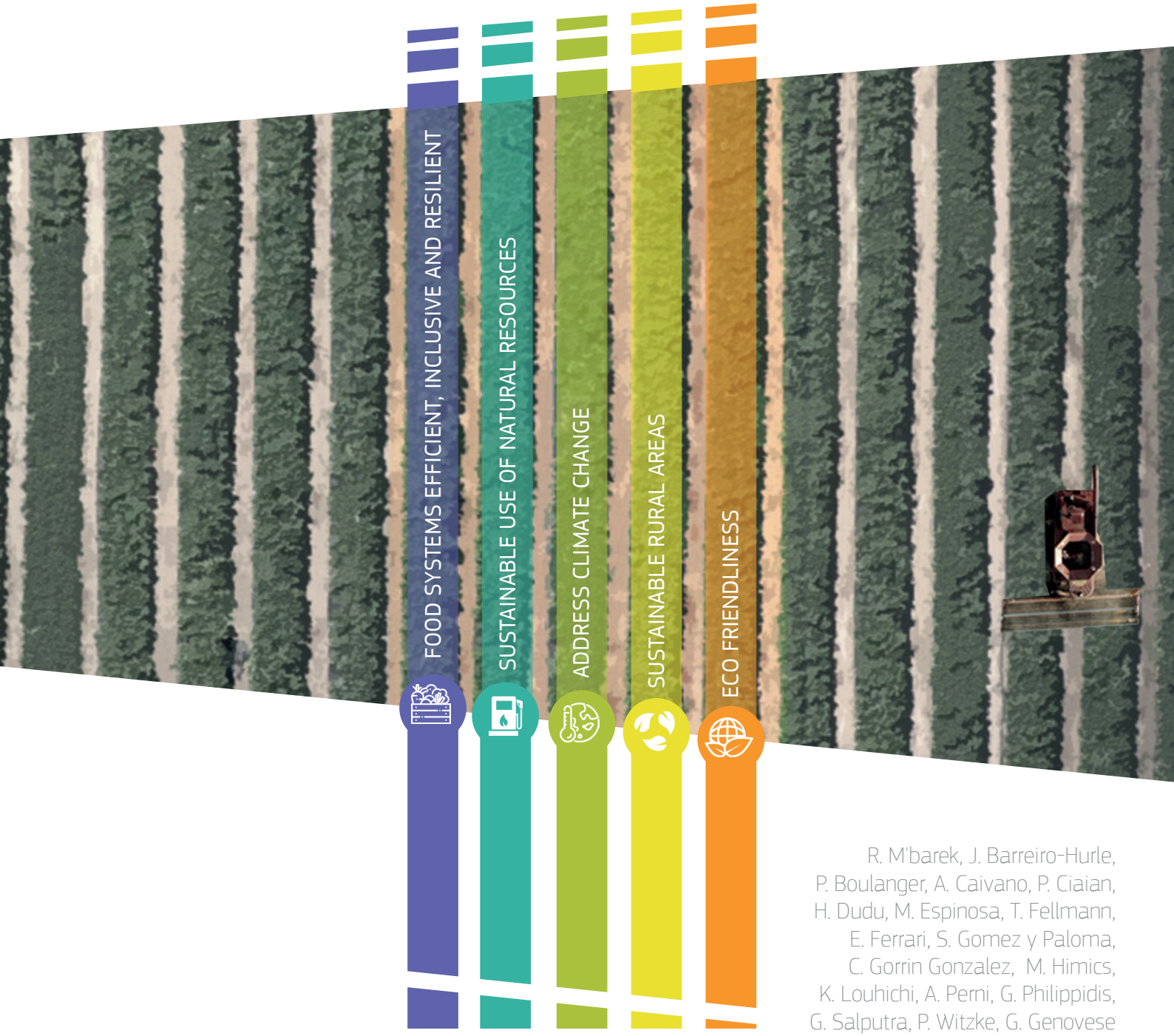
European Commission

SCENAR 2030

PATHWAYS FOR THE EUROPEAN AGRICULTURE AND FOOD SECTOR BEYOND 2020

SUMMARY REPORT



R. M'barek, J. Barreiro-Hurle, P. Boulanger, A. Caivano, P. Ciaian, H. Dudu, M. Espinosa, T. Fellmann, E. Ferrari, S. Gomez y Paloma, C. Gorrin Gonzalez, M. Himics, K. Louhichi, A. Perni, G. Philippidis, G. Salputra, P. Witzke, G. Genovese

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Complex pathways for the European agriculture and food sector by 2030
Analysing stylised scenarios with economic modelling tools reveals complex relations, incentives and trade-offs of the different policy instruments, in particular regarding the environmental dimension. Marginal areas of the EU are most vulnerable to drastic policy changes.

Visualisation of results
The reader is invited to consult the JRC agro-economic portal DataM at https://datam.jrc.ec.europa.eu for more details of the modelling results in interactive dashboards. The interactive infographics about this study is under the "Agro-economic studies" visualisation section.

Direct link:

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SCENAR 2030

Pathways for the European agriculture and food sector beyond 2020

SUMMARY REPORT

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ACKNOWLEDGEMENTS / EXECUTIVE SUMMARY

Acknowledgements

The 'Scenar 2030 – Pathways for the European agriculture and food sector beyond 2020' report was prepared by the European Commission's Joint Research Centre (JRC) with support from Wageningen Economic Research (WECR) and EuroCARE, as well as contributions from the Directorate-General for Agriculture and Rural Development.

The overall coordination of the study was the responsibility of Robert M'barek, who also edited the report together with George Philippidis.

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The MAGNET model work was carried out by the JRC CGE team under the leadership of Emanuele Ferrari (EF) with valuable support from George Philippidis (GP) at WECR. The other team members are: Pierre Boulanger (PB), Hasan Dudu (HD) and Robert M'barek (RM). GP and EF provided the baseline and implemented the scenarios; HD took care of result visualisation; and RM, PB, HD and EF analysed the results and drafted the relevant sections of the report.

The CAPRI model work was carried out by the JRC CAPRI team under the leadership of Jesus Barreiro-Hurle (JBH) with support from Peter Witzke (PW) at EuroCARE. The other team members are: Thomas Fellmann (TF), Mihaly Himics (MH) and Guna Salputra (GS). MH provided the baseline; MH and GS, with the support of PW, implemented the scenarios; and TF, MH, GS and JBH analysed and cross-checked the results and drafted the relevant sections of the report.

The IFM-CAP model work for Scenar 2030 was carried out by the JRC IFM-CAP team under the leadership of Pavel Ciaian (PC). The other team members are: Kamel Louhichi (KL), Maria Espinosa (ME), Angel Perni (AP) and Sergio Gomez y Paloma (SGP). The tasks were performed by the team members as follows: data preparation and implementation of CAP direct payments was performed by ME, KL, PC and AP; baseline preparation was performed by PC, KL and ME; model setting and the implementation of scenarios was undertaken by KL, PC, ME and AP; result visualisation was carried out by AP, KL and ME; and result cross-checking and analysis, and drafting relevant sections of the report was conducted by PC, KL, ME, AP and SGP.

The visualisation of results was implemented mainly by Arnaldo Caivano, Celso Gorrin Gonzalez and Saulius Tamosiunas. Emiliano Bruno and Massimiliano Fucci designed the cover page. Administrative support was provided by Sandra Marcolini, Mathilde Drouin, Els De Rademaker and Tanja Acuna.

Executive summary

The Common Agricultural Policy (CAP) of the European Union (EU) faces the challenge of evolving towards a multifunctional policy that responds to the constantly changing needs of society. The CAP must respond to demands related to increased market efficiency and competitiveness; guarantee a territorial balance; fostering jobs and 'smart' growth; contributing to climate change mitigation while adapting to a changing climate; ensuring responsible and sustainable biologically renewable resource management; and still respecting its initial aim of ensuring food security.

The present report was carried out by the Joint Research Centre (JRC) and external experts in the context of the JRC's analytical support to the Directorate-General for Agriculture and Rural Development. The report analyses the impact on the agricultural sector of stylised scenarios, reflecting the main drivers of policy debate. While the scenarios presented do not represent real policy options, they underline the potential for changes to current agri-food policies to address societal challenges and demands.

The analysis of the social, economic and environmental impacts of various options for the next CAP employs the iMAP platform models MAGNET, CAPRI and IFM-CAP in an integrated manner, covering different spatial scales (global, EU, Member State, NUTS 2 region and individual farm levels).

The general caveats that apply to all modelling exercises (i.e. a simplified representation of reality, no forecasting models, high uncertainty, etc.) apply to this study. Moreover, many of the concerns that surround the agricultural policy debate, such as generational renewal, value distribution along the food chain and structural change, cannot be captured in the model results and warrant additional investigation before any conclusions are made with regard to which policy option best meets them. In this context, expanding the analysis to a food systems approach could provide further insights into other impacts of the policy options.

The study considers three scenarios, designed beginning of 2016, that take polar paths, against a reference scenario, to characterise different visions for the CAP. The first scenario, Income & Environment (Inc&Env), assumes a more restrictive compliance with agri-environmental objectives needed for direct payment eligibility while maintaining the EU's CAP budget at its current nominal level. The second scenario, Liberalisation & Productivity (Lib&Prod), assumes a strong reduction in subsidies (the removal of Pillar 1 direct payments, which are returned to tax payers), with a shift of Pillar 2 payments to productivity-increasing measures and further trade liberalisation[1]. As a variant of the Lib&Prod scenario, the No Policy (NoCAP) scenario also eliminates Pillar 2 payments, thus removing all budgetary support to agriculture.

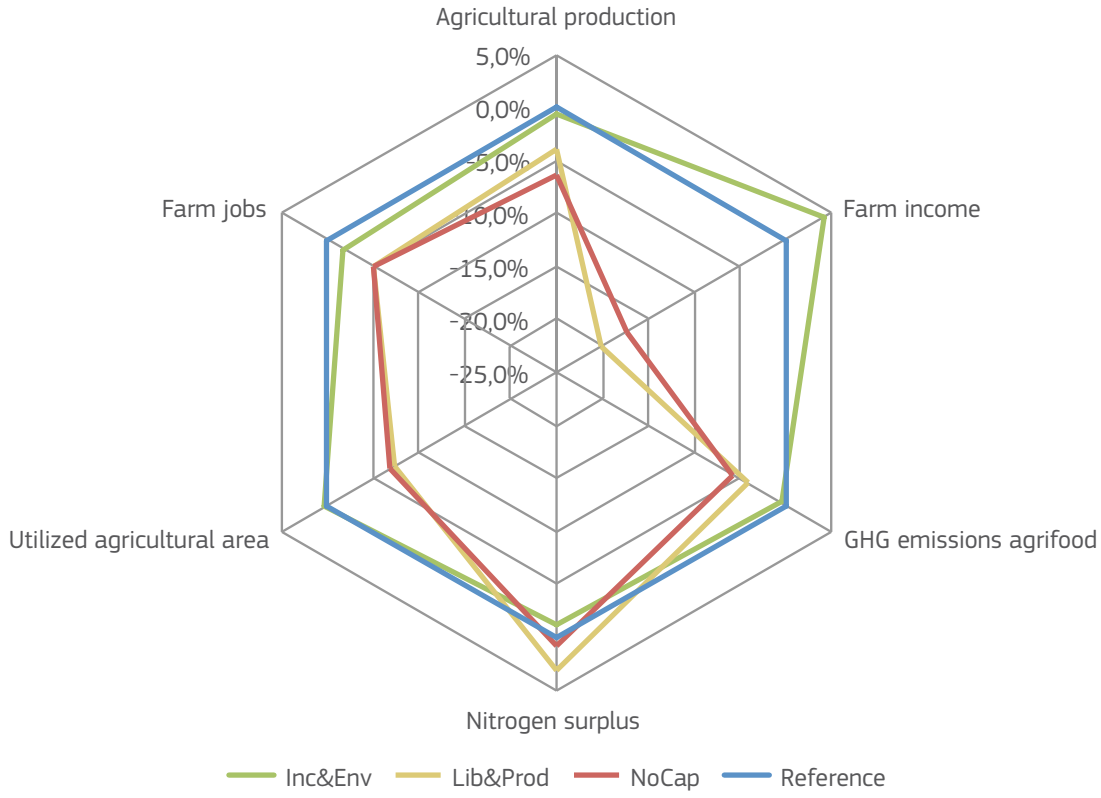
Scenario results emphasize the vulnerability of small farms, in particular in marginal areas of the EU, where agricultural subsidies are economically more important than market income. The trade liberalisation scenarios reveal opportunities for some but risks for most agri-food sectors. Special attention must be paid to the complex relations, incentives and trade-offs of the different instruments, in particular regarding the environmental dimension. The objective of direct payments has to be clearly defined and translated into implementation rules (i.e. targeting, conditionality) during the policy design phase, as they still represent the largest share of the budget dedicated to agriculture and steer most of the sector's responses. If the objective is redistribution,

[1] Cumulative impact of 12 bilateral or regional trade agreements, as described JRC report (2016) "Cumulative economic impact of future trade agreements on EU agriculture", http://ec.europa.eu/agriculture/trade-analysis/impact-assessment/.

then the target population needs to be better defined; if the objective is environmental performance, then conditionality has to be better designed.

The policy scenarios are assessed with regard to their impact on markets (production, demand, trade and prices), land use, the environment and farmer income from the global level to the farm level. The figure below summarises the impact of the three scenarios on agricultural production, farm income, greenhouse gas (GHG) emissions from the agri-food sector, nitrogen surplus, utilised agricultural area and farm jobs. Negative values show a reduction in these indicators under a given scenario and positive values an increase. While an increase in agricultural production and farm income are considered a positive outcome, an increase in GHG emissions and nitrogen surplus indicate a negative impact on the environment and the climate.

Overview of scenario impacts



The **Inc&Env scenario** shows only marginal changes for production, land use and emissions. The more pronounced focus of this scenario on the environment, implemented through extended greening measures and a limit on nitrogen use, is associated with a small, economy-wide cost, but contributes to an improving trend for agricultural

nitrogen balance. However, the reduction of about 1% of the nitrogen surplus in this scenario compared with the reference is not sufficient to address the nitrogen balance problem in areas already in surplus. Under this scenario, farm income in the EU increases, but not its distribution, as measured by a Gini coefficient. Thus, key challenges related to the environment and a fair standard of living for farmers are only partly addressed, suggesting that even more stringent environmental and distributional conditions are needed to achieve those objectives.

The **Lib&Prod scenario** and its even more extreme variant, the **NoCAP scenario**, have a much stronger impact on farm income, land use, production and emissions. The decrease in agricultural production, leading to price increases in the NoCAP scenario, is within the limit of interannual variation, but is associated with a pronounced reduction in land use. This affects territorial balance, with marginal areas being further marginalised or, at worst, abandoned, possibly leading to environmental degradation, with fewer jobs, and intensive agricultural areas being further concentrated. Less production, in principle, reduces the overall use of resources and thus reduces environmental impacts like, for example, GHG emissions. However, if GHG emissions decline in the EU, this decline is likely to be levelled out through the leakage effect, by which increased emissions occur in the other world regions to which production is shifted. Releasing land from agricultural uses could also provide an opportunity for the creation of carbon dioxide sinks, such as forests and other ecological areas, with important benefits for biodiversity. However, additional measures would be needed to ensure that abandoned land is indeed used to benefit the environment. While a reduction in nitrogen use could be seen as an environmental improvement its reduction will not be homogenously distributed and might even lead to an increase in nitrogen use in some areas, which could increase the corresponding environmental pressure.

Under both the Lib&Prod and NoCAP scenarios, there would be trade-offs between slightly reduced production, a mixed impact on the environment and a strongly negative impact on farm income. Beyond the structural job contraction common in baseline and all scenarios, most of the additional impacts on jobs will affect small farms in the net beneficiary countries, and would increase farm income inequality even more and put the resilience of many farms at risk. The scenarios show, also as a consequence of further trade liberalisation, that there would be an increase in the vulnerability of crop and cattle/beef farmers. As production decreases and consumption remains more or less constant, Europe would become a net importer of many commodities under these scenarios. This gives rise to concerns about the transfer of the positive and negative externalities associated with agricultural production to other world regions.

Finally, the aggregated welfare results are contingent on how effectively the funds released from agricultural policy are used for alternative public expenditure. Our analysis assumes that expenditure in other sectors will increase welfare.

The Scenar 2030 scenarios show that designing an agricultural policy that tackles all of its societal objectives is a daunting task. At best, the policy will have to focus on key priorities and accept that trade-offs will have to be made with regard to others. An internationally competitive agriculture sector in Europe might come at the expense of increased environmental pressures or further job losses in the sector.

Further research must also be dedicated to identifying the areas in which investing in model linkage does in fact improve analytical capacity. The JRC should also invest some additional resources in improving key parameters, such as the impact on productivity of Pillar 2 payments.

At the time of finalising this report, the main uncertainties about the future of the agricultural sector and its related policies stemmed from the early stages of discussions on the Multiannual Financial Framework 2021-2027 and Brexit negotiations. The JRC will continue to support the analysis of these topics using the tools described in this report.

1

THE SCENAR 2030 **APPROACH**

1 The Scenar 2030 approach

The CAP is evolving into a multifunctional policy that can respond to the constantly changing needs of society. The CAP must meet market-efficiency and competitiveness criteria; be a motor of job creation and 'smart' growth also in rural areas; continue to aid the fight against climate change as an environmentally accountable policy measure; act (in tandem with other policies) as a custodian of responsible and sustainable biologically renewable resource management; and still respect its initial aim of ensuring sufficient amounts of food for all citizens at affordable prices.

Given the above, the design of post-2020 farm policy is once again under consultation and a wide range of policy options are being considered, from retaining the status quo to radical reform.

The present report[2], in the tradition of the 'Scenar 2020' studies, contributes to the analysis of selected scenarios and provides a framework for further exploration of the process of designing the future CAP.[3] It complements recent, more qualitative, forward-looking studies with a well-elaborated baseline and multiple perspectives through the use of different models.

This analysis of the social, economic and environmental impacts of several options for the next CAP employs models of the iMAP platform hosted by the JRC. This suite of economic models ranges from one that models macroeconomic aspects (a CGE model, i.e. MAGNET[4]) to those that model more sectoral economic aspects (a PE model, i.e. CAPRI[5]) and microeconomic aspects related to the impact on individual farms (IFM-CAP[6]).

MAGNET, CAPRI and IFM-CAP are run in an integrated manner on different spatial scales (global, EU, MS, NUTS 2, individual farm), having as a common reference the EU Agricultural Outlook published at the end of 2015 (DG AGRI, 2015), generated with the AGLINK-COSIMO[7] PE model.

The reference scenario in Scenar 2030 is based on 'EU Agricultural Outlook: Prospects for EU agricultural markets and income 2015-2025', published in December 2015 (DG AGRI, 2015). It assumes the implementation of the 2013 CAP reforms, as well as the ratified FTAs.[8]

The reader is reminded that the general caveats that apply to all modelling exercises (i.e. a simplified representation of reality, no forecasting models, high uncertainty, etc.) apply here. Furthermore, using three different models and their (soft) linkages adds complexity and a certain degree of inconsistency (e.g. different commodity categories).

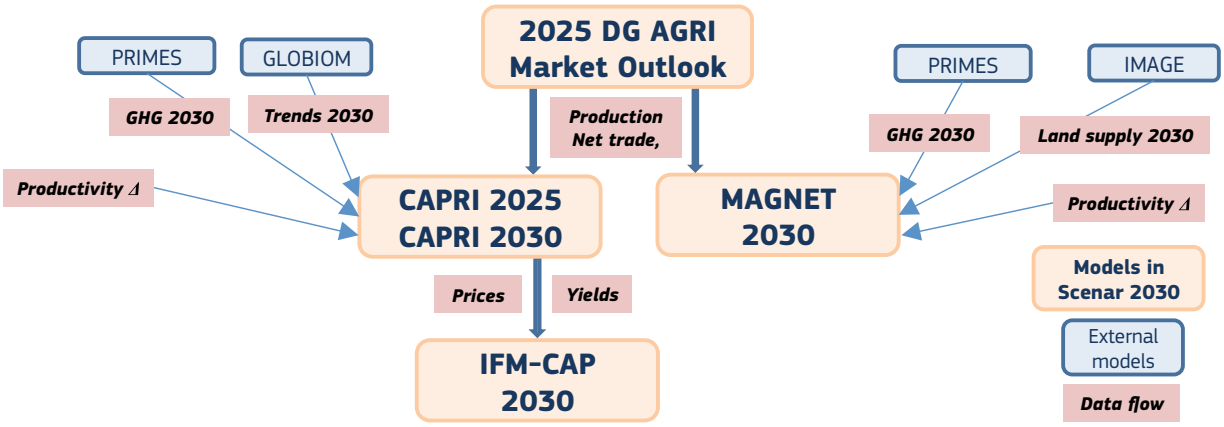


FIGURE 1: MODEL CHAIN.
Source: own presentation.

[2] This report is a summary of the full Scenar 2030 report, https://datam.jrc.ec.europa.eu/datam/mashup/SCENAR2030.
[3] See http://ec.europa.eu/smart-regulation/roadmaps/docs/2017_agri_001_cap_modernisation_en.pdf.
[4] Modular Applied GeNeral Equilibrium Tool (MAGNET), http://www3.lei.wur.nl/magnet/.
[5] Common Agricultural Policy Regionalised Impact (CAPRI) model; http://www.capri-model.org/docs/capri_documentation.pdf.
[6] Individual Farm Model for Common Agricultural Policy Analysis (IFM-CAP); https://doi.org/10.1093/erae/jbx029.
[7] AGLINK-COSIMO; http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92618/jrc92618%20online.pdf.
[8] Asian FTA means Japan, Vietnam, Thailand, Philippines and Indonesia.

2 THE SCENARIOS

2 The scenarios

Scenar 2030 looks at three scenarios that take polar paths, against a reference scenario (the baseline), to characterise different visions for the CAP.

The baseline, or reference scenario (or the business-as-usual scenario), was generated on the basis of the latest available reference at the time of the study, i.e. the 2015 EU Agricultural Outlook[9], with a perspective up to 2025. The baseline was extended up to 2030 in order to cover the timeline of the Scenar 2030 study.

The first scenario (Inc&Env) was defined on the basis of a more restrictive level of farmer compliance with agri-environmental objectives needed for direct payment eligibility, while keeping the EU CAP budget at its current nominal level.

The second scenario (Lib&Prod) was defined to include a strong reduction in subsidies (the removal of Pillar 1 direct payments, which are returned to tax payers), with a shift to productivity-increasing measures and further trade liberalisation.

The third scenario (NoCAP) is a variant of the Lib&Prod scenario, but it also eliminates Pillar 2 payments, and is basically intended to represent a removal of agricultural policy.

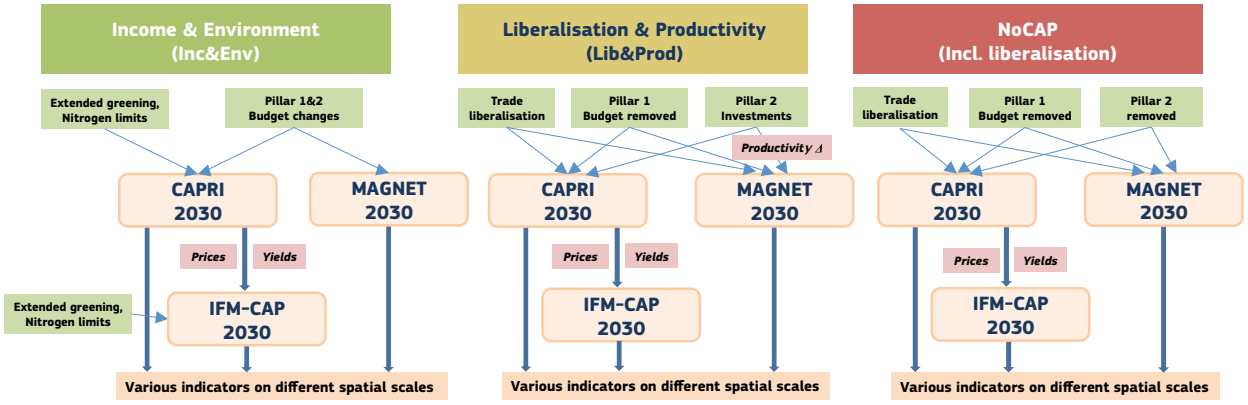


FIGURE 2: OVERVIEW OF THE SCENARIOS.
Source: own presentation.

The policy scenarios are assessed with regard to their impact on markets (production, demand, trade and prices), land use, environment and farmer income from the global to the farm level. In the following section, the key results are presented in relation to their economic, social and environmental dimensions.

[9] *EU Agricultural Outlook: Prospects for EU agricultural markets and income 2015-2025.* Directorate-General for Agriculture and Rural Development, European Commission.

3

THE EU AGRI-FOOD SYSTEM BETWEEN MARKETS AND **SOCIETAL CHALLENGES (SCENARIO RESULTS)**

3 The EU agri-food system between markets and societal challenges (scenario results)

In the following section, the key results of the three scenarios are described according to the economic, social and environmental dimensions. The results are presented in terms of changes with respect to the results given by the baseline (reference or business as usual scenario).[10]

3.1 | Economic dimension

Agricultural production is declining, but not disappearing, in most extreme scenarios

The results show a small negative impact on agricultural production under the Inc&Env scenario, whereas under the Lib&Prod and NoCAP scenarios production decreases by 4% and 6%, respectively. The differences between EU-15 and EU-13 are negligible, and the variability between EU MSs is greatest under the NoCAP scenario.

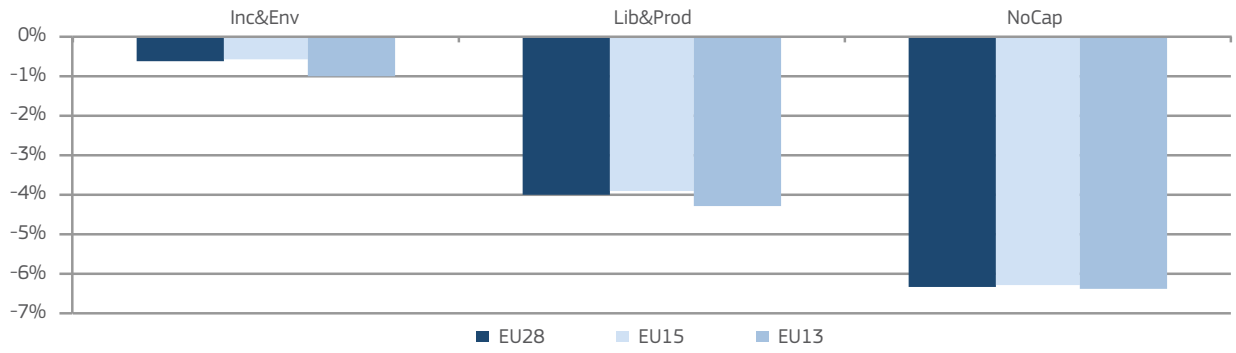


FIGURE 3: AGRICULTURAL PRODUCTION, EU-28, TOTAL QUANTITY CHANGES COMPARED WITH REFERENCE (%).
Source: Scenar 2030, CAPRI model.

Producer prices increase if the CAP is eliminated

Following the small decreases in agricultural production under the Inc&Env scenario, aggregated EU producer prices increase by about 1%. In the Lib&Prod scenario, EU producer prices drop by almost 1%, as EU production decreases are compensated by cheaper imports. With the elimination of all CAP payments, the stronger EU production declines cannot be fully compensated by imports, leading to increased aggregated EU producer prices of about 5% in the NoCAP scenario.

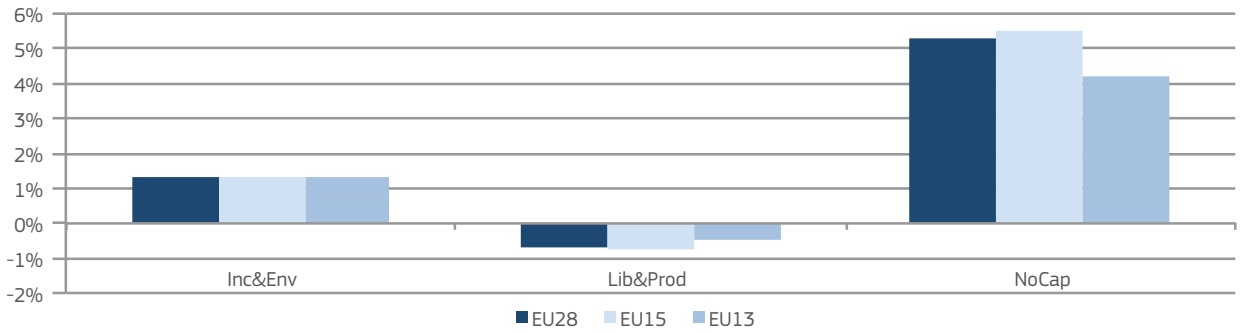


FIGURE 4: PRODUCER PRICE, EU-28, CHANGES COMPARED WITH REFERENCE (%).
Source: Scenar 2030, CAPRI model.

[10] More details can be found under this link: https://datam.jrc.ec.europa.eu/datam/mashup/SCENAR2030.

More imports than exports

Imports increase in all scenarios, leading to a decrease in the EU trade balance. Although exports in the Lib&Prod scenario grow substantially, also thanks to the ambitious trade agenda pursued by the EU, they cannot compensate for the higher level of imports. In the NoCAP scenario, the trade balance is reduced by about EUR 25 billion, billion trade surplus in 2030 under the reference scenario, bringing back the EU to net importer status.

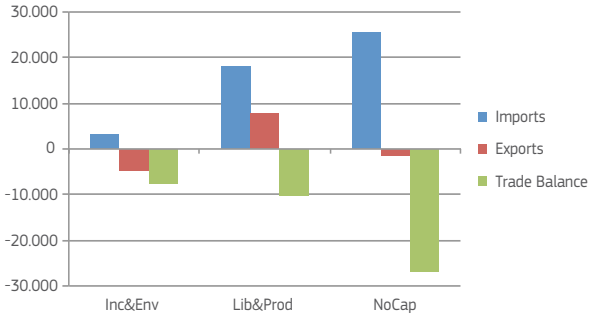


FIGURE 5: EU IMPORTS, EXPORTS AND TRADE BALANCE CHANGES (EUR MILLION) COMPARED WITH REFERENCE, 2030.
Source: Scenar 2030, MAGNET model.

Income of farms decreases strongly when the CAP is abolished

Under the Inc&Env scenario, gross farm income increases by around 4.5%, mainly through higher prices, with the CAP budget remaining stable. The negative effects in the Lib&Prod scenario (–20%) mean that there is a slightly larger income decrease than under the NoCAP scenario, following the larger decreases in EU production. Again, the EU-13 farming sector experiences a stronger negative impact on income than the EU-15, reflecting a generally higher importance of CAP payments in total income..

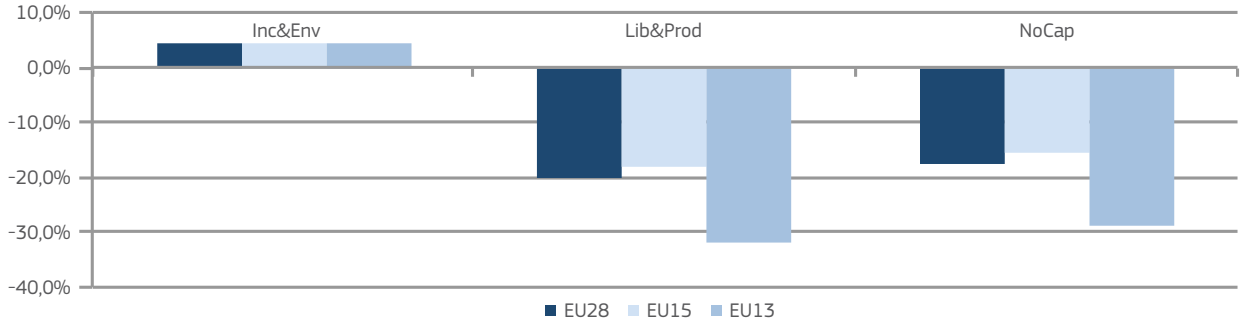


FIGURE 6: GROSS FARM INCOME (% CHANGE RELATIVE TO REFERENCE).
Source: Scenar 2030, CAPRI model.

	Inc&Env	Lib&Prod	NoCAP
Specialist COP	1.2	–23.5	–22.6
Specialist other field crops	0.4	–2.1	–0.2
Specialist horticulture	–0.9	1.9	0.8
Specialist wine	0.4	–7.1	–7.6
Specialist orchards – fruits	–2.7	–4.0	–6.2
Specialist olives	–11.6	–20.6	–19.9
Permanent crops combined	–1.5	–7.7	–9.2
Specialist milk	–0.1	–8.7	2.6
Specialist sheep and goats	–0.5	–12.1	–11.9
Specialist cattle	–2.3	–36.7	–31.8
Specialist granivores	1.0	–3.7	3.6
Mixed crops	–0.3	–2.8	–3.6
Mixed livestock	1.8	–12.0	–3.0
Mixed crops and livestock	0.2	–14.8	–9.7

TABLE 1: INCOME VARIATION BY FARM SPECIALISATION IN THE EU-27 (% CHANGE RELATIVE TO REFERENCE).
Source: Scenar2030, IFM-CAP.

The simulated effects are less heterogeneous between economic sizes classes than they are across farm specialisations. However, there is a relatively consistent pattern indicating an inverse relationship between the magnitude of the simulated impacts and economic farm size in all three simulated scenarios. Among the most affected farm specialisations, mainly in the Lib&Prod and NoCAP scenarios, are the specialists cattle, COP (cereals, oilseeds and protein), and olives.

Overall, economic growth effects are small, but are substantial for some Member States

The CAP has an important role to play in territorial cohesion. The effect of the scenarios on GDP is very small (maximum –0.3% in the NoCAP scenario for the EU-13); however, under all scenarios, changes in GDP are negative for the EU-13. In general, the gains observed in the scenarios with a large or complete reduction in CAP payments for the EU-15 countries drive the EU-28 GDP to a small but positive value.

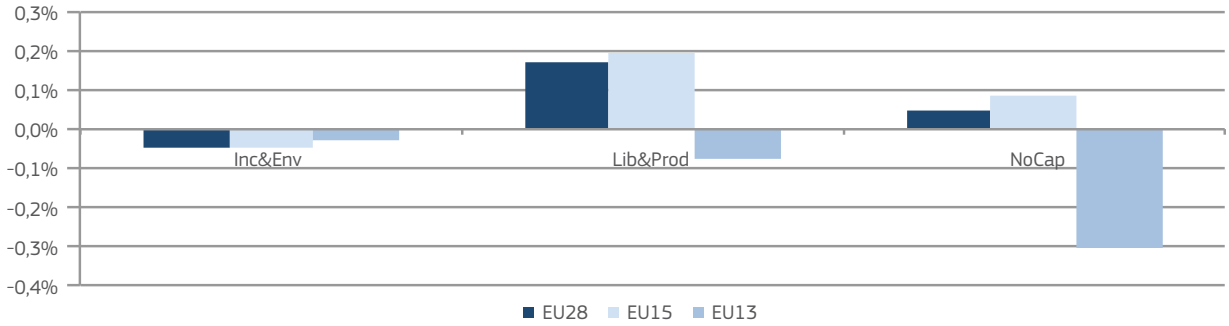


FIGURE 7: GDP, CHANGE FROM REFERENCE (%), 2030.
Source: Scenar 2030, MAGNET model.

When looking at the individual MS results, sizeable impacts are observed for Croatia, Cyprus, Greece, Latvia and Lithuania, who lose up to 1.7% of their GDP compared with the reference scenario.

One can observe that most of the EU-13 and some EU-15 countries not only experience a high absolute per capita welfare loss, but even more in relative terms (here in % change of household expenditure).

Small increase of prosperity, but only for richer EU-15 countries

Using so-called Equivalent variation (EV) as a welfare measure, i.e. the real income change, we observe a similar pattern as that observed for GDP, namely that the scenarios have only small impacts on welfare. Compared with the reference scenario in 2030, the Inc&Env scenario for the EU-28 results in a slightly negative EV of EUR 2.6 billion (–0.08%), the Lib&Prod scenario shows a EUR 18.4 billion welfare gain (+0.15%) and, finally, the NoCAP scenario shows a EUR 0.1 billion welfare gain (+0.01%).

The welfare decomposition highlights the reasons behind these developments. The EV results in, for instance, the Lib&Prod scenario show losses for the 'new' EU-13 MSs vis-à-vis EV gains for the 'old' EU-15 MSs. For the EU-13 MSs this result is mainly driven by changes to the CAP budget, whereas efficiency gains and improving terms of trade occur in the EU-15 MSs and lead to an overall positive welfare effect in the Lib&Prod scenario..

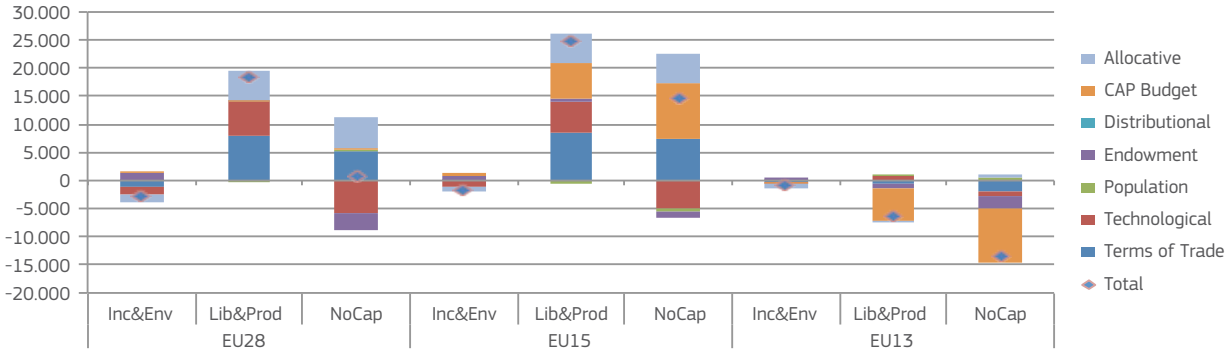


FIGURE 8: WELFARE (EV) DECOMPOSITION IN THE EU-28, EU-15 AND EU-13, 2030, EUR MILLIONS, SCENARIOS VS. REFERENCE.
Source: Scenar 2030, MAGNET model.

The time dimension of scenario shocks matters for welfare

The dynamics of the scenarios' impacts on welfare (and other indicators) have to be closely observed, on the one hand to anticipate temporary hardships and the necessary accompanying measures, on the other hand to monitor the recovering of an economy after a (structural) adjustment.

In the Lib&Prod scenario, and even more so in the NoCAP scenario, EU-13 welfare growth shows a substantial decline in 2025 after the policy change in 2020, but recovers in the period from 2025 to 2030 due to the market evolution and structural adjustment of the economy.

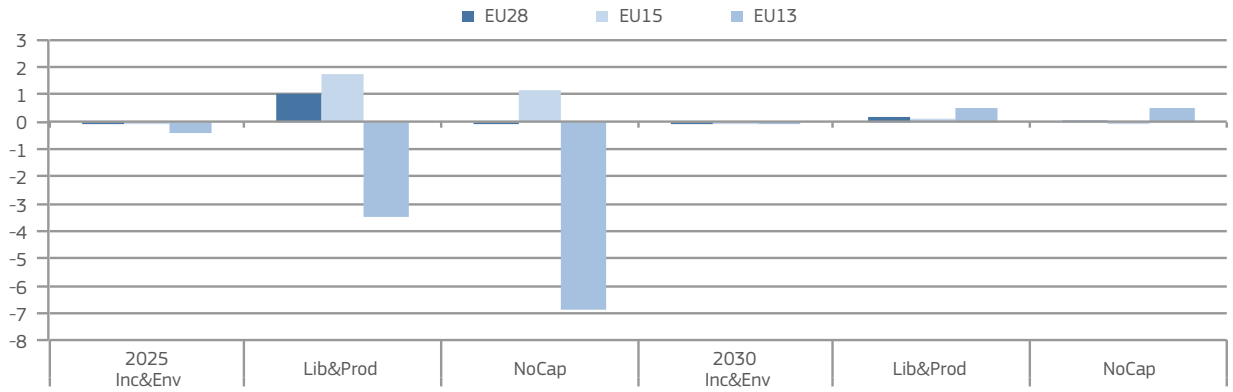


FIGURE 9: WELFARE GROWTH, CHANGES (%) FROM BASELINE FROM ONE PERIOD TO THE NEXT WITHIN A SCENARIO, IN EUR BILLION.
Source: Scenar 2030, MAGNET model.

3.2 | Social dimension

In this subsection, the income distribution among farms and the impacts on jobs are analysed.

Small farms lose a higher proportion of their incomes than larger farms

With the exception of the smallest farms in the Inc&Env scenario, all farm sizes lose income under all scenarios. The smaller farms are generally more affected because the share of subsidies in their total income is usually higher than for larger farms. It should be noted that the income calculation on the farm level is slightly different from the gross farm income calculation.

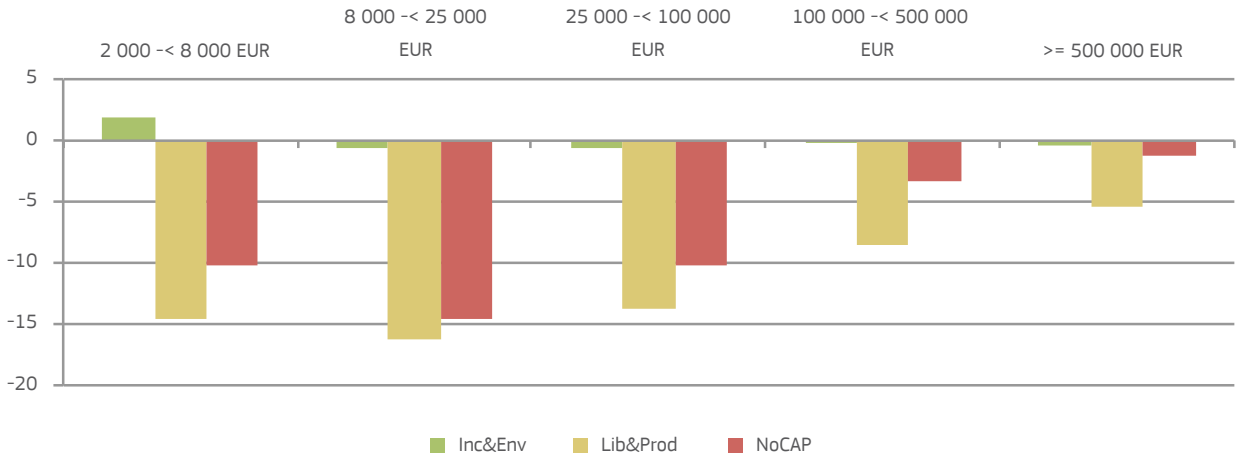


FIGURE 10: INCOME VARIATION BY ECONOMIC FARM SIZE IN THE EU-28 (% CHANGE RELATIVE TO REFERENCE).
Source: Scenar 2030, IFM-CAP model.

CAP subsidies play an income equalisation role among farms in the EU. Decreasing or cutting payments increases inequality, where a higher Gini coefficient indicates higher inequality.

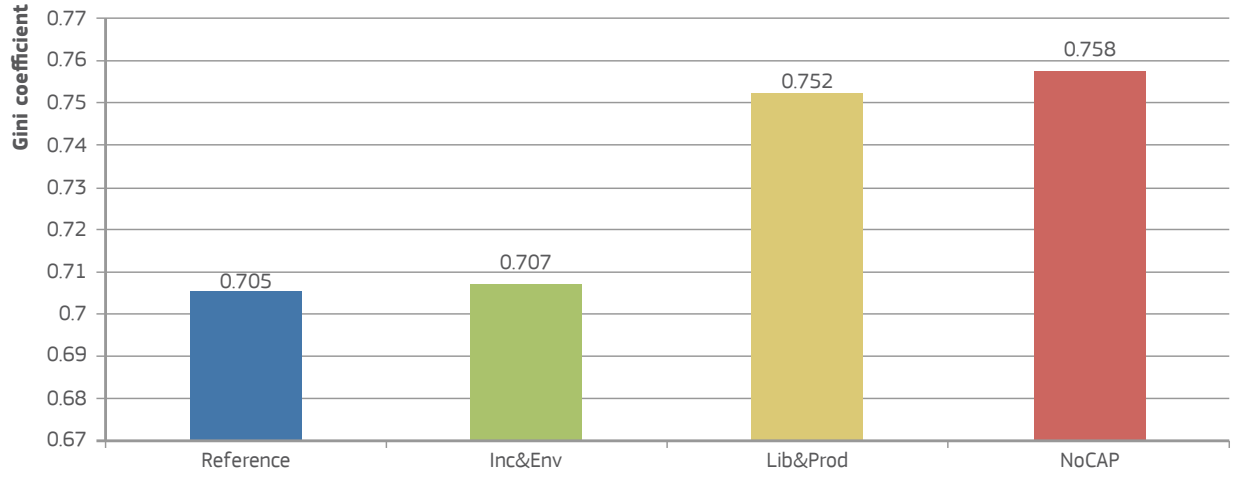


FIGURE 11: GINI COEFFICIENT FOR INCOME DISTRIBUTION IN THE EU-27.
Source: Scenar 2030, IFM-CAP.

Job numbers decrease

Under all three scenarios, in addition to the job decline of about 25% in the reference scenario, there is a negative effect on jobs in the agricultural sector. The decrease in agricultural jobs is more pronounced in the Lib&Prod and NoCAP scenarios (–5%) than in the Inc&Env scenario (–1.8%). Decreases in employment in the food industry are less noticeable.

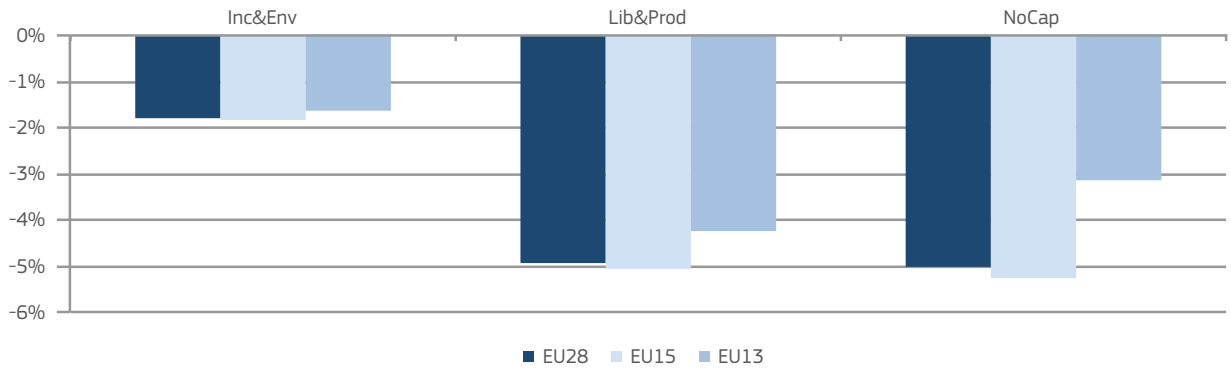


FIGURE 12: IMPACT OF SCENARIOS ON EMPLOYMENT NUMBERS, 2030.
Source: Scenar 2030, MAGNET model.

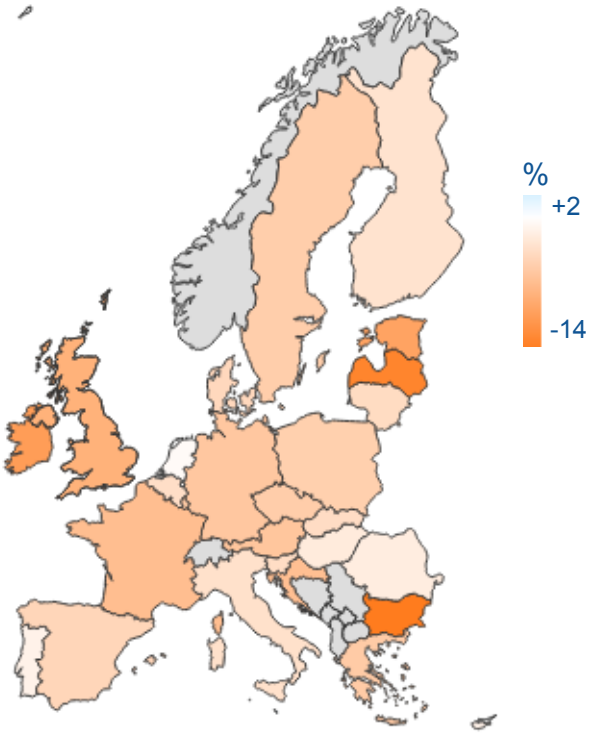


FIGURE 13: IMPACT OF LIB&PROD SCENARIO ON EMPLOYMENT NUMBERS (IN % CHANGE), 2030.
Source: Scenar 2030, MAGNET model.

3.3 | Environmental dimension

With regard to the environmental dimension, the results are considered in the context of land use, nitrogen surplus and GHG emissions.

More land is abandoned with diverse impacts

The slight increase in UAA in the Inc&Env scenario of 0.3% (+0.6 million ha) contrasts with the substantial decreases of 7.3% (–13.1 million ha) in the Lib&Prod scenario and about 6.9% (–12.4 million ha) in the NoCAP scenario. The decreases in UAA in the Lib&Prod and NoCAP scenarios are directly linked to the removal of direct payments, which immediately affect the profitability of all crop production activities, and the decreases in EU production levels, especially the decline in cereal production and pasture, i.e. part of the land is taken out as economic returns decrease.

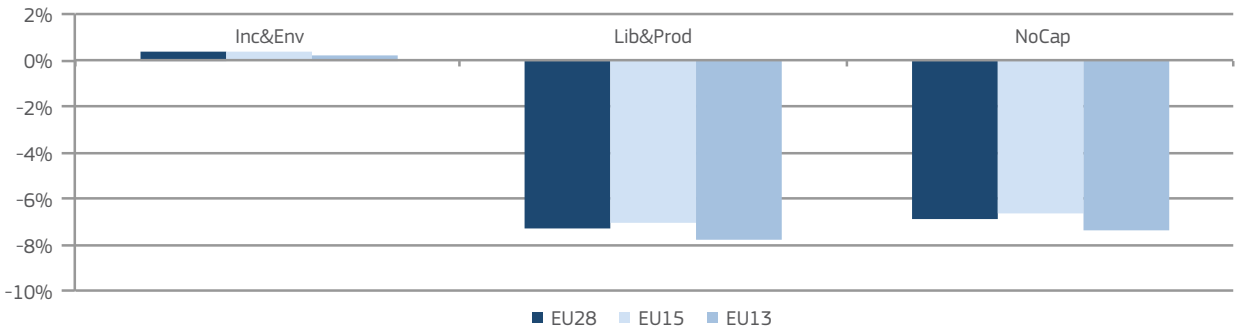


FIGURE 14: UAA, % CHANGE.
Source: Scenar 2030, CAPRI model.

Under the Inc&Env scenario, UAA increases by 0.3% (+0.6 million ha) compared with the reference scenario, whereas UAA substantially declines, by 7.3% (–13.1 million ha), in the Lib&Prod scenario and by about 6.9% (–12.4 million ha) in the NoCAP scenario.

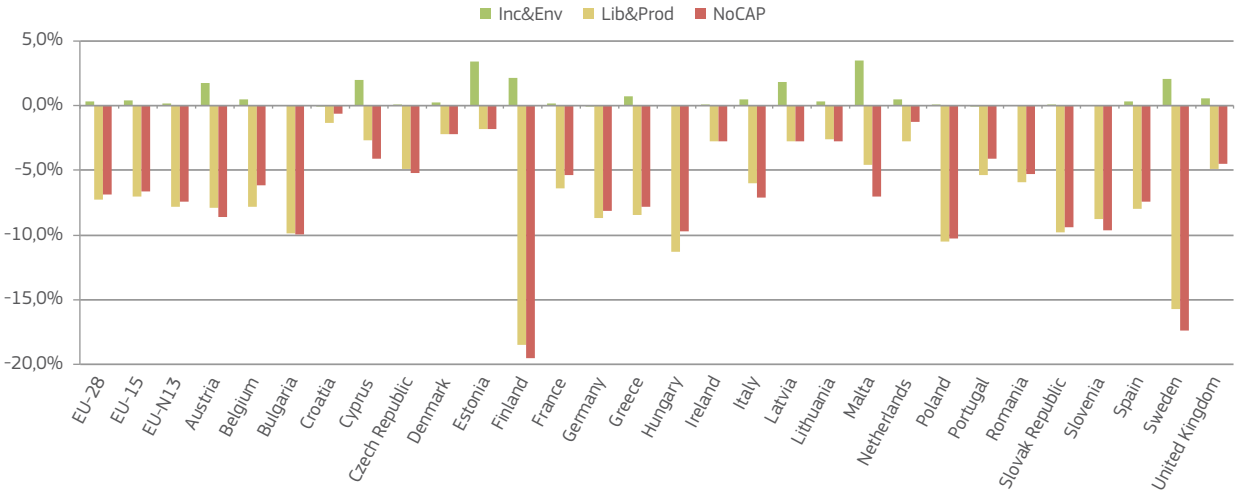


FIGURE 15: CHANGE IN UAA PER MS (CHANGE RELATIVE TO REF).
Source: Scenar 2030, CAPRI model.

A similar decrease in grassland area (–8.8%) can be observed, driven by the removal of direct payments and by the absence of any CAP measure targeting the maintenance of (permanent) grassland. This is relevant from a public goods point of view (e.g. landscape, tourism).

Nitrogen - a particular challenge

High concentrations of nitrates in the soil and water constitute a widespread problem caused by nitrogen surplus. Nitrogen surplus per ha decreases under only the Inc&Env scenario, by 1%. The increase of 3% in the Lib&Prod scenario illustrates the challenge of sustainable intensification.

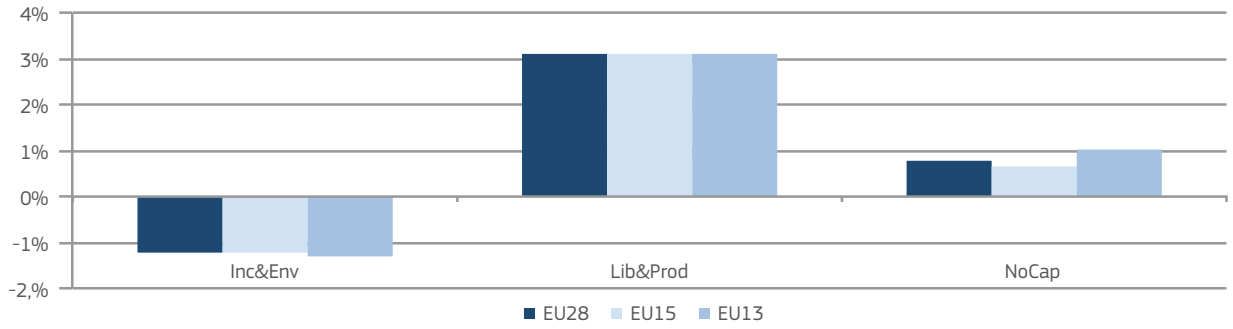


FIGURE 16: NITROGEN SURPLUS PER HA.
Source: Scenar 2030, CAPRI model.

The limitation in animal stocking density and the restriction on nitrogen use lead to a decrease in the N-surplus of 0.8 kg N/ha UAA. A considerable reduction is reported in particular in Member States and regions with a high N-surplus in the reference scenario, such as Belgium and the Netherlands, mostly related to reductions in stocking densities. In contrast, under the Lib&Prod and NoCAP scenarios, the N-surplus increases by 2 and 0.5 kg N/ha UAA, respectively. The increase in N-surplus is, on the one hand, driven by the decrease in UAA and, on the other hand, the intensification of livestock and crop production on the remaining UAA. In both scenarios, more substantial increases in N-surplus are indicated for regions that already have the highest N-surplus in the reference scenario, as these are among the most competitive regions.

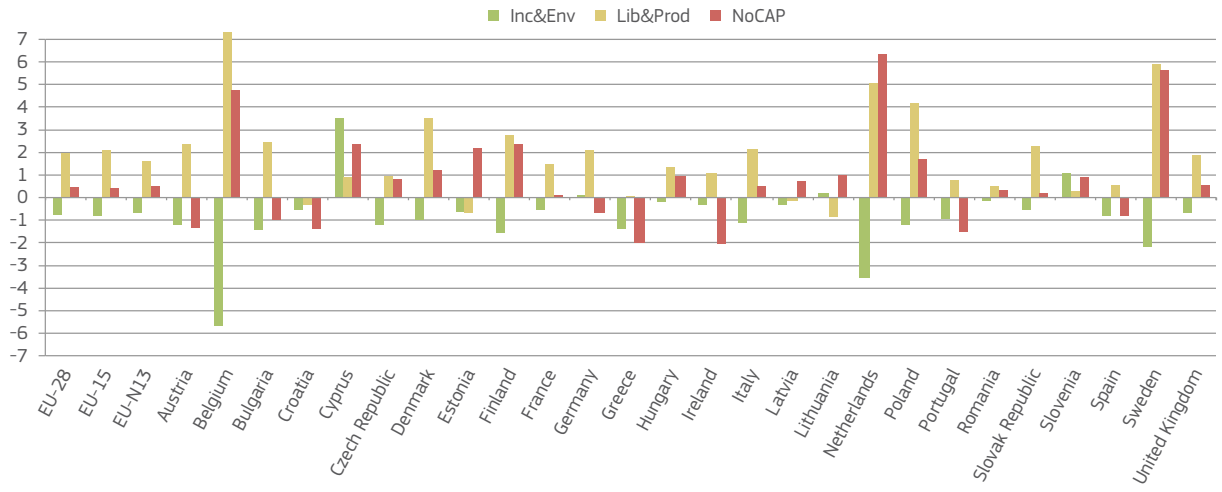


FIGURE 17: CHANGE IN N-SURPLUS PER MS (ABSOLUTE CHANGE IN KG N/HA UAA RELATIVE TO REF).
Note: Malta has been removed from the graph to improve the readability. The values for Malta are: Inc&Env -14%, Lib&Prod +17%, NoCAP +12%".
Source: Scenar2030, CAPRI.

Looking at the regional distribution of the N-surplus the increase is concentrated in productive areas that already have high N-surplus in the reference scenario.

GHG emissions – a question of leakage?

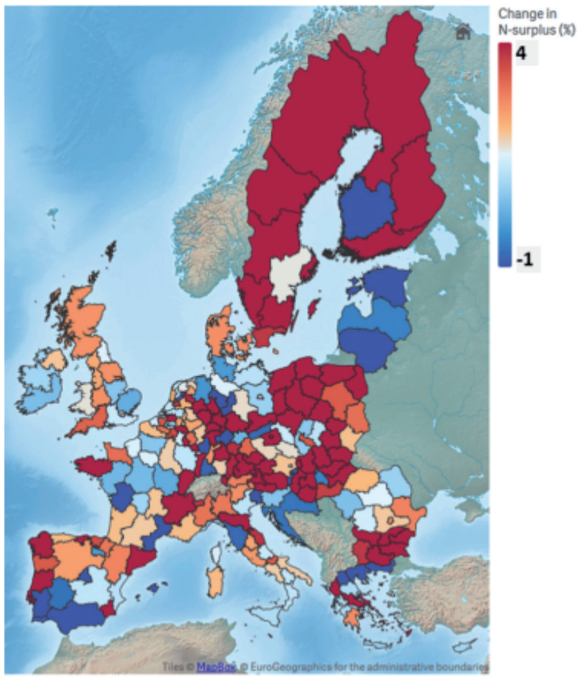


FIGURE 18: NITROGEN SURPLUS PER HA, % CHANGES IN THE LIB&PROD SCENARIO.
Source: Scenar 2030, CAPRI model.

The GHG emissions of EU agriculture follow directly the production developments. Therefore, changes are rather limited in the Inc&Env scenario, with a decrease of 0.5% in EU-28 emissions; however, considerably larger decreases are indicated under the Lib&Prod scenario (–4.2%) and NoCAP scenario (–5.8%). The impact of technological GHG mitigation options is very limited in the scenarios (i.e. the technologies are not widely applied), which is why the predicted GHG changes mirror production changes so closely. Moreover, the GHG emission analysis does not take into account that the land taken out of EU production could be used for afforestation and therefore as a carbon sink. At the MS level, the changes in agricultural non CO2 GHG emissions also reflect the corresponding production changes in the scenarios.

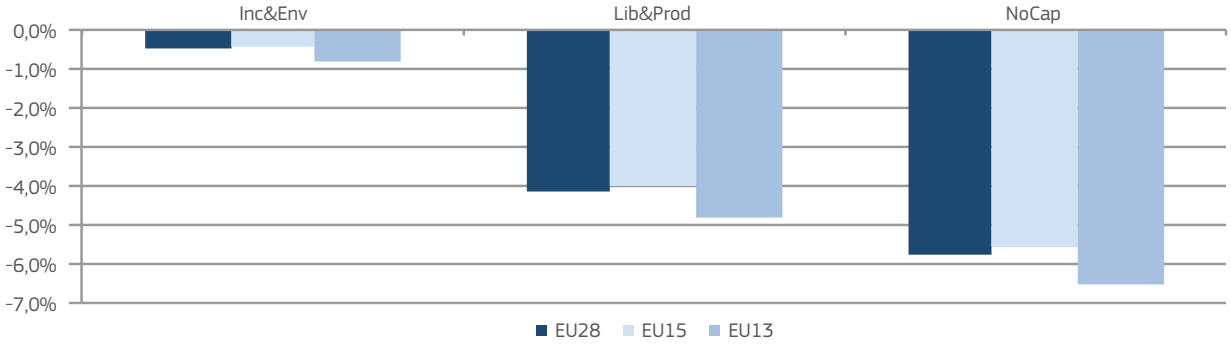


FIGURE 19: CHANGE IN AGRICULTURAL NON-CO2 GHG EMISSIONS (%).
Source: Scenar 2030, CAPRI model.

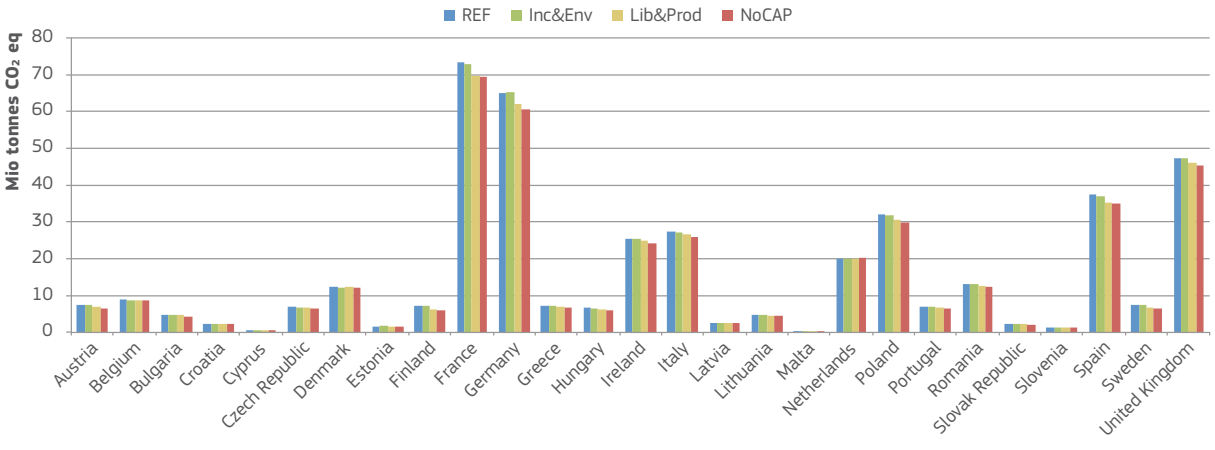


FIGURE 20: AGRICULTURAL NON-CO_2 GHG EMISSIONS IN THE EU MSs (IN MIO TONNES CO_2 EQ).
Source: Scenar 2030, CAPRI model.

From a worldwide perspective, the emission reductions in the EU are widely compensated by emission increases in non-EU countries, mainly due to increased production and exports of agricultural commodities to the EU. This emission leakage effect is for example illustrated by the increase of agricultural GHG emissions in Mercosur or Australia & New Zealand. As a result of emission leakage, the net benefit of EU emission reductions on global agricultural GHG emissions is minimal.

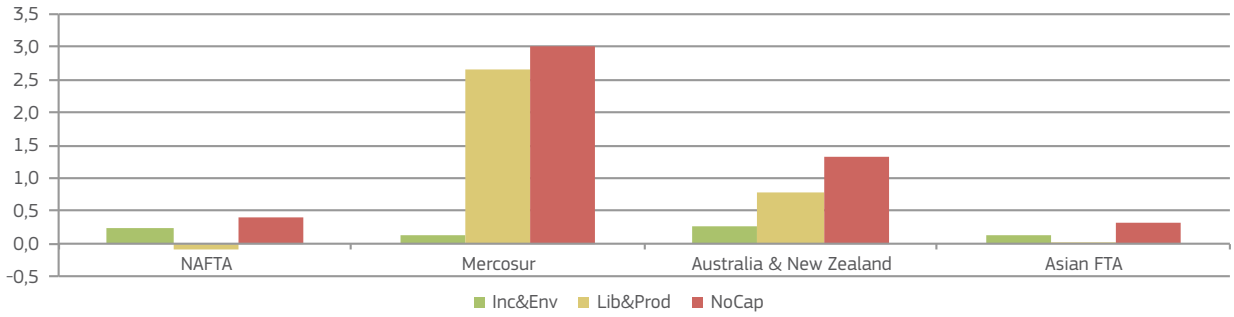


FIGURE 21: GHG EMISSIONS IN AGRICULTURE, DIFFERENT REGIONS, 2030, DIFFERENCE (%) FROM REFERENCE.
Note: Asian FTA means bilateral trade agreements between the EU and Japan, Vietnam, Thailand, Philippines and Indonesia respectively.
Source: Scenar 2030, MAGNET model.

The main caveat in relation to the scenarios' consideration of GHG emissions is that only a rough estimation of GHG emissions is possible. However, the main message is the importance of GHG emission leakage through increased EU imports.

4

SCENAR 2030 AND THE LONG ROAD AHEAD: **ACHIEVEMENTS AND REMAINING CHALLENGES**

4 Scenar 2030 and the long road ahead: achievements and remaining challenges

The present study offers a well-established, model-based agro-economic analysis enriched with new features, providing a framework for future policy analysis. In particular, an attempt has been made to deliver a fully transparent study report, linked to an interactive visualisation of the results.

The scenarios chosen are instructive and show the existence of trade-offs.

In particular, the combination of different types of models allows the analysis of the scenarios from all three sustainability perspectives and on different spatial scales, i.e. from the global market to the individual farm level.

During the course of this study, experiences have revealed repeatedly that the linkage of models is a challenge. Furthermore, the assumptions on the impact of policies on productivity are of particular importance, pointing to the need for more research.

At the time of finalising this report, many uncertainties about the future of the agricultural sector remain. They include the early stage of discussions on the Multiannual Financial Framework (MFF) 2021-2027, the Brexit, the ongoing free trade negotiations, the implementation of COP21 and SDGs, the Renewable Energy Directive, and the evolving bioeconomy among others.

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