Protein policy in Europe

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Presentation summary

The purpose of this presentation is to support discussion about the role of public policy, particularly policy at the European level, in addressing the challenge of optimising Europe's access to supplies of plant protein.

The presentation starts with a reminder of the difference between 'politics' and 'policy'. 'Policy' is a professional activity that turns political vision into change in the real world. The European Union policy system is similar to that in the UK in that there is a clear separation of function between politicians and policy makers, with the policy-making process using science (including economics) and other sources of evidence to test political ideas and develop programmes that deliver on political aspirations. In practice, this means that political ideas alone, no matter how compelling, are not enough. These ideas are tested using science in an apolitical environment. This applies to the CAP too, and the role of science and economics used was noticeable in the political debate leading to the recent reform of the CAP.

Nearly 70 years ago, just about 2 km from where this presentation was made, we can see that citizens of Berlin (slide 4) farming the Tiergarten in front of the destroyed Reichstag. Their priorities to increase food production in Europe recovering from war were shared by the founders of the European Union. This flowed into the Common Agricultural Policy established in 1962. That policy not only met basic food needs, it succeeded in achieving self-sufficiency for a larger population eating well beyond nutritional requirements, particularly for livestock products. Exploitation of the high cereal crop yield potential in Europe provided the backbone of this performance and cereal-based feeds were optimally complemented by imported soy, So by 1984, the problems of oversupply were clear and heightened then by a record cereal harvest in Western Europe. That was the year that dairy quotas were introduced.

The food crisis of 2007-2008 reminded us how successful CAP reform was in reducing surplus production and reminded us too of the importance of food security. Food security has been supplemented by other goals, particularly the protection of the environment. Agri-food is now also increasingly recognised in many countries (e.g. the UK and Ireland) as an important part of the economy that was relatively resilient in the economic crisis from 2008. Policy development has been influenced by broader expectations on the EU, particularly subsidiarity (slide 5). Economic liberalism , has left its mark too and many Member States look first to markets to optimise the allocation of resources and provide solutions to challenges. This at least partly underlies the move towards decoupling in the 2003 reform.

(summary continued on slide 6)

The primary responsibility of policy is to convert political vision into change in the real world

Security

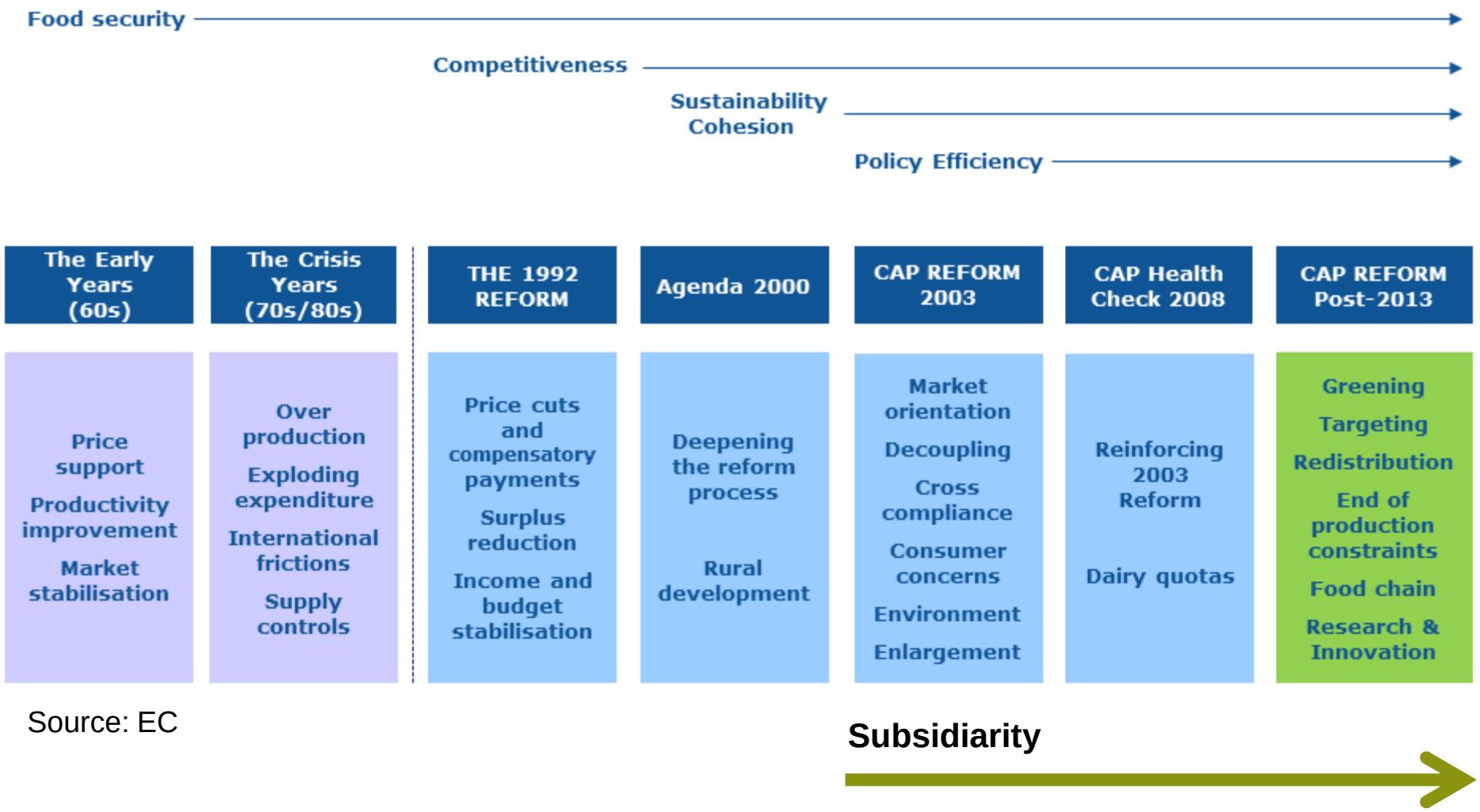
Justice

Protecting and enhancing public goods

Food security

Photo: J. Logan

The history of the CAP is important background



Source: EC

Presentation summary (continued)

Slides 7 and 8 are from the European Commission and provide an overview of the general direction of the current CAP. The question here is what implication has this for a policy on plant protein or protein crops. The map of trade in soy provided by Danube Soya (slide 10) very clearly shows that the trade in soy is one of the world's most significant inter-continental resource flows with well understood consequences in both the exporting and importing regions (slide 12). Considering that protein is about 16% nitrogen, then this is a trade in organic nitrogen with very significant consequences to the global nitrogen cycle and environment. FAOSTAT data for the EU reveal the driver behind this resource flow to Europe: a combination of production technology changes and increased income has led to a large increase in meat consumption in particular that has been met mostly by livestock production in Europe. This increase is most notable for the monogastric animals (pigs and poultry) that rely largely on cereal and oilseeds. It can be said that European agriculture exploits comparative advantage in producing carbohydrate rich cereals and combines this with imported soy to deliver the remarkable achievement of self-sufficiency in most foodstuffs that can be grown in the EU (slide 14). We even have a net cereal export. In addition, despite the very large trade in soy, the EU is also more self-sufficient in plant protein than is sometimes suggested in political circles. While 71% of the protein crop commodity that we use is imported, The EU is actually 71% self sufficient in tradable plant protein, 75% of this is fed to animals, and 90% of imports is soy. The protein content of our cereal crops is twice that of the protein in imported soy (slide 15). So given that we have comparative advantage in cereals, that we are about 85% self-sufficient in plant proteinis (when protein grom grassland is considered), and that our consumption of meat and dairy products exceeds health recommendations, is the use of imported plant protein really a public policy problem?

The European Commission recognises that there is (slide 16). There are a complex range of reasons behind this recognition: environmental (both in the EU and in exporting countries); supply security in a resource-constrained world; and concerns about agronomic imbalances in European crop production.

Continued on slide 20

The reform introduced a new system of direct payments …

Ensuring the long-term viability of farms

- *Providing a basic layer of fixed income support*
- *Making them less vulnerable to fluctuations in prices and income*

Enhancing the sustainable management of natural resources

- *Reflecting the important role of agriculture in the joint delivery of private and public goods*
- *Supporting agricultural practices beneficial for the environment and climate*

Contributing to territorial development

- *Allowing for structural and production diversity*
- *Supporting agriculture in specific areas with significant spillover effects on food supply chain and rural economies*

… while enhancing their efficiency

Improved targeting

- ✓ Active farmer
- ✓ Young farmers
- ✓ Green payment
- ✓ Specific support to territories, sectors and size

More equitable distribution

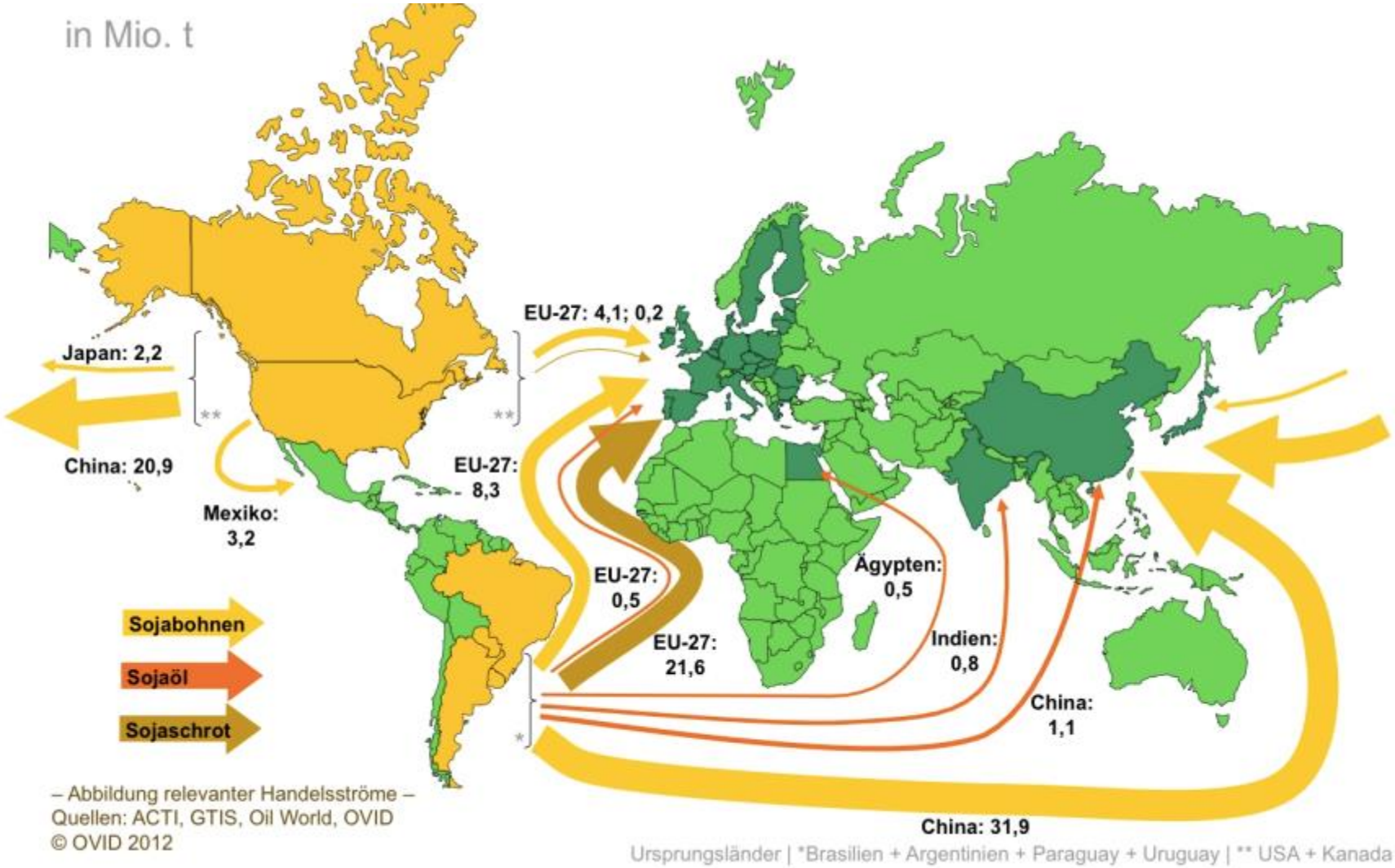
- ✓ Convergence of payments among MS
- ✓ Convergence of payments among farmers
- ✓ Redistributive payment

Greener direct payments

- ✓ Mandatory practices beneficial for environment and climate
- ✓ 30% of direct payment budget
- ✓ Streamlined cross-compliance

The Protein Challenge

Trade streams worldwide soya beans, oil and meal 2011



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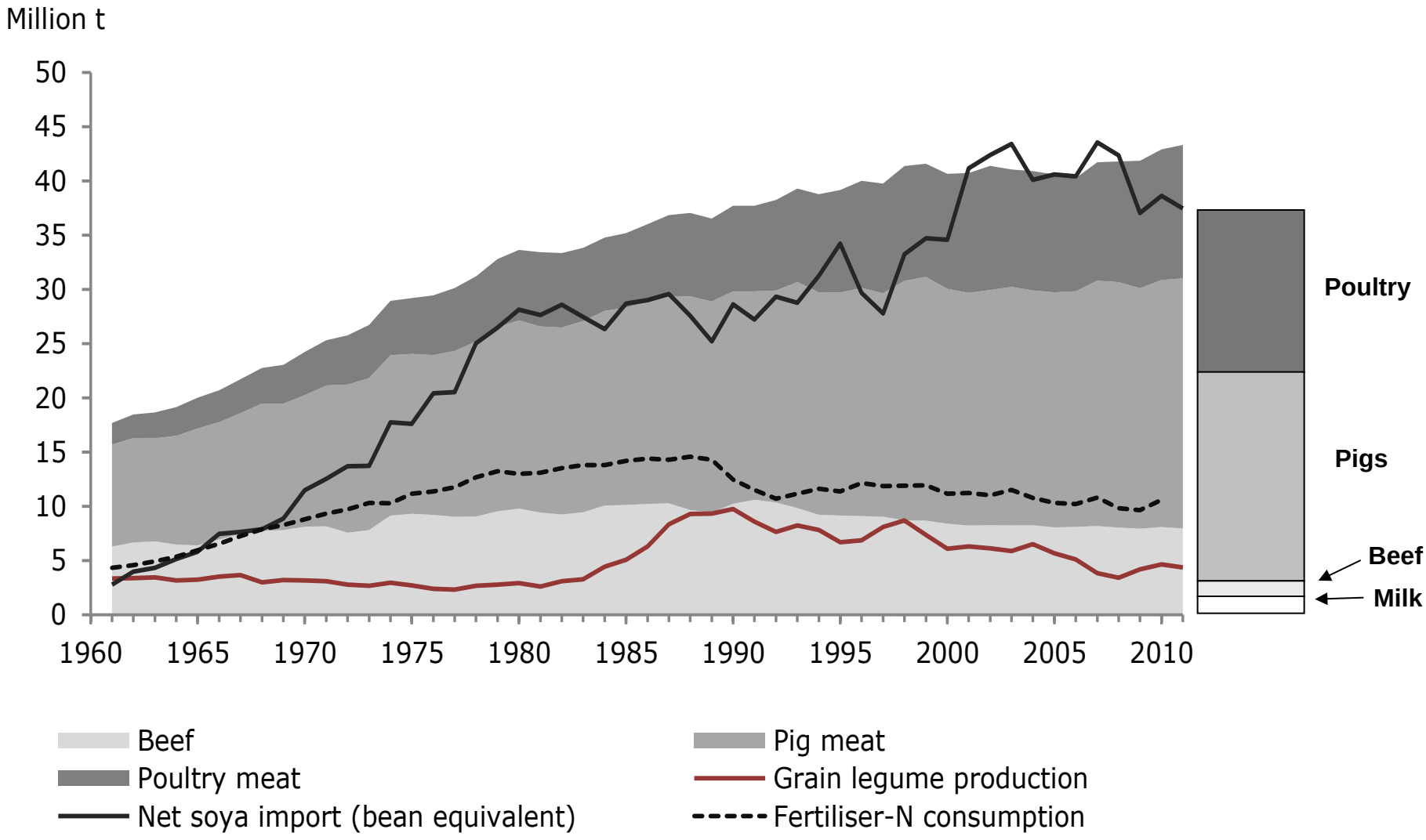
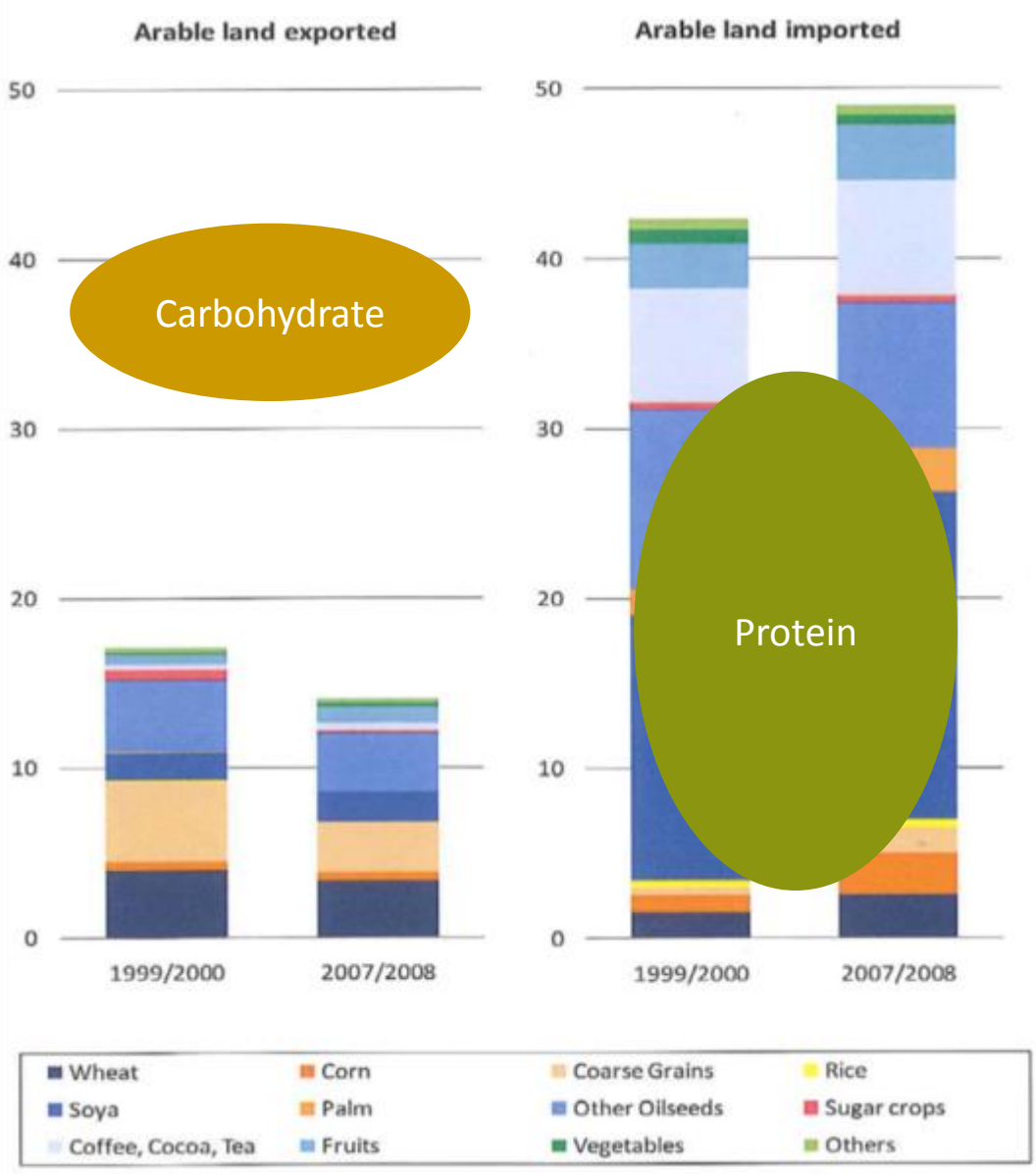
Growth in poultry and pig meat consumption is the driver behind increased plant protein imports



Source: FAOstat 2013.

European livestock production depends on imported protein – and crop land outside Europe

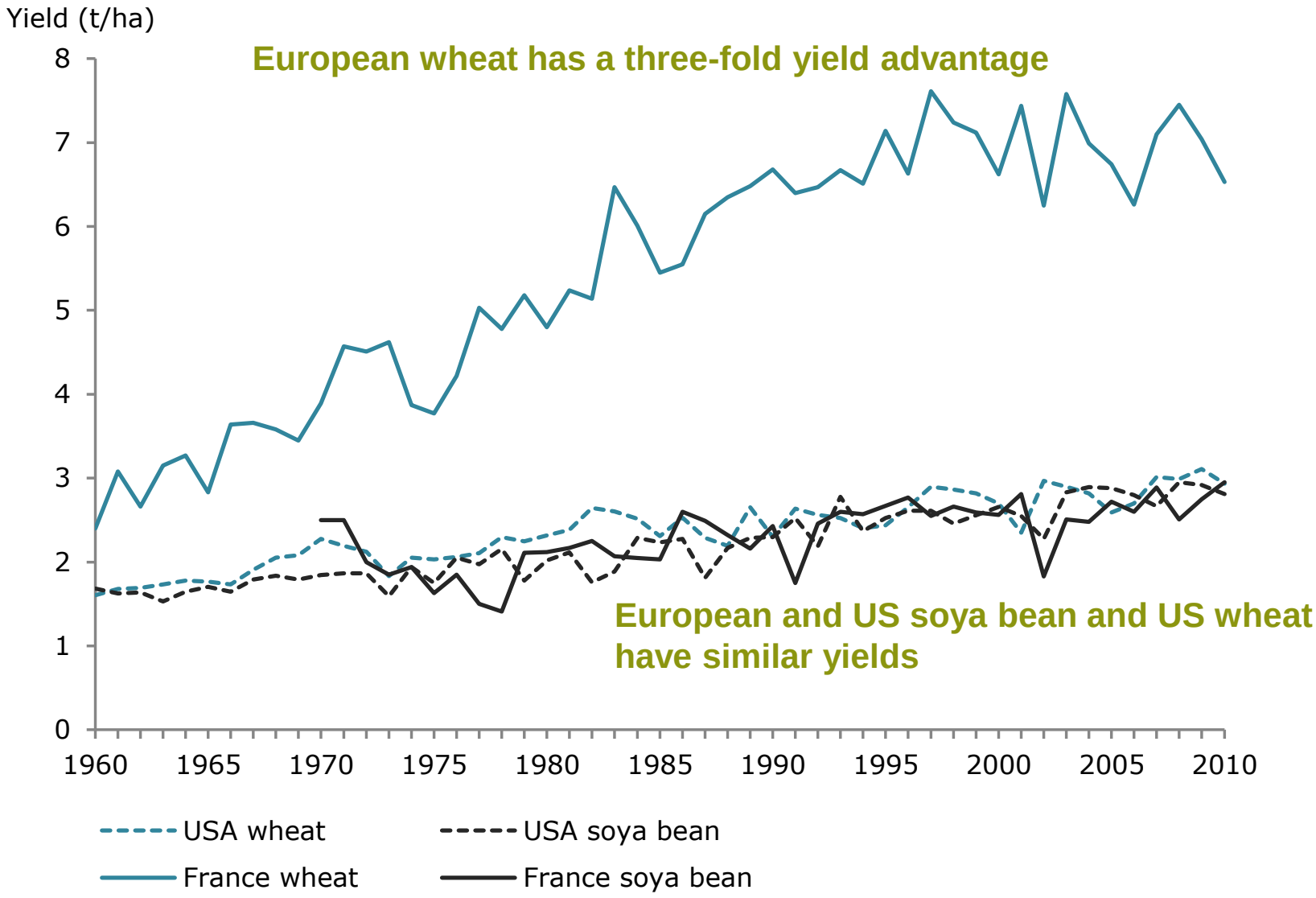


Von Witzke & Noleppe 2010

But is this a policy problem?

Photo: J. Logan

European protein crops are high yielding, but Europe is a world champion in growing wheat



The European (EU) arable plant protein account

	Import	Production	Use in animal feed	Use in food
Protein quantities (million tonnes)				
Soybean	15.13	0.53	15.62	0.04
Oilseed rape	0.57	4.05	4.62	0.00
Sunflower seed	0.68	1.45	2.13	0.00
Palm kernel meal	0.41	0.00	0.41	0.00
Other oilseeds	0.50	0.00	0.50	0.00
Pea	0.02	0.38	0.19	0.21
Faba bean	0.06	0.46	0.30	0.22
Fruit and vegetables	0.14	1.93	0.09	1.98
Cereals	-1.80	29.06	16.38	10.88
Total 'tradable' crops	15.71	37.86	40.24	13.33
Forage maize	0.0	3.85	3.85	0.0
Total from arable crops	15.71	41.71	44.09	13.33

Murphy-Bokern, 2015 (in preparation)

However, the protein challenge is recognised

“The Commission recognises the importance of protein crop production both from an economic and environmental perspective.. trade etc. ….Efforts have been made though to improve the situation:

Flexibility to grant a limited Voluntary Coupled Support (VCS) to protein crops. (16 MS)

Furthermore, in order to maintain the protein- based autonomy of their breeding sector, Member States which decide to use at least 2 % of their direct payment envelope to support the production of protein crops are allowed to use a further 2% of the envelope for the sector.

Allowing such crops as "Ecological Focus Areas" in the framework of the "greening" of direct payments. (27 MS)

Further, research and innovation is of high importance to improve the technologies for production of protein crops and to assure that they remain competitive.”

(From an EC statement – personal communication)

The green direct payment

30% of the direct payment envelope for applying three basic practices :

- Maintaining **permanent grassland**
  - ✓ ban on ploughing in designated areas
  - ✓ national/regional ratio with 5% flexibility
- **Crop diversification**
  - ✓ at least 2 crops when the arable land of a holding exceeds 10 hectares
  - ✓ at least 3 crops when the arable land of a holding exceeds 30 hectares
  - ✓ the main crop may cover at most 75% of arable land, and the two main crops a maximum of 95% of the arable area
- Maintaining an **"ecological focus area"** of at least 5% of the arable area of the holding
  - ✓ only applicable for farms with more than 15 hectares arable land.
  - ✓ figure may rise to 7% after a Commission report in 2017 & a legislative proposal
  - ✓ EFAs may include: field margins, buffer strips, fallow land, landscape features, afforested area, terraces, areas with catch crops, green cover and nitrogen fixing crops, short rotation coppices, agro-forestry, strips of land along forest edges

Equivalence: MS can decide that, instead of applying these three practices, a farmer can undertake practices which are considered equivalent (e.g. crop rotation instead of crop diversification).

VCS: sectors supported

Sectors mostly supported:

- ✓ Beef and veal: 24 MS, 42% of total VCS envelope for 2015
- ✓ Milk and dairy products: 19 MS, 20% of VCS envelope
- ✓ Sheep and goatmeat: 22 MS, 12% of VCS envelope
- ✓ Protein crops: 16 MS, 10% of VCS envelope
- ✓ Fruit and vegetables: 19 MS, 5% of VCS envelope
- ✓ Sugar beet: 10 MS, 4% of VCS envelope

Regional targeting in the UK (beef and veal and sheep), IT (olive oil, protein crops, grain legumes, durum wheat and soya) and PL (hops)

No support for cane and chicory, short rotation coppice, dried fodder

Policy options within the CAP

- **Crop diversification requirements (Greening in Pillar 1)**

- **Inclusion of legume crops in ecological focus areas. 27 Member States (Greening in Pillar 1)**

- **Voluntary coupled support schemes (2% of DP). 16 Member States. (Direct support under Pillar 1)**

Presentation summary (continued)

With the recognition by the policy community of a protein challenge, what effect are new CAP reform policy measures likely to have. To address this, these policies were simulated with the Common Agricultural Policy Regional Impact (CAPRI) model. It is a partial equilibrium model for the agricultural sector and, as the name indicates, it is capable of specifying the impact of CAP measures on farmers' behaviour for each region. Like most economic models, CAPRI is designed to simulate effects in the short and medium term. Therefore, we have modelled 2020 as the target year. The model contains parameters for all crops that are grown in a region, not for those that might perhaps be grown.

The results show that with a continuation of current trends **(business as usual)** with no policy action, the area under pulses will decrease further by 327,000 hectares or 24%. However, cultivation of soybean will increase by 213,000 hectares or 70%, meaning an overall net loss of 114,000 hectares for grain legumes, or 7% of the grain legume area in 2009. Strong increases are due to an expansion of soybean cultivation in countries where the climate is suitable. These increases are particularly noticable according to the model in the Danube Soy region. This simulation does not take into account the effects of efforts to improve farm practice or the effects of declines in the competitiveness of other crops due to the effects of monoculture etc.

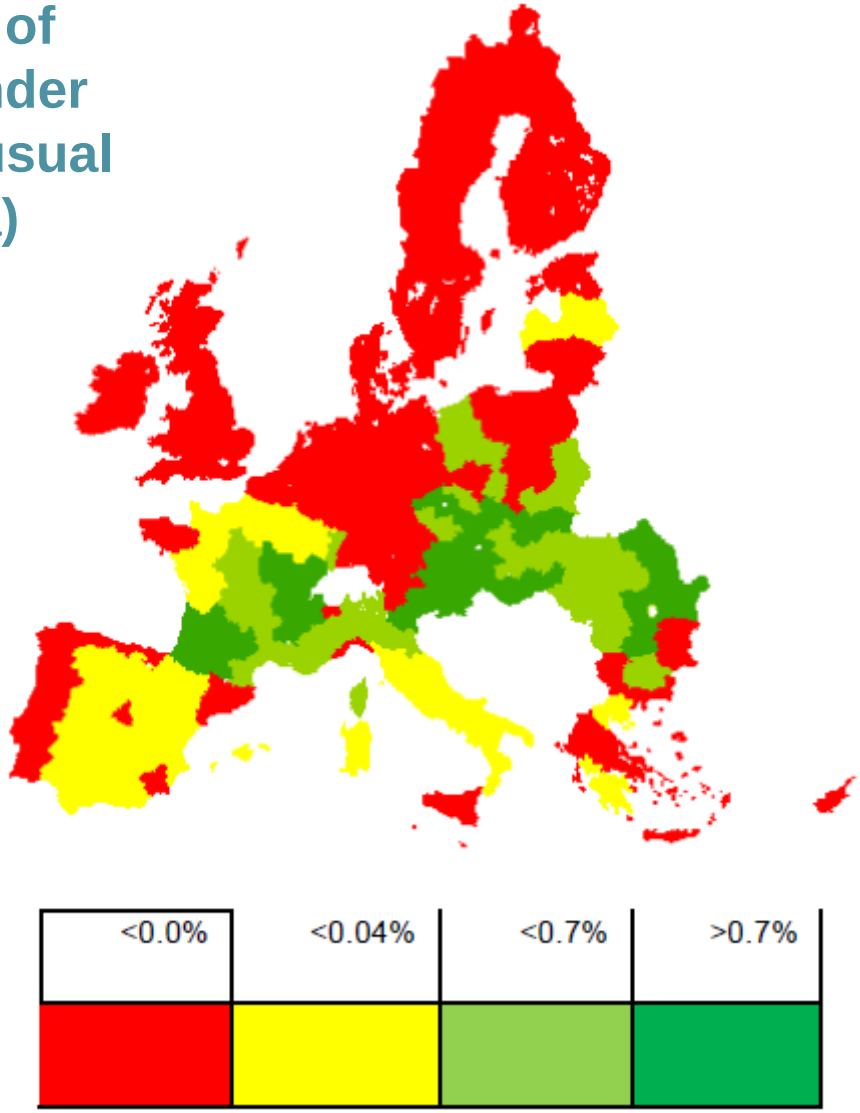
Continued on slide 23

Business as usual – no policy action

Analysis using CAPRI:

- **To 2020, 24% reduction in pulses (327,000 ha)**
- **7% increase in soy: 213,000 ha**
- **Net grain legume loss of 114,000 (7%)**

Changes in the production of soybeans under business as usual (% of area)



Helming, J., Kuhlman, T., Linderhof, V., and Oudendag, D. 2014. Impacts of legume scenarios. Legume Futures Report 4.5. Available from www.legumefutures.de

Presentation summary (continued)

For assessing the effect of the **Voluntary Coupled Support (VCS)** as a policy approach, we have defined the premium in such a way that up to 2% of the CAP budget for direct farm payments (Pillar 1) in any one region is allocated to legumes. We have constrained the model so that the premium cannot be higher than the average direct farm payment per hectare at national level. The resulting annual payments simulated here range from € 70/ha to €425/ha. Our results indicate that such a policy will lead to an increase of the area under grain legumes of 12% in 2020 compared to the reference scenario. The effect differs between regions, with some regions even experiencing a decrease in the area under legumes. Reductions probably due to price changes: as more legume products come onto the market, the price will be reduced and this will make cultivation unattractive to some farmers. In our simulation, this is the case in Romania and Bulgaria because we simulate that direct farm payments are lower to begin with, so the premium may not be sufficient to offset the lower price for the produce (slide 24). In interpreting this result it must be remembered that it is a model simulation about one specific policy measure; it is not a prediction of production change which may be affected by other factors, particularly production technology improvements and changes in the productivity of competing crops. These countering factors are currently important in some countries, notably Romania and Bulgaria.

Apart from the increase in area under legumes, the policy will have other effects on land use. Firstly, cropland expands by about 42,000 hectares compared to the reference scenario, but some land in some places will be taken out of production and converted into woodland. This will occur on 27,000 hectares, or 0.015% of the total utilized agricultural area (UAA), mostly in Scotland and Spain (according to this simulation).

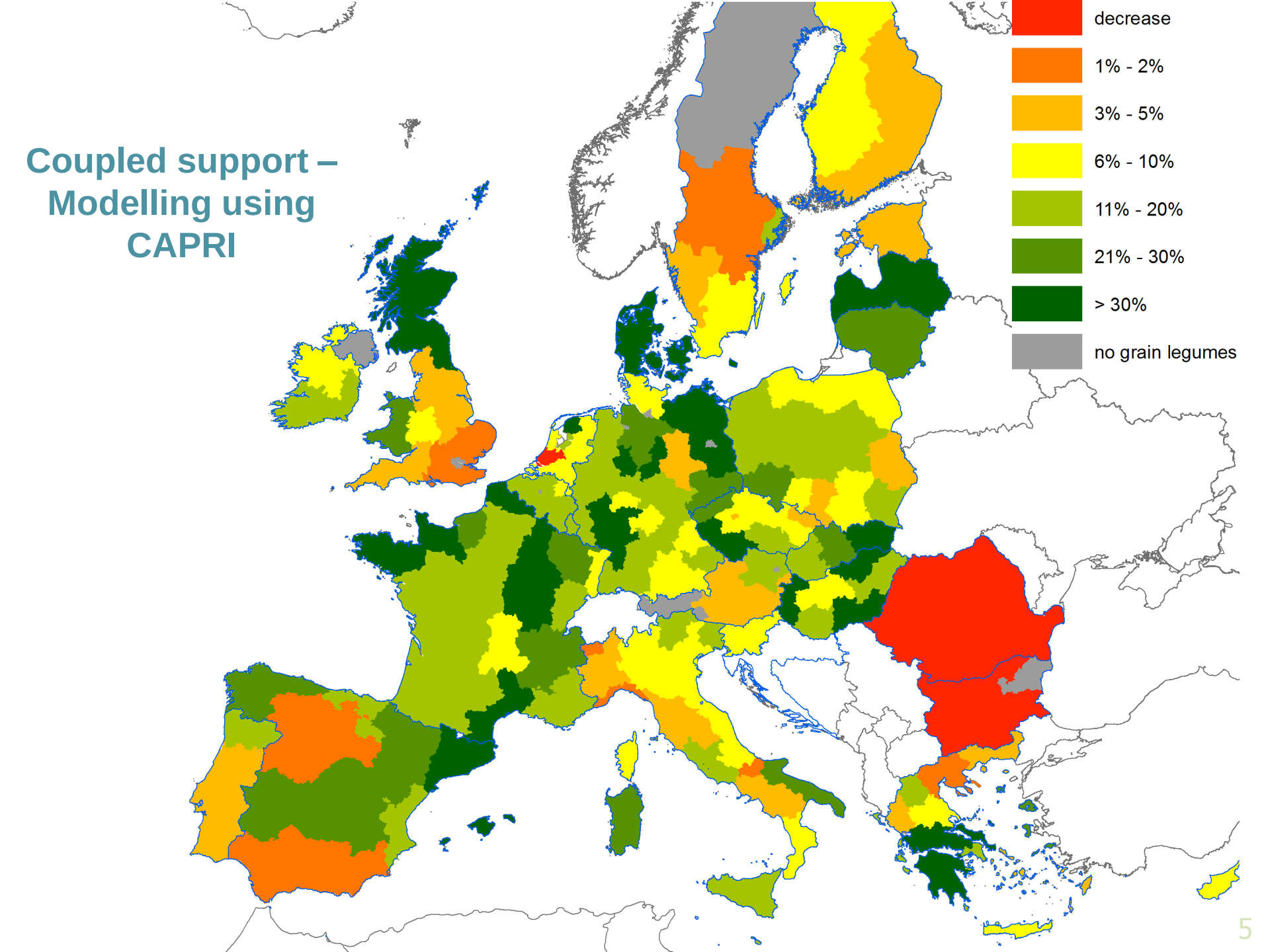
Economic effects of the VCS include lower imports of soya and pulses; redistribution of direct farm payments in favour of farmers who grow legumes at the expense of those who do not; an increase in overall farm income by 0.08%; a slight advantage to consumers (€36 million) due to price effects. There is a cost to taxpayers (€ 50 million), and since consumers are also taxpayers there is no net gain**.** The net effect on the economy is a positive €139 million.

Continued on slide 25

Voluntary Coupled support – Modelling using CAPRI

- Payments would vary from 70 Euros/ha to 425 Euros/ha
- 12% increase in grain legume area
- Could increase pressure on grassland
- Could reduce arable production on marginal land due to reduced direct payments (27,000 ha or 0.015%).
- Overall increase in farm income (0.08%) and GDP (139 million Euros)
- Small benefit for consumers via feed prices

Coupled support – Modelling using CAPRI



Presentation summary (continued)

If growing legumes fulfil the **Ecological Focus Area** requirement, the farmer would choose between growing legumes and other options, including fallow: simply not using the land, buffer strips, hedges or some other form of semi-natural vegetation; and catch crops in some regions. Overall, we forecast an increase in uncultivated land of almost 3 million hectares while legumes increase by no more than 50,000 hectares relative to the reference scenario. These results seem counter-intuitive. To understand this, we must consider that the costs and revenues of growing legumes vis-à-vis leaving the land fallow are different in each region. In regions which are more marginal for growing legumes, these will therefore become less competitive due to a decrease in price, making fallow even more attractive than before.

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Continued on slide 28

Ecological Focus Area

Analysis using CAPRI:

- **Increased in uncropped area of 3 million ha**
- **Only small increase in legumes (50,000 ha)**

Presentation summary (continued)

And what about measures outside the CAP. We have considered two: a meat tax and a carbon tax. The meat tax policy is implemented in such a way that 2.5% of meat consumption is substituted for by vegetable proteins, in particular pulses. A subsidy is applied pulses, until their consumption rises by an amount equivalent to 2% of meat consumption. The result is achieved by taxing meat production by an average 7% of the margin between producer and consumer price, and by subsidizing the same margin in the pulse price by, on average, 50%. CAPRI projects a decrease of meat consumption by 1.1 million tonnes or 2.5%, whereas human consumption of pulses goes up by 865,000 tonnes or 72%. Net exports of meat increase and so do net imports of pulses; moreover, less pulse produce is used for animal feed. On balance, production of meat decreases by 1.5% and domestic production of pulses increases by 2.9%. The area under pulses increases proportionally to the increase in production, but the production of soybeans does not increase: the decrease in meat consumption keeps its area stable. Hence, the increase in area under legumes as a whole for the EU-27 is only 25,000 hectares. Farmers' income declines under this scenario, particularly in areas with few legumes but much livestock, such as over much of northwest Europe and throughout France.

For a carbon tax, a carbon tax equivalent to €72 per tonne of CO_2 equivalent emitted is used. The cultivation of legumes would increase by 62%, to 3.5 million hectares in 2020 – with increases almost everywhere (slide 28). Livestock farming would become less profitable, and total utilized agricultural area would decrease by 1.6%. There would be a shift from intensive to extensive grassland. The net effect on average farm income would be small as the revenue from the tax is returned to the farming sector in the form of rewards for mitigating greenhouse gas emissions.

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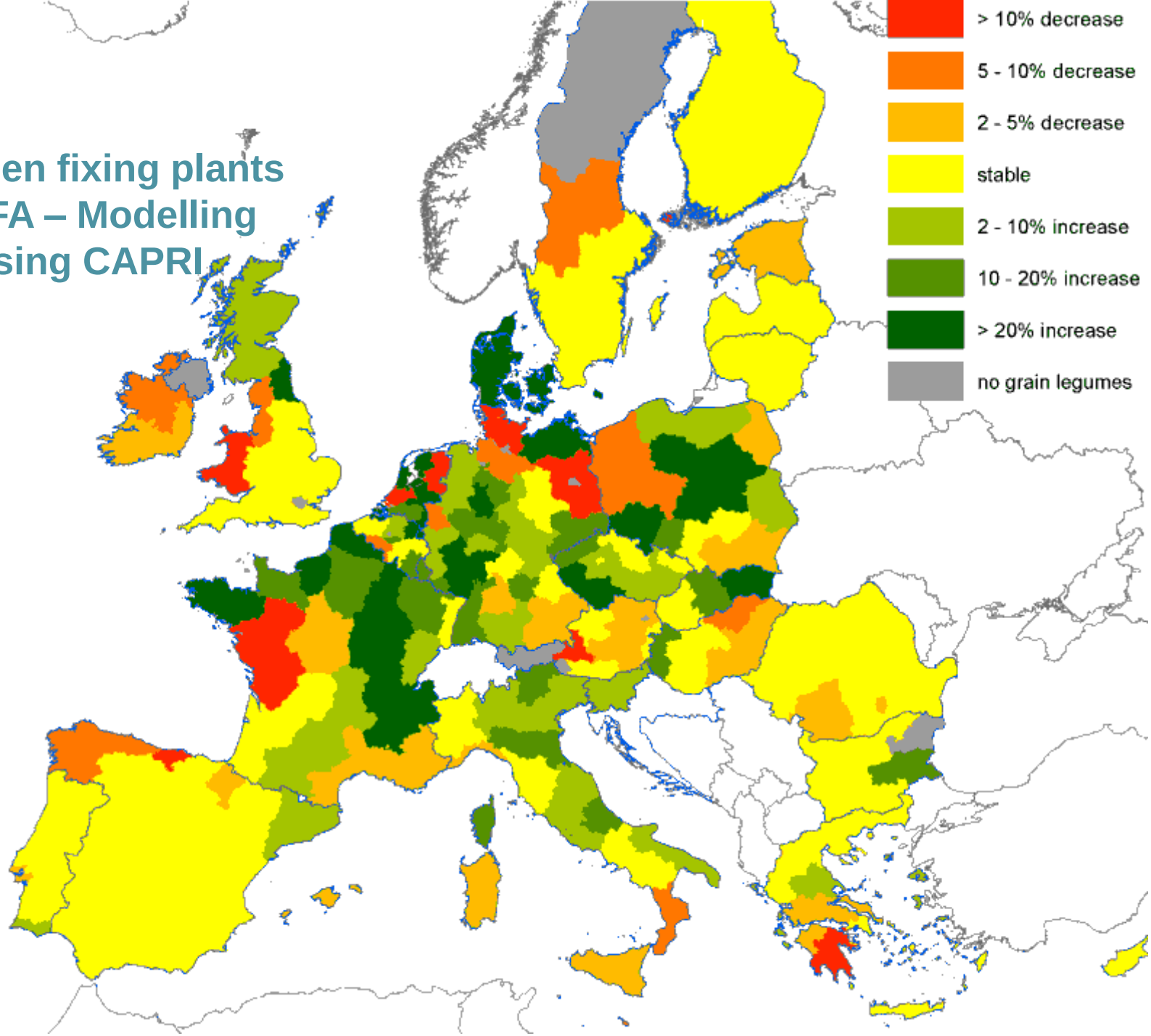
Continued on slide 34

Nitrogen fixing plants in EFA – Modelling using CAPRI



Meat tax (hypothetical)

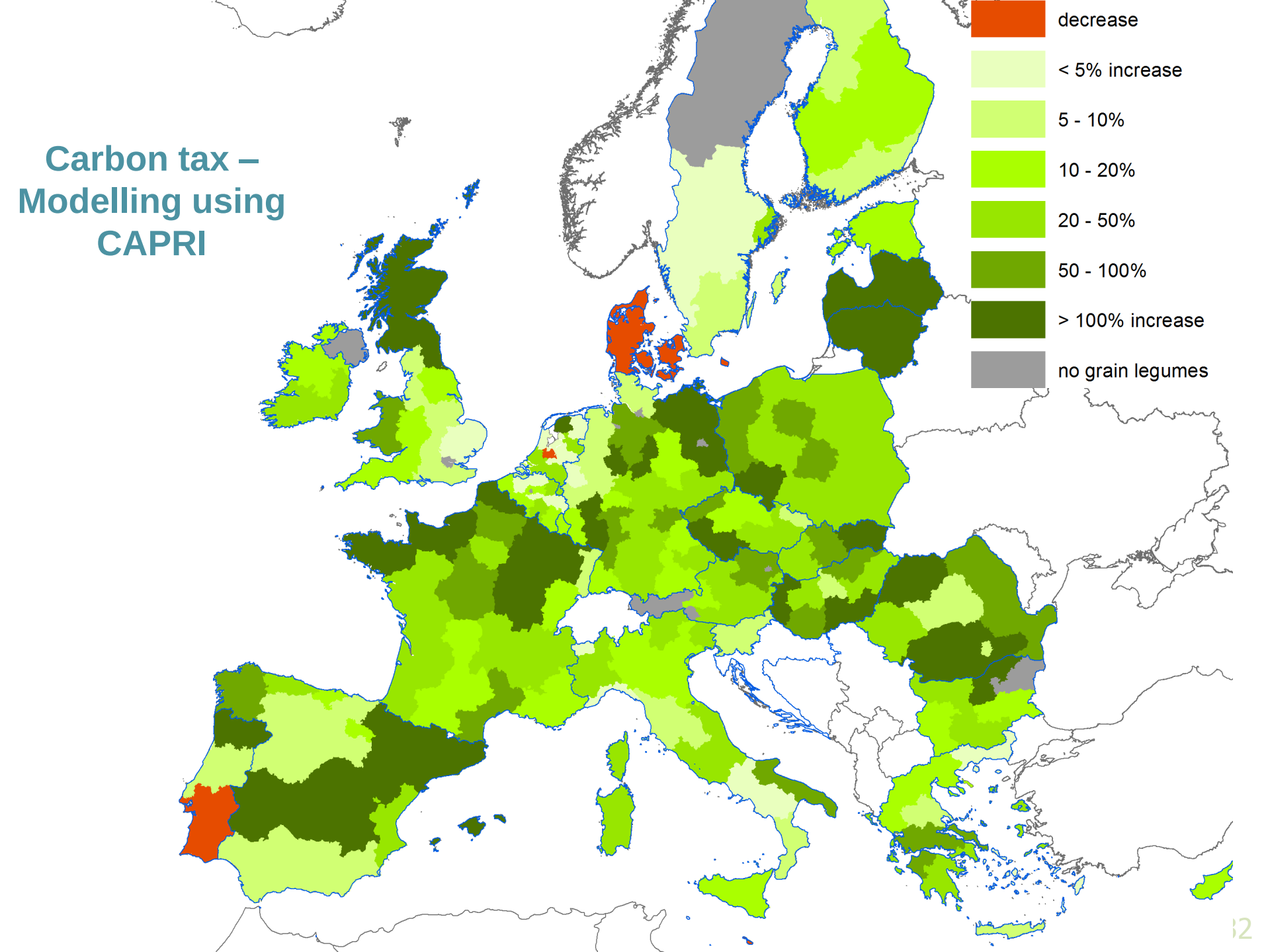
7% tax on meat, 50% subsidy on pulses to reduce meat consumption by 2.5%:

- **Pulse producer prices rise**
- **Pulse production increases by 2.9%, soy remains stable**
- **Pulse consumption increases by 865,000 tonnes (72%)**
- **Meat production decreases by 1.5%, lower farm income**
- **Decline in GHG emissions due to reduced meat production**

Carbon tax (72 Euros/t CO2)

- 62% increase in grain legumes
- Decline in livestock farming
- Decline in agricultural area (1.6%)
- Lower land prices: extensification
- Overall neutral farm income effect due to transfers with C credits

Carbon tax – Modelling using CAPRI



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Review

Magnitude and farm-economic value of grain legume pre-crop benefits in Europe: A review

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ABSTRACT

Grain legume production offers multiple environmental benefits and can enhance sustainability of European farming, but their production area is declining constantly. Grain legume competitiveness is frequently constrained by lower gross margins compared to agronomically suitable cropping alternatives, but it can be improved by appreciating their ability to increase yield of subsequent crop(s) and, potentially, to reduce input requirements (fertiliser, biocide, tillage). Information on the magnitude of grain legume pre-crop effects is diverse and has not been synthesised for European agriculture. This paper reviews research on pre-crop benefits to yield and input requirements of subsequent crops, and the farm-economic profitability of grain legumes in European cropping systems. This includes an analysis of the magnitude of pre-crop benefits to cereal yields measured in 29 experiments in Europe; and 19 studies on grain legume gross margins ranging from crop to cropping system level are assessed. In the available studies, yield benefits of legumes to subsequent crops are highest under low nitrogen fertilisation to subsequent crops and fertilisation can be reduced by 60 kg N ha^{-1} on average under maintenance of acceptable yields. With the aim at maximising yield potential, nitrogen fertilisation following grain legumes can be reduced by 23–31 kg ha^{-1}, and cereal yields are mostly 0.5–1.6 Mg ha^{-1} higher than after cereal pre-crops. With adequate estimates of pre-crop benefits, gross margins of full crop rotations can better assess grain legume competitiveness. In the studies reviewed, 35 of 53 modelled crop rotations with grain legumes were competitive with comparable non-legume rotations. Grain legume rotations were more competitive under conservation tillage systems if gross margin calculations accounted for cost savings arising from adjusted machinery requirements. In conclusion, grain legume pre-crop value is a crucial component of their farm-economic profitability in European cropping systems, but further experimental research is required to ascertain its magnitude. Expanding profitability measures to consider pre-crop effects substantially increases the number of situations where grain legumes can compete with cereals, and has a small positive effect on their competitiveness with alternative break crops. Besides a better consideration of the pre-crop value, further genetic and agronomic improvement in legume cropping, supportive market development, and policy support are required if Europe is to utilise environmental benefits of legumes and increase the sustainability of its farming.

Presentation summary (continued)

Our analysis indicates that measures which can be included in the Common Agricultural Policy with relative ease are unlikely to reverse the trend of declining legume cultivation in Europe. Only much bolder policies, such as an ambitious climate change strategy, could achieve that.

Concluding from our research, the most promising way to promote grain legumes would be through a policy taxing greenhouse gas emissions at a fairly high rate; that policy would not be restricted to the agricultural sector, and produce a much wider impact than analysed here. An additional policy would be needed to promote forage legumes in grassland; we have shown only one example of such a policy, but inventive policy-makers may well come up with better ones. Our modelling exercise did not discuss management practices such as rotation patterns with legumes. CAPRI is not equipped to deal with them, but legume-friendly policies may well consider such aspects.

We know from recent research in Legume Futures that grain legumes crops are more profitable at farm level than is indicated by simple crop gross margin analysis (slide 33). An integrated policy pproach that combines public and private efforts and public and private gains is required. Financial incentives are only one way of influencing farmers' behaviour. Progress in research on legumes, and the application of this knowledge to local conditions (as is supported by the European Innovation Partnership under the CAP) and farm improvements such as is promoted by Danube Soya may well make them more attractive than they are today. The message here is that promoting technical change so that the economic yield of grain legumes rises faster than that of competing crops will over years provide a sustainable basis for reducing reliance on imported soy.

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Photo: J. Logan

- **Multiple and complex public effects point to integrated policy development using complementary policy measures.**
- **There are no “silver bullets”**
- **Increase the productivity of legume crops faster than other options – R&D.**

Policy options within the CAP (continued)

- **Legumes via agri-environment schemes (Pillar 2)**

- **Organic farming**

- **Investment into research, breeding, and technical progress**

- **Support producer initiatives (e.g. Danube Soya)**

General conclusions

There has been a slow but steady move over 20 years towards a policy aimed at public goods, particularly the environment.

The economic contribution of European agriculture in a resource constrained 'free-trade' world is increasingly recognised.

Political choice between policy efficiency and special interest groups.

Agricultural policy is not simple.

Acknowledgements

www.legumefutures.de