# BIODIVERSITY, NOT SOYA MADNESS!

## HOW TO SOLVE THE LONG-STANDING PROBLEM OF PROTEIN DEFICIENCY IN THE EU

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A REPORT COMMISSIONED BY MARTIN HÄUSLING, MEP

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# IMPRINT


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# PREFACE BY MARTIN HÄUSLING, APRIL 2013

## WHEN MEAT PRODUCTION BECOMES COUNTER-PRODUCTIVE

The ability of ruminants (cattle, sheep and goats) to turn pastureland that is of little use for food production into tasty, nutritionally valuable products like beef and milk is one of the main reasons why people started using these animals and their products in the first place.
Not only do such animals extend the range of available human foodstuffs; they play an important part in the production process, producing manure, helping to work the soil, working as draught animals, providing transport, processing waste and stabilising their owners' food security. Without them, vast expanses of land, especially in subtropical climates, would be virtually useless for human food production. In this respect they certainly enrich our lives.

However, the sheer scale of meat production and consumption in the European Union today is having far from an 'enriching' effect and cannot be deemed a sensible use of pastureland. For some time now, high imports of soya have for been a key driver in the development of European agriculture, favouring the spread of intensive animal husbandry. Such livestock farming methods are not only extremely fuel- and energy-intensive, damage both the climate and the environment and should be rejected for animal welfare reasons; they are also unjustifiable with respect to 'feeding the planet', because in the countries where the soya used to feed this livestock is grown they are squeezing out smallholders and causing extensive damage to the landscape and soil.

The nub of the problem here is not that we keep livestock and include meat in our diet, but rather that with the animal husbandry and feeding practices in widespread use today, feed needs are starting to compete with food needs.

Europe's dependence on imported protein for this cast scale of meat production also poses major threats to many European farmers. The credo in recent years has been that farmers should produce for a world market price that does not even cover their European production costs, let alone make a profit. Furthermore, animal production in Europe, being based on a so-called import-based 'remote feed' system, is directly dependent on price fluctuations on global markets. Many farms are unable to absorb these and give up.

We really need to get animal husbandry and milk and meat production back on track again. Farmers need to be given the prospect of a less dependent source of feed, we need to adopt a more localised approach, focus more on quality and create more value added for Europe's farmers and regions alike. There could also be positive consequences in it for our climate, soil, water and biodiversity.

In our report published in 2011, entitled The EU protein deficit: what solution for a long-standing problem?, we Greens presented an ambitious, forward-looking report that greatly stimulated the debate on the reform of the EU's Common Agricultural Policy (CAP) over the period 2014-2020 - see http://gruenlink.de/2yz.

Nonetheless, as things currently stand in 2013, so far not much headway has been made because too many interests are standing in the way of progress. Regrettably, the protein shortfall was only half-heartedly topicalised in the CAP reform, though at least protein crop cultivation will be incorporated in the stipulations on 'greening'.

Europe is still a long way off from taking a critical view of its division of labour with the USA and South America in the agricultural trade. A free trade agreement between the EU and the USA is definitely not conducive to making Europe more autonomous in the animal feed sector or promoting intra-European competitiveness for domestically grown legumes. On the contrary, Europe - which is already dependent on soy imports - runs the risk of also seeing gene technology which the EU rejects finding its way over here on a massive scale.

We Greens intend to continue supporting the wise and worthwhile expansion of domestic protein crop cultivation. To this end, in 2011 the study collected valuable information underpinning the multiple benefits of such an approach. The study also described the tremendous difficulties involved, suggested potential solutions and pinpointed areas where action needed to be taken.

Two years on, in 2013, the study Biodiversity, not soya madness! is just as valid as it was back in 2011.

I agree wholeheartedly with this study's closing sentence: "We should rediscover these crops and make use of the benefits they offer!"

Martin Häusling, April 2013

# 1. EU PROTEIN IMPORTS

## 1.1 LAND-GRABBING WITH KNIVES AND FORKS

Over the past decade, the cultivation of protein crops in the EU has declined sharply, plummeting by 30% for the main pulses (excluding soybeans) and by 12% for soybeans. Only a fraction of all protein feed for animal production is currently grown in the EU, and protein crops are currently grown on a mere 3% of all the arable land in the Union (in Germany the figure is now just 1%). Increasingly, farmers are dropping legumes from their crop rotation, so the benefits of their cultivation are being lost.

Meanwhile, every year more than 40 million tonnes are imported into the EU, a total equivalent to almost 80% of the amount consumed there. Outside Europe, protein crops for European animal production are cultivated on around 20 mio ha of land (LMC 2009).

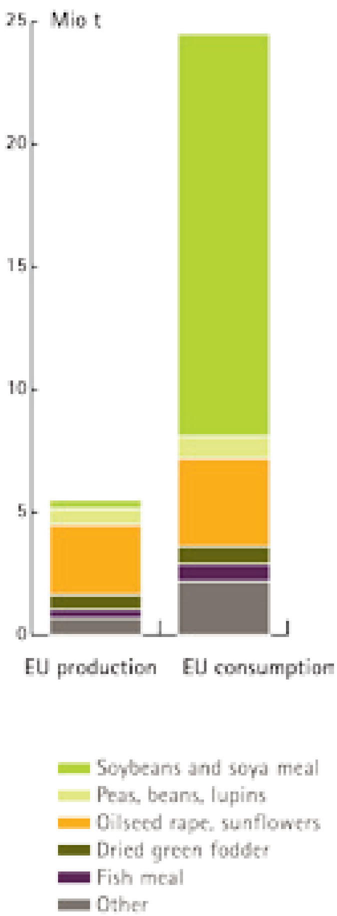
This kind of land management not only places a burden on the environment in Europe, due to the impact of intensive animal husbandry; it also provokes an intensification of agriculture in other regions of the world, promoting the spread of monocultures and polluting the environment. The land used to satisfy our very calorie-rich diet is thus no longer available to produce the food consumed by a majority of people around the world. In the ongoing international debate, evenness of distribution is not a parameter usually considered in connection with land use, yet distribution here is just as non-equitable as with other natural resources: the vast majority of land is used by people from industrial nations, who use a larger proportion of it than is due to them, including us Europeans.

## 1.2 THE CONSEQUENCES OF THE CURRENT INTERNATIONAL DIVISION OF LABOUR

The sharp decline in protein crop production in Europe stems primarily from past international trade agreements, like the General Agreement on Tariffs and Trade (GATT) and the Blair House Agreement, which gave the EU more freedom in cereal production in return for allowing
duty-free imports into the Union of oilseed and protein crops, above all from the USA.

GATT turned the European Union from a net grain importer into the world's second largest grain exporter to the USA, not only in light of the mounting intensification of cereal production, but also because soybeans replaced cereals as a staple in animal feed. The duty-free imports accorded to the USA, and later on also to South America, made the price of forage soybeans in Europe approximately 40% less than the cost of a grain mix of equivalent nutritional value. In 1950-1951 the proportion of cereals in feed concentrate was around 79.1%, whereas by 1994-95 it had dwindled to a mere 29%. This lower cereal content in animal feed duly paved the way for grain exports on a massive scale. At the same time, the USA and South America seriously stepped up their soybean cultivation and started exporting soya to the EU. This division of labour has promoted virtually 'landless' animal husbandry, led to extremely one-sided crop rotation and created pronounced international (inter)dependence.

**The shortage of protein-rich animal feed in the EU-15 2003/04**




Source: GL-Pro (2005)

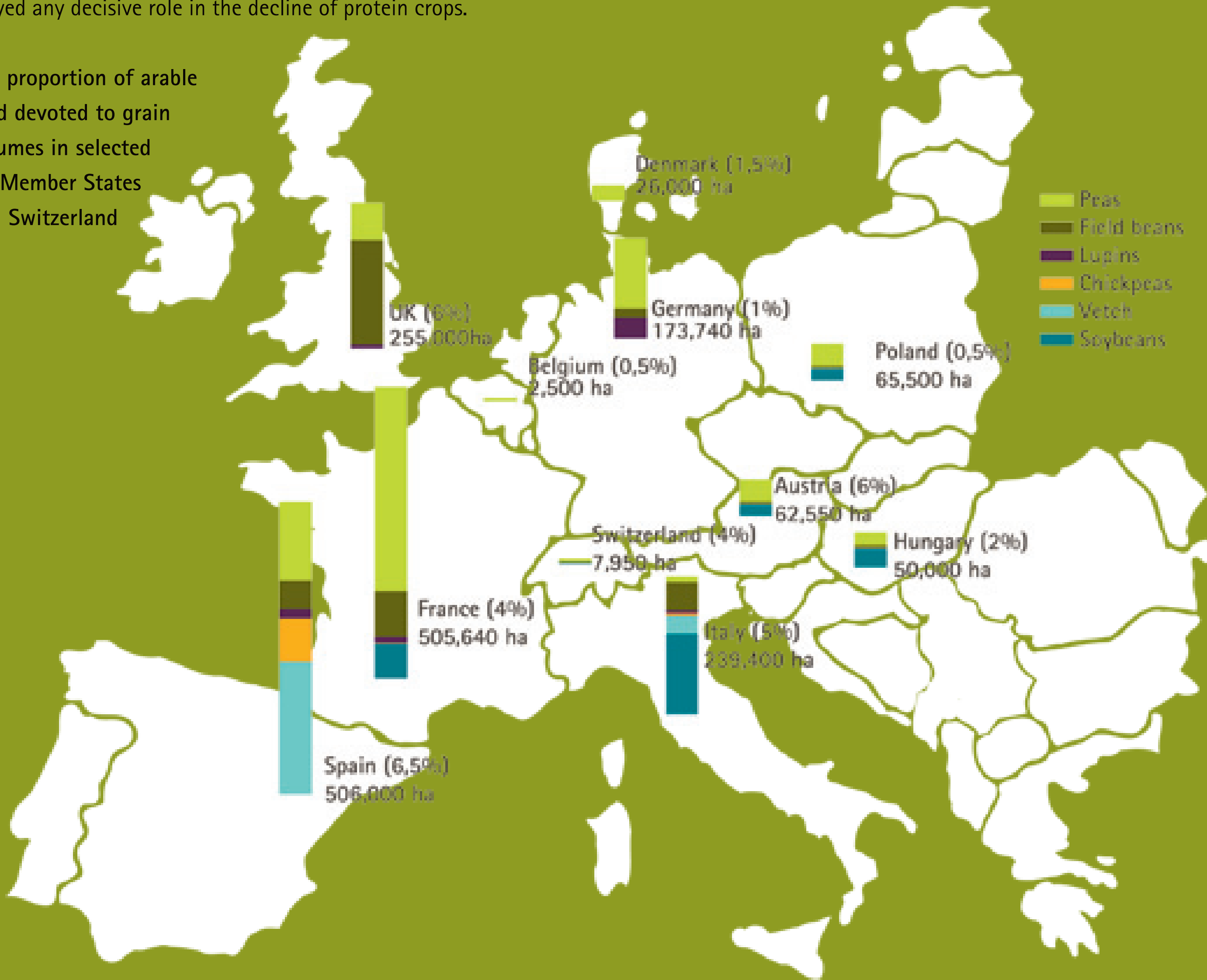
# 2. THE COST

## 2.1 EUROPE'S LOSS OF LEGUMES

Cheap imported soya from the USA and low-cost mineral fertiliser have made it unattractive to produce leguminous forage and cultivate legumes to fix nitrogen in the soil. Moreover, the development of varieties of maize adapted to grow in a Central European climate have made that crop a more popular ingredient of animal feed. Its lower protein content could be compensated by very protein-rich meat and bone meal, the use of which was permitted until 2001. Corn silage not only provided greater yield reliability and feed security than grain legumes, but also meant easier cultivation and harvesting. However, a study conducted by LMC-International (LMC 2009) on behalf of the European Commission concluded that the decoupling of direct payments (which were awarded as lump sums per hectare instead of on a yield-dependent basis from 2003 onwards) had not played any decisive role in the decline of protein crops.

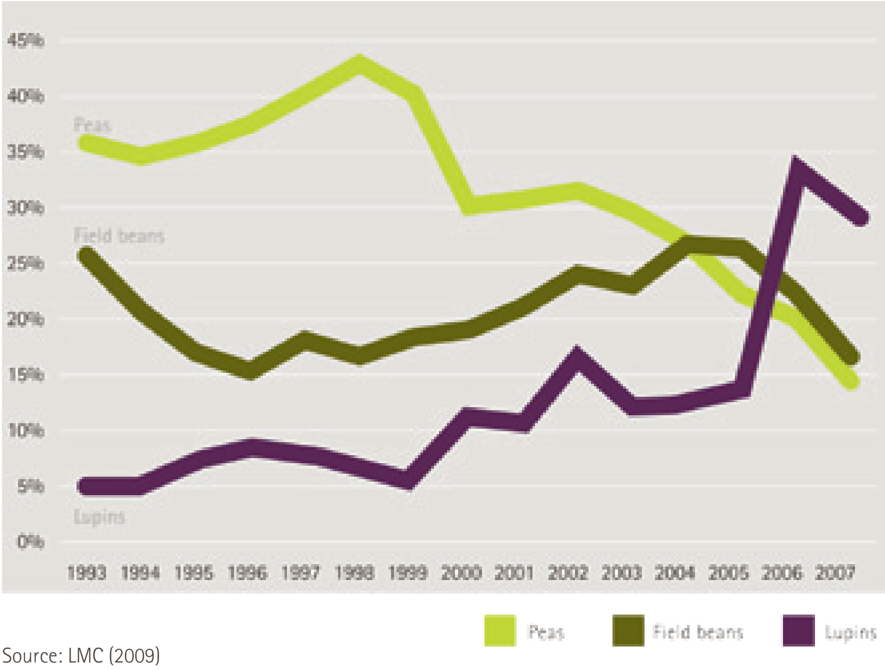
These changes markedly lowered the competitiveness of protein production, causing a sharp decline in the cultivation of such crops. Accordingly, interest faded in the development of disease-resistant and high-yield varieties, and farmers and the processing sector lost interest in protein-crop production. Practical knowledge about field cropping and crop rotation, processing and animal feeding was lost and the number of processing facilities declined dramatically. In the meantime, the trade in oilseed crops and protein plants became totally geared towards importing protein crops, though lupin cultivation for on-farm feeding was not affected to quite such an extreme extent.

The proportion of arable land devoted to grain legumes in selected EU Member States and Switzerland




Source: Own compilation from GL-Pro (2005) and LMC (2009)

**Europe's share of global production of field beans, lupins and peas between 1997 and 2003**




Source: LMC (2009)

**Arable land devoted to protein crops in the EU between 2000 and 2007 (in ha thousands)**

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|
| France | 458.30 | 474.60 | 428.40 | 456.00 | 445.30 | 423.80 | 323.00 | 234.00 |
| Germany | 182.60 | 215.20 | 203.90 | 201.60 | 172.80 | 164.60 | 139.90 | 113.00 |
| Spain | 69.60 | 76.30 | 134.20 | 161.20 | 200.30 | 224.70 | 201.20 | 179.60 |
| United Kingdom | 208.00 | 273.00 | 248.00 | 234.00 | 256.00 | 238.00 | 227.00 | 156.00 |
| Italy | 55.60 | 56.40 | 53.00 | 57.40 | 57.50 | 62.20 | 61.20 | 67.10 |
| Portugal | 24.00 | 24.00 | 24.00 | 24.00 | 24.00 | 24.00 | 24.00 | 24.50 |
| Austria | 44.10 | 41.40 | 45.00 | 45.80 | 42.40 | 39.90 | 37.70 | 33.00 |
| Poland | 44.60 | 28.70 | 14.60 | 22.90 | 23.50 | 46.50 | 38.60 | 55.70 |
| Hungary | 30.80 | 29.90 | 25.70 | 25.20 | 23.10 | 21.30 | 21.30 | 23.20 |
| Czech Republic | 37.20 | 35.30 | 31.10 | 27.20 | 25.20 | 34.50 | 29.50 | 24.30 |
| Lithuania | 27.10 | 21.80 | 20.00 | 9.40 | 14.10 | 17.20 | 26.70 | 25.90 |
| | | | | | | | | |
| Total | 1181.90 | 1276.60 | 1227.90 | 1264.70 | 1284.20 | 1296.70 | 1130.10 | 936.30 |

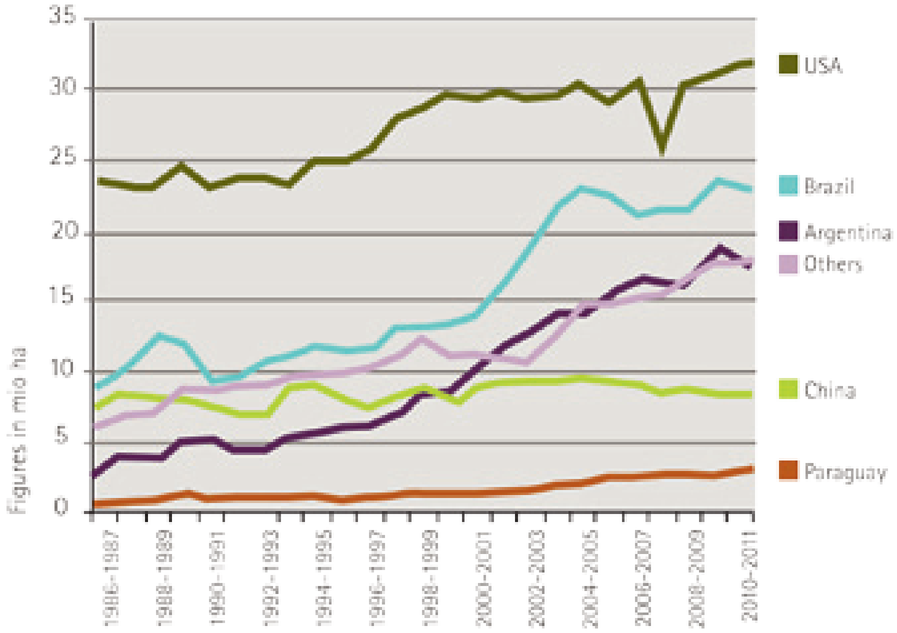
*NB: Only those Member States that cultivated more than 20,000 ha of protein crops during at least one year between 2000 and 2007 are included.*

Source: LMC (2009)

Of course, as legumes vanished from Europe's farms, so too did all their beneficial effects, and conventional livestock farmers were forced into extreme dependence. This change had detrimental environmental and economic consequences, not only in Europe.

## 2.2 INTENSIVE SOYBEAN CULTIVATION IN THE USA AND SOUTH AMERICA

**Trends in soybean cultivation in the USA, Brazil, Argentina, China and Paraguay**




Source: DGIP (2010b)

### 2.2.1 ENVIRONMENTAL IMPACT

#### GENETICALLY MODIFIED SOYA AND THE NON-SELECTIVE HERBICIDE ROUNDUP

Whilst 99% of all farmers around the world still refrain from cultivating genetically modified (GM) crops and more than 90% of all arable land has no GM crops growing on it (figures from 2009, Antoniou, M. et al. (2010)), the vast majority of soybean cultivation in the USA today involves Monsanto's genetically modified Roundup Ready variety (even back in 2006 this variety was grown on 30.3 mio ha, accounting for more than 70% of the total US soybean harvest).

This genetically modified soybean is resistant to the herbicide Roundup, whose main active ingredient is glyphosate. Glyphosate kills all plants in the farmers' fields except genetically modified soya. It is often claimed that glyphosate poses no danger to human beings or the environment, but scientific research questions the veracity of such claims. Indeed, some studies have found that glyphosate is seriously toxic to people and the environment. The additives and auxiliary agents in Roundup heighten this toxicity. Moreover, the concentrations of glyphosate and Roundup that have been found to be harmful include levels that are widely used in agriculture, not just high concentrations used in laboratory tests.

Here are some of the findings:

- In human cells, Roundup causes complete cell death within 24 hours. This result occurs at values clearly lower than those recommended for agricultural applications and that undercut the corresponding residual concentrations in foodstuffs or animal feed.
- Glyphosate herbicides are substances that interfere with hormone functions. These effects already occur at concentrations up to 800 times lower than the maximum residue levels (MRLs) permitted in the USA for some GM crop plants destined for use as animal feed. At these concentrations, glyphosate herbicides damage the DNA in human cells.
- Glyphosate and auxiliary agents in Roundup damage human embryo and uterine cells at concentrations below those measured for agricultural applications.
- Roundup is toxic and deadly to amphibians. When applied at concentrations recommended for agricultural applications Roundup was found to deplete the biodiversity of tadpoles by around 70%. An experiment using lower concentrations still caused a 40% death rate.
- Glyphosate herbicides and aminomethylphosphonic acid (AMPA), the main metabolite of glyphosate (a degradation product in the environment), alter control points in the cell cycle of sea urchin embryos by disrupting the physiological DNA repair mechanism. This kind of disruption is known to cause genomic instability and may cause cancer in human beings.
- Glyphosate is toxic to female rats, causing skeletal malformations in their foetuses.

Source: Antoniou (2010)


*Glyphosate, the active ingredient in Roundup, clearly impacts negatively on both human health and the environment.*

*More than 70% of the US soybean crop is genetically modified.*

These results show that glyphosate and Roundup are both carcinogenic and highly toxic to numerous organisms and human cells.
The intensive use of this herbicide also causes a loss of natural vegetation and an increase in weeds that are resistant to it. In the USA and Australia, glyphosate resistance has been documented in various plants, including rye grass, couch grass, bird's foot trefoil and creeping thistle, among others. Despite this, the herbicide's use is on the increase. At the time of publication there were no quantitative data on the herbicide's residue level in Roundup maize and soya which, unlike cereal products, are not subjected to conventional market research studies on pesticide residues.

Although there are no comprehensive findings regarding Roundup's impact on soil quality, various studies have confirmed the following effects:

- A deterioration of soybeans' and clover's ability to fix nitrogen.
- Higher disease susceptibility of soya and wheat.
- A decrease in microbiological activity in the soil.
- Metabolic changes in soil organisms that inhibit their ability to control harmful fungi and bacteria.

## SOY MONOCULTURE INSTEAD OF RAINFOREST AND GRASSLAND

In Brazil, Argentina, Colombia, Ecuador and Paraguay, soy monocultures have been cultivated on land that used to be rainforest or grassland. Indeed, by 2007, the spread of soya had prompted the deforestation of 21 mio ha in Brazil, and 14 mio ha in Argentina. At the same time, this development means that 200 million litres of glyphosate herbicide are being deployed every year in Argentina alone.

*Land planted with soybeans is extremely vulnerable to erosion, especially if insufficient crop rotation is practised.*

Pressure of demand for soya, including for biofuel, means that an additional estimated 60 mio ha of land in Brazil are expected to be converted into soybean fields. Roughly 55% of Brazil's soya crop is genetically modified (11.4 mio ha). In Paraguay, soybeans now occupy more than 25% of all agricultural land, and the country's entire Atlantic rainforest has disappeared, falling victim to soybean cultivation.

Land planted with soya is extremely vulnerable to erosion, especially when insufficient crop rotation is practised. The average rate of soil loss in the American Midwest is 16 t/ha, and estimates for Brazil and Argentina put the average at between 19-30 t/ha (whereby the loss of 13–16 t/ha is roughly equivalent to the removal of 1 mm of soil. By contrast, the soil regeneration rate lies somewhere between a tenth and a hundredth of this value).

In Argentina, intensive soybean cultivation has led to extremely serious nutrient depletion in the soil, with continuous soybean production estimated to have already caused the loss of 1 million tons of nitrogen and 227,000 tons of phosphor from the soil. The cost of making up for this nutrient loss by deploying fertilisers is put at a staggering $910,000,000!

Soya monoculture has destroyed soil fertility in many places throughout the Amazon Basin, prompting a knee-jerk response of intensive fertiliser use. In Bolivia, soybeans are being cultivated on soil that has already been compacted and degraded.

Nonetheless, a further intensification of soybean cultivation is expected in connection with rising demand for biofuel (Altieri/Bravo 2007), and unless this approach is re-thought, the soil abused in this way will remain infertile for generations to come.


## RESPONSIBLE CULTIVATION OF GENETICALLY MODIFIED SOYA?

In recent years, a number of different institutions have taken part in the debate about sustainability and tried to describe the production of genetically modified Roundup Ready soya (or 'GM RR soya') as sustainable and responsible.

These Institutions include:

- The International Service for the Acquisition of Agri-Biotech Applications (ISAAA), an international non-profit organisation backed by the genetic engineering industry.
- Plant Research International at the University of Wageningen in the Netherlands, which published a paper setting out arguments in favour of the sustainability of GM RR soya.
- The Round Table on Responsible Soy - RTRS), an association of various interested parties whose members include NGOs like WWF and Solidaridad as well as multinational companies including ADM, Bunge, Cargill, Monsanto, Syngenta, Shell and BP.

Source: Antoniou (2010)

Since GM soya is geared towards the application of glyphosate, making its cultivation without that substance pointless, and because glyphosate is known to be toxic, asking how the cultivation of GM soya can be in any way sustainable is a perfectly legitimate question. The WWF is currently facing hefty public criticism for its involvement in this 'self-certification process'.

## 2.2.2. SOCIAL IMPACT

The spread of soya is leading to the extreme concentration of land and incomes. In Brazil, soybean cultivation is squeezing out an average of 11 agricultural workers for every newly created job, and there is nothing new about this phenomenon. In the 1970s, 2.5 million people were driven out of work by soybean cultivation in Parana and 300,000 by the crop's spread in Rio Grande do Sul. Many of the then landless people migrated to the Amazon Basin, where – deprived of their traditional, sustainable form of rainforest use – they found themselves employed in clearing trees. In Argentina, 60,000 farms have been lost whilst the area of land cultivating GM RR soya has almost tripled.

For the biotech industry these massive increases in soybean cultivation constitute an economic success, yet for many people in Argentina such 'progress' deprives them of access to land and thus means increasing hunger. For the country as a whole, it brings more imports of basic foodstuffs, further eroding its food sovereignty and generating higher food prices (Pengue 2005 in Altieri/Bravo 2007).

*Whereas in the USA and Argentina the main victim of soybean cultivation has been grassland, in Brazil both grassland and tropical rainforest have been affected.*

BRAZIL


USA


Source: Parkhomenko 2003

# 3. LEGUMES – ALL-ROUNDERS IN CROP ROTATION!

## GREATER EFFICIENCY AND FEWER RESOURCES CONSUMED

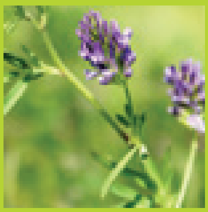
### LEGUMES – PROTEIN CROPS – PULSES

As flowering pulses, legumes (papilionaceous plants, Fabaceae) are one of the richest plant families (including peas, field beans, lucerne (alfalfa), lentils, chickpeas, clover, lupins, vetch and soybeans). Unlike other plants, legumes can actively take up atmospheric nitrogen and convert it into nutritionally valuable essential amino acids. This capability makes them particularly important in human and animal nutrition. At the same time, grain legumes are particularly beneficial in crop rotation because they maintain soil productivity and improve both the nitrogen supply to crops and the quality of rotation. Consequently, they are used in agriculture as soil-improving catch crops.

As main or catch crops, legumes have some highly favourable effects on the agricultural ecosystem, contributing towards a favourable climate footprint and also cutting farmers' production costs by lowering their need for mineral fertilisers, energy and pesticides.

*Peas*

*Field beans*



*Lucerne*

*Lentils*

*Chickpeas*

*Clover*

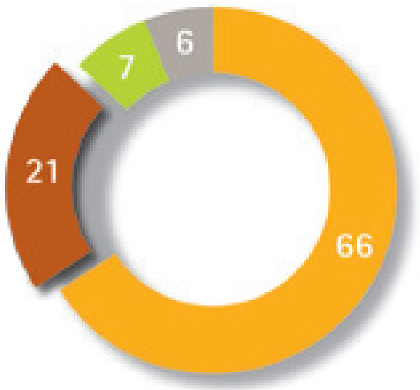
*Lupins*

*Vetch*

## 3.1 LESS MINERAL NITROGEN REQUIRED, ENHANCED SOIL PHOSPHOROUS MOBILISATION, LESS NITROGEN ENTERING GROUNDWATER

In its statement on the reform of the EU's Common Agricultural Policy, the German Advisory Council on the Environment (SRU) found that intensive agriculture, which is responsible for 61% of overall nitrogen emissions into water is the greatest causer of nitrogen pollution in our freshwater ecosystems. This makes it the main culprit for nitrate leaching into groundwater. Moreover, 58% of the nitrogen carried by rivers into the Baltic Sea stems primarily from agriculture and forestry (SRU 2009). One recent nitrate study, compiled by an international group of scientists found that the nitrogen surplus from agriculture causes damage to the environment throughout Europe totalling € 20-150 billion per annum, compared with a figure of €10-100 billion for the added value to agriculture generated by nitrogen use. In other words, the macroeconomic damage caused exceeds the microeconomic gain (Sutton et al. 2011).
Figures for Germany, the EU's biggest animal producer, demonstrate that 21% of nitrogen input into agricultural systems stems from imported animal feed alone.

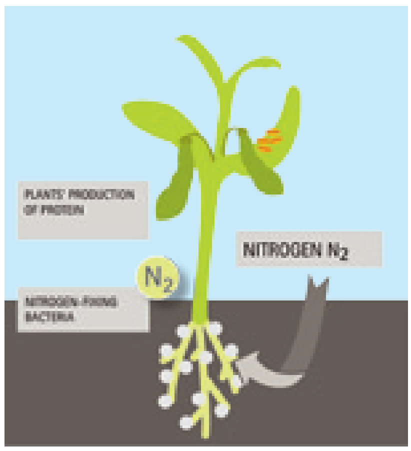
**Nitrogen input from agriculture**




| | % |
|---|---|
| Mineral fertiliser | 66 |
| Imported animal feed | 21 |
| Leguminous crops, amongst others | 7 |
| Air input (e.g. deposited by vehicle exhaust fumes) | 6 |

Source: SRU (2009)

Field peas, field beans and lupin varieties can fix atmospheric nitrogen.
Nodule bacteria take up residence at their roots, because they can use the substances exuded by the legumes. These bacteria can fix nitrogen directly out of the air and then convert it into nutrients for the plants.
When field peas, field beans and lupins are harvested, most straw and all the roots are left in the field, leaving the nitrogen stored therein to be reused by subsequent crops. Nitrogen fixation by legumes can save considerable quantities of fertiliser, amounting to 100 kg/ha per month.
Accordingly, the more widespread use of pulses in crop rotation substantially curbs the need to use nitrogen fertiliser, which not only cuts greenhouse gas emissions during its manufacture, but also lowers farmers' overall production costs. Meanwhile, the trend towards rising oil prices on world markets is constantly pushing up the costs of agricultural equipment, including fuel. So crop rotation that also makes use of protein crops can reduce the amount of fuel consumed to cultivate the soil, because the humus




*Legumes can fix nitrogen from the air. More specifically, nodule bacteria that become established in the legumes' root nodules 'bind' nitrogen directly from the air into a soluble food for the plants.*

and humidity it contains is more effectively retained and the soil does not need to be tilled as intensively. A study conducted by the French General Commission for Sustainable Development (CGDD 2009) estimated the potential cost savings on fertiliser use in France alone at 215,628 tonnes, equivalent to an annual saving of up to €100 million.

*€ 100 million saved for France through reducing fertiliser use*


The frequently discussed risk of nitrogen leaching caused by legume cultivation is considerably reduced if the soil used is sufficiently carbon-rich, if harvesting and tillage take place at the right time and if the undersown crops used retain nitrogen rather than using mineral fertiliser.

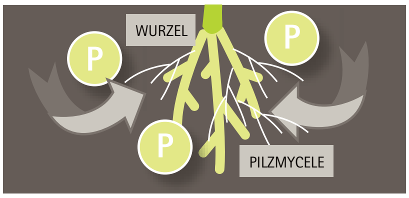
## IMPROVED PHOSPHATE AVAILABILITY

Calculations made by the Food and Agriculture Organisation (FAO) suggest that the rising world population and associated increase in food production required mean that our phosphate requirements are only covered for the next 60 to 130 years (FAO 2004). In addition to this, many degraded rock phosphates contain a whole series of unwanted accompanying elements, including uranium, and numerous phosphate storage sites have a high cadmium content, which should not be widely diffused for prophylactic soil protection reasons.

Legumes can absorb phosphates in the soil because of their symbiosis with mycorrhizal fungi, which enhance crops' supply of potassium, copper, zinc and other minerals, acting as a barrier against damaging root infections and exuding substances that inhibit harmful fungal infections.

However, most importantly mycorrhizal fungi can absorb phosphates in the soil and thus increase the quantity of them available to the crop plant, reducing the need for phosphate fertiliser. The downside is that they are damaged by pesticides and intensive applications of nitrogen fertiliser, which decimate the fungi, causing the root secretions needed by the fungus to regress and mutate. Legume cultivation promotes mycorrhizal formation and thereby also fosters phosphate availability to other crops in mixed crops and the subsequent crop. (Köpke/Nemecek 2010).

**Improved phosphate availability**




*Mycorrhizal fungi can absorb phosphates in the soil and thus increase the amount of quantity available to the crop plant and reduce the need for phosphate fertiliser.*

## 3.2 SAVES ENERGY AND PRODUCES LESS GREENHOUSE GAS

The manufacture of mineral fertiliser takes a lot of effort, accounting for 50% of energy consumption per hectare in intensive agriculture. If the use of these fertilisers is curbed, the gross energy consumption of the agricultural system will fall, which will in turn also improve the sector's carbon footprint ($CO_2$ emissions). A field bean yield of 4 tonnes per hectare is equivalent to 180 kg of mineral nitrogen per hectare, meaning that 180 litres of petrol or diesel fuel or 480 kg of $CO_2$ emissions necessary to produce that quantity of mineral fertiliser can be saved (Köpke/Nemecek 2010). On top of this, the positive effects of legume roots on soil structure (root loosening) save on the fuel required to till the soil, again curbing energy consumption and lowering $CO_2$ emissions.

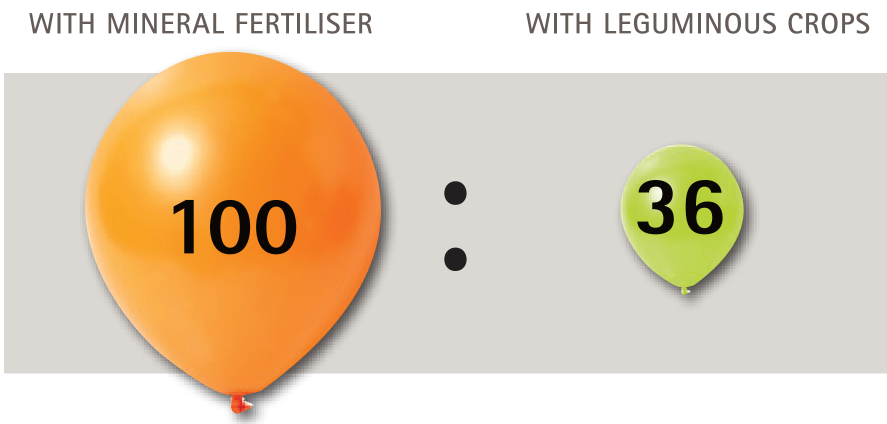
Whilst a no-tillage system simply leaves out soil turning, thereby saving energy but in principle not improving the soil (in many cases it even exacerbates compaction), catch crops – and legumes in particular – actively loosen the soil, necessitating less. Root loosening is absolutely essential for ensuring positive soil development (Beste 2005; 2008 a).

*If the entire greenhouse potential (carbon dioxide, nitrous oxide and methane emissions) of mineral-fertiliser-based crop rotation is allocated a value of 100, then the equivalent figure for a legume-based rotation is just 36.*
*(own calculation based on Robertson et al. 2000 in Köpke/Nemecek 2010).*

**Potential CO2 savings through legumes**


*More widespread cultivation of legumes could significantly lower the amount of energy consumption used to manufacture mineral fertiliser and thereby avoid $CO_2$ emissions.*

Mineral fertiliser nitrogen is also responsible for most global nitrous oxide emissions (N2O). Nitrous oxide's impact on the climate is 300 times that of $CO_2$. The total greenhouse gas potential (carbon dioxide, nitrous oxide and methane emissions) of mineral-fertiliser-based crop rotation compared with that of a leguminous-crop-based rotation can be represented as a ratio of 100:36 (own calculation based on Robertson et al. 2000 in Köpke/Nemecek 2010).




*The environmental impact of savings on mineral fertilisers and energy or achieved by lowering greenhouse gas emissions easily outweigh the economic costs in the balance of trade.*

**Costs and profitability in euro for the replacement of soya by locally cultivated protein crops in animal feed for France alone**

| | | 2010 | | Rounded up to 21 years |
|---|---|---|---|---|
| | Drop in rapeseed imports | -315,574,000.00 | | -4.604,327,646.00 |
| Costs (€) | Drop in grain exports | -340,832,536.00 | | -4,972,857,923.00 |
| | **Interim total** | **-656,406,536.00** | | **-9,577,185,569.00** |
| | Drop in soya imports | 429,295,092.00 | | 6,263,555,490.00 |
| | Drop in imports of nitrogen fertiliser | 101,116,061.00 | All calculations by CGDD | 1,475,316,326.00 |
| Profits (€) | Drop in imports of natural gas | 31,137,356.00 | for 2009 | 454,304,186.00 |
| | Drop in GHG* emissions | 56,577,703.00 | | 1,418,174,924.00 |
| | **Interim total** | **618,126,212.00** | | **9,611,350,926.00** |
| TOTAL (€) | | **-38,280,324.00** | | **34,165,357.00** |

** GHG – greenhouse gas emissions*

Source: CGDD (2009)

## 3.3 FEWER PESTICIDES, GREATER BIODIVERSITY

The intensification of agriculture in Europe since the end of World War II and factors associated with it, like the increasing size of fields, the simplification of crop rotations, the decline of forage crop growing and the clearance of woody plants have all prompted the ongoing species impoverishment of agricultural ecosystems. Crop rotations to which legumes are added boost biodiversity and enhance the ecosystem's self-regulatory capacity, among other things by promoting beneficial organisms. And of course, fields where the growth of a broader array of species is deliberately promoted leave less space for weeds.

**Possible crop rotation**

*1. Winter wheat*

*2. Lucerne*

*3. Lucerne*

*4. Winter wheat*

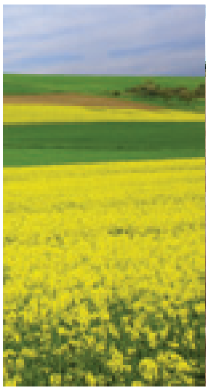
*5. Oats*

*6. Spring barley*

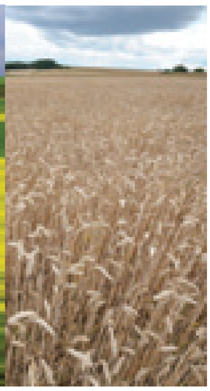
Harmful organisms are less able to spread in diverse ecosystems than in impoverished environments. Generally speaking, by providing better conditions for growth and positive mutual influences between crop plants (allelopathy), expanding crop rotations curbs both the intensity and negative consequences of pest infestations.

A high level of biodiversity among the roots in the soil is another fact that should not be underestimated here. Roots form valuable friable humus. They nourish and foster soil life overall and thereby also promote the biological mechanisms for controlling pathogens and harmful organisms. In a species-poor soil diseases and harmful organisms can spread more quickly and more persistently, because there are fewer beneficial organisms to keep them in check. In addition to numerous other positive effects, this is advantageous in that it reduces pesticide use (Kahnt 2008, Köpke/Nemecek 2010).

*Narrower crop rotations, less biodiversity*



*Rapeseed*



*Wheat*

*Including protein plants in crop rotation: major benefit to the environment and lower production costs for farmers*

## 3.4 $CO_2$ FIXING, HUMUS FORMATION, ENHANCED SOIL STRUCTURE, FLOOD PROTECTION AND YIELD STABILITY

The organic matter introduced into the soil through the roots of leguminous plants has a low carbon-to-nitrogen ratio (i.e. a high carbon content), which produces more high-quality, friable (unstable) and stable humus. The enriched humus fixes $CO_2$ and activates soil life, fostering soil agrregation and improving soil structure. As a result, the soil's rain absorption and water retention capacity increase dramatically.

Experience and various studies show that most of intensively farmed soil in Europe shows increasing compaction, due to a lack of humus and diminishing biological activity. Consequently, such soil can absorb, retain and filter less water and is thus prone to flooding and vulnerable to erosion. In addition, the resulting lack of water causes more and more often lower yields.
The key active crop cultivation measures for successfully countering this process entail promoting soil life and enhancing soil structure. Mulch seeding or direct drilling offer no solution here, because unless these techniques are combined with expanded crop rotations and the cultivation of catch crops – e.g. legumes, they only lead to greater compaction (Beste 2008 a).
Medium pores in the soil are only created by biological processes; they cannot be 'manufactured' by technical means. Medium pores absorb water that can then be passed on to plants. Accordingly, against the backdrop of climate change, their contribution is decisive, making optimal use of the smaller quantities of rainfall and therefore need to be given a more central role in agricultural adaptation strategies.

In this connection, it should be emphasised that for centuries legumes have been known to function as soil-rehabilitating crops because they actively loosen the soil (not only tap-root plants, but also plants with more complex, finely branched root systems). Legumes form their own medium pores and stimulate soil organisms, which actively play an important role in establishing a healthy soil structure forming medium pores too (Beste 2005). In turn, these pores substantially boost yield stability, which in Europe will increasingly come to depend on optimising the soil conditions for the use of precipitation.

*For centuries, legumes have been known to function as soil-rehabilitating crops because they actively loosen the soil, form medium pores and ensure a healthy soil structure through biological activity.*

# 4. IMPORTING FEWER PROTEIN CROPS INTO THE EU – AN IMPORTANT PART OF THE CAP REFORM

The European Commission and EU Member States agree that stepping up protein crop cultivation can constitute a positive step towards meeting new challenges like climate change, biodiversity loss, soil exhaustion, groundwater pollution and fluctuating prices of agricultural produce on the world market. However, following the sharp fall in protein crop cultivation, the attainment of this goal will necessitate a critical number of serious measures regarding animal husbandry, crop cultivation, processing and trading.

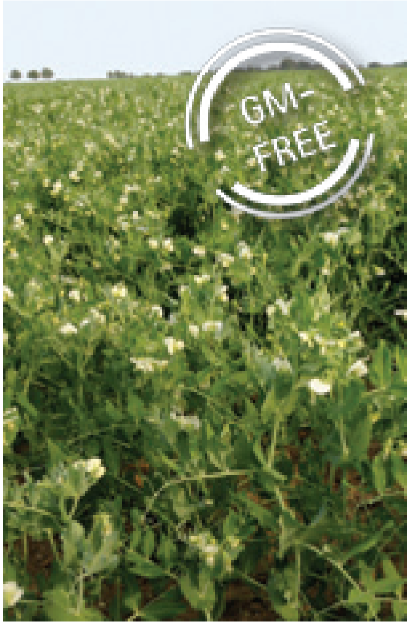
Grain legumes cultivated within the EU are not economically lucrative crops and the producer price that can be obtained is viewed as unattractive. One reason for this is that planting decisions are usually only made on the basis of a simple comparison of profit margins, rather than by considering how grain legumes perform within an entire crop rotation system. If legumes' many positive effects as preceding crops were taken into account, a rather different conclusion would be reached (see section 5.2.2 Cultivation).

Marketing the harvest currently poses problems because in some regions the agricultural trade is not very interested in purchasing grain legumes, owing to the lack of bulk availability or uniformity (not enough batches of defined quality). Legume producers do not have as much success in boosting yields as growers of other crops, and the number of cultivation programmes is very limited (LMC 2009, Specht 2009, see section 5.2.1 Research and cultivation).

*Growing their own feed crops makes farmers more independent, is inexpensive and ... bypasses the market.*

One particular - and important - aspect to do with the use of EU protein fodder crops that also strongly influences the development of regional and interregional trade and processing capacities is the high proportion of such crops that are 'home-grown' and then used to feed the producing farm's own livestock. This phenomenon actually means both that substantial quantities of protein crops are being grown in Europe (often using own seed) and that notable use is made of them as animal feed. Such farm-based crop replication is particularly common with lupins.
However, the lack of availability on the market and concomitant absence of attractive profit margins mans that this use and demand is barely being taken on board by seed suppliers in their development of seeds or by feed manufacturers in their production of finished feedstuffs containing higher proportions of EU-grown protein crops. So a high proportion of the protein crops being used is currently bypassing the market, which is certainly to be applauded in terms of boosting farmers' independence as well as with respect to increasing the efficiency and sustainability of livestock farming by supporting small, energy-extensive production cycles. And yet, at the same time this practice is exacerbating a 'critical threshold' problem, for unless that threshold is reached researchers, traders and processing businesses will hardly show any interest in the sector's further development (see section 5.2.3 Processing and trading).

Despite this, the LMC study commissioned by the European Commission on protein crop cultivation in Europe views farms' own cultivation and use of protein crops as one of the most promising future ways of increasing the supply of home-grown protein crops available within the EU. This is especially true for the organic and GMO-free animal feed segments (LMC 2009).




*Legumes can be guaranteed to be GM-free.*

To support larger-scale cultivation, independent research on seed development is required, as are recommendations on farms' own feed mixes. Moreover, intensive focus on this issue is needed in a training context and in extension services. Before this can happen, necessary actions have to be pinpointed and measures taken, in close collaboration between growers and the agricultural sector (including associations, scientists and policymakers) to promote the entire value-added chain of cultivation, trading and processing.

Bearing in mind the further liberalisation of global agricultural markets sought by WTO negotiations, in which 'third countries' like the USA, among others, are calling for the easing of trade barriers to imports of animal feed made of GM crops, the EU must heed the clear call for GMO-free produce from the vast majority of European consumers and make sure that the legally secured right to food sovereignty of countries and regions takes its rightful place in these talks. The USA must not be allowed to decide what lands up on the plates of European citizens.

# 5. WHAT NEEDS TO BE DONE TO BOOST PROTEIN CROP CULTIVATION IN EUROPE

## 5.1 ARE EUROPEAN SOYBEAN CROPS THE SOLUTION?

Let us begin by stressing that Europe's agricultural policy must not aim to replicate the situation regarding soybean cultivation in the USA or Argentina here in Europe.
The cultivation of genetically modified soya is prohibited in the EU. Anyway, it would not solve the sizeable problems associated with glyphosate use (see section 2.2 Intensive soybean cultivation in the USA and South America). At the same time, a vast majority of European citizens not only reject the presence of genetically modified organisms in crops and foodstuffs, but increasingly in animal feed too (AVAAZ 2010, FORSA 2009, Zott 2011, see section 5.2.4.4 Stronger demand for organic and GMO-free animal feed). Nonetheless, conventionally cultivated and organically grown soya can certainly help to improve Europe's supply with 'home-grown' protein.

Soya originates from China, where it has been grown for millennia not just in tropical regions, but also in areas with temperate climates. This flexible cultivation is possible because of the tremendous range of different types of soya available (more than 10,000 varieties worldwide) (Lyssenkov 2005).
For the time being, Europe has no large-scale soya cultivation going on, the crop only being grown where the climate conditions are deemed suitable, i.e. where the climate is warm and there is an ample supply of water. The main soya-producing countries in Europe are Italy, Romania, France, Hungary and Austria. In 2007, EU requirements totalled 34.5 million tonnes of soya meal, 0.3 million tonnes of which were produced within the Union (Krumphuber 2008).

**The EU's main soya-producing countries in 2008**

| Country | Production in thousands of tonnes in 2008 |
|---|---|
| Italy | 500 |
| Romania | 210 |
| France | 70 |
| Hungary | 67 |
| Austria | 55 |
| Slovakia | 18 |
| Czech Republic | 5 |

In Austria, most of the soya harvest goes into foodstuffs. Soybeans or processed soya products are mixed into muesli, breakfast cereals or baking mixtures, or serve as the basic ingredient in soya milk or tofu. Some of this produce is also exported. In Germany, most soybean cultivation takes place in southern Bavaria and the Upper Rhine Region, where between 800 and just under 1,000 ha were cultivated in 2008.
The fact that traditional soybean-growing countries are finding it increasingly difficult to keep their varieties GMO-free lends additional strategic importance to the crop's cultivation in Europe. European soya growers must aim not only to produce sufficient yields and protein content, but more importantly ensure that young and blooming plants can withstand the cold and are drought-tolerant, mature early, are sturdy and have the lowest husks growing as high up the stalks as possible. If the resulting crops are to be fed to pigs and poultry, it would be ideal if the plants contained as few digestion-inhibiting compounds as possible (Recknagel 2008).

In the context of crop cultivation or rotation, soybeans compete with maize, first and foremost grain maize. For a number of reasons, e.g. to combat the corn root worm, loosen crop rotation or counteract the soaring costs of fertiliser for maize, it may well make sense for farmers to expand soybean cultivation at the cost of growing maize. However, as an intensively bred high-yield, exotic crop, soybeans do not bring the same environmental benefits for crop rotation or the soil as grain legumes cultivated within the EU are known to do.

## 5.2 EUROPEAN GRAIN LEGUMES

### 5.2.1 RESEARCH AND CULTIVATION

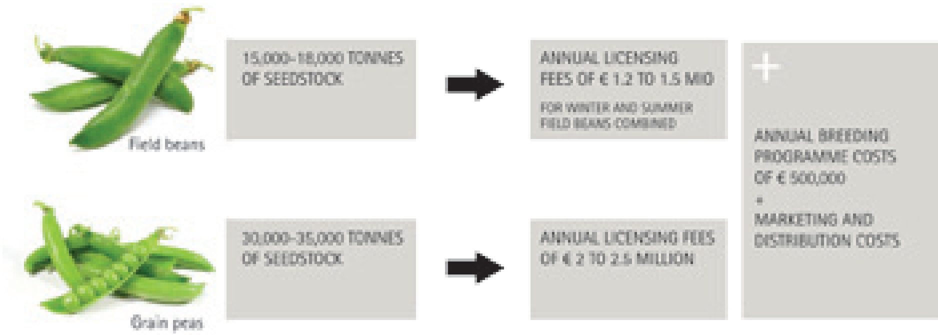
*Below a critical threshold, cultivation does not make economic sense.*

The present situation regarding the cultivation of grain legumes is characterised by the failure to each 'critical thresholds'. Whilst the crop is being grown and traded in such negligible quantities, there is no real interest trading and processing in particular or indeed in the cultivation of new, more resistant and higher-yield varieties. The result has been a steep decline in recent years.

There is a close correlation between the falloff in cultivation and sales of certified seeds. At the same time, the frequently difficult situation in which farmers find themselves is increasingly prompting them to save on seed. As a result, especially where grain peas are concerned, both the scale of cultivation and use of certified seedstock have dwindled disproportionally.

According to calculations made by Sass in 2009, in the EU-15 sales of roughly 15,000 to 18,000 tonnes of certified field bean seedstock secured annual licencing fees totalling €1.2 to 1.5 million. The corresponding figures for grain peas are 30,000 to 35,000 tonnes, generating licence fee income of € 2 to 2.5 million per year. To make sense of these figures, the cost side needs to be considered. The annual costs of a full-blown breeding programme can be estimated at around € 500,000. Furthermore, as well as the aforementioned licences, all the marketing and distribution costs in all markets need to be taken into account. Finally, the breeders' business objective is not only to cover their costs, but also to generate sustainable profits, even under such conditions (Sass 2009). In recent years, these unfavourable economic conditions have prompted a number of producers to stop breeding field beans and especially grain peas.

### Breeding costs and licensing income




*In recent years, these unfavourable economic conditions have prompted a number of producers to stop breeding field beans and especially grain peas.*

Source: Sass (2009)

Nevertheless, breeders have achieved some significant progress:

- Improved yields and advances regarding properties that ensure yield stability.
- Greater crop stability.
- Greater feeding value.
- Higher protein content.
- Fewer value-reducing ingredients.
- Frost-resistance in winter peas, winter field beans and white winter lupins.

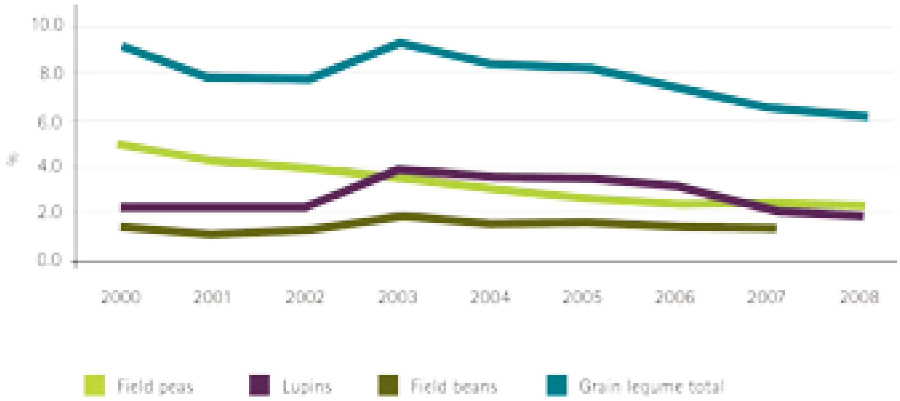
Part of the decline in grain pea cultivation in France is due to prior intensive cultivation, which caused crop rotation problems in some areas and led to an infestation of the soil fungus *Aphanomyces euteiches*. Soil contaminated with this fungus cannot be used to cultivate peas for a long time thereafter. (Sass 2009)

Accordingly, the study by LMC International commissioned by the European Commission attributes particular importance in future research on variety development to scarcity of water, fungal resistance and mixed crop cultivation with a view to enhancing competitiveness with other crops, believing these factors to be key to the entire sector's survival.

Nowadays, a high proportion of research on protein crops is done within the context of studies focussed on organic farming, where the ability of protein crops and/or legumes to fix nitrogen, build humus and loosen the soil has firmly established a place for them in crop rotations and in animal husbandry, where they remain the prime providers of protein in animal feed. Weed suppression is more problematic than in grain farming because of the protein crop's slow early-stage development, so variety selection and mixed cropping play an important role in this connection. Cultivating mixed crops also boosts yields and improves yield stability. Compost trials have established that applications of compost can effectively suppress fungal infections in legumes. There is tremendous potential for further research in this domain (Bruns et al. 2011).

Nevertheless, grain legume cultivation by organic farmers is waning. In total, the share of grain legumes grown on organically farmed land declined by almost a third (31.9%) between 2000 and 2008, dropping to just 6.2%.

**Share of organic legumes grown on arable land in Europe**

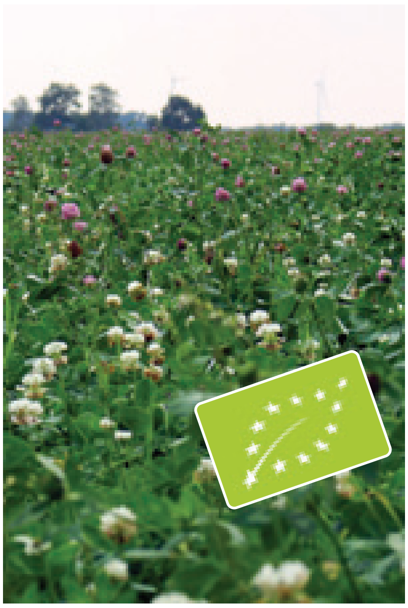



Source: ZMP, Statistical Yearbook (various years), whereby the figure for organic lupin cultivation in 2002-2003 is actually the sum of lupins, lucerne and vetch.

These data highlight a clear need to develop cultivation strategies aimed at more systematically integrating grain legumes into crop rotations. On the other hand, more recent studies show that long-standing organic farms that cultivate legumes, especially peas, are experiencing lower yields. The causes of this need to be identified and new cropping strategies developed (Böhm 2009). Especially where breeding seed for use in organic farming is concerned, robustness, health and suitability for mixed cropping often play a more important role than variety-specific yield. When assessing varieties and weighing up yields against yield stability, the enhancing and stabilising effect on the subsequent crop or crops needs to be factored into the economic equation.

With regard to organic farming, research on breeding is deemed necessary in the following areas:

- Protein quality
- Resistance and winter varieties
- Phytosanitary aspects of crop rotation
- Cropping system optimisation – including with respect to improving overall economic value
- Use of grain legumes in human nutrition



*Organically grown legumes*

### Breeding grain legumes for organic farming

*Germany*

| Breeder/establishment | Breeding programmes for grain legumes | Selected objectives | Does breeding take account of organic farmers' interests? | Contact person |
|---|---|---|---|---|
| **Norddeutsche Pflanzenzucht,** Hohenlieth und Malchow/Poel | Field beans and grain peas (summer and varieties of each) | Grain yield, stability, protein content, winter hardiness | no | Dr Olaf Sass<br>Tel.: 04351/736-456<br>E-mail: o.sass@npz.de<br>www.npz.de |
| **Saatzucht Steinach,** Steinach und Bornhof | Main focus on blue lupins | Crop yield and yield stability, protein content and quality, low alkaloid content, disease resistance, tolerance to lupin leaf weevils and aphids | yes | Regine Dietrich<br>Tel.: 039921/717-0<br>E-mail: regine.dieter-ich@saatzucht.de |
| **Saatzucht Triesdorf,** Weidenbach | White lupins | Anthracnose resistance, low bitterness | yes | Herbert Geißendorfer<br>Tel.: 09826/184000<br>E-mail: saatzucht@triesdorf.de |
| **Getreidezüchtungsforschung Darzau,** Neu Darchau | Winter peas | Winter hardiness, no half leaves, white and coloured flowers, suitability for mixed cropping, crop stability | yes, exclusively | Dr Karl-Josef Müller<br>Tel.: 05853/1397<br>E-mail: k-j.mueller@darzau.de<br>www.darzau.de |
| **Kornelia Vogt und Werner Vogt-Kaute,** Wartmannroth | Winter peas & field beans | Winter hardy white and coloured cultivars | yes, exclusively | Werner Vogt-Kaute<br>Tel.: 0935799952<br>E-mail: w.vogt-kaute@naturland-beratung.de |
| *Switzerland and Austria* | | | | |
| **Saatzucht Ebnerhof,** Arnreit Österreich | Field beans | Low tannin content, swift early growth, cold-resistance | Yes, exclusively | Hans Gahleitner<br>Tel.: 0043(0)7282/20758 |
| **Saatzucht Gleisdorf,** Gleisdorf, Österreich | Field beans (summer and winter varieties), soybeans | Crop yield and yield stability, crop stability, resistance to root and leaf diseases, higher seed protein content | yes | Johanna Winkler<br>Tel.: 0043(0)3112/2105-0<br>E-mail: winkler.szgleis-dorf@utanet.at<br>www.saatzuchtgleis-dorf.at |
| **Staatliche Forschungsanstalt Agroscope Changins-Wädenswil ACW,** Nyon, Schweiz | Soybeans | Early maturity, cold tolerance, suitability for human consumption | yes | Claude-Alain Bétrix<br>E-mail: claude-alain.betrix@acw.admin.ch<br>www.agroscope.admin.ch |

Source: Anonymous (2011)

Nonetheless, the current intensity of breeding activities in both ecological and conventional breeding programmes is insufficient to ensure that significant headway is made in breeding these types of crops, especially compared to established major arable crops. As a result, the gap in performance between these minor and major crop types will continue to grow unless measures are taken to prevent this from happening.

If grain legumes are to be reintegrated into our cultivation systems, and bearing in mind these crops' special contribution to the 'ecologisation' of agriculture, it is crucial that the wording of the Common Agricultural Policy (CAP) provides for the establishment of research projects focussing on EU-internal cultivation. Promoting research and breeding is an essential prerequisite for re-establishing legumes in Europe.

## 5.2.2 CULTIVATION

The agricultural policy framework for field beans, grain peas and sweet lupins is determined primarily by the CAP 'Health Check' decision of November 2008, which provided for the abolition of the (now decoupled) protein crop subsidy of €55.57 per hectare by January 2012 at the latest.
In practice, most decisions to grow a particular crop stem merely from a simple comparison of profit margins of a single crop, with no consideration of non-monetary benefits of crop rotation systems. This is problematic not only in connection with the phasing out of the subsidy, but because arable farming is dogged by a failure to factor in all the economic effects of crop rotation, especially where the cultivation of grain legumes is concerned.

Evaluating the environmental and economic performance of grain legumes in crop rotation systems as a whole gives this group of plants a completely different economic standing:

Here are some of the tangible economic effects that can arise in crop rotation systems:
- Higher yields for subsequent crops (up to 12% for wheat).
- A more evenly distributed workload, leading to more efficient machine capacity utilisation.
- A 20-25% drop in pesticide and fertiliser costs (GL-Pro 2005).
- A prerequisite for energy-saving conservation tillage.
- Better management of herbicide and pesticide resistance in subsequent crops.

**Yield increases for various cereal crops planted after grain legumes (dt/ha)**

| Cereal crop | Yield after | Yield increase after | | |
|---|---|---|---|---|
| | cereal crop | legumes | winter rapeseed | potatoes |
| Trial 2 (Dornburg, 1997) | | | | |
| Winter wheat | 69.7 | + 12.7 | | |
| Winter triticale | 75.2 | + 12.6 | | |
| Summer barley | 50.4 | + 14.3 | | |
| Trial 3 (Dornburg, 1999) | | | | |
| Winter wheat | 78.2 | + 10.4 | + 6.5 | + 7.4 |
| Winter barley | 76.6 | + 6.7 | + 4.2 | + 9.6 |
| Trial 4 (Heßberg, 2000) | | | | |
| Winter wheat | 90.6 | + 9.5 | + 9.1 | |
| Trial 5 (Dornburg, 2001) | | | | |
| Winter wheat | 85 | + 4.8 | + 4.1 | 0 |
| Trial 6 (Heßberg, 2002) | | | | |
| Winter wheat | 79.7 | + 8.4 | + 13.3 | |
| Trials 3-6 | | | | |
| Winter wheat | 83.4 | +8.3 | +8.3 | |
| All trials | | | | |
| Winter wheat | 80.6 | + 9.2 | | |

Source: Albrecht/Guddat (2004)

At present, the build-up of resistance attributable to the trend towards wheat monocultures or narrow crop rotation is steadily shortening the period of efficacy of active agents in pesticides used on cereal crops. Similar effects occur with the cultivation of winter rapeseed in narrow crop rotations. This development calls for a rethink on the part of farmers, pesticide manufacturers and above all in agricultural extension services when planning crop rotations.

In general, such extension services need to take far greater account of the profit margins from crop rotations. Whereas advisory bodies on organic farming are generally well aware of legumes' nitrogen-fixing capabilities, combinations with other nitrogen fertilisers, the planning of crop rotation and mixed cropping and the positive effects of legumes in agricultural systems, the same cannot be said of the vast majority of conventional agricultural advisory bodies. This highlights a need for more intensive training within the EU Member States' advisory bodies, to ensure that knowledge can actually be applied in practice.

*Advisory bodies in the EU need more training on planning crop rotation and mixing their crops as well as on the positive effects of legumes within the agricultural system.*

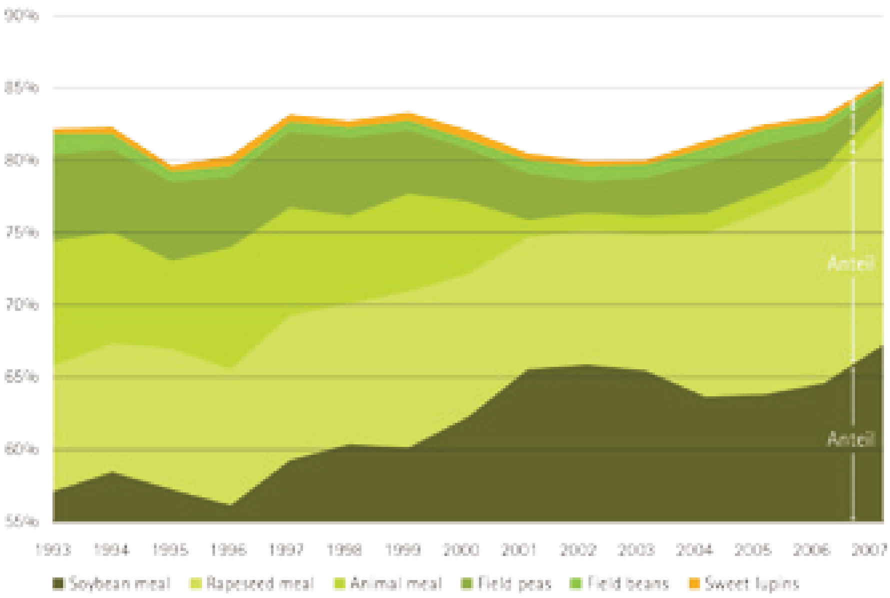
## 5.2.3 PROCESSING AND TRADING

### 5.2.3.1 PROCESSING

Since 2000, demand for protein crops has been directly influenced by three main factors. The outbreak of BSE led to a ban on the use of meat and bone meal in animal feed in Europe, starting in 2001. Whereas meat and bone meal contain 50-60% protein, protein crops contain just 21-48%. So prior to 2001, protein crops in feed mixtures were enriched with meat and bone meal protein, but after 2001 this was no longer possible. This made protein crops less attractive for meeting the extremely high, exacting protein requirements in the poultry and pork sectors from 2001 onwards.
Rapeseed cakes, larger quantities of which were available in thanks to increased rapeseed cultivation for energy generation and cheap imports of soybeans provided a more protein-rich replacement.
Grain prices, which had been falling since the early 1990s, made mixtures of soya and feed grain irresistibly attractive to processing businesses.

*Available know-how has to be put into practice!*

**Use of leading protein components in animal feed as a percentage of their overall deployment within the EU 1993/94-2007/08**




Source: LMC (2009)

### 5.2.3.2 TRADING

Wherever producers were still buying protein crops, especially in trade between cooperatives, prices went up because of dwindling supply and the associated storage and trading difficulties regarding profit margins, making protein crops an even less attrac-

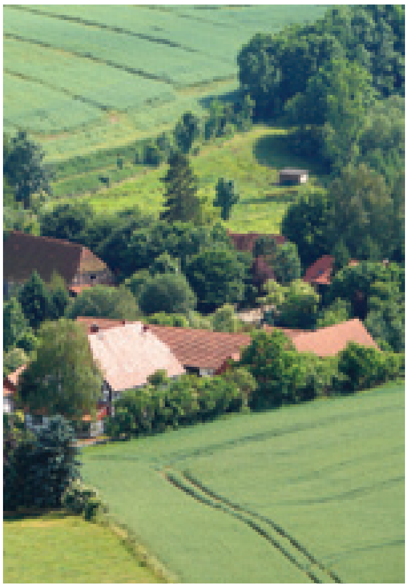
*Producers should be encouraged to follow the example set by organic farmers and grow their own grain legumes ...*

tive proposition for feed manufacturers (LMC 2009).
Geographically, animal feed manufacturers tended to move away from their former locations to locations by ports, which offered more favourable access to imported feed, causing regional trading and processing structures to disappear increasingly.

### 5.2.3.3 PRICES OF CONVENTIONAL PRODUCE

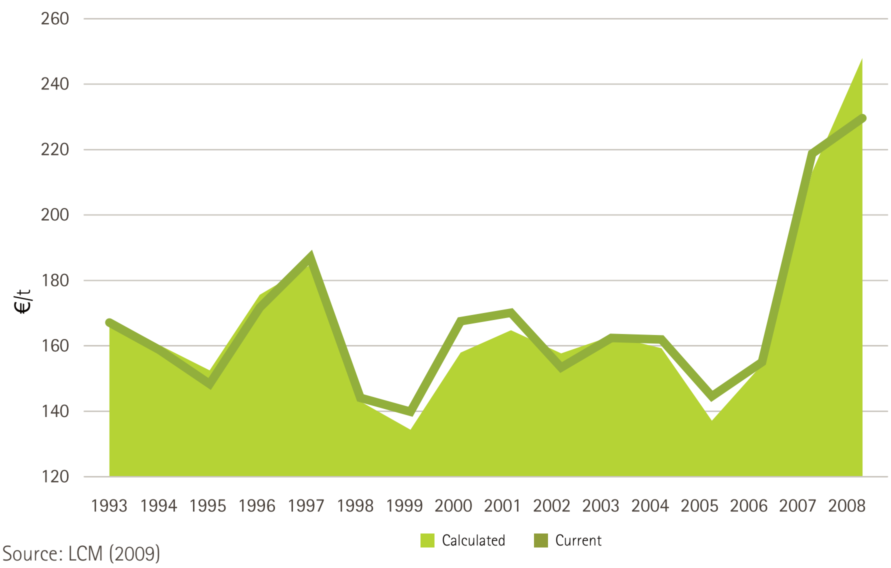
There is currently no world market price for grain legumes, with Canada, the world's biggest producer of grain peas, listing prices for different quality categories, and only limited details of European prices for grain legumes available. Base prices, which are what matter in a trading context, mainly reflected either the conditions applying to French production, since that was where most protein crops were being produced, or were derived from the trade in animal feed transacted in Rotterdam (LMC 2009).

The key factor determining whether or not it is worthwhile to cultivate, say, field peas, which are the most important grain legumes in the mixed feed sector, has very much to do with the cost of feed wheat and soya meal, since field peas can easily be replaced in feed mixtures by roughly two parts of feed wheat and one part of soya meal. Since most lupins are cultivated on farms for their own use as animal feed, no standard market prices could be ascertained here (LMC 2009).



*... since this not only saves on energy for transport, but also entails a sensible adjustment on the part of livestock farmers to the changing acreage in Europe available for growing animal feed.*

**Prices for field peas: specific price and calculation based on the cost of wheat and soybeans on the Rotterdam Commodity Exchange in the Netherlands, 1993-2008**




Source: LCM (2009)

The LMC study also recommends learning from Canada's success on high-price markets for food and pet food. Over the past few years, Canada has exported roughly 50% of its pea production to Asian food markets (LMC 2009), whilst Great Britain has been exporting some of its field beans to food markets in Egypt (Sass 2009).

### 5.2.3.4. PRICES OF GMO-FREE AND ORGANIC PRODUCE

The LMC study also sees interesting prospects for GMO-free and organic production (see section 5.2.4.4 Stronger demand for organic and GMO-free animal feed). So far, the GMO-free label has not netted significantly higher prices for grain legumes, since EU-grown rapeseed meal and sunflower seed meal fill this bill anyway. However, over the past few years, rapeseed production in the EU has increasingly served to supply the livestock farming sector with domestically produced high-grade vegetable protein. Thus the share of extracted rapeseed among all the types of oil meal used to feed livestock in the EU-27 is 17%, and in Germany the corresponding percentage is already more than 35% (Specht 2010).

The trade in organically grown protein crops constitutes a distinct market, where the prices charged reflect the in many ways more demanding cultivation this requires. But here again, larger processing capacity and available quantities are key to making the establishment of separate processing lines (e.g. rapeseed meal from plant oil production) economically viable.

*Organically cultivated protein crops command higher prices in the market-place.*

### 5.2.3.5 THE NEED TO DEVELOP NEW STRUCTURES

It is important to foster and step up the cultivation of and trade in GMO-free protein feedstuffs within the EU. If this market is to function in the future, sufficiently large volumes need to be traded. That said, the aim should not be to adopt the same structures as apply to imports. It makes no sense to transport vast quantities of soya or other grain legumes from the favourable regions for cultivation in Europe to intensive livestock fattening farms. Where possible, producers should be encouraged to follow the example set by organic farmers and grow their own grain legumes, since this not only saves on energy for transport, but also entails a sensible adjustment on the part of livestock farmers to the changing acreage in Europe available for growing animal feed.

*It makes no sense to ship produce from one end of Europe to another. Decentralised trading structures and minimal transport increase local value-added and save energy costs.*

## 5.2.4. USE AS ANIMAL FEED

The effectiveness of the use of protein crops in animal feed production hinges largely on the essential amino acid content of the various plant varieties and the composition of the compound feed. For now, soya meal is playing a prominent role in this context. The poultry sector accounts for 50% of consumption in this area, ahead of the pig sector (28%) and cattle farming sector (21%).

**The use of soya meal**

Soya meal can be replaced with differing levels of success, depending on the type of animal and husbandry involved. One problem with EU-grown grain legumes in the pig and poultry sectors is their tannin content, which poses no problem to ruminants. Tannin levels could be significantly reduced in newly developed varieties. The mean values established for field beans, as opposed to extracted soya meal and wheat, show that their raw protein content lies somewhere between the levels of both these crops, whereas field beans' starch content is closer to that of wheat. Accordingly, field beans should be regarded as providers of protein and energy. So grain legumes produced within the EU cannot be expected to simply replace soya meal in animal feed. Instead, highly specific feed mixtures containing the highest possible proportion of domestically grown grain legumes should be developed, tailored to the segment in which they are used.

**The nutritional suitability of grain legumes for pigs, poultry and cattle**

| | Pigs | Poultry | Ruminants |
|---|---|---|---|
| Peas | +++ | +++ | ++ |
| Field beans | +++ | +++ | ++ |
| Vetch | – | – | ++ |
| Lentil vetch | – | – | ++ |
| Chickpeas | ++ | ++ | ++ |
| White lupins | +* | ++ | +++ |
| Blue lupins | ++ | ++ | +++ |
| Yellow lupins | ++ | ++ | +++ |
| Soybean meal | +++ | +++ | +++ |

Source: GL-Pro (2005)

## 5.2.4.1 PIG FATTENING AND POULTRY

Studies have shown proportions of grain peas of up to 40% in feed mixtures for fattening pigs (Specht 2009). Of all the grain, sweet lupins display the most balanced amino acid patterns of all legumes for feeding pigs. Nonetheless, finding a far-reaching replacement for soya meal in the pig fattening segment is no easy matter. In the organic sector, some experience has been gained in splitting fattening periods into two phases in which different feed mixtures are applied, with fluctuating proportions of field beans, peas and sweet lupins, as well as rapeseed cakes, potato protein and maize gluten (Büttner 2003).

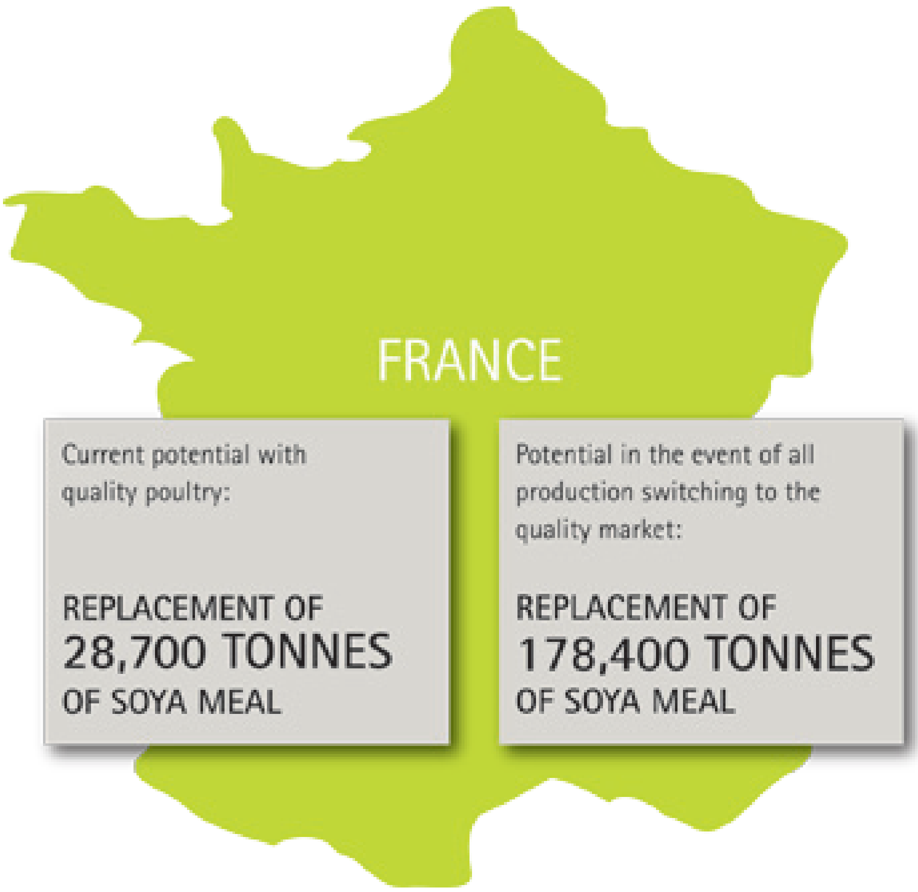
The main candidates for replacing extracted soya meal in poultry feed are firstly EU-produced grain legumes (peas, field beans, soybeans, lupins), bi-products of oil extraction (types of extracted oil meal or cakes derived from sunflowers, rapeseed, soybeans and oil pumpkin) and secondly, to a lesser extent, bi-products of starch extraction and beer brewing (maize gluten, potato protein, brewer's yeast). Once again, it is the composition of the animal feed that will determine how optimal its use as a ration turns out to be.

According to a study conducted by the French General Commission for Sustainable Development (CGDD 2009), substituting soya meal in feed for broilers leads to longer fattening periods, because it delays growth. A switch to quality-oriented production involving lengthier fattening periods or organic production would open up possibilities for using grain legumes to replace soya protein content.

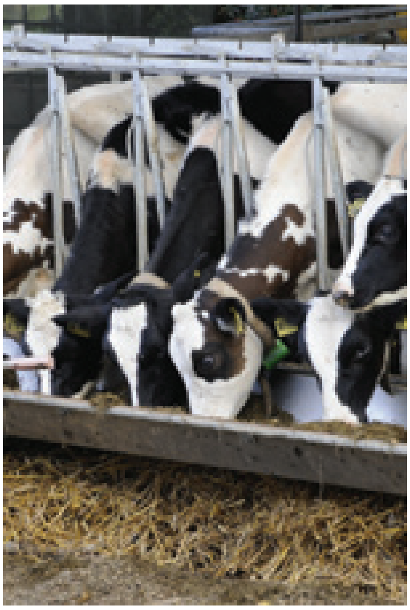
Regulation (EEC) no. 1538/91, which introduces rules on certain marketing standards for poultry, stipulates that free-range birds (with the exception of organically raised poultry), have to be fattened using a feed formula containing a very high minimum percentage of cereals – see Regulation (EC) no. 543/2008). This virtually forces poultry farmers to feed their stock a high proportion of soya meal to maintain its quality (CGDD 2009).

Harmonising this arrangement to tally with the requirements for animal feed in organic production, where peas may be used, could lead to the replacement of 28,700 tonnes of soya meal every year in French production of quality poultry alone. If all French poultry farmers switched to high-end production and the EU Regulation was amended, a total of 178,400 tonnes of soya meal could be replaced by peas (CGDD 2009). Furthermore, this would be in line with the call made in the European Commission's Green Paper on agricultural product quality to more strongly orient the food chain towards quality schemes (European Commission 2009).

*The policy forced use of soya meal in conventional poultry fattening as a result of Commission Regulation (EEC) No 1538/91 has hindered the use of grain peas.*




*Peas could be used to replace 28,700 tonnes of soya meal every year in French production of quality poultry alone.*



*Trials show that a substantial proportion of imported animal feed could be replaced by protein-rich animal feed grown in the EU.*

### 5.2.4.2 CATTLE FATTENING

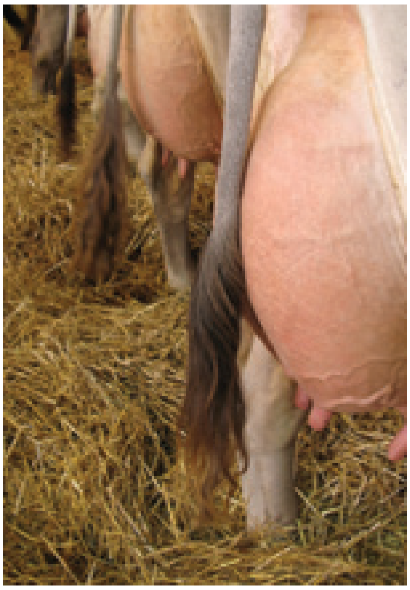
Several bull-fattening trials have studied the use of differing amounts of protein-rich types of animal feed grown within the EU (field beans, peas, extracted rapeseed, sunflower extracted oil meal and raw and hydrothermically treated soybeans) with respect to fattening and carcass yield.

The results of these trials indicate that a large proportion of imported protein-rich animal feed could be replaced by an EU-produced equivalent. However, if the use of domestically grown protein-rich crops is to run smoothly, it is absolutely essential to start off as early as possible feeding such a mix to juvenile animals. Calf starter feed and heifer feed should already contain the highest possible share of domestically grown protein-rich arable crops.

This way our own protein-rich animal feed would stand the same chances as extracted soya meal already does, for example. Field beans, extracted rapeseed and soya products can cover the full raw protein requirements of fattening bulls, and peas and sunflower-extracted oil meal can cover roughly half of them (Austrian Federal Institute for Alpine Agriculture (BAL) 2001).

### 5.2.4.3 MILK PRODUCTION

High-quality green fodderand optimal feed management markedly reduce the need to add protein to fodder for dairy cattle. Likewise, the need for protein concentrate can be lessened by lowering the proportion of corn silage contained in these rations. An effective feed ration can be obtained by using locally available sources of protein concentrate independently of the green fodder or milk yield (Austrian Federal Institute for Alpine Agriculture (BAL) 2001).



*In milk production, protein alternatives could replace huge quantities of soya and make feed mixes far more versatile.*

Any protein feed cultivated within the EU will constitute a cheaper alternative to extracted soya meal in dairy production. Cakes and slurry have to be combined with a second protein feed. So far it has proven difficult to dispense altogether with extracted soya meal in feed for high-yield cows because most substitute feedstuffs have lower energy content than extracted soya meal. Nonetheless, alternative sources of protein can replace large quantities of soya and serve to diversify the rations fed to cattle. (Tiefenthaller 2007)

The protein content of green fodder can be influenced by the time of harvest and by increasing the proportion of legumes they include, thus lessening the need for protein supplements. If the harvest is early, proper use of fertiliser should produce a raw protein content of 15% or 150 g/kg of dry matter, whereas harvesting later harvest (relative to floresence) can lose up to 5% of the crop's raw protein content. Since many farmers only harvest their grassland when flowering is just beginning or in full swing, valuable reserves of raw protein content are just waiting to be exploited.

A higher raw protein content is also achieved by increasing the proportion of clover in green fodder.

Provided that the green fodder is harvested in good time and grasslands are properly fertilised, the raw protein content of the overall feed can be calculated using the following formula: 140 g + (percentage by weight of clover x 0.5 g)

Source: Bundesanstalt für alpenländische Landwirtschaft (2001)

### Mixing proportions for grain peas and field beans in various feed rations

Grain peas in animal feedstuffs

| | | Mixing proportions in all mash |
|---|---|---|
| Pigs | | |
| | Piglets (weaned) | up to 30% |
| | Fattening pigs | up to 40% |
| | Sows | up to 25% |
| Dairy cows | | up to 4 kg in the daily ration |
| Fattening bulls | | up to 2.5 kg in the daily ration |
| Poultry | | |
| | Broilers/Fattening chicks | up to 50% |
| | Layers | up to 30% |

*All monogastric animals must receive sufficient quantities of the amino acids they need, especially methionine.*

Field beans in animal feedstuffs

| | | Mixing proportions in all mash |
|---|---|---|
| Pigs | | |
| | Piglets (weaned) | up to 5 % |
| | Fattening pigs | 15 to 25 % |
| | Sows | up to 15 % |
| Dairy cows | | up to 4 kg in the daily ration |
| Fattening bulls | | up to 2 kg in the daily ration |
| Poultry | | |
| | Broilers/Fattening chicks | up to 40 % |
| | Layers | up to 10 % (vicin-free types) |

*All monogastric animals must receive sufficient quantities of the amino acids they need, especially methionine.*

Source: Specht (2009)

### Legumes' potential in crop rotation in France according to the 'protein plan scenario'

| Crop in 2006 | No. of hectares | Alternative scenarios | Crop under the 'protein plan scenario' | No. of hectares |
|---|---|---|---|---|
| **cereals** | 9,048,072 | 645,549 ha deducted for the cultivation of pulses and rapeseed | **cereals** | 8,402,583 |
| oilseed | 2,117,542 | | oilseed | 2,365,763 |
| **incl. rapeseed** | 1,405,603 | 415,793 ha gained by curbing 70% of exports, 248,221 ha taken over from cereals | **incl. rapeseed** | 1,653,824 |
| **protein crops** | **323,972** | 377,177 ha taken over from cereals | **protein crops** | **701,089** |
| other arable crops | 1,045,387 | | other arable crops | 1,045,387 |
| annual fodder crops | 1,460,646 | | annual fodder crops | 1,383,704 |
| including maize | 1,370,460 | 76,942 ha freed up for fodder legumes | incl. maize | 1,293,518 |
| **fodder legumes** | **371,963** | 76,942 ha freed up for fodder legumes<br>39,742 taken over from English ryegrass<br>20,151 ha taken over from cereals | **fodder legumes** | **508,798** |
| **non-permanent grassland (*)** | **2,742,870** | 39,782 ha of English ryegrass for fodder legumes | **non-permanent grassland** | **2,703,088** |
| **including in mixed crops** | **1,097,148** | double the amount of land for mixed crops | **incl. in mixed crops** | **2,162,470** |
| fallow land | 1,268,343 | | fallow land | 1,268,343 |
| total agricultural land | 18,378,795 | | total agricultural land | 18,378,795 |

(*) Grassland areas serving as pasture for only a few years, as opposed to permanent pasture.

Source: CGDD (2009)

*A drop in grain and maize cultivation will free up large swathes of arable land for the cultivation of grain legumes.*

*Livestock production in Europe, which is already far too intensive, must not be further facilitated by the risky use of animal products in feedstuffs.*

## MEAT AND BONE MEAL AS A SOURCE OF PROTEIN?

During the years before the ban imposed in 2001 on feeding meat and bone meal to animals (in response to BSE), a total of 2.5 million tonnes of meat and bone meal were fed to animal in the EU each year. Having a high protein content (50–60%) and being relatively cheap, meat and bone meal were popular among processing businesses, above all to ensure a high protein content of feed concentrate.
For some time now the European Commission has been considering the possibility of lifting the ban on feeding animal products to non-ruminants. However, limiting admissibility to non-ruminants is no real help because it is widely known that actions taken by criminal elements in the meat industry are very likely to see animal products ending up in ruminants' feed.
The meat scandals of recent years underscore real problems in exercising sufficient control over the meat industry, especially regarding the trade in slaughterhouse waste.

In an opinion issued in 2008, the European Food Safety Authority (EFSA) pointed out that even low animal protein residues in feed for ruminants constitute a threat to consumers and warned against raising the tolerance levels for animal protein in feedstuffs.
In this context, too, providing protein by cultivating legumes has clear benefits in terms of food safety and quality, not to mention animal welfare. Intensive stock-rearing and already excessive meat consumption must not be further facilitated by the risky use of animal products in feedstuffs.

*18% of all greenhouse gas emissions and 9% of all anthropogenic CO2 emissions stem from intensive meat production.*

## HIGH-QUALITY PRODUCTS FROM PASTURING ARE ENERGY-EFFICIENT AND ENVIRONMENTALLY FRIENDLY!

Intensive meat production accounts for 18% of all greenhouse gas emissions in COS equivalents and 9% of all anthropogenic $CO_2$ emissions, including those from fossil fuels used to manufacture the required input.

Around the world, intensive meat production is responsible for some 8% of human water consumption. Most of this amount is used for irrigation purposes when cultivating animal feed. In all, between 20 and 43 tonnes of water are consumed to produce a single kilo of edible beef. In an energy context, each calorie of intensively produced beef requires 10 calories of grain. The equivalent ratio for pigs is 1:3, and for egg production 1:4. Similar losses of dietary protein arise when it is fed to animals: in fact the losses for beef are 17 times as high.
The United Nations' environmental organisation (UNEP) has calculated that the calories lost in the conversion from plant-based foods to foods of animal origin

could theoretically feed 3.5 billion people!

Excluded from this calculation of lost calories are animal-based food products derived from pasturing, which increase the number of available calories by converting grassland that humans cannot consume into protein-rich foodstuffs. Making pasturing more widespread could save on a proportion of the protein-rich feed components needed today. Pasturing is the most energy-efficient and environmentally friendly form of animal husbandry because it does not entail any competition between feed and food production. At the same time, it has a far more favourable carbon footprint than energy and space-intensive indoor stock keeping where the animals are fed feed concentrate. Finally, it makes a much greater contribution to biodiversity.

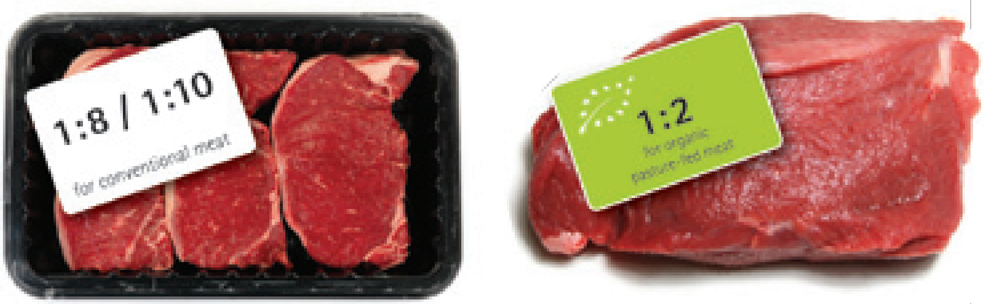
At the same time, pasture-fed meat and pasture milk have a higher nutritional value. Pasturing, green fodder and a slower growth rate for the animals give their meat three times the omega-3 fatty acid content of conventionally fattened cattle. Another significant factor in animal nutrition is the diversity of meadow flora.

Clearly, a more natural type of farming and the promotion of biodiversity in pastureland pay dividends. Milk derived from cows fed primarily on a diet of green fodder is healthier because it contains more omega-3 fatty acids, which scientific studies have shown to have very clear health benefits, including the attenuation of inflammatory reactions, a lower risk of cardiac arrhythmia and lower blood pressure. Another decisive health benefit for humans, in addition to organic pasture-fed meat's high omega-3 content, is its higher ratio of omega-3 to omega-6 fatty acid content, which is roughly 1:2. Conventionally produced beef has a nutritionally inferior ratio of between 1:8 and 1:10.

Sources: Leiber (2005), Weiß (2006), Kühl/Hart (2010)

*Pasturing is the most energy-efficient and environmentally friendly form of animal husbandry because feed and food production do not compete for land and because this form of animal husbandry has a better carbon footprint and contributes far more to biodiversity.*

**Ratio of omega-3 to omega-6 fatty acids**

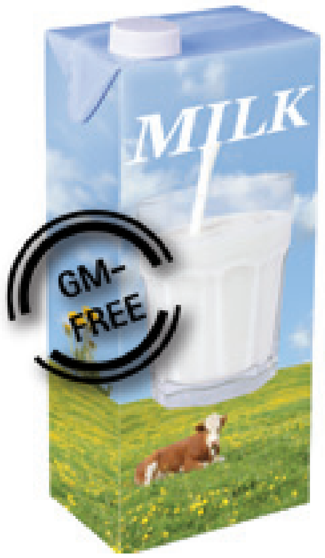



*A high omega-3 content and the ratio of omega-3 to omega-6 fatty acids are key to healthy consumption*

Source: BUND (2008)

### 5.2.4.4 STRONGER DEMAND FOR ORGANIC AND GMO-FREE ANIMAL FEED

The latest Eurobarometer survey shows that almost everywhere in Europe people have become more sceptical about the use of genetic engineering in the food sector. The percentage of people who totally or largely reject genetically modified foodstuffs has risen from 73% (2005) to 77% (2010). The general message of the 2010 Eurobarometer is that the development of genetically modified foodstuffs should not be promoted.




*GM-free products are currently the fastest-growing market segment in the USA.*

In Germany, the label "ohne Gentechnik" ("not genetically engineered") was introduced on 1 May 2008, enabling German consumers to see whether the animals from which their products had been derived had been fed genetically engineered (GMO) animal feed. Where conventionally produced eggs, meat and milk are concerned, European consumers still have no way of knowing whether genetically modified plants were used in their manufacture because there is no obligation in the EU for products of animal origin to bear a label stating that genetically modified animal feed was used in their creation.

A representative survey conducted by the Forsa Institute on behalf of A German dairy called Zott confirmed that consumers find such labelling extremely important. In fact, 82% of the respondents described such food labelling as making sense, and a similarly high proportion (75%) said that they used the "not genetically engineered" label to guide their shopping decisions (Forsa 2009; Zott 2011).

In another survey, this time one conducted by the University of Giessen in Germany in 2008, more than 70% of respondents said that they also reject GMOs in animal feed as well as their use in fodder production. They said, too, that their decisions to buy products were guided by their knowledge about the involvement of genetic engineering in their manufacture. When asked to place various factors determining their purchases in order of importance, two of the three top-ranked criteria were the lifelong feeding of animals with GMO-free fodder and the absence of GMOs from the actual foodstuffs themselves (Herrmann 2009).

As long as there remains barely any acceptance of genetically engineered foodstuffs among consumers, the food sector will exert pressure on upstream links in the production chain to guarantee that products remain GMO-free. Such products are likely to find new market share as a result.

A survey conducted by market research company Nielsen shows that GMO-free products are even currently the fastest-growing market segment in the USA, expanding by 67% in 2009 alone to attain a sales volume of $60.2 million (Nielsen 2010).

Although importing GMO-free soya into the EU for GMO-free animal feed is possible, frequently its procurement demands more effort and sometimes comes at greater cost. This opens up clear opportunities for the cultivation of grain legumes within the EU, both in the organic sector, which prescribes the avoidance of GMOs and the highest possible level of cultivation of home-grown animal feed anyway, and in conventional agriculture, where the absence of GMOs is also increasingly appreciated in the context of branded meat programmes or regional quality programmes.

The market share of organically cultivated grain legumes (see section 5.2.3 Processing and trading) varies tremendously from one Member State to another and is difficult to estimate because of the high level of own use by farmers the often small quantities involved.
Noteworthy market shares are attained in Germany, where the estimated market share of organically grown protein crops in 2008 was 40%, compared with a mere 3.5% for France in 2006. Interviews conducted in Spain suggested that protein crops accounted for 10% of organic production; and the estimate for Hungary was 20% (LMC 2009).

## 5.2.5 CONSULTING, TRAINING AND INFORMING

One factor that plays a key role in fostering the cultivation of pulses in Europe is the intensification of efforts to communicate their advantages and associated opportunities to scientists and farmers, as well as to the general public.
The problem among conventional farmers is that the practical knowledge of how best to cultivate pulses and advice on this are not sufficiently widely known.
Whereas farmers and advisory bodies in the organic sector tend to possess specialist knowledge about legumes (re their nitrogen-fixing properties, their combination with other nitrogen fertilisers, planning crop rotation and mixed cropping, and their positive impact within the agricultural system), so far the same cannot be said of most bodies advising conventional farmers.
Consequently, more training of the members of advisory bodies is required in the Member States, so that this know-how can be put into practice.
Agricultural extension services need to be stepped up very substantially, especially with regard to the profits to be earned from crop rotation. And the same applies to the training provided to future farmers.

Where the cultivation of grain legumes features in the curriculum, suggestions on the corresponding changes needed in the content of training courses can and should be derived from practical training offered to people studying to become organic farmers and advisors.
In vocational training, too, the economic assessment of legume cultivation needs to be turned upside down, especially with a view to ensuring fair comparisons between the profit margins for pulses and rival crop types. The profit margin of a leguminous crop like the blue lupin, which is currently being grown on less than 20,000 ha of land in Germany, often in marginal sites unsuitable for other crops, cannot be compared with the profit margin of main crops cultivated on a large scale on good to top-quality soil. Moreover, here again the profit margin over the entire crop rotation needs to be taken into account.

*Suggestions for adapting the content of training should be taken from practical training programmes and courses of study for farmers and advisors on organic farming in which the cultivation of grain legume is a firmly established component.*

A case study by the Southern Westphalia University of Applied Sciences (FH-SWF) showed that taking account of such factors enables a more comprehensive evaluation of the excellent economic performance of legumes that more closely approximates farm reality and leads to a substantially more positive conclusion than can be reached if considering just the profit margin obtained (Wehling 2009).

If protein crops and legume cultivation are to gain a solid reputation as excellent performers in crop rotation and become more popular with the general public, the facts need to be communicated much more effectively at the social and political levels, as opposed to merely at the professional level. Other key issues to raise in the public debate on this topic include the fact that such crops are GMO-free and locally produced.

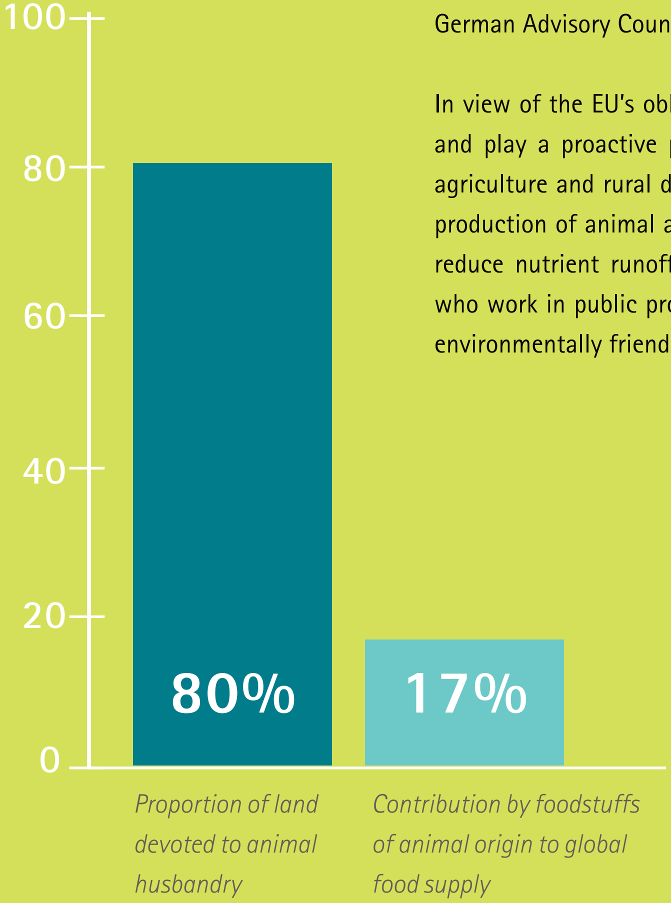
*A case study conducted by the Southern Westphalia University of Applied Sciences (FH-SWF) clearly illustrates the excellent economic performance of legume cultivation when the effects of crop rotation are factored in.*

# 6. LEGUMES ON OUR PLATES!

## OUR MEAT CONSUMPTION: TOO LARGE AN AREA FOR TOO FEW CALORIES!

Around the planet, roughly 38% of the available land surface, approximately 5 billion hectares in all, is cultivatable. By far the majority of this, around 3.4 billion hectares (or 69% of agricultural land worldwide), is pastureland, compared to 1.4 billion hectares of arable land (28%) and 0.138 billion hectares of permanent crops (3%).
Easily the lion's share of agricultural land is used for animal husbandry, which takes up some 80% of the total available surface area. In addition to pastureland, about a third of arable land is used to produce animal feed. Yet this very high percentage contrasts very sharply with the low proportion of foodstuffs of animal origin in the global food supply, which totalled just 17% in 2003 (FAOSTAT 2008, cited in a 2008 report by the German Advisory Council on Global Change (WBGU)).

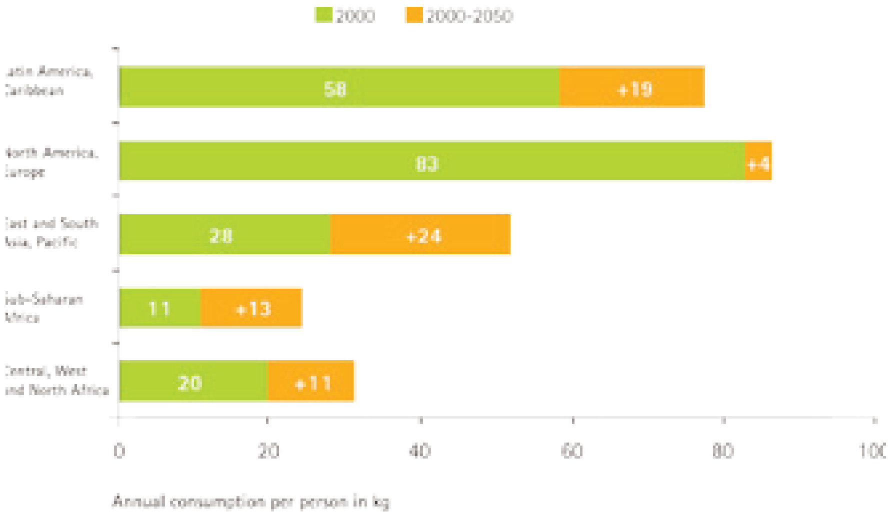
In view of the EU's obligation to make an active contribution to global food security and play a proactive part in attempts to combat climate change, future policy on agriculture and rural development should not only strive to achieve a more balanced production of animal and plant protein in a bid to cut greenhouse gas emissions and reduce nutrient runoff into waterways, but also endeavour to motivate consumers who work in public procurement and the catering sector to opt for a more balanced, environmentally friendly and diverse selection of foodstuffs.



*How can we use locally available means to secure the best possible food yield per surface area using minimal resources?*

Over the past 40 years, annual meat consumption worldwide has more than trebled, rising from 78 million to 250 million tonnes. The World Agriculture Report expects this trend to continue, if the high rate of meat consumption in industrial countries remains unchanged and the urban middle classes in China and other emerging countries continue to approach the same level. Average meat consumption per annum by every individual totals 39 kg, which is equivalent to just over 100 g per day according to a report by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD 2008).

**Per capita meat consumption, 2000–2050**




Source: IAASTD (2008)

How can 9 billion people feed themselves healthily, properly and sustainably without using up considerably more soil and water, and thereby generate 50% fewer greenhouse gas emissions in Europe and even 80% fewer worldwide? These objectives will not be attained if we continue to transport animal feed halfway round the globe and then 'destroy' calories when processing it. In future, food production should always be coupled with this question: How can we optimise use the nutritional yield of agricultural land using the fewest available resources?

*In some cases, a diet entailing moderate meat and fat consumption can feed more people in the world than a vegan diet. The main reason for this is that ruminants can convert non-comestible pastureland into a type of food that humans can consume.*

One study conducted in 2007 (McMichael 2007) estimated the maximum acceptable level of global meat consumption in 2050, assuming a 40% increase in the world population, and arrived at figure of 90 g of meat per person per day. This would entail a considerable cut in meat consumption in Europe, where the current average is in the region of 180 g per person per day.

Another study (Peters 2007) examining 42 different diets, based on two variables: firstly their proportion of meat and secondly their overall fat percentage (the amount of energy consumed was a constant: 2,308 kcal/day) found that the higher the proportion of meat in a diet, the higher the percentage of pastureland it required. On a per calorie basis, producing the meat and milk of ruminants takes up less arable land than other types of meat, like pork or poultry.

The calculations show that, given the constraints on the availability of land (arable land being limited supply but pastureland being abundant), in some cases a diet entailing moderate meat and fat consumption can prove more nutritious to a small number of

people than a high-fat vegan diet excluding produce of animal origin. The main reason for this is that ruminants can convert pastureland into a type of food that humans can consume.
Vegans use more of our limited arable land to grow their purely plant-based crops, albeit only to the extent that abundant pastureland is available and is used for this purpose (Peters 2007).

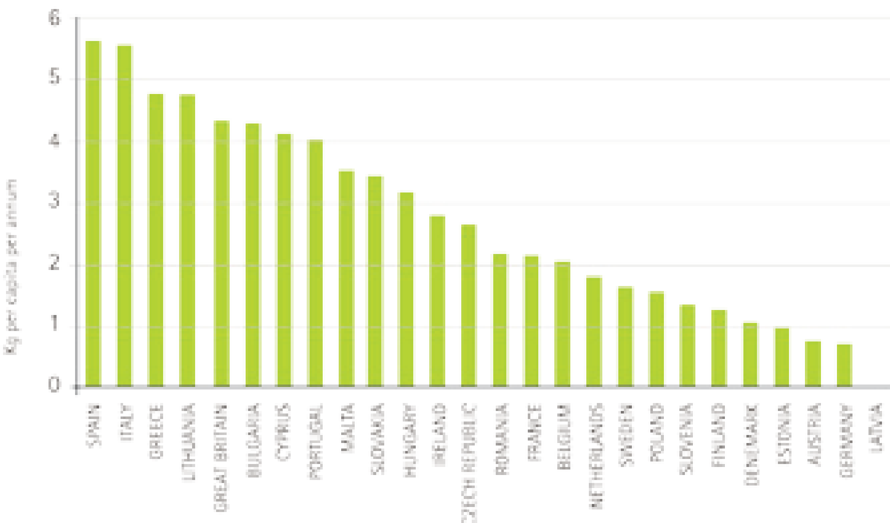
## DIG OUT SOME OLD RECIPES AND REDISCOVER LEGUMES AS VEGETABLES!

The seeds of leguminous crops have characteristically high protein content. In this connection, they have always played an important role in human nutrition wherever animal protein was in relatively short supply. The level of protein contained in 100 g of dried beans (up to 21 g) is higher than that of most fish species or many types of meat. In East Asia, the dominant source of protein is the soybean, whereas in Africa and other subtropical regions it tends to be the peanut. In Latin American countries most protein is provided by Phaseolus beans, and in the Andean highlands of South America a main provider of protein for centuries has been a lupin (Lupinus mutabilis) commonly referred to as 'tarwi'. Peas, beans and lentils used to be valued sources of protein in the European diet, whereas today they still play a considerable role in Mediterranean countries in particular.

Roughly half of the world's beans and three-quarters of its lentils are grown in Asia. Also, 80% of peas are produced in China and Russia, whereas India is the world's biggest producer of chickpeas. Peas, broad beans, vetch, dry beans, chickpeas, lupins and lentils are all grown in the European Union. Average per capita consumption in the 27 EU Member States is highest in Spain and lowest in Germany.

*Tarwi, a source of protein in the Andes.*

**Average availability of pulses in the EU in 2003**




Source: Dilis/Trichopoulou (2009)

Together with cereals, grain legumes are an important component of the human diet. Not only do they boast a high protein content, they also contain large quantities of complex carbohydrates, mainly starch and dietary fibre, and numerous vitamins (especially in the B group) and minerals like potassium, calcium and magnesium. In addition, some types of beans and chickpeas are very rich in iron. Tests involving people suggest that pulses can help to prevent medical conditions, especially heart disease and maybe diabetes (Dilis/Trichopoulou 2009).

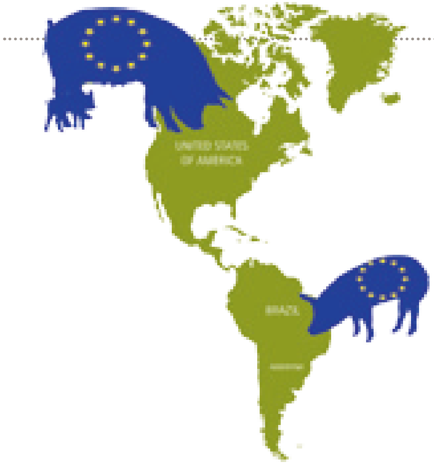
Nowadays, in addition to allergy sufferers a relatively large proportion of consumers are buying lifestyle and meat substitute products, ranging from soya yoghurts to lupin schnitzels, with European food retailers selling roughly 370,000 t of soya products a year, 85% of which are soya drinks. Since 2006, sales figures have risen by more than 19% in Spain, the Netherlands and Great Britain. Soya products currently account for 1.5% of the European dairy industry (in Germany the figure is 1.1%). Yet soya is being consumed in addition to dairy products, rather than instead of them (Recknagel 2008).

Outside Asia, pulses have been a part of the human diet for far longer than soybeans. The Ancient Egyptians and Romans were both well aware of their nutritive value, and they were probably among the first crops cultivated by mankind more than 8,000 years ago.

Many different ways of using pulses are firmly anchored and appreciated in a number of different cultures. Foods like the Brazilian bean stew feijoada, Arab falafels (chickpea balls), the countless Mediterranean dishes featuring red lentils (salads, risottos, patties) and German broad bean soup already exist, and are simply waiting to be rediscovered or popularised even further.

With a view to switching to a more balanced, low-meat diet, these recipes urgently need to regain their former pride of place as culturally defining culinary dishes throughout people’s lives, from their early education to their education and training. Furthermore, their nutritional value also ought to be highlighted in advice dispensed to canteens and large-scale kitchens.

*Foods like the Brazilian stew feijoada, Arab falafel and German broad bean soup already exist and are simply waiting to be rediscovered or popularised.*



# CONCLUSION

The ability of ruminants to turn pastureland that is of little use as food into healthy, nutritionally valuable and palatable human foodstuffs like beef and milk is one of the main reasons why people started using these animals and their produce in the first place. Without them, extensive expanses of land, especially in subtropical climates, would otherwise be virtually useless for feeding humans. Accordingly, animal husbandry and moderate meat consumption should not be condemned out of hand. With arable land in limited supply but pastureland abundant, in some cases a diet entailing moderate meat and fat consumption can prove more nutritious to a small number of people than a vegan diet excluding produce of animal origin. In sheer numerical terms, vegans use more of the limited arable land available for their exclusively plant-based diet, assuming that pastureland is available and is used for cultivating edible crops. So the problem here is not the ruminants themselves, but rather how they are fed. By contrast, intensive poultry and in particular pig farming should be viewed more critically, because the feedstuffs they need compete directly with human foodstuffs for available cultivatable land.

One thing is clear: the current scale of meat production and consumption in Europe no longer has anything to do with sensible, efficient food production. High imports of soya are key prerequisites for the negative development of European agriculture that favours the spread of intensive stock-rearing, squeezing out pasturing which makes far more sense.

Europe in particular, with its fertile soil, temperate climate and highly advanced, productive agriculture, likes to see itself as 'helping to feed the world'. Yet our meat production turns this around completely, for outside the European Union we Europeans use an additional area of arable land equivalent in size to 10% of the available cultivatable area in the EU. Logically, that land is then no longer available to feed the local populace.

In short, this export-oriented production is utterly wasting calories, warming the climate, consuming vast amounts of water, ruining markets and destroying smallholders' livelihoods in less developed countries. Moreover, it is not even generating a profit for Europe's farmers.

On the contrary, back in the 1950s in converted figures 66.8 Cent of every Euro of consumer expenditure on meat products still went to the farmer, whereas today farmers end up with a mere 20.4%, less than a quarter of the sales revenue. In 2009, farmers' average income in the EU-27 dropped by more than 12%, leaving them earning just 40% of the wage earned in other sectors.

Against this backdrop, fostering legume production in crop rotation schemes and for use in home-grown feedstuffs offers a number of advantages:

**It protects the environment**
(less use of mineral fertiliser and pesticides).

**It protects the climate**
(by generating fewer greenhouse gases).

**It protects resources** (energy, soil and water).

**It entails lower operating costs** (home-grown fodder, efficient pastureland management).

**It maintains pastureland.**

**It loosens crop rotations.**

**It boosts biodiversity.**

**It yields environmental cost benefits.**

**It lessens dependency on imports and fluctuating world market prices.**

**It shores up a form of animal husbandry that is tailored to the amount of land available.**

We should rediscover these crops and make use of the benefits they offer!
Andrea Beste

# OUTLOOK AND POLITICAL DEMANDS OF THE GREENS/EFA

## MARTIN HÄUSLING


To curb Europe's current dependency on non-sustainably produced animal and ensure that the EU plays a fairer role with respect to feeding the world in its productive use of resources, the domestic production of animal feed needs to be stepped up and made a cornerstone of the Common Agricultural Policy (CAP).

At the same time, the promotion of protein production in Europe must not be allowed to turn into a long-term and highly subsidised aid project. Horizontal measures in particular need to be incorporated into the CAP reform if farmers are to be offered fresh incentives to grow and use protein crops alongside cereals and oil seed and their by-products. These measures should not entail the payment of any specific crop premium.

General conditions must be created and agricultural methods encouraged that respond to the new challenges of climate change, protecting resources and boosting biodiversity whilst at the same time overcoming the Union's protein deficit problem. The full range of combined benefits of legumes described in this study needs to be taken into account when promoting them in all contexts: training, advising, breeding and actual cultivation.

Article 68 of Regulation (EC) No 73/2009 has been used by a number of Member States to support protein crop production as a contribution to positive agro-environmental practices. In addition to creating favourable general conditions for such crops, this option should become EU-wide practice.

The Commission should consider a top-up payment with compulsory rotation of at least four different crops including at least one protein crop, as well as increased support for non-arable permanent grassland areas including specific grass-leguminous fodder mixtures. These measures would not only reduce greenhouse gas emissions, but also contribute to a higher level of plant and animal health.

The Commission should also consider specific support of investments in regional, local or on-farm facilities for storage, cleaning, and on-farm processing of protein crops as part of rural development programmes.

It is also important to carry out a study on current deficits in research, seed production and cultivation techniques, including in particular the need for improved extension services and to consider a decentralised approach to research programmes which takes into account farmers' local knowledge and sustainable farming systems.

## DEMANDS TO THE EUROPEAN COMMISSION

1 Draft a report on the potential of EU protein crop cultivation that focuses in particular on:
- Substituting imported soya.
- Producers' incomes and rural development.
- Climate change, biodiversity, water quality, soil fertility and curbing the use of mineral fertilisers and pesticides.

2 Conduct a study on deficits in research, seed development, cultivation and extension services.

3 Produce a study on how current import tariffs and trade agreements impact on various oil seed and protein crops.

4 Publish a report on the current use of slaughterhouse waste, kitchen waste, meat and bone meal and other sources of animal protein as animal feed in the Member States and on the options for their alternative use as fertiliser, in biogas plants or for incineration, taking account of energy efficiency and the precautionary principle.

5 Devise rural development measures and instruments that foster the development of storage capacities, processing units and trade structures for protein crops grown within the EU.

6 Redefine good agricultural practice by stipulating a minimum amount of EU-grown protein crops as a precautionary measure against plant diseases and to boost autonomy from price volatility in animal production together with the Member States.

7 Introduce an agricultural and rural development framework programme for decentralised research and on-farm training programmes designed to improve research, enhance breeding and foster the cultivation of locally adapted protein crops.

8 Introduce payments to farmers who integrate 10% of protein crops, including grass ley, in their crop rotation.

9 Repeal the Blair House Agreement and amend Regulation (EC) No. 543/2008 on the marketing standards for poultrymeat.

10 Levy tax on imports of GM soya.

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The placement of the EU organic logo became mandatory on 1 July 2010 for pre-packaged organic food and remained voluntary for imported products after that date. Where the Community's organic logo is used, it is accompanied by an indication of the place where the agricultural raw materials were farmed.

The EU logo means that:

- At least 95% of the product's ingredients of agricultural origin were organically produced.
- The product complies with the rules of the official inspection scheme.
- The product came directly from the producer or preparer in sealed packaging.
- The product bears the name of the producer, the preparer or vendor and the name or code of the inspection body.

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## PICTURE CREDITS

**Depositphoto: cover photo: legumes / Elena Elisseeva, p. 42 field of legumes / Markit Volodymyr**

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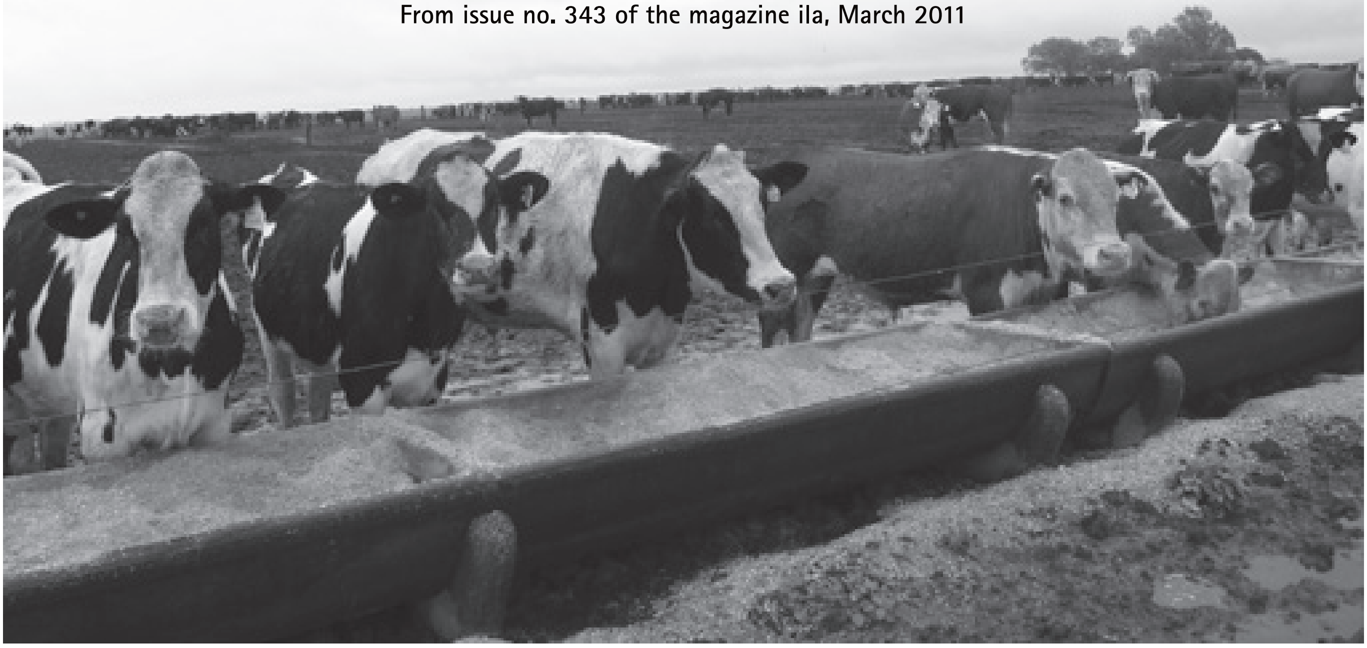
# COW PRISONS AND SOYA MADNESS

## ARGENTINA: WHEN COWS NO LONGER GRAZE

From issue no. 343 of the magazine ila, March 2011



*TEXT AND PHOTOS BY GABY KÜPPERS*

**What our cows eat is grown on 20 million hectares (mio ha) of arable land outside Europe, on land once grazed by cattle. In Argentina, for example, which took just few years to become the world's third largest exporter of soya, cows have been squeezed out, and today they stand in their thousands, packed together in confined spaces, standing in their own faeces, not moving around, eating genetically modified feed. And all this is thanks to 'soyaisation'. For by practising 'precision farming', industrial soy farmers are earning a fortune and not stopping to consider the damage being done in terms of soil fertility, animal health and land rights.**

**In December 2010, Green MEP Martin Häusling, Michael Alvarez, Director of the Heinrich Böll Foundation office in Santiago de Chile, and Gaby Küppers took a look around the Argentinean pampas for themselves.**

"Argentinians have changed their taste", said Osvaldo Pierella. "Nowadays they prefer their beef from feedlots, where large numbers of cattle are kept in a confined space, with not a blade of grass in sight, standing in their own excrement. The meat is fatter and sweeter and tastes a bit like pork", he told us as we sat picking at the food on our plates in the largest restaurant in Chañar Ladeado, right in the middle of the Argentinean temperate grasslands. We had been looking forward to devouring juicy steaks from free-range cows – but this?

That very morning we had seen the reason for what our palates found to be the distinctly 'un-Argentinean' taste of our beef. The Pierella family had presented to us what they described as their "leap into the agriculture of the future", namely lots of soya to export, some soya, wheat and maize to feed their own animals, and masses of cows.

Daniel, a third-generation Pierella farmer, first showed us around by way of a PowerPoint presentation – a propaganda slideshow produced by the soybean association, whose members can take that template and simply fill in their own data. We then hopped into a vehicle and drove to Caferatta, 4 km away, passing the Pierellas' fields, to the 'mega feed preparation silo', where a single employee enters the cattle's daily ration into a computer system and then monitors it. He did not wish to divulge the composition of the feed; his boss was within earshot. Finally, we went to check out the feedlot, where 3,260 cattle were packed close together, standing in mush, with not a blade of grass in the ground. Their daily feed of 6 to 7 kg fodder is delivered to long troughs. By eating it they gain a good kilo of weight ever day. Three months after their arrival, weighing 120-140 kg, they are sold to the abattoir weighing in at 330-350 kg.

What about diseases? Alberto Pierella shook his head: "Nothing serious so far", he said, and promptly changed the subject. Without ample chemicals in their feed, the animals kept there, standing in their own dung, would not even survive 3 months.

The Pierellas are proud of their family farm, now in its third generation. Only 4% of farms in Argentina get handed down that far. Most of them give up earlier, sell up or lease out their land, given the currently high price per hectare. Either that or they are squeezed out, as we were later to learn from somebody else. The farm was started by the late José back in 1974, when it totalled just 400 ha, and his sons went on to study agriculture, accountancy and veterinary science, as did his grandchildren. Today, 12 members of the Pierella family earn a living from the farm, aided by six farmworkers. That makes a grand total of 18 people working the 1,500 ha the family owns and the 1,200 ha they lease in addition to that, excluding the feedlot. What other kinds of jobs are available in Chañar Ladeado, a town with a population of 5,000? Hm, the Pierellas racked their brains. Chañar Ladeado, which lies a good 150 km away from the port of Rosario in the middle of the fertile pampas, used to be the focal point of Argentinean pig production until President Menem applied the neo-liberal recipes of the International Monetary Fund back in the 1990s. Agriculture was not spared by the resulting clear-cutting. The Institute for Price Control was closed down and open borders for cheap Brazilian pork finished off the local pig farmers. The agricultural research establishment INTA had its funds slashed, leaving Monsanto and Co. to fill the vacuum, virtually take over the research and duly reshape Argentina's agricultural sector.

Since the 19th century the pampas had been home to extensive cattle farming. Then came maize, wheat and sunflower cultivation. In the early 1990s farmers started switching to soya, encouraged not least by foreign demand for animal feed. In addition, soya is far more of a low-maintenance crop than maize, which spoils unless rain falls during the plants' two-week flowering period. In the mid-1990s, soya production took a massive leap forwards. Monsanto launched both its herbicide glyphosate, marketed as Roundup, and genetically modified soya.

Today, the pastureland has largely disappeared from the pampas, leaving soybean fields stretching into the distance as far as the eye can see. This is agriculture without farmers, the number of soya producers having plummeted by two-thirds. Of these, 200-300 are really large-scale operations, covering (sometimes far) more than 100,000 ha, owned for the most part by corporations, banks or funds. More and more foreign investors are also jumping on the bandwagon – with 13 mio ha already sold to non-Argentinian investors. Near Salta, for instance, roughly 1 mio ha have been sold to Chinese buyers, and during the stock market round-up aired before the news broadcast ever cheerful newsreaders have now more frequently started to recommend lucrative investments in agricultural production. Soaring prices are leading to concentra-

tion of ownership. Just a few years ago a hectare of land cost $2,000; now it costs $24,000. This is fuelling speculation. People buy into a pool of land lessors just before harvesting and then vamoose shortly afterwards, taking their proceeds with them.
That said, Argentinians have certainly not all turned vegetarian. They continue to prefer eating lots of high-quality meat, which always used to be cheap. However, the soya boom and, more recently, the drought of 2008/2009 have reduced the beef herds by 10 million head of cattle.
What is the answer as land for grazing cattle is increasingly being marginalised and forced to the edge of the pampas, further and further away from the densely populated metropolises of Buenos Aires and Rosario? It is said that 40% of Argentinians, i.e. 17 million people, live within 100 km of the trademark Obelisk of Buenos Aires. 80% of food production stems from the pampas, the flat grasslands extending from the country's capital to the Andes.
The solution is...feedlots, which produce meat that the Argentinians do not really prefer. But in Buenos Aires virtually nothing else is available any more, and feedlot beef is affordable, thanks to the (now discontinued) start-up support offered under the ruling Kirchners' regimes. Just a few years ago, 5% of slaughtered cattle came from feedlots: today that figure has soared to nearly 50%. Following a brief decline, the overall population of cattle has now climbed back to 50 million, where it was 8 years ago (in Brazil, over the same period, the total stock has multiplied by a factor of eight). The feedlot cattle are smaller than the so-called top-quality 'Hilton' beef, the only type for which Argentina has an EU import quota. The animals providing it come from the few enclaves of pastureland that have survived the spread of soya. Since most of the remaining livestock industry is being forced into the warmer northern part of the country, new, more resistant strains of cattle are being bred for the country's subtropical regions. What the conversion of forest into pastureland will mean for the existing biotopes or climate is not difficult to imagine.

At the end of our lunch, Osvaldo Pierella asked whether Martin Häusling, in his capacity as a member of the European Parliament, might not be able to have the Hilton Quota extended to feedlot meat. The answer to that question was very hard for him to swallow: "If Europeans knew the circumstances in which the highly prized Argentinean beef is being produced, its good reputation would be lost and sales would plummet". Another objection was also very difficult for him to understand: "We have been outsourcing our cattle feed production. Your soybean cultivation is ruining your best soil. That is clearly not sustainable and has to change. We have to start producing our own animal feed again". No member of the Pierella family shares that view. They feel they have made a quantum leap into the age of GM soya.

The magic formula for quick profit is 'direct seeding'. Championed by the Argentinean soya association Acsoja and its member organisations, this approach entails turning pastureland into soybean fields directly, without ploughing up the land. To avoid erosion, newly sown seeds are placed directly onto the previous crop on top of the straw residues, without breaking the soil. However, this requires the use of considerable quantities of pesticides, fertiliser and genetic engineering, and desertification is inevitable. In fact, direct seeding is a ticking time bomb that most Argentinean soya producers today believe to be an ideal technology, because it has catapulted the country into the pantheon of the world's top soya producers. "Although Argentina is a developing country, it boasts the world' most advanced precision farming", enthused Secretary of State for Agriculture Lucrecia Santinoni. Satellites scan 20 x 20 m2 fields to pre-programme the most efficient machine seeding and determine the optimal quantities of pesticide to use.

Argentina's total grain harvest in 2010 was 100 million tonnes, more than half of which was soya, the vast majority of which was exported. "Soybeans are currently being cultivated on 32 mio ha and there is potential for another 10 mio ha", said Acsoja President Miguel Calvo. New varieties of soya, which thrive in Patagonia, for example, would aim to increase the overall yield to 150 million tonnes within the near future. "We are the most dynamic sector of Argentina's economy". That is no exaggeration. The members of Acsoja include growers, exchanges, banks and even universities and research establishments, making it an economic-cum-ideological special-purpose association that suppresses dissent. Anyone claiming that glyphosate and GM soya may be harmful is almost deemed guilty of high treason. For example, an event organised by the head of molecular embryology at the University of Buenos Aires (UBA), Andrés Carrasco, in La Leonesa in northern Argentina in August 2010 was violently disrupted. Universities are refusing to publish his work or the research findings of the agronomist Walter Pengues. Acsoja President Miguel Calvo waves this all aside, saying that nobody can conclusively prove that glyphosate and GM soya are harmful. His association's headquarters are strategically located in Rosario, Argentina's third-largest city. Lying by the Paraná River, it is the economic centre of soya production and has clearly prospered, as witnessed by its harbour promenades, flashy restaurants and shopping precincts. Many of the ports privatised back in the 1990s under the Menem regime are located nearby and serve to ship the soya out of Argentina (as well as from Brazil and Paraguay) directly to Europe. 80% of those exports take the form of meal and 18% oil.

Lately, another option, half of which is destined for the domestic market and half for export, is soya petrol. Argentina's requirement that petrol contain 7% - and soon - 10% agrofuel has opened up another lucrative market niche for soya. Raul Bernardi, the CEO of Unitecbio, a soy fuel facility owned by leading entrepreneur Eduardo Eurnekian, took us on a tour of the plant near Rosario which has direct access to its own private harbour. Each year, 240,000 tonnes of soy fuel were already being manufactured there, and a second plant was due to open at the end of 2011. Soy fuel is a transitional technology, Bernardi said. Eurnekian, who wants to see his legacy include something useful, is supposedly already experimenting with algae. Since soybean cultivation is penetrating every further into formerly forested areas, there are surely bound to be problems with fulfilling the EU's sustainability requirements, we argue. "That's no problem", said Bernardi laughing: "For the EU we take soya from unobjectionable growing areas, and for Argentina or China we use the other type.

"The agricultural export industry, with its ever shorter profit cycles is crowding out all other forms of production in Argentina. "In this respect the Kirchners have continued the policy conducted by Menem", lamented Umberto Fuerte from the opposition party UCR. "In the 1990s, Menem predicted that 200,000 farmers would have to disappear to enable his 'progressive model' to prevail. Under his neo-Liberal rule 120,000 of them ended up having to make way, followed by another 60,000 during the Kirchners' terms in office. Another 20,000 and Menem's prophecy will have been fulfilled."

The Kirchners' agricultural policy is contradictory. Their attempt to push through taxes on grain exports, to enable the country to claim its share of the hitherto unbridled flow of profits earned by agribusiness, failed, mainly because of resistance from the mighty agro-lobby, and was duly watered down to the – still opposed – export licensing regime 'ROE Verde'. In 2008, when the rebellion by 'big agro' reached its zenith, smallholders also took to the streets to oppose taxes, without noticing that they were merely serving as willing stooges for the interests of major agribusinesses. In the meantime, various smallholders have rescinded the alliance, are offering up resistance to land grabbing, which is forcing them out, and large numbers of them are switching en masse to a family-based agricultural model that is in keeping with sustainability requirements. This was not at all a priority for President Néstor Kirchner, neither does it feature high on the agenda of his widow and successor, Cristina Kirchner.

Whilst Acsoja's friends stalk the corridors of the Ministry of Agriculture and blueprints for organic agriculture are wasting away in a drawer somewhere, developments are afoot in Argentina's National Institute of Industrial Technology (INTI) and National Agricultural Technology Institute (INTA), whose staff have recognised that in isolation the soya model has no future. Consequently, they are developing programmes designed to bind people to the land. "Argentina is turning out agricultural produce for six times its own population, but not creating jobs. Making a quick buck by exporting soya to feed Europe's cattle is tempting, but is ruining the country. Suitable technology and organic varieties could enable farmers to live in dignity without a lot of capital", said INTA's Julio Catullo. Three million people are involved in the GMO-free programme Pro Huerta (meaning 'in favour of vegetable gardens'), 70% of them from the vicinity of towns or cities. INTI is building refrigerated warehouses for Argentina's domestic market in the less industrialised northern part of the country, to shorten the relevant production chains. Another thing it is doing is building small-scale agricultural machinery, because John Deere and the other manufacturers are only producing monster machines for the agricultural industry. Furthermore, it is taking steps to support abattoirs that also slaughter goats, to revive the consumption of goat meat. "We don't have patents", INTI's Graciela Muset told us. "We ensure that knowledge is disseminated for use by the public".

Walter Pengue, a scientist at the National University of General Sarmiento in Buenos Aires province, has nothing but praise for this approach. "First and foremost the people here have to have a good life", he said. Good food? 95% of organic foodstuffs are exported, and 60% of that proportion go to Europe. "The organic lobby is not questioning the agricultural export model. For them it suffices if the government certifies their produce for export, regardless of whether or not the people are going hungry", said Walter Pengue indignantly. Argentinean supermarkets stock virtually no organic products. Producers think in containers, not crates. "But why should tomatoes be shipped 12,000 km around the world", Pengue asked. The National University of General Sarmiento is located in one of the poorer areas. A weekly market is held on campus, to bring people in. This is why Pengue prefers the slightly more socially inclusive terms "agri-environmental" or "agro-ecological" to the adjective "organic". "People are dying here in land battles", he went on, "but nobody talks about them, because as the saying goes: 'Argentina is big and God only serves Buenos Aires'. First of all basic needs must be met, then we can start thinking about international trade".

After the recently initiated debate about agrofuel, which is squeezing out food production, there is an urgent need to debate animal feed for European cattle, pigs and poultry, which can have the same 'side-effects'. •

# WE DON'T WANT MOUNTAINS OF MEAT PRODUCED USING IMPORTED ANIMAL FEED!

## INTERVIEW WITH GREEN MEP MARTIN HÄUSLING

From issue no. 343 of the magazine ila, March 2011

*TEXT AND PHOTOS BY GABY KÜPPERS*

**It is common knowledge that cows eat grass. But if that was all they ate they would grow more slowly and provide far less meat and milk than is usually the case today. To supply these commodities at the rate they do they need concentrated feed, i.e. cereals (especially maize) and protein. Once upon a time European farmers used to grow their own protein-rich pulses (legumes) like lucerne, field beans, peas and clover, but nowadays most such crops are imported, primarily in the form of soya. The magazine ila has frequently reported on the negative social and environmental consequences of soybean production in Latin America (including the squeezing out of smallholders and farmers, the dwindling production of basic foodstuffs, and rainforest clearance). However, from an agri-environmental point of view the drop in protein crop cultivation is also highly problematic for European agriculture. Gaby Küppers spoke to Martin Häusling, the spokesman on agriculture for the Greens in the European Parliament, who 2010 presented a report there on the protein deficit in the EU, about the impact of the soya boom in both continents.**

*What percentage of protein crops used in the European animal husbandry sector is actually grown in the EU?*

Only around 20%. We import approximately 80% of the protein we require for animal feed. Most of this comes from South America. We are also increasingly importing maize – once again more and more of it from South America. So all in all, our meat production in Europe is largely dependent on imports.

*Is this proportion tending to fall or to rise?*

The proportion of imports has risen in recent years, quite sharply in fact. European protein production, i.e. cultivation of peas, field beans or lucerne is in decline. Indeed, they are now only grown in a mere 3% of arable land. So the European Union's dependence on imported protein has now reached an absolute record level.

*Why are so few protein crops grown in the EU today?*

When you ask the farmers that question, they say that imported soya is so cheap that the cultivation of protein crops within the European Union is simply not worthwhile. The uncoupling of EU payments to farmers means there are no longer any direct subsidies for protein crops, and this makes their cultivation of no


economic interest to most farmers. Another key factor is in recent years no more progress has been made in the breeding of protein crops in Europe, so the difference between their yield and that of soya, for example, has increased. Politically, too, in recent years soya imports have either been actively promoted or nothing has been done to curb them. We have the Blair House Agreement, which liberalised soy imports into the EU, so there are no import duties. As a result, the market for protein crops is totally open.

*Can you briefly put the Blair House Agreement in context?*

The Blair House Agreement was concluded in the early 1900s as part of the ongoing GATT negotiations. It is still in force and guarantees importers of soya, unlike those of many other products, free access to the European market.

*You just said that most of our protein comes from South America, in the form of soya. Can you be any more specific? From which countries exactly?*

Most soya comes from Brazil and Argentina. Those are our main suppliers. US soya imports have steadily declined in recent years. By the way, most Brazilian imports of soya are GMO-free.

*What, in your view, are the biggest problems posed by the rapid spread of soybean cultivation in these countries?*

We recently had a chance to see for ourselves in Argentina. The agricultural structure there changed dramatically over the last 15 years. Today, soya is being grown on the best land in the pampa. Just 15 years ago the pampa was still a region where cattle grazed on vast grasslands. But that has now changed completely. The soya boom has transformed the pampa into a soybean desert, where the soya and maize cultivation are totally dominant, with the same result as in Brazil: meat production is migrating to the northern part of the country, where forests are cleared so that cattle can graze. Another phenomenon in Argentina is the thoughtless use of genetic engineering. Moreover, genetic engineering combined with the application of Roundup, a non-selective herbicide. This will cause immense long-term damage to the environment. Damage is already being done, but its extent will continue to spread.

*Doesn't the EU impose any constraints on imports of genetically modified soya?*

In Europe, part of the reforms of the EU's agricultural policy entail a higher proportion of environmental legislation, including for agriculture. However, our imports are not affected, because countries like Argentina and Brazil do not really have any environmental standards governing soya cultivation. Europe does not use gene technology to grow any of its protein crops. That is the result of political will. But we need to make sure that the same standards apply to imports, which is currently not the case.

*What does it mean for the soil in Europe if fewer and fewer protein crops are being cultivated? Does it also have negative consequences here, as critical farmers and agronomists maintain?*

The first Agricultural Revolution in Europe occurred when the three-field system was introduced and protein crops like clover and lucerne, field beans or peas were included in crop rotation, because these plants are capable of fixing atmospheric nitrogen, essentially performing the same task that is achieved by artificial means today, by deploying nitrogen in the form of mineral fertiliser. The plants in question supply themselves and subsequent crops with nitrogen. Another positive environmental impact of leguminous plants is their favourable impact on soil fertility: they are so-called soil-rehabilitating crops. In addition, they also play a prominent role in the climate change debate, because since clover and lucerne, for example, are capable of forming considerable quantities of humus in the soil, sequestering carbon, they exert an indisputable positive effect on agriculture's climate balance. In recent years, these factors have been utterly disregarded in Europe. The use of mineral fertilisers has completely supplanted this old knowledge and stripped legume cultivation of its economic importance. We are convinced of the need to steer a very clear course towards cultivating more protein crops in Europe. Moreover, this is in line with what we want to see in agricultural policy terms, namely higher soil fertility, less use of mineral fertilisers, and potential for carbon storage. These are also some of the fresh challenges facing the Common Agricultural Policy and consequently they must be reflected in the reform of the EU's agricultural policy.

*Which animal feed would it make most sense for us to grow ourselves in Europe?*

As we all know, cows eat grass first and foremost. Grassland always has a high proportion of legumes if the areas in question are kept in good condition. So nature supplies cattle grass, cereals and some protein. However, in recent years the situation has become so distorted that although grass constitutes the basis of cows' diet, it is grain and imported soya that determine their yield. If we, the members of the European Parliament, want agricultural policy to be reformed in a way that makes real sense, we must be able to say that feeding our cattle with home-grown crops is sustainable and in line with our principles. In other words, we must incorporate protein crops into our crop rotation in a balanced way. We can either make this mandatory or we can provide incentives for doing so. We must make sure that the basic rations for milk production once again stem from grassland, instead of being maize- and soya-based.

*If more protein crops were cultivated in Europe, would that mean that fewer other crops could be grown? What would this mean?*

Perhaps we would no longer be in a position to produce such large surpluses of cereals in the European Union as is the case today. Overall, production would be more balanced and ecologically appropriate. In other words, the cereals we would no longer export would no longer need to be imported in the form of high-quality protein crops. We do not want imports of animal feed to result in the senseless production of quantities of meat that we would then end up granting export subsidies so that it could be sent back around the world. Such a situation really messes up agricultural markets and makes no sense whatsoever in the long run.

*You are an organic farmer yourself. Are cattle also being fed more imported – but of course organically cultivated – soya in organic animal husbandry, or do environmental associations set guidelines prohibiting or imposing limits on such a practice?*

Well, I can answer that based on my own experience. We have a farm with 60 head of dairy cows. Roughly one-third of the land on our farm is used to grow legumes, primarily clover and lucerne, which we use to feed the cattle. We need these legumes to fix nitrogen in the soil because we do not use any mineral fertiliser. No soya whatsoever is imported for our dairy farming, or indeed by any of my fellow organic dairy farmers. But imported organically grown soya is used in organic poultry farming. In fact it plays a prominent role there. This is because there are barely any alternatives in the form of suitable protein crops grown here in Europe. We also have a deficit in organic farming.

*Would meat and dairy products become considerably dearer if Europe produced its own animal feed?*

No, that is not a fair statement. I believe that if we were to focus overall on serving the European market and dispensed with the majority of pointless agricultural subsidies in many sectors and only support activities that are both social and environmentally necessary, overall agricultural production would become less expensive. Having said that, not all costs that arise are reflected in meat prices. For example, who pays for the consequences of large-scale forest clearance in South America? That is not factored into the price at all. Future generations will have to pay for that. I am convinced that we need to change our system in a way that incorporates environmental impacts into prices. We cannot offset such damage with European subsidies. It is only honest to include environmental impact costs in agricultural prices, and if we did that the 'bill' for organic or regional produce would look quite different from the cost of products arising from intensive stock-rearing. The thing is, Europeans should not really be encouraged to continue eating as much meat as they consume today.

*So do you think European consumers should scale back their consumption of meat, eggs and dairy products? If so, by how much?*

Fortunately a very intensive debate has already begun on the significance of our meat consumption and the role it plays. If worldwide meat consumption continues to rise, we will need even more animal feed, and that will lead to even more severe bottlenecks in the supply chain in some areas. I believe we need to differentiate when it comes to meat consumption. For example, I don't see beef as the problem. If cattle are kept on land that cannot be used for any other agricultural purpose, like grasslands, then I don't see an ecological problem in that. The problem we do face, though, in the long run, concerns higher production of pork and chicken. Pigs compete directly with humans for food. Of course, you never can tell with statistics, and it is hard to make sweeping statements that meat consumption needs to be cut by this or that much. Argentinians eat 80 kg of beef a year, whereas Germans consume 90 kg of meat, including 30 kg of beef, the remainder being pork and chicken. There is no way everybody can consume so much meat: doing so is a complete luxury.

*How can meat consumption be reined in without actually prohibiting anything?*

We don't want to prohibit anyone from eating meat. That would be impossible to do anyway. I believe there are two possibilities. One is that we initiate a public debate on this. A very intensive discussion is actually already under way, including consideration of questions as to what ranks as normal and what is healthy. The other is that we ascribe to products the true costs they incur, which is something we would also like to see done in many other areas. If the environmental costs of meat production were factored into the price, pork would cost at least twice as much and chicken perhaps three times as much as is currently the case. If that happened, consumption would go down of its own accord. It is absurd that some pork schnitzels are cheaper than their accompanying vegetables. This has nothing to do with actual trends in market prices, and everything to do with our strongly promoting certain forms of agriculture whilst not supporting others at all. •

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# BIODIVERSITY, NOT SOYA MADNESS!

Europe's extensive dependence on imported protein for its meat production poses a number of major threats to its agricultural system, with animal production based on feed imported from overseas and directly dependent on price fluctuations on global markets. Many European farms, which are not producing at world market prices anyway, find themselves unable to cope and give up.

High soya imports have been – and remain – a key prerequisite for the development of European agriculture that favours more widespread intensive stock-rearing. The level of meat production and consumption prevalent in the European Union for the past few years not only uses up large quantities of raw materials and energy, but is also causing damage to the climate and the environment and should be rejected for animal welfare reasons. Moreover, it is unjustifiable in terms of rising to the challenge of feeding the world.

That said, the real problems are not animal husbandry or meat production, but concern how livestock are kept and fed, because the methods applied result in animals' needs for feedstuffs competing with human foodstuffs for land.

By promoting protein crop cultivation within the EU, we can offer European agriculture the prospect of a more independent feeding method characterised by a stronger regional element, higher quality and greater value creation for the farmers and regions involved. Our climate, soil, water and biodiversity would all benefit as a result.

This study provides a snapshot of the status quo concerning legumes in Europe, highlights current problems and proposes some solutions. It also identifies those areas where action needs to be taken if European protein crop cultivation is to be boosted effectively.