance. Specialty products and origin labels such as Geographical Indications (GIs) have strong growth potential and provide an additional avenue to differentiate products in high value markets at home and in the EU. GIs allow organized local producers to collectively define and manage production and processing quality standards, defend their products' reputation, and communicate their value to consumers. They also help agri-food manufacturers exploit the diversity and manage the fragmentation that characterizes the agri-food sector in Croatia. Croatia has extensive experience as regards GIs, but their socio-economic impact has been limited mainly due to weak producer organizations, marketing capabilities, and internal monitoring and control systems.

52. **Increasing agricultural capital and R&D investments could significantly increase agricultural factor productivity in Croatia.** Agricultural capital stock, fertilizer consumption, and economy-wide research and development (R&D) have been found to be key determinants of agricultural labor productivity in Southern Europe[70]. For Croatia, the analysis shows that while fertilizer use in the country is slightly higher than the EU average, Croatia's agri-food sector is characterized by low capital formation and a large capital gap compared to EU averages[71]. The empirical estimates imply that closing half of the gap in the stock of agricultural capital per worker relative to EU-28 levels would increase agricultural labor productivity by 25% in Croatia[72]. The model estimates also indicate that increasing R&D investment to close half of the R&D gap (as % of GDP) relative to EU-28 levels would increase agricultural labor productivity 12% in Croatia. Thus, there are significant expected returns to both increased capital formation and R&D investments in Croatian agriculture.

53. **Expanding financial inclusion could leverage public resources for broad-based capital accumulation.** Improving financial education/literacy and longer-term business planning can improve access to private finance, particularly for smaller and vulnerable farmers. Beneficiaries of micro and small loans (EUR 50,000 and below) need significant business development support for financial planning, etc. While such support is provided, the focus is on getting access to funding (grants or loans) rather than on overall business development and promoting the entrepreneurial capacity of producers. Moreover, collateral for agricultural loans is often a constraint, as rural land ownership is not always clear and structures often do not have permits. Even though acceptability of collateral by commercial banks is generally limited and makes access to finance a problem, RDP instruments generally tend to take the value of future investment as collateral, while the RDP guarantee is specifically designed to reduce collateral requirements to up to 80%. There is a good opportunity to develop the use of moveable collateral[73] in Croatia to overcome the binding

70 World Bank. 2018. Exploring the Potential of Agriculture in the Western Balkans.

71 Fertilizer consumption in Croatia is 207 kg per ha of arable land compared with 166 for the EU-28. R&D expenditure is 0.8% of GDP for Croatia, compared to 2% for EU-28. The net capital stock per worker is only US$33,051 (in constant 2010 US$), compared to US$111,733 for EU-28.

72 A different analysis on the determinants of labor productivity in agriculture in Croatia finds that 1% increase in agricultural capital per worker results in 0.63% increase in labor productivity, with the effect being slightly lower (0.50%) when direct payments are controlled for.

73 In other countries, warehouse receipt systems (using crops as collateral) and crop receipts (crop pledges as collateral) have been used as alternative collateral to real estate.

constraint for access to credit and improve the competitiveness of many (small) agri-businesses. Blended finance[74] (combining grants or guarantees with commercial lending) is another financial instrument that can benefit smaller producers. However, in the context of EAFRD, complexity of implementation due to different eligibility rules is to be taken into consideration.

54. **Croatia has the ingredients for a strong agricultural knowledge and innovation system (AKIS).** The system is diverse, comprising many public and private actors. Supporting institutions (e.g. veterinary, phytosanitary, farm advisory, food safety services) are in place, with good technical capacity. Improving their coordination and effective collaboration for knowledge generation and transfer would significantly improve the functionality of Croatian AKIS as a whole and help translate knowledge into productivity increases in Croatian agriculture. This requires the continuous updating of skills and knowledge of farm advisors to respond to producer demands and deliver the technologies and innovations that will transform the sector (including digital technologies, deployment and monitoring of climate smart actions and commitments[75]). Promoting innovation in the Croatian agri-food sector, that goes beyond basic research and transitions applied research to the collaborative development and adoption of new technologies, is the engine of AKIS and overall sector growth. In particular, innovations aimed at enhancing competitiveness, improvements of food safety and food quality, development of new food products, biomass production and processing, etc., could help improve the value added of Croatian agriculture. However, developing and integrating the AKIS along these lines will require significant financial incentives and capacity to implement. In this regard, digital tools could further strengthen the functionality and coordination of AKIS by enabling the effective distribution and sharing of knowledge to producers in line with local needs.

55. **Realigning priorities across and within policy instruments with a focus on results can accelerate the agriculture transformation process.** To make public support more efficient and effective, a marked shift from coupled to decoupled payments is needed, complemented by a better targeting of these payments to poorer areas and smaller producers. This would ensure income smoothing and risk reduction for poor or emerging farmers to enable increased on-farm investment. For larger farmers, who can afford risk management tools, such income transfers constitute a rent rather than an incentive. For them, rural development support is important to further increase investments, both on and off-farm. Aligning rural development measures with stakeholder and market needs could improve both their absorption and impact and play a critical role in the agriculture transformation process. The probability of higher returns could be further improved by better sequencing basic public service provision (roads, etc.) and the individual investment projects to support agricultural productivity and employment in support of the continued sustainable modernization of agriculture. These changes may require the rethinking of eligibility and selection criteria, to ensure inclusion, as well as the re-balancing of built-in incentives for investment priorities (e.g. shifting investment from equipment, e.g. tractors, towards a more integrated support to enabling linkages between producers and markets). They also necessitate a re-directing of the focus of agricultural policy on measuring results (for evidence-based strategic planning) rather than inputs (amount of support), which is the direction proposed by the European Commission for the CAP post-2020.

---

74 Currently the combination of programs is constrained by state aid rules. However, if some instruments (loans or guarantees) are priced commercially, they can be combined with other financial instruments that receive subsidies. Blended finance for agriculture may also be needed for investments in climate smart agriculture to reduce the vulnerability of agriculture to climate change, reduce emissions from agricultural (and livestock) production and processing and improve overall resource and waste management from agricultural (and livestock) production and processing.

75 Investment in localized research is required to develop detailed, economically sound adaptation measures. The implementation of climate smart measures (including both adaptation and mitigation actions) requires a strong education pillar that has a strong partner in the advisory services available to farmers. Capacity building programs are necessary to develop educational programs tailored to farmers, advising services, administrative staff, scientists, teachers, and other stakeholder on existing and new systems of cultivation, cropping, and planting.

56. **Reducing disparities in the distribution of income support should be an integral part of the changes in the agricultural policy mix.** Voluntary capping in Croatia is not applied nor is the reduction of payments for those beneficiaries entitled to receive annually more than EUR 150,000 under the Basic Payment Scheme (BPS). Redistributive payments, an optional scheme, might be chosen as one of the compulsory modalities in BPS implementation instead of reducing payments. Setting a mandatory reduction of payments at a certain level (or capping) could improve the targeting of direct payments. Furthermore, the large individual differences in the value of the payment entitlements allocated under the BPS could be shifted towards a uniform level to ensure a more equitable distribution of direct payments between farms of different economic sizes. In order to redistribute support to smaller farms, EU Member States may allocate up to 30% of their national ceiling for direct payments to grant redistributive payments. Among the ten countries applying this scheme in 2017, Croatia and Portugal are the only EU Member States who opted for a threshold farm size below 30 ha. The decision to set the threshold at 20 instead of 30 ha, combined with a decision to allocate an annual ceiling of 10% (the regulation offers a 30% limit), may have reduced the impact of desirable stronger redistribution in Croatia towards small and medium size farms, given the very high level of concentration of current income support. Analysis of the farm structure and the distribution of entitlements in Croatia indicates that higher thresholds for both area and financial envelope for extra payments would lead to a more even distribution of direct payments.

57. **Mainstreaming climate actions into production decisions is a smart development approach and an economic opportunity for Croatia, as it aligns to the new CAP proposal[76].** Overall agricultural greenhouse gas emission levels are falling and the carbon intensity of agricultural production in Croatia is significantly lower than EU averages[77]. Adaptation measures in agriculture can significantly contribute towards increasing land productivity, climate resilience and overall environmental sustainability, through focusing on measures such as reducing soil erosion, optimizing crop rotation and the use of new varieties, increasing the adoption of conservation agriculture, using efficient irrigation and drainage systems, diversifying businesses, improving access to crop insurance and investment into agricultural equities. For example, the total area under organic farming is steadily increasing in Croatia, faster than the EU-average[78]. Although most actions are implemented locally and at the farm level, greater emphasis can be placed in the future on larger-scale actions. Such actions may include (i) developing technical support systems for increasing the effectiveness of farm-level activities; (ii) creating risk management or risk transfer instruments (e.g. index-based insurance)[79]; (iii) developing drainage and irrigation infrastructure; (iv) revising principles and guidelines for water, fertilizer and pesticide use and supporting capacities by involving farmers in learning about relevant adaptation options and involving them in policy design and resource use planning (e.g. water); and (v) working with researchers in ensuring effective monitoring and warning systems and dissemination of information to farmers and producers.

---

76 The proposal for a new legislative framework of the Common Agricultural Policy (CAP) for the next programming period, under which the European Commission is leading the transition to a more sustainable agriculture. To achieve that, three of the nine CAP objectives will focus on climate and natural resource preservation, highlighting the benefits farmers provide to society on issues such as climate change, biodiversity loss, and soil quality. Actions under the CAP are expected to contribute 40 per cent of the overall CAP budget to climate action. Income support will be made conditional on enhanced environment and climate-friendly farming practices. In addition, an "eco-schemes" system, will be mandatory for EU Member States to offer (but voluntary to farmers) and funded from national direct payment allocations as each EU Member State can design their own. EU Member States will also be required to dedicate at least 30% of their rural development budget to environment and climate measures.

77 GHG emission reduction in agriculture was 9.2% in the period 2005-2015, compared to a reduction of 15.7% in the EU-28 and a slight increase of 1% in the EU-13. In 2016, enteric fermentation (37.1%), synthetic fertilizers (20.7%), and manure management (17.8%) accounted for the bulk of agricultural GHG emissions in Croatia. Although Croatia still has a high carbon intensity of the economy, which is about 20% higher than the EU average, the carbon intensity of agricultural production in Croatia (0.18%) was significantly lower than EU averages of 0.3% for EU-15 and 0.4% for EU-11 during pre-accession (2012).

78 The total area under organic farming in Croatia is 93,500ha in 2016 or 6.1% of total utilized agricultural area, with EU-average being 6.7% of UAA (EUROSTAT).

79 In the context of Croatia, traditional indemnity insurance products focus on specific, named, natural perils with payouts based on the measured loss for an individual farm. Index-based insurance, on the other hand, differs from traditional indemnity insurance in that farmers can purchase coverage based on an index that is correlated with those losses, such as the amount of rain during a certain time span (weather-based indices) or average yield losses over a larger region (area yield indices).

Mainstreaming climate change in agricultural policies and programs would help incentivize behavioral change of farmers, while facilitating access to resources for enhancing productivity sustainably and maximizing synergies between adaptation and mitigation actions. It would also support behavioral change in public agricultural institutions by shifting the emphasis from reactive management to proactive planning on the basis of a longer term vision.

58. **Croatia is also well positioned to take advantage of ongoing developments in digital agriculture.** Increased investment in broadband coverage in rural areas would lower the costs of accessing and transmitting data. The country is highly ranked in terms of consumers' readiness to use internet services. Croatia's agri-food sector is one of the most promising sectors for harnessing the potential of digital tools for smart growth and the knowledge economy, by improving productivity, environmental sustainability and connectivity across the entire agri-food system. The sharing economy can make it easier for farmers to access capital equipment, while just paying the marginal cost, and digital information puts a world of knowledge at the farmer's fingertips, even without broadband. On the public side, the development of digital agriculture in Croatia is facilitated by the National Council for Digital Economy. On the private side, while digital agriculture is still dominated by traditional companies, new and disruptive players are increasingly entering the market and strengthening their position. While digitalization has been a growth driver in the distribution of food and beverages, uptake of precision agriculture technologies[80] has thus far been limited among producers, whereas the agri-food industry is generally lagging in leveraging e-commerce platforms, which enable manufacturers to reach and communicate businesses and consumers directly, build brand loyalty, and gain feedback about existing and new products faster and more cost-effectively[81]. Digital market places also create new opportunities for the market entrance of smaller, single focus agri-food and beverage manufacturers as well as production-on-demand, which may help the agri-food industry to micro-manufacture in line with buyer and consumer demands. Improved knowledge flows and digitization of information could therefore play an important role in realizing the sustainable transformation of the agri-food sector by modernizing both agricultural production, post-harvest operations, and distribution systems.

59. **The bioeconomy offers numerous opportunities to Croatia.** There is an opportunity to create more integrated, sustainable, and circular value chains that support greater resource use efficiencies, increase and diversify producer incomes, and bring economic diversification opportunities to rural areas. By harnessing food/non-food complementarities, sustainable and circular bioeconomy value chains could help create value addition and establish new markets in traditional agri-food systems. Bio-based product development could help address pollution and climate mitigation, while diversifying rural economies away from primary agriculture activities. Efficient use of resources, value addition, and diversification are both key to increasing productivity and central elements to sustainable and circular bio-economy value chains. Vertical and horizontal integration of bioeconomy value chains requires the articulation of national and regional bio-economy strategies guided by bottom-up, strategic territorial planning approaches involving stakeholders across the public sector, industry and research institutions. Under the CAP, Croatia could leverage community-led local development initiatives (CLLD) to promote bio-economy value chains and diversify rural economies more broadly. However, outcomes will depend on how government institutions vertically coordinate their interventions and engage with other stakeholders at each level, as inadequate coordination increases the risk of duplication of territorial investments and a lack of critical mass for impact. In this context, biophysical mapping of crop/biomass potentials and analyses of potential market demand are needed to effectively prioritize interventions and support effective planning processes.

---

80 At the farm level, for example, precision agriculture decision-support tools based on site-specific satellite imagery can help optimize site-specific fertilizer applications, weeding, spraying, and harvesting, leading to lower production costs and better environmental impacts. At the level of agri-food chains and markets, digital marketplaces could help agri-food producers and processors forge direct links with buyers and consumers.

81 European Commission (October 2013): *Six Perspectives on Retail Innovation – Expert Group on Retail Innovation,* available at https://ec.europa.eu/research/innovation-union/pdf/Six_perspectives_on_Retail_Innovation_EG_on%20Retail_Sector_Innovation_web.pdf

REFERENCE MATERIAL

Agrocycle Project (2018). Data on Co-products and By-products (AWCB) Generated along Animal, Fruit, Cereal and Vegetable Value Chains. Available at: http://www.agrocycle.eu

European Commission (2013-2016). *FADN Public Database*. Available at: http://ec.europa.eu/agriculture/rica/database/database_en.cfm

European Commission (2018). *Direct Payments to Agricultural Producers – Graphs and Figures: Financial Year 2017.* DG Agriculture and Rural Development, Brussels.

European Investment Bank (2018). *Potential Future Use of Financial Instruments (FIs) in Croatia's Agricultural Sector in the 2014-2020 Programming Period.* European Investment Bank, Zagreb.

Eurostat (2013-2015). *Farm Structures Survey.* Available at: https://ec.europa.eu/eurostat/web/agriculture/data/database

Eurostat (2013-2017). Data on Agricultural Land Rents and Agricultural Wages. Available at: https://ec.europa.eu/eurostat/web/agriculture/data/database

Eurostat (2014). *Sectoral Employment Data at NACE rev. 2 Level – Labour Force Survey Series.* Available at: https://ec.europa.eu/eurostat/web/lfs/data/database

FAO (various). Government Expenditure on Agriculture, Forestry and Fishing. Available at: http://www.fao.org/faostat/en/#data/IG

FAO (various). *Producer Prices Data*. Available at: http://www.fao.org/faostat/en/#data/PP

Ministry of Agriculture, Republic of Croatia (2014-2016). FADN Individual Farm Database. Ministry of Agriculture, Zagreb.

Ministry of Agriculture, Republic of Croatia (2013-2017). Farm Structures Survey. Ministry of Agriculture, Zagreb.

Paying Agency for Agriculture, Fisheries and Rural Development (2013-2018). *Detailed Payments for Agriculture and Rural Development at the Beneficiary Level and at Aggregate County and National Levels*. Ministry of Agriculture, Zagreb.

Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R. and de Vries, G. J. (2015). An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production. *Review of International Economics*, 23: 575–605.

World Bank (2016). *Croatia: Small-Area Estimation of Consumption-Based Poverty (Poverty Maps).* World Bank, Washington DC.

World Bank (various). World Development Indicators. Available at: https://databank.worldbank.org/data/source/world-development-indicators

World Input-Output Database (2018). Input-Output Tables for Croatia, 2014. Available at: http://www.wiod.org/database/niots16