

# Towards a Common Agricultural and Food Policy

---

Louise O. Fresco and Krijn J. Poppe



**WAGENINGEN**  
UNIVERSITY & RESEARCH

---



# Towards a Common Agricultural and Food Policy

---

Louise O. Fresco and Krijn J. Poppe



---

# Preface

At Wageningen University & Research we aim to play a catalytic role in issues facing global society, such as the provision of adequate and safe food, climate change, the development of a circular economy, protecting and utilising biodiversity and reducing poverty. At the same time, we strengthen the international debate in these areas. We find it important to develop new insights and solutions around sustainable agriculture and healthy and safe food in Europe.

We want to develop these insights and solutions by working in multidisciplinary teams, by encouraging cross-pollination between fundamental and applied research and between university and research institutes and in dialogue with society.

There is currently much debate about our agriculture and food system. This debate, which reflects deep feelings and convictions, is fundamental to any discussion regarding the future Common Agricultural Policy (CAP). During the Dutch presidency of the EU in the first half of this year, Louise O. Fresco and Krijn J. Poppe felt challenged to apply their insights to the future of the CAP. They wrote this position paper which summarises and reviews the tensions between the need to change our agriculture and food system and the resistance to adapting the policies which govern it. They review the societal challenges and the options for innovation and come to the conclusion that the CAP has to develop into a broader Common Agricultural and Food Policy, which helps the entire food chain – from farm to fork, from animal breeding to human feeding – to cope with the challenges of the coming decades.

Their insights are shared at the first Mansholt Lecture in Brussels in 2016. To create this position paper, the authors have shared thoughts with many colleagues within Wageningen University & Research, from economics and sociology to biology and animal sciences. We would like to thank all colleagues for their contribution.

With kind regards,



Jack van der Vorst  
General Director Social Sciences Group  
Wageningen University & Research


---

# Contents

1	The need for change: five major challenges	6
	Food and nutrition security and safety	
	Climate change and water & energy use	
	Reducing ecological impacts	
	Healthy diet for a lifelong healthy lifestyle	
	Inequality	
2	Five major innovation areas	14
	Genetics	
	Digitalisation and big data	
	Energy and bio-based transitions	
	Redesigning the food chain	
	Social innovations	
3	Five misunderstandings	20
	‘There is a crisis in agriculture’	
	‘It is wrong for the organisation of the food chain to be so industrialised’	
	‘Agriculture is the main solution for rural areas’	
	‘International trade is harmful’	
	‘The CAP is expensive and leads to overproduction’	

---

4	Five examples of a Common Agricultural and Food Policy	30
	Make our diets more healthy and sustainable with a price that factors in true cost	
	Incorporate climate change agreements in farm decisions	
	Align incentives in the food chain	
	Install smart instruments for environmental management	
	Support disruptive innovation in the urban food system and bio-economy	
5	Transforming the CAP into a Common Agricultural and Food Policy after 2020	38
	Pillar A for income support: reduce direct payments by capping and targeting	
	Pillar B for ecosystem services based on contracts: align with regional public contracts and industry sustainability schemes	
	Pillar C for rural development: innovate for competitiveness	
	Pillar D for consumer food policy: address consumers, retail and the food industry for a healthy and climate-smart diet	
	Pillar E for monitoring, reflection and research	
	A selection of relevant literature	52

A large-scale center pivot irrigation system is shown in a lush green field. The system consists of multiple parallel metal arms supported by a central pivot point, with numerous smaller wheels and pipes extending from them. The background shows a hazy, brownish landscape under a clear sky. A large, light blue number '1' is overlaid in the center of the image, enclosed within a thin blue circular border.

# 1

The need for change:  
five major challenges



---

## Food and nutrition security and safety

The ultimate challenge faced by the global food system is to feed a population which may rise to nearly 10.5 billion by 2100. These people will also be comparatively richer on average and the majority will live in an urbanised environment. The demand for food, in particular animal proteins, will therefore increase by even more than the growth in population suggests.

Although undernourishment has been on the decline for decades in relative and absolute terms, nearly one billion people are still affected by food shortages. Famines have become scarce and are mostly caused by civil war, catastrophic policies (as demonstrated in Zimbabwe and North Korea), poor logistical infrastructures, extended periods of extreme weather or natural disasters. In total two billion suffer from undernutrition. If we also include the 1.5 billion-plus people who are obese or overweight, and hence poorly fed, around half of the current global population suffers from a food-related problem. This is called the 'double burden' of undernourishment and excess weight.

While the planet should, technically speaking, have no problem feeding ten billion people or even significantly more, this will not happen automatically if current production trends are maintained. Agriculture and food production mean, nearly always, managing natural processes such as weather, water, soil fertility and new and old diseases and pests. To face these challenges, precision agriculture, including continuous breeding of crops and animals, and ongoing application of new breeding techniques, is required. So, too, are specialisation and trade: products can best be cultivated in the most favourable places and where trade can help balance out weather-induced shortages between countries and continents. Without scientific, technical and financial investments there can be no progress in feeding future populations.

More than any other continent, Europe has a very high percentage of good agricultural soils, with sufficient water availability and an attractive climate. Its farmers and food industry have an exceptional level of know-how, and innovation is an important element of the farming tradition. It is in our own interest to facilitate the development of agriculture elsewhere and provide food for other, less advantaged areas, especially in the Mediterranean and Middle Eastern regions, which are becoming more arid and have growing populations. The export of technologies and good governance in terms of agricultural policy and food systems to Africa, for instance, is another opportunity as well as a moral duty.

---

All these issues have consequences for the CAP. For simple reasons such as a lack of subtropical and tropical products or, more generally, the logic of producing products where they can best be produced and the need to import key technologies, Europe cannot feed itself without trading with the rest of the world. Similarly, the world cannot feed itself without a contribution from Europe. Food and nutrition security for all can only exist if the CAP is rooted in an open trade policy, one which gives European agricultural and food businesses the possibility to export commodities to other countries and special products to consumers all over the world. In addition, to stimulate regional development, farmers in developing countries should have access to European markets as well as know-how.

## Climate change and water & energy use

The 2015 United Nations Framework Conference on Climate Change, COP21, decided that the world should act to keep the temperature rise below two degrees Celsius, and preferably 1.5 degrees at most. Although COP21 stated that any actions taken must not endanger food production, this does not imply that the agriculture and food system have no role to play in mitigating climate change, while adapting to changes in rainfall, temperatures and CO<sub>2</sub>.

Many technologies for a more climate-smart agriculture and food system are available and could be further developed and adopted. Climate, energy and agricultural policies can help farmers take management decisions to adopt such technologies. However, future energy prices and their influence on agriculture and food production and the bio-economy in general are very uncertain.

**Agricultural and climate policies have to be in line**

Economic policy instruments such as CO<sub>2</sub> trading could play an important role in making the food chain more climate-smart. It is unlikely, however, that energy and climate policies alone can solve the issues. Agricultural policies will have to be in line with climate policies, enabling farmers to adapt and play a role in mitigation and adaptation by helping them manage risks, be more innovative and make the right decisions.

Taking into account the magnitude of this challenge, it is neither realistic nor fair to make farmers alone responsible for producing food that is climate-change proof. Part of the solution has to come from food chain partners and consumers, who need to shift to a more sustainable consumption pattern. This puts the

---

spotlight on food processors and retailers who play an important role in nudging consumers towards a more sustainable diet.

Rising temperatures and related changes in weather patterns may cause flooding, droughts and disease, all of which influence food production and food safety. In risk management, it is important to understand that - while future yields are likely to be more volatile - the problem for farmers is income risks, not yield risks. Markets automatically offset some of the yield risks: lower yields in a certain period often lead to higher prices and, sometimes, better incomes. In addition, farmers have many tools available to organise and finance their operations which reduce the effects of yield risks, such as contracting, insurance, hedging and prudent borrowing. A good public risk management policy encourages the use of such tools and is mainly oriented towards mitigating catastrophic risks for which no insurance cover is available.

## Reducing ecological impacts

In addition to climate change, the agriculture and food system faces major challenges related to the environment and biodiversity. These arise from the fact that agriculture is essentially a system of managing nature in space and time and therefore, by definition, has ecological impacts. The chemical revolution of the 20<sup>th</sup> century has led to an agricultural system based on high inputs of energy, fertilisers, pesticides and antibiotics. These have brought and continue to bring many advantages. In some cases, however, the effect of their excessive use on the environment (water and air quality and even public health) has not been considered when deciding whether to use these inputs.

Significant progress has been made in reducing those negative effects over the past 20 years, reducing biocide and fertiliser use and improving water quality. Sustainable use of agrochemicals without long-term residual effects is now theoretically possible. Important challenges remain, however, both in terms of the inputs and also in the area of water, soil and biodiversity.

As a result of climate change and the heavy demands for urban and industrial uses, water is or will become scarcer in many regions of Europe. While irrigation is an option, one that is applied already in many areas, this has to be carefully organised in order to avoid wasting water or creating/exacerbating problems with soil salinity and erosion.

---

Intensive use of soils and monocultures without proper soil management leads to problems such as depletion of organic matter and soil biota, over-compacting

## Intensive use of soils and monocultures without proper soil management leads to problems

caused by heavy machinery, erosion, and the spread of certain bacteria, fungi and weeds. Good soil management may primarily be the responsibility of farmers, but landowners, contractors and food processors also have a role to play or a stake in the matter. A good agricultural policy must help solve this challenge.

The same holds true for issues related to biodiversity, landscape and nature management. Often, farming systems have come to be seen as radically opposed to nature and biodiversity. Appreciation is growing, however, for the roles played by bees, trees and other animals and plants in nature, and their benefits for agriculture. Some bird species depend on extensive farming systems and need protection when agriculture intensifies. Any future agricultural policy must allow for a separation between agriculture, landscape and nature where appropriate, but include fruitful co-existence in other cases or promote synergies with principles of agro-ecology. An aspect of sustainable intensification is that more intensive farming is allowed in one region, to free land for other purposes elsewhere. Attention is also needed for traditional landscapes that are the result of farming. In this context, this means incentives to produce eco-system services but also to accommodate resource-efficient intensification.

## Healthy diet for a lifelong healthy lifestyle

The link between food and health is recognised around the world. Agriculture and food are required to provide consumers with healthy and safe food and to ensure they can more easily make healthy choices. At the same time, concerns about food safety have exploded. Europe has been confronted with various foodborne illnesses and food scares in recent years, sometimes due to accidents, at other times as a result of fraud. Some of these problems are linked to long distance, international trade in anonymous food chains with a low level of transparency. Food-safety scares have led to a strengthening of public and private law and related administrative burdens.

The majority of chronic diseases such as type 2 diabetes, cardiovascular diseases, certain types of cancer and obesity (which is itself related to diseases like diabetes) are linked to food intake and lifestyle. We consume more meat

---

than is advisable and do not eat enough fruit and vegetables to get the fibres we require.

These challenges are not a direct result of problems created by agriculture, although some argue that agricultural policy and the direction of innovation have favoured the production of surpluses in general, as well as favouring meat, dairy and sugar over fruit and vegetables.

Safety and health engage all actors in the food chain. Just as with climate change, even if agriculture is not the source of the problem it can still be part of the solution and be affected by those solutions. Agriculture in and around cities (peri-urban) can contribute to a healthy environment and lifestyle (smart cities), and digital innovations in food products (including the breeding of crops and personalised nutrition) can make healthy diets more available and affordable.

## Inequality

The high levels of inequality in the world, in Europe and in the agricultural sector, are a source of political and social tensions in the wider world. Tackling the inequalities between the European Union and emerging and poor economies requires a Europe which is open to exports from these countries, allowing their farmers to earn decent incomes. Europe should also export know-how, services and inputs to those countries to strengthen production potentials elsewhere. In parallel, the exports of high-quality and specialised products to middle class consumers without destroying local markets and local production is a priority.

A lack of economic growth and persistent unemployment has increased inequality within Europe within rural areas and between rural and urban populations. This has become a major concern and an important driver of politics. A significant proportion of income and labour inequalities occurs in cities. The main role of agricultural policies in this respect is to retain a focus on healthy and affordable diets that benefit the poor.

Payments currently go to large farmers and landowners

But many rural areas face low incomes as well, certainly in farming. The question arises to which extent agriculture and the food industry could contribute to creating more jobs in these areas and to facilitating growth. Given the high investments needed per worker and the small share of agricultural employment in even the most isolated rural areas, it is not easy for agriculture to make a contribution in this respect. It is, however, clear that most CAP payments

---

contribute little to redressing inequality within farming communities. Payments currently go to large farmers and (indirectly) large landowners while it is small farmers and unemployed young people who are probably most in need of a social policy. More is required if rural areas are to benefit in terms of employment in the entire food chain beyond primary production.

## **Reflecting these challenges in the CAP of the future**

The five major challenges – food and nutrition security, climate change, the environment, healthy and safe food and inequality – must shape the food and agricultural policy of the future. It is hard to imagine that this can all be realised by only addressing farmers who are merely part of a food chain in which most of the power lies with the retail, food industry and input industry. All partners in the food chain must participate in order to address the low incomes of farmers (fair trade), their environmental performance and the need to offer healthy choices for consumers. Dealing with the negative effects of the food chain organisation cannot be left to farmers and tax payers. It is also important that the various policies related to food, agriculture, the environment, climate change and competition be better aligned, at European and national levels. An agricultural and food policy will need local or regional know-how to deal with the diversity of ecosystem services, farming traditional and food cultures. Decentralisation is therefore an important condition of such an agricultural and food policy. However, such decentralisation should not create barriers in our common market.



A close-up photograph of a person wearing a white latex glove holding a clear glass test tube. The test tube contains a small amount of clear liquid and a piece of green plant material. A large, semi-transparent number '2' is centered over the image, enclosed within a thin, light-colored circular border. The background is a soft-focus laboratory setting.

2

Five major innovation  
areas



---

The challenges discussed in chapter 1 are also the business opportunities of tomorrow and a driving factor for innovation, investing in the application and development of new technologies. Let us now examine five intertwined innovation areas in more detail to see which challenges they address as well as the types of complexity they add.

## Genetics

New plant breeding techniques are becoming available that blur the difference between traditional breeding and genetic modification. It is already possible today to use gene-editing techniques which switch certain genes off and change the traits and composition of plants without resulting in genetically modified crops. Such techniques mean that the breeding of new varieties in fruit trees or potatoes, for instance, which normally takes decades, can be speeded up. Furthermore, unwanted genes, e.g. leading to susceptibility to diseases or to allergy, can be removed. Tolerance to abiotic factors (e.g. drought) can be obtained too. Similar techniques apply to animal breeding. Precision breeding for precision foods for specific consumer types is within reach, especially through the enhancement of nutritional quality. Genetics and data mining are becoming cheaper.

All this will inevitably lead to new societal discussions

For industrial processes, the functionality of existing proteins is improved or new enzymes are created. In animal science, new selection techniques as well as production of vaccines will move forward rapidly. All this will inevitably lead to new societal discussions.

## Digitalisation and big data

Information and Communication Technologies (ICT) make it possible to set up new systems for farming. They also enable food chains to be organised with much more precision and detailed data capturing, for example anticipating variations in the weather. In the years ahead we will face a deluge of data as sensors, satellites, robots and all types of machines (including drones) enter the farm and the rest of the food chain. A revolution comparable to the introduction of the tractor and chemical products in the 1950s is in the making. This may raise productivity (improving food security), make farming more climate-smart, solve environmental issues and help consumers opt for more healthy and sustainable personal diets in their

ICT can make policies more targeted

---

smart kitchen. ICT can make policies more targeted and address inequality issues, for instance by focusing on farms with a low income.

At the same time, developments in ICT are not neutral. Depending on who owns the data and how the exchange of data is organised, the food chain can be governed in many different ways. This can shift the balance of power and lead to more central decision-making, turning farmers more into franchise takers for a centrally organised food chain. As in previous rounds of mechanisation, more technology could also lead to greater inequality in agriculture as those who adopt it grow faster than those who do not. Its effects on the labour market remain to be seen but are unlikely to be positive for low-skilled workers.

## Energy and bio-based transitions

The third innovation which brings new challenges with it is energy transition, especially in the bio-economy. Future energy prices are very uncertain and may depend largely on the development of solar technology, improved gas production/use and electricity. The trend is towards low carbon industrial processes replacing petro-chemicals and fossil fuels. Non-fossil biological materials will be in higher demand and they can only be produced via agriculture, forestry and recycling. This could lead to a bio-boom (with low energy prices) as well as bio-scarcity (high prices for food and energy, with agricultural products mainly used for food). In the process of moving to a post-fossil-fuel, carbon-neutral world, resource efficiency is essential. This includes the problem of food waste: around 30-40% of produced food does not arrive on a plate for human consumption due to waste by farmers (mostly in developing and emerging countries as post-harvest loss by farmers and in processing) or consumers (in OECD countries).

Resource  
efficiency is  
essential

## Redesigning the food chain

Redesigning food and feed chains as part of the process of aiming for a circular bio-based economy is another major area of innovation. Partly based on a better understanding of biomaterials and manufacturing processes, cascading is becoming an important principle in the allocation of biomaterial. Products from the land (and, ultimately perhaps, also the sea) become ingredients that are allocated to the most useful and profitable destination. This applies not only to food waste and biomaterial for other industries but also to food production itself. Food processing now primarily involves the unpacking and repacking of ingredients, and the trend is towards recombining single ingredients to compose

---

tailored foods. Modern dairies have become refineries, something which most consumers are unaware of.

A society with an economy based on renewable resources, in particular biomass, requires that we organise production chains that create full value in each step from all the biomass produced for food, feed, energy and materials. This means agriculture must be linked to bio-economy chains, to supply them through smartly designed systems with minimum losses of produced biomass. Human demand for bio-based products would then be met, with optimal use of each hectare of land and without hindering the environment and society.

In designing such chains, the potential of the seas and oceans should be taken into account for all types of aquaculture; not only fish farming, but also the production of algae and other sources of feed, food and chemicals. It is important to close and anchor the soil-crop-livestock-manure-soil biomass cycle to enable higher productivity and turnover, and this will require chains to be redesigned. Livestock has a crucial role to play in closing the cycle in an efficient way by turning waste into products: creating feed from biomass residuals and refining manure to improve soil fertility as well as grazing on land that cannot be used for crop production and turning vegetation unfit for humans into food.

The potential of the seas and oceans should be taken into account

There are other developments which also lead to changes in the way our food chains are organised. The awareness of food safety and sustainability has already resulted in a move away from commodities traded mainly on price to more complex contracts and production on specification. Focused factories also fit in this trend, such as those in urban indoor farming where hydroponics (farming which uses water as a substrate instead of soil) and LED lighting are used to grow fresh vegetables in a totally controlled environment. ICT will lead to new players in the chain, such as web shops and ICT companies, and new types of organisation that are active in the value creation networks that move food from the farm to the fork.

## Social innovations

Innovations do not necessarily originate from inventions or research. Changes in consumer demands or in attitudes to food or to working in farming also create innovations. Especially in and around cities there is a need for a peri-urban

---

landscape where farmers offer services in areas such as leisure, care and nature management as well as producing food. Urban farming is also on the rise, making cities and regional authorities stakeholders in food policy. Citizens are becoming increasingly involved in co-creation processes, including through the use of social media. This affects farming and policy making as well as (citizen) science.

## Cities become stakeholders in food policy

Demographic changes will lead to smaller work forces in the coming decades. The competition for a well-educated labour force will intensify. Jobs in farming and in many areas of food processing are unpopular, a fact that is exacerbated by low pay levels. ICT and robotics will partly solve this, as will farm enlargement. It is important, however, that the next generation of farmers is not rebuffed by the need for high investments in taking over farms and by the profession's poor image and low incomes. Both education and fiscal policies will be important in this respect.

### Reflecting these innovations in the CAP of the future

In conclusion, innovations will change agriculture and the food chain in the years ahead. This will provide new options for solving societal challenges as long as the innovations are supported by a good food and agricultural policy. The same applies to new technologies, which raise new (ethical) issues. All of this underpins our view that the Common Agricultural Policy needs to shift to a more integrated food and agricultural policy, one which coherently governs and optimises the entire biocycle from farm to fork, from seed to meat. Social innovation and adaptive governance must also be a part of this policy.



3



Five misunderstandings

---

There are many misunderstandings that arise in discussions on agriculture and food production. The five most common ones in the public debate could even be aggravated by innovations in the pipeline, hampering fruitful discussions on the future of agricultural policy.

### 'There is a crisis in agriculture'

A first misunderstanding is that we are in the midst of a major agricultural crisis, perhaps even comparable to those experienced in the 1880s or 1920s and '30s. Every day we hear of farmers selling their farms, with statistical surveys consistently showing that the number of farmers has dropped. The data are accompanied by stories of dairy and pig farmers who face hard times due to low prices. And, so the thinking goes, because we are in such a crisis, the government should intervene in the markets to ensure better prices for farmers.

The reality is more complicated. Aggregate income in farming does not suggest a major crisis: sector income is 20% higher than in 2005. Land prices have gone through the roof in recent years, suggesting that many want to invest in farming and that those who sell are making a tidy profit. Many farmers do not benefit from such capital gains, of course, not least because many rent their land, and young entrants can be severely handicapped by this situation. Indeed, ensuring profitability for a next generation of farmers and agricultural entrepreneurs is a key issue. The background to the rise in land prices is a mix of trends: low interest rates leading to interest from outside investors and a lack of alternative investment opportunities for those who wish to sell, the linking of the CAP payments to the land, and an interest in the expansion in farm size, in addition to agricultural incomes.

Farmers have to increase size

To maintain their income, farmers have to increase farm size. New farm technology assists them in doing just that: new machinery is bigger, milking robots need less labour, and new ICT tools help them check what is happening with the pigs or tomatoes elsewhere on their holding without having to walk there. These kinds of investments help them earn more income and have an income development comparable to the rest of society. This development is crucial to ensure that the next generation does not vote en masse with its feet, which is what happened in Japan and Korea during the fast industrial development in the 1960s, for instance. These countries now have a small-scale farming dominated by pensioners, which may sound romantic but is certainly not good for food security.

---

Returning to Europe, given the limitations on the availability of land, farmers who wish to expand their operations have to buy out their neighbour. This is often a quite natural process. Some farmers who have no successor or cannot make a good living decide to stop investing. Seeing that their family farm is too small to generate an interesting income, their children choose a job outside of farming. With retirement in sight, farmers therefore sell their holdings. The implication of this is that many farms face a crisis as they will disappear. But at a sector level, the low number of new entrants to such small farms is much less of a problem as it benefits the income on other farms and lowers prices for consumers.

The dairy and pig sectors are currently facing an extreme case of this general development. The CAP had more or less stopped this process in its tracks in the dairy sector for around 30 years via the milk quota system. The abolition of this system allowed many farmers in very efficient dairy regions such as Ireland and the Netherlands to expand their production exponentially, while forcing less competitive regions such as parts of France to restructure. External market circumstances such as high production in competing continents, the Russian boycott and the stagnant Chinese economy are currently worsening this situation.

The pig sector faces even greater problems. The increase in scale here is not restricted by the availability of land and many small farmers are losing out due to the declining demand for pork. But the industry is also not ideally located: in the 1960s, the CAP encouraged the industry to concentrate around the ports of Western Europe, and made it dependent on imported protein feed. This has led to high environmental costs (manure), with cost prices that are uncompetitive on a global scale.

Although the problems in these sectors are highlighted in public discourse, this should not be taken as a signal that the dynamics of the farm sector are fundamentally unbalanced. It should be possible for farm sizes to increase so that farmers can earn a reasonable and equitable income and lead a life that makes their children interested in becoming farmers themselves. Inequality in the farm sector is increasing, as it is in other parts of society. While this certainly requires our attention, it does not mean that the markets should be abolished as a governing principle, because they allow consumers to efficiently signal which way they would like to see production go. Policy needs to respond to those signals and provide an enabling policy environment that considers long term

**Pig industry is not ideally located**



---

issues such as sustainability and climate change, which are not automatically delivered in markets.

## 'It is wrong for the organisation of the food chain to be so industrialised'

Many people are critical of the current organisation of the food chain. Like other sectors, agriculture has become industrialised over the past century and this has brought many benefits. First and foremost, food is much cheaper and safer, greatly reducing (but unfortunately not eliminating) hunger and leaving us with the kind of disposable income for other products that our grandparents could never have dreamt of. Europeans nowadays spend only around 10 to 15% of their income on food, compared to 40 to 50% in the 1950s.

The changes in the food chain also made a large variety of fresh or well conserved food available at times other than the local harvest, and as such contributed to our health. This resulted from developments in international trade, logistics, food processing and conservation and retail as much as in farming. Farming and the breeding of crops and animals contributed by introducing innovations that met the demands of consumers.

**Food is much cheaper and safer**

This development of the food chain was and remains based on industrial engineering and economic principles. We learned to manage the natural process of growing food much better thanks to a number of revolutionary breakthroughs (essentially in chemical but also in biological and mechanical science) during the 19<sup>th</sup> and 20<sup>th</sup> century.

The economic principles of profit maximisation govern this process. By reacting to price signals, farms and companies have innovated in the direction that consumers set by making their choices in the shops and supermarkets. To reduce costs, retailers have grown from local shops into large multinationals, while regional food processors and input suppliers to farmers have likewise expanded. Farmers, on the other hand, have stayed relatively small, although they, too, had to grow to pay for higher fixed costs with a larger volume of produce. Farms with 50 hectares of tomatoes or 500 dairy cows or 2,000 hectares of arable production are far from exceptional, and their owners have become small business entrepreneurs with millions of euros in yearly turnover.

---

These and other much smaller farms increasingly depend on contracts from the food industry (farmer-owned cooperatives as well as investor-owned firms) for access to markets. These contracts are often seen as an instrument used by large companies to force low prices on farmers and allocate most of the value added in the chain to others. In reality these contracts are also an instrument to increase the pie before sharing it: they translate consumer, retailer and food industry demands into production specifications for which farmers are rewarded.

This development has left many consumers and farmers with an embarrassment of riches. The current food system is at odds with the pictures in our children's books of Old MacDonald's mixed farm, and it does not fit the romantic paintings of 19<sup>th</sup> century rural life. Few are aware that artists were painting these scenes to record a way of life that was already on the way out back then.

A certain degree of reluctance regarding the current state of affairs is both understandable and appropriate given that high-tech agriculture and the industrialised food chain are far from perfect. The anonymity that characterises parts of the food chain has led to food-safety scandals. There are few products which have not been impacted by fraud or human errors: Spanish olive oil, Austrian wine, Belgian and French poultry, Dutch horse meat, British beef, Czech spirits – the list is long; too long. Nevertheless our food is safer than it has ever been. Accidents simply tend to be larger and better reported to the public, leading to more costs. The same is true in cases of animal disease when

### Anonymity led to food-safety scandals

stamping out is the best remedy, such as during the foot-and-mouth disease outbreaks in England, the swine fever epidemic in the Netherlands and, most recently, *foie gras* production in France.

Equally disconcerting are the environmental costs of our food production methods. The effects on others and the environment due to the use of chemical inputs (pesticides, fertilisers, antibiotics), heavy stocking rates (manure, odour) or simply the fact that biological processes in animals produce greenhouse gases have not been taken into account in business decisions as they did not occur as costs. Governments were late in reacting to these public issues, although huge improvements regarding environmental impact have been made over recent decades.

---

The misunderstanding in the debate is that the current organisation of the food chain is fundamentally wrong, cannot be corrected within the current system and that a similar level of service in terms of food availability, quality and affordability could be guaranteed by a system that would be completely local and small scale.

No region will ever supply all the products necessary

Fortunately there are very interesting and promising developments which reconnect consumers at a local or regional level with farming via shorter supply chains and in peri-urban settings. While this is to be applauded and provides consumers with familiarity and experience, no region will ever supply all the products necessary (certainly not tropical ones, for instance) and no place is completely resilient to unwelcome weather.

### 'Agriculture is the main solution for rural areas'

A third misunderstanding is the idea that farming is the driving force of rural development. Agriculture dominates the European landscape outside the cities, and the landscape is intricately linked to our agricultural activities. The most valued landscapes are the result of farming, grazing and selective logging. If farming would disappear, the land would simply be covered in endless forests or shrubs, with a substantial decline in tourism being just one of the results.

The fact that the landscape is so often a result of the dominance of agriculture leads many to think that agricultural incomes determine the rural standards of living. This is not actually the case. Farming accounts for less than 2% of European GDP. A lot of our food is produced in regions that are not very rural, but considered urban or peri-urban. In those regions, cities dominate the economy and off-farm income is often available. But even in rural areas where cities are far away and play a smaller role, for example in some regions in the Mediterranean and Eastern Europe (especially Bulgaria and Romania), agriculture is not the predominant economic activity.

A lot of our food is produced in regions that are not very rural

There are two caveats here, neither of which should be misinterpreted. The first one is that employment is greater than the contribution to GDP suggests, which reflects the low income of many farmers. But here we should realise that farming is heavily concentrated. Although the latest statistics reveal there are 10.8 million farmers in the European Union, 80% of them produce less than 20%

---

of the food, often with extensive land use. This category includes many people over 65 years without successors, as well as part-time farmers. In some of the new member states, farming is even more concentrated in the hands of a small group than in Western Europe. And because some farmers own more than one farm, the concentration is even stronger than the data suggests.

The second caveat is that farming facilitates many other economic activities: supply of inputs, contractors, food processing, trade and services such as extension, accounting, veterinary care and banking. Although there is a multiplier effect at work here, this should not be overestimated either. Many of these activities are carried out by multinational cooperatives and agri-businesses that tend to create most of their added value in their headquarters and laboratories. These are more often located in urban and peri-urban regions, where they can attract good staff, rather than deep in rural areas.

The reality, therefore, is that farming plays a minor role in the rural economy and rural development. Given the low return on assets in agriculture, it is not even very attractive to create employment in agriculture in rural areas. The investment needed for a workplace on a farm in Germany, for instance, is close to half a million euros (excluding land investments), and the income is low. Someone working in tourism or construction earns a better income with far less investment.

### 'International trade is harmful'

A fourth misunderstanding is the role of Europe in the global food system. Some see Europe mainly as an importer of soy from South America, fish from Asia and fresh and tropical products from Africa. They correctly point out a number of environmental problems in those production systems, including erosion and pollution. Some see such activities as a kind of land grab that hurts economic development in those countries and conclude that Europe should have a clear self-sufficiency policy. Others consider it unnecessary for Europe to export meat and poultry which is sometimes produced at great environmental cost.

Europe is a  
net exporter  
of agricultural  
products

In reality, Europe has been a net exporter of agricultural products for several years. It exports high-quality products to the middle classes all over the world. Imported soy is partly used for milk production in, for instance, the Netherlands, and further exported as cheese to Germany. The Germans export some of their

---

fresh milk to Italy, which gives the Italians the option to send their own milk in the form of expensive cheeses all over the world. This is value creation at work.

Most of the food we eat is European. If we see intra-European trade as domestic consumption, around 25% of the food is exported out of the European Union; the value of imports (in which feed and tropical products are important categories) is clearly lower. These imports help regions in Asia, Africa and Latin America to develop, just as agriculture in Denmark and the Netherlands led regional development in the 19<sup>th</sup> century thanks to export opportunities to an industrialising United Kingdom. And international trading standards, including schemes such as GlobalGap, are also a way to exchange knowledge on consumer demand and good production practices.

The environmental costs of trade are an additional source of misunderstanding. Yes, transportation means CO<sub>2</sub> emissions – but the overall environmental impact of transport is very low compared to the emissions linked to production and storage, the environmental footprint of consumers driving to the supermarket, and the heating and cooling of products. This implies that importing from highly (environmentally) efficient producers or in the winter season can be better than inefficient production or storage locally.

In addition to providing developing and other countries with a European market, we also support development overseas by exporting seeds and other inputs, agricultural machinery, and services. Such products are full of European know-how that the buying farms use to develop their agriculture.

### **‘The CAP is expensive and leads to overproduction’**

Given the misunderstandings about the workings of the organisation of the food chain and its dynamics, the income development and the role of agriculture in rural areas and in the global economy, it is no surprise that there are also misunderstandings about the Common Agricultural Policy.

Some still have butter mountains and wine lakes in mind when they think about the CAP. Yet these were the result of a highly effective CAP which has, since the 1960s, turned the EU from a net importer of main commodities to an exporter. This success is what made the policy outdated. It led to the setting of quotas, and then to the direct payments system we have today. Now that payments have been ‘decoupled’ from production obligations, we have a transfer system which no longer influences production levels or commodity choices as much as it

---

used to. The idea that it is agricultural policy which is making people obese therefore has to be questioned. At any rate, the problem can certainly not be solved by changing relative prices at the farm level as this would have very little influence on consumer choices.

Others question the size of the budget costs of the CAP, as nearly 40% of the EU budget is spent on the agricultural policy. This is a very misleading comparison, however, because the CAP is one of the few budget spending policies that are centralised at EU level. The budget for any centralised social, education or defence policy would dwarf that for agriculture.

The budget for any centralised social, education or defence policy would dwarf that for agriculture

Nevertheless, citizens are questioning why agriculture needs so much money in the first place. Politicians give two arguments, depending on the audience. One is a kind of social policy argument: article 33 in the European Treaty mentions the need to ensure a fair standard of living for the agricultural population. The other revolves around public interest, especially concerning the environment and landscape – an objective that was not relevant back in 1958 and is not clearly mentioned in the treaty.

It is also an element that continues to be strongly debated. The contracts for nature and landscape management under the rural development programme probably work best. The cross-compliance idea, which obliges farmers who receive direct income payments to obey environmental and other directives, is less visible to citizens and unpopular with farmers. The effectiveness and efficiency of the recent 'greening' obligations is still under evaluation, but also criticised for its administrative burden.

---

## Reflecting on better integration in the CAP for the future

We can conclude, then, that agriculture and the food system are not well understood by the public, with innovative solutions to the overarching challenges actually seeming to aggravate the misunderstandings. This has become a problem for the renewal of the Common Agricultural Policy, with less and less willingness to use nearly 40% of the European budget for a policy whose results are questioned and which addresses only the weakest part of the chain, the farming community.

This reinforces our conviction that the major challenges have to be solved by all the actors in the food chain. Farmers can be part of the solution, but cannot shoulder this burden alone. Agricultural policy should therefore be broadened to a food (chain) policy that governs the entire food system. This would help renew the link between citizens, agriculture and food, and make a wide range of innovations possible.

# Five examples of a Common Agricultural and Food Policy





---

The current CAP is out of date. The formal current objectives deal with the classic issue of price setting between consumers (low prices) and farmers (income) but not with public issues such as environment and climate change or healthy food. The fact that the main stakeholders in the chain such as input industries, food processors and retailers have become much more powerful and yet are not addressed makes a review of the CAP even more urgent. We therefore propose to develop the CAP into a wider Common Agricultural and Food Policy.

An agricultural and food or a food chain policy (we use the two terms and the term 'food policy' interchangeably to cover the concept) would reinforce the resilience of our food system from breeding to feeding, from input industries to the consumer, recognising the changed power relations in the system and the interdependence of food production with consumption. It would make the policy more appealing to citizens who want to see their concerns addressed and demand change. The current challenges in food security and safety, climate change, environmental impacts (including biodiversity), healthy diets and inequality are explicit policy goals in such an integrated policy. The policy dialogue will be more balanced if environmental and consumer NGOs are seen as being of equal importance as the farming community. Food processors, input producers and retailers must also be part of the dialogue since they are an integral part of the food chain.

## Make our diets more healthy and sustainable with a price that factors in true cost

A food policy should, first of all, deliver a diet to the 500 million European consumers which is healthier and more sustainable. People in Europe today consume an excessive number of calories and their diets are unbalanced, containing too much red meat and not enough fish, fruit and vegetables. Balancing diets will to a large extent go hand in hand with making them more climate-smart.

The first step in realising this will be to make consumers pay the true cost of food and remove price distortions. This should include environmental costs such as CO<sub>2</sub> emissions, for example, applying a polluter pays principle along the food chain (including in farming) and emission trading. Most farms (i.e. those responsible for 80% of production) are large enough to be in such systems, given the fact that they are also audited for food safety systems and the CAP. Where such real costs lead to persistent income problems even after a slow introduction, consumers could be compensated by

Consumers have to pay the true cost of food

---

income tax and social security systems and farmers by direct payments. Once true cost pricing, which factors in externalities, is a reality, there will be no need for discussions about the long-distance transport of food (CO<sub>2</sub> miles). Many environmental certification schemes and their administrative burden would no longer be needed. Unfair competition to organic farming by conventional products that do not pay for their pollution would be ended, and more consumers could opt for organic food if they so wish.

As the price of food would be somewhat higher under this policy, there would be a stronger incentive to reduce food waste, especially for consumers, who, in Western countries, are the main culprits. Even if getting the prices right would not lead to an immediate change in consumer behaviour, it would better direct innovation processes. For instance, distorted energy prices can give very wrong signals when organising chains in the bio-economy.

It is unlikely that removing price distortions would solve all the issues affecting our diet. Where needed, governments should use other instruments, including education and advice, procurement strategies and consumer nudging. Over the coming years, several of these instruments could be built on the insights that we will gain from food research into personalised nutrition, based on a better understanding of the human body thanks to neurobiology and genetics. For instance, why do our brains like food items such as chocolate so much and what do they do to our body? This will lead to personalised nutrition: tailored food choices based on genetic predisposition and gut flora are within reach. The

### A food policy for and with farmers, consumers, retail and food companies

integration of food and pharma is also taking place. If, at the same time, fast breeding can turn out new varieties with special components, this will revolutionise the food chain – and raise new challenges for food policy.

Neither the EU nor national governments can do this on their own or by solely addressing consumers and farmers. Retailers and food companies (especially those which market Abrands) should also be a policy partner or policy target. The changes in consumer behaviour they help realise will send signals to farmers to innovate and adjust production and production processes. Involving retailers and food companies in such a policy can create synergies with their investments in systems to guarantee food safety in a healthy diet as well as the trend towards guaranteeing the authenticity of food.

---

## Incorporate climate change agreements in farm decisions

To make our diets and the agriculture and food chain more resilient to climate change, more is needed than just sending better signals from consumers and the retail sector to farmers. An explicit targeting of farmers is needed in the agricultural and food policy to help mitigate the effects of climate change, and notably to enable them to adapt to the expected increase of two degrees Celsius in the average temperature.

The current agricultural policy already has instruments to support farmers in changing their practices. Support for innovation and investment is available in the rural development programme (the so-called Pillar 2) of the CAP. And the handing out of direct income support in Pillar 1 is linked to cross-compliance and greening measures that can incentivise farmers to change farm behaviour, although there is much discussion on the effectiveness and administrative burden of these measures.

The agreements on tackling climate change made during COP21 in Paris in December 2015 imply that the CAP should be adapted. While the agreement states that food production must not be put at risk, this does not mean that food production (and consumption) cannot make a contribution. Emissions of CO<sub>2</sub> and CO<sub>2</sub>-equivalent gases can be mitigated by carbon storage in agriculture, especially in agricultural soils. This means that, in a system of CO<sub>2</sub> trading (such as the ETS), farmers must be rewarded for this service to the ecosystem. Digital data and satellite monitoring are examples of innovations which benefit such schemes.

Food production has  
to contribute to  
COP21 agreements

Emissions caused by animal production could be greatly reduced by keeping animals like cows inside stables instead of having them outside on meadows. It could also help solve manure issues. The use of genetics in breeding and investing in precision farming, plant production and animal husbandry will be helpful. A clear link with a consumer-oriented food policy, including a societal dialogue, is required as many consumers frame this as an undesirable trade-off with animal welfare.

## Align incentives in the food chain

The agricultural and environmental policies could, of course, directly address the farmer, as they currently do. It is interesting to note that several retailers and food processors are already acting on the issue of climate change and other

---

environmental issues and have installed systems that monitor and incentivise farm behaviour. Some of these private systems go far beyond the demands of current governmental regulations. Other food chain companies have promised their shareholders and the public to move to a carbon-neutral production process.

These activities by private companies in the food chain are sometimes linked to specific green brands and logos to satisfy consumer demand. At other times, they are put in place to support the reputation of the company and strengthen its brand.

In addition to partly overlapping with government demands, these schemes also create additional (administrative) complexity for farmers: in effect, the latter receive signals from the food chain partners as well as from governments, but can only decide to plough or spray a field once. This makes an alignment between government measures and private schemes in the food chain attractive: the food chain is to be incentivised by a food policy to set up more such private systems that encourage or force farmers to produce in a more environmentally friendly and healthy way, and lead to a pricing of food that takes into account true cost.

### Align government measures and private schemes

Over the last decade, there has been a debate about increasing upstream and downstream concentration and hence the power relations in the food chain and how they are influencing the allocation of the consumer-euro (or the value added) to the different actors in the food chain. Farmers are squeezed between large input firms and big multinational food companies and retailers. Where the rest of the food chain is increasingly organised in large, multinational companies which have long since replaced the local blacksmith and baker, many farms remain small local family farms. This creates a duty of care with these multinationals: their dominance should not lead to shifting the income risks and environmental risks of the production system to the weakest part in the chain.

Buying and selling between farmers and food companies already involves much more than talking about prices and quantities. The need for traceability and information exchange implied by lean supply chains has meant that contracts nowadays play a major role in organising the relationship between farmers and food processors. Creating an incentive to include more aspects of climate change, environmental management and price risk management in these contracts would be an attractive option from a policy point of view.

---

One way to move in this direction would be to build upon the current greening equivalence clause, which states that private environmental programmes in the industry can replace the greening requirements in the CAP. If payments to farmers in the CAP would be dependent on farmers being in such schemes, this would increase the pressure exercised by farmers on food companies and retailers to create such schemes and take up their duty of care.

It also has the advantage of reducing administrative burdens and moving the auditing of individual farms from governments to the private sector, where certification and auditing firms can perform that task together with their current activities. Governments will have to determine the criteria for the minimum level of 'greenness' for a private scheme and audit any given scheme as a whole.

## Install smart instruments for environmental management

One of the ways to reduce the environmental effects of pesticides, fertiliser and energy (CHG) is by deploying information and communication technology. This means that agricultural and environmental policies could both support the development and adoption of these technologies and make use of them. The Internet of Things data collected by farmers and the manufacturers of equipment (such as milking robots and spraying machines) can be shared with authorities to observe water quality and biodiversity. The same data can be used to monitor and audit contracts with farmers who are willing (or obliged) to change farm behaviour in favour of reduced ecological impact.

Such arrangements make it possible to decentralise current CAP greening obligations to regional or local governments. Policies could be made smart by

### Make policies smart and effective for smaller regions

targeting those (smaller) areas where the management of the environment (including biodiversity and the landscape) needs government intervention. Just as city governments create dashboards for smart city management based on big data, regional governments could do this for rural areas, and thereby move to smart monitoring and smart metering of effects. This could also foster biodiversity and landscape diversity, countering situations where economic specialisation processes have created too many monocultures. This would also allow the attractiveness of peri-urban and rural areas to be better managed for the benefit of visiting citizens.

---

There are signals which suggest that the ICT revolution will also mean that some decisions will move from the farm to up- or downstream in the food chain. Farmers will become a little more like franchisers or contract farmers, as is already the case in some food chains (such as veal or vegetables for the canning industry). The background is that data mainly have value if they are aggregated and combined at a higher level. This, and the option for remote decision-making by data and digitised video, means a bigger role for companies in agriculture.

If such input companies, or the food companies, become more involved in farm decisions, either by making those decisions themselves or by incentivising farmers with information or other rewards to act in a more sustainable way, government bodies will need access to those data to play their role in smart management. And for some farm-level decisions, it is the industry that has to be addressed and regulated, not the small contract farmer.

## Support disruptive innovation in the urban food system and bio-economy

The digitisation of society has led to some quite disruptive business models in certain sectors, including web shops, streamed entertainment and platforms such as Airbnb and Uber. Although it is hard to predict, such technology may lead to new ways of organising the food chain. Perhaps on a more regional basis, with greater attention to urban and peri-urban farms, there may be more (geographically) shorter supply chains for some products and multifunctional business models. Some entrepreneurs, NGOs and regional or city governments are actively working on this, even if this mainly concerns a limited product portfolio.

Current technology  
best suited for  
larger farms

Bottlenecks in setting up such supply chains are partly also found in other areas. Examples include food waste management regulations, solving the problems of the 'last mile' delivery, zoning regulations and building permits, and creating attractive pathways between the city and the peri-urban area. A more regional and integrated approach could help and strengthen the current European Innovation Partnerships.

More or less comparable needs for disruptive innovation exist in isolated rural areas. They are experiencing a rural exodus that will probably increase with greater mechanisation and robotisation, as well as an increase in the size of farms and the arrival of foreign investors. Even governments are withdrawing institutions

---

such as post offices and schools from villages, with inhabitants creating new mechanisms to keep some basic services open such as shops or hotels. Although job creation is an important issue, certainly in such regions, it is not advisable to artificially create more employment in agriculture and to regulate against the trend towards larger farms. Current technology is already best suited to farms larger than the current average, and increased labour productivity is important to allow farmers to earn an income comparable to that elsewhere in society. Moreover, there will be a scarcity of skilled workers in the coming decades due to demographic changes. If such a farm income with a high labour productivity is not attained, the next generation will vote with its feet even more.

Jobs in rural areas probably therefore have to be found by linking agriculture with other sectors, for instance those in the bio-economy such as forestry, fish farming, nature management, leisure/tourism (one of the fastest growing industries) and the chemical industry. New and disruptive business models require new players to be brought in. This also takes agriculture policy beyond farming.

### **An agricultural and food policy would bring in new players**

These five examples of innovations illustrate that actors other than farmers must be involved in order to address the societal challenges with innovations. The CAP today has elements that partly address some of the issues, certainly at farm level, and some of the instruments could probably be expanded to some extent. But if we really want to renew the link between citizens and agriculture & food, and between the city and the countryside, we need to develop the CAP into a Common Agricultural and Food Policy. Innovations will benefit from capitalising on the interdependence of food production and consumption, and from working with or challenging the current power relations in the food chain.

A person wearing a white lab coat is holding a bunch of grapes. The grapes are a mix of dark purple and light green. The person's hand is visible on the left side of the frame. The background is a blurred laboratory or office setting with a computer monitor and other equipment.

# 5

Transforming the CAP  
into a Common  
Agricultural and Food  
Policy after 2020



---

Although farmers are located in the countryside, they earn their money primarily from city-dwellers by selling food through the food chain, via tourism & other services, and to a large extent also via the payments of the Common Agricultural Policy. The general public in cities is, however, dissatisfied with the functioning of the food chain: they question agricultural policies, which they feel are failing to deliver the development of the type of food system they would like to see.

The current Common Agricultural Policy has two pillars. Pillar 1 enhances farm income and fosters market stability. It focuses on direct payments to farmers, a legacy of the compensation for price decreases in the 1990s. To receive these payments, farmers have to comply with environmental legislations ('cross compliance') and have to undertake a number of 'greening measures', such as maintaining ecological focus areas. Pillar 2 concerns rural development and revolves around nature and biodiversity management, competitive position and innovation.

To meet the expectations of tax-paying citizens, the new CAP should be turned into a CAFP (Common Agricultural and Food Policy) which aims to reinforce the resilience of the entire food chain, recognising the changed power relations in the chain and the interaction between consumption and production.

### However the policy turns out, the consumer has to be in

However the CAFP turns out, it needs to include consumers. This is not easy, given the lack of trust in supply chains. Many citizens do not see their own potential role in the supermarket and leave it to governments or industry to bring about the desired

change. There is a relatively small group of consumers who are attracted by products with sustainability labels, including organic and animal-welfare formulas. In fact, NGOs increasingly target retailers and food processors instead of governments to change the food system. With the reputation of their brands at risk, they seem to be more responsive to change than governments.

At the same time, most citizens sympathise with farmers, especially if they are small farmers, who are often the weak link in the food chain. Many have relatively low incomes despite high investments and hard work. The tragedy of being the last generation to farm the land, does not go unnoticed. Although most environmental problems in the food chain occur at the farm level, farmers are principally seen as victims of the system rather than polluters who should pay.

---

As neither the current food system nor the CAP solves their problems, it is logical that farmers continue to lobby for direct payments to support their income – and preferably with as few obligations and costly environmental measures attached as possible. Since the start of the Common Agricultural Policy, the power of input firms, food processors and retailers has grown as a result of concentration. Farmers see this dependency, and have an interest in not being labelled as the only stakeholders responsible for solving public issues with the food system simply because they receive CAP payments.

Agriculture, food, the landscape and the environment are not an economic sector in the same way as transportation or manufacturing, for example. This industry is too important to our survival, culture and health to simply leave to ministries and sectoral organisations. However, while a commitment to agriculture by all stakeholders in society is essential, it must be based on a proper understanding of how farming and food production work. Farmer organisations and government ministers have often not invested a great deal in communication with the rest of society. Conversely, many members of the public prefer to entertain their own perceptions of agriculture rather than listen to the genuine concerns of farmers. It does not have to be this way: consumers could become strong allies of farmers and both can help to provide checks and balances in the food chain.

### A proper understanding of farming and food production is essential

Given the misunderstandings, the lack of understanding of new technologies and misinterpretation of the current situation, it is hard for governments at different levels (regional, national, EU) to come to a coherent policy that is fit for the future. Part of the problem is the institutional aspect of the civil service itself. Governments are running austerity programmes and trying to slim down. At the member state and regional level, agricultural policy is not very expensive in budget terms (to a large extent the money comes directly from Brussels); however, it is labour intensive, as reflected in the number of civil servants. This can feel like an undue burden given that the sector is such a small part of the economy. In many member states, ministries of agriculture have been merged with other departments or have taken up tasks in environmental policy, nature policy, consumer protection and food safety. Changing the Common Agricultural Policy is therefore implicitly linked to the organisation of the civil service.

There is also a need to rethink the different levels of decision making, from cities and regions to the member state and European level. The Common Market and

---

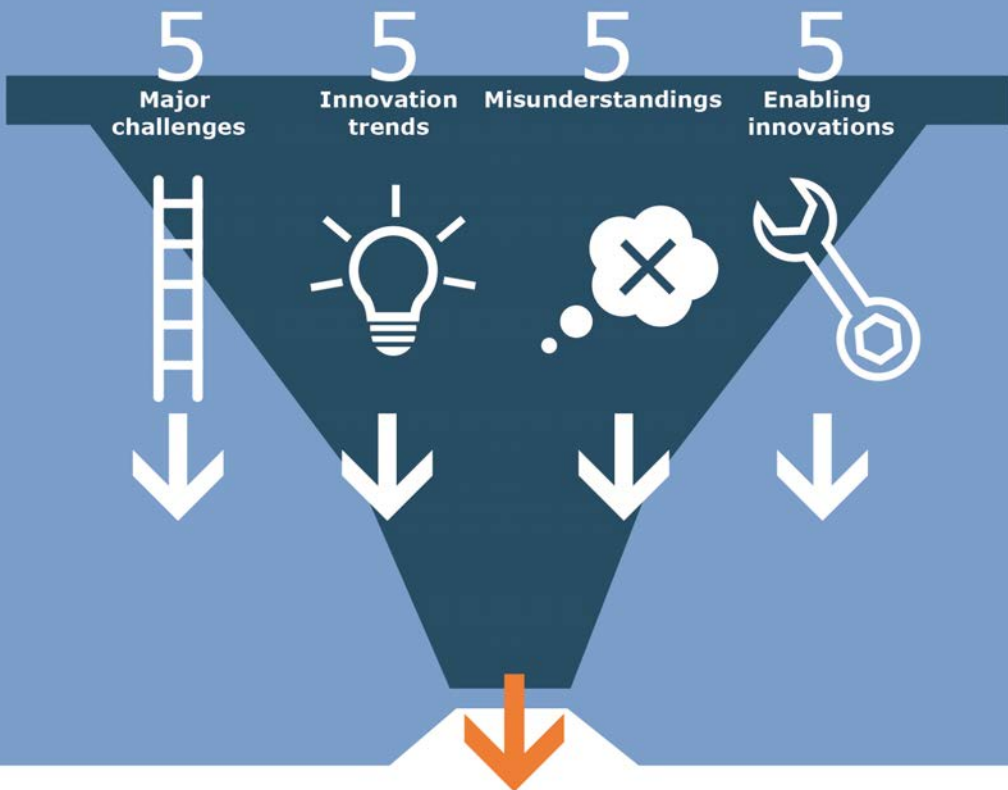
international trade are the responsibility of the European Union, while many ecosystem services ask for detailed local knowledge on demand that is solidly anchored in the rich diversity of European agricultural and cultural traditions. Such diversity is key to resilience. Innovation is linked to the smart specialisation strategies deployed by regions. This implies that a great deal of room should be given to regions to act in the way they find necessary, with state-aid rules to safeguard the Common Market and learning processes for spill-overs between regions. The current political climate makes this move toward a Europe of the regions even more necessary than it would otherwise be.

## Ecosystem services asks detailed local knowledge

### The five pillars of a Common Agricultural and Food Policy

We realise that we are talking about a major change in thinking on the CAP. It will naturally take time to make the decision and even longer to execute the transition. We therefore provide some practical recommendations for this transition below. Our suggestion for developing a Common Agricultural and Food Policy is to build upon the Common Agricultural Policy by splitting it into three pillars and adding two new ones. This simplifies the intervention logic by having clearly defined pillars with their own *raison d'être*.

The first three pillars are derived from the current CAP: a pillar on income support & risk management designed to guarantee food security, a pillar on public issues & eco-system services that are not automatically realised in imperfect markets, and a pillar on rural development to support innovation and the quality of rural life. These pillars mainly address farmers and the industries up and downstream (input industry and food processing). A fourth pillar would deal with consumer food policy and address consumers, retail and food industry in order to make our diets healthier and more climate-smart. The fifth pillar should be devoted to monitoring, reflection and research. These pillars, labelled A-E, are discussed in more detail next along with their design principles.



A

**INCOME  
SUPPORT**



B

**ECOSYSTEM  
SERVICES**



C

**RURAL  
DEVELOPMENT**



D

**FOOD  
& HEALTH**



E

**MONITORING  
& RESEARCH**

---

## Pillar A for income support: reduce direct payments by capping and targeting

One of the pillars of a future Common Agricultural and Food Policy (CFP) should focus on the income of farmers. The objective is to secure a certain minimum income for farmers, support them in risk management, and maintain market stability & food security, especially in times of crises such as major supply or demand shocks.



The policy is characterised by the design principles 'capping' and 'targeting'. It moves away from the current system of payments per hectare towards payments to individuals who have a genuine need for such a safety net. In cases where per-hectare subsidies still apply, an absolute cap must be imposed on the amounts that can be received by individual farmers, with a transition system for those areas and cases which stand to lose substantial amounts of subsidies under the new system, i.e. large farmers in fertile areas.

Farmers currently receive more than 40 billion euros a year in the form of direct payments, based on historic situations and not particularly related to needs. Payments per hectare vary greatly between regions. There is a historic reason for this: the price supports of the original CAP were heavily linked to production and to the products of the early six member states, including cereals, sugar beet, beef and dairy. Some today argue for a flat rate payment per hectare for the whole Union. This makes little economic sense; furthermore, it would lead to distortions: there are large differences in production (a hectare of wheat in Germany produces twice as much as one in Bulgaria), in land values (a hectare of land in Denmark is 2.5 times as expensive as in Spain) and in labour costs (an hour of labour in the French industry costs nearly five times more than in Hungary).

The system of payments per hectare implies that the largest farms get the most direct payments: 20% of the farmers receive 80% of the funds. In reality, the situation is even more uneven, as larger landowners also reap the benefits of higher rents. These landowners are often large entities such as institutional investors, state agencies, churches or noble families. There are several successful sectors where hardly any subsidies apply, in particular the horticultural sector, where productivity, innovation and competitiveness have been fostered by a low level of government interference.

However, many farmers are greatly dependent on this direct income transfer. In many regions, agriculture is barely profitable in its current form; if the costs of environmental damage are included, the picture is even bleaker. In order to move to fair and inclusive prices for food, changes in policy can only be implemented gradually.

As a way to start applying the principles of capping and targeting, payments could be coupled to a regional average or minimum income per farmer. Next, they could be linked to national income tax systems so that they become an addition to obtain the regional minimum income. Alternatively or in addition, payments could be restricted to farmers not receiving government pensions (to circumvent an age limit of 70 years, say) and be phased out for the next generations. This would allow a large saving in direct payments that could be used for public objectives within another pillar. Farmers who would like to keep their direct payments could be invited to join a scheme for ecosystem payments in Pillar B.

In addition, Pillar A could include policy instruments which would support governments' role in handling catastrophic risks, and provide incentives to farmers to develop risk management strategies for more normal risks.

## Pillar B for ecosystem services based on contracts: align with regional public contracts and industry sustainability schemes

Pillar B of the CAFPP would provide environmental public goods (including unspoiled nature), pursue climate change adaptation & mitigation and safeguard public health issues at a farm level. It would build upon the cross compliance, greening and contracts for agri-environmental management in the current CAP.



This pillar aligns policy with industry sustainability schemes and public contracts. In other words, the policy would mainly be based on contractual relationships. As environmental circumstances and demand differ greatly among the regions of Europe, this policy would mostly be run at a regional level. Public authorities (cities, regional governments, water authorities, etc.) could hand out agri-environmental management contracts, co-financed by the CAFPP as they are currently under Pillar 2 of the CAP. The EU should be able to guarantee that such payments are not a form of state aid but a contract for delivering public goods at market oriented prices.

---

The money saved in Pillar A (compared to CAP Pillar 1) could be used to provide payments to farmers who have joined a sustainability scheme of food processors which meet certain levels of sustainability. The conditions for such schemes to qualify for a top-up could be increased over time. This would have several advantages: sustainability signals from consumers and retailers through the market would be integrated with those from the policy side, and there would be savings in administrative and audit costs. But the most important effect could be that farmers, who would lose payments currently provided under the old Pillar 1 of the CAP, would have an incentive to ask food processors to set up such sustainability schemes. This would increase the likelihood of the food chain becoming a partner in tackling climate change and environmental issues rather than leaving the environmental (and income) risks with farmers and taxpayers.

There should be incentives to make all these contracts as smart as the latest ICT options allow. For instance, sustainable water use must be integrated in production strategies. In many parts of the EU, water is free or not billed according to the volume used. The upshot is very low water use efficiency. Here, too, digital monitoring is appropriate and urgent. Regional governments could set up smart dashboards (as in smart cities) to manage their contracts with farmers, using data from farmers in schemes for ecosystem services and green infrastructure.

## Pillar C for rural development: innovate for competitiveness

A third pillar of the Common Agricultural and Food Policy would address more explicitly social issues: employment, a thriving rural area and innovation to support the agricultural competitiveness of regions. The design principle would be the support of innovation.

This would build on the policy instruments in Pillar 2 of the CAP. But it could also include other sectors of the bio-economy, as well as other companies in the food chain. The competitiveness of agriculture also very much depends on the competitive position of the food industry and even retail: German agriculture has reaped significant benefits from the internationalisation of its very competitive (discount) retailers in the last 20 years.



Fostering innovation and competitiveness is an important objective, as this is the main road forward for the food sector, including agriculture. As documented earlier, we are expecting important innovations in the areas of genetics, ICT, the bio-economy, optimisation of the food chain, and social innovations in peri-urban areas. New agro-ecological insights can be taken up by farmers with the support

---

of advisory services. Innovation is key in rural development and that also holds true for urban farming. This requires collaboration among several stakeholders, including new, disruptive players. Such is already the approach of the current European Innovation Partnership for Agricultural Productivity and Sustainability, which places an emphasis on operational groups and multi-actor projects. A food policy that addresses all these stakeholders would reinforce this point.

In the coming 10 years, policy should also address a major restructuring in some industries. The livestock sector in particular is currently undergoing a transition. The milk industry has been kept artificially stagnant for 30 years by the quota system, and is currently relocating to a more North European milk belt with a more pronounced concentration in larger farms. Moreover, the industry uses milk as an input into far more sophisticated health products. The pig and poultry sector received incentives from the old CAP to choose locations around the ports of Western Europe. It currently operates on imports of feed from overseas and from Central Europe, partly using migrant labour. Today, the industry is moving to Central and Eastern Europe, where environmental costs are lower and manure contributes to organic matter in the soil. In addition, the industry has to slim down due to overproduction issues and the trend towards reduced meat intake by consumers. Such restructuring processes would require special attention from the CAP to make industries and regions more competitive.

Some of the rural areas are in poor, isolated provincial regions, such as parts of Eastern Europe. Small farms and associated businesses are often the only economic activity in these areas. Poverty alleviation must include measures that target farming, even if it is unlikely that these farms can be viable. The direct payments under Pillar A are probably of more importance for this generation than improving the quality of life through innovation and smart specialisation would be. In other areas of cultural and historic interest – such as almond, citrus and olive groves in parts of the Mediterranean region – farming is an integral part of the landscape. Stewardship of the landscape and biodiversity can be defined and rewarded according to specific criteria, like the public services in Pillar B. Moreover, in hilly areas, even extensive farming provides protection against erosion, which would be very hard to control by other cost-effective means. Remuneration for erosion prevention measures could be part of the package for these farmers as well. At any rate, in both cases the societal cost of abandoning farms would be much greater than in more productive areas as there will be no new farms taking over. This requires a dedicated policy mix within Pillars A (poverty alleviation), B (public services) and C (innovation).



---

## Pillar D for consumer food policy: address consumers, retail and the food industry for a healthy and climate-smart diet



The challenges cannot be solved without involving consumers.

This applies not only to healthy food consumption but also issues such as climate-smart diets priced at their true costs and even resource-use efficiency (given the food waste problem). These are issues that go beyond the General Food Law, which is mainly focused on food safety (and could be integrated in this pillar).

The design principle of Pillar D could be the idea of co-creation. Food is an important part of our cultures and has many functions, from taking in nutrients to sharing experiences. Furthermore, our food consumption is typically the result of interactions between consumers on the one hand and between consumers and the rest of the food chain on the other. Co-creation processes can take place anywhere where people learn to appreciate better and healthier food. Aspects of lifestyle and (preventive) health will be built into consumption patterns more and more (an example is personalised nutrition). Trading up to a healthier diet should replace a narrow focus on price. Innovation must also lead to better use of farm, slaughter, feed and food waste in order to move towards a true circular and bio-based economy.

Pillar D of the Common Agricultural and Food Policy should therefore address the consumers and industry partners who most influence consumers in their food choice and consumption. These are retail, the out-of-home food catering industry and the food processors.

Recent examples from member states offer a glimpse of policies ranging from a general nudging of consumers into healthy lifestyles to specific actions such as school food programmes, taxes on sugary foods and drinks, harmonised VAT rates, labelling of food, and agreements with industry on the salt content of products. It is true that our food cultures are national or even regional and have to be protected. But it is equally clear that many aspects of food composition, packaging and marketing, as well as VAT rates, are relevant to the Common Market too, which means the EU has a role to play.

---

## Pillar E for monitoring and research

A move from an agricultural policy to an agricultural and food policy is a major transition which requires monitoring and involvement by the public. There is a gap between citizens and farming to be closed. Innovation does not occur in isolation but feeds on basic science and research & development. The latter is increasingly organised within the framework of public-private partnerships and many of the players in the food chain interested in such programmes have activities throughout Europe. These partnerships should find better ways to include SMEs, a potential source of innovation, and – because cross-overs often result in new advances – build links with other sectors like ICT or partners in the bio-economy. Fostering start-ups and access to angel and venture capital are also important elements. The current H2020 programme is not sufficiently geared to this and a better alignment between H2020 and a new CAPF would be greatly beneficial.



Extension and consultancy to farmers in nearly all European regions are now ensured by a mix of public and private providers of advice. It is advisable to boost transparency and support synergies and complementarities among advisory service providers, both public and private. Links should be strengthened between knowledge institutes and the education system. It is important that the farmers and consumers of the future obtain the required basic knowledge and that teachers have up-to-date knowledge on the situation in practice as well as the latest scientific results.

We will need excellent research infrastructures. As the number of farmers in countries and regions becomes smaller and the willingness to support research for the commercial food chain from public funds in times of austerity is declining, there should be greater European coordination of research facilities, including experimental sites, demonstration farms and soft infrastructure elements such as data networks.

Data sets must be renewed or extended for monitoring and policy research. The key to renewal of the subsidy system linked to the Common Agricultural and Food Policy is increased digitalisation and monitoring of farm activities. This requires a full database of land registries, land use and farmers, and identical criteria & methods for measuring farm performance. Progress in remote sensing and automated analysis are making this increasingly cost-effective and error & corruption-proof. Funds need to be provided to build this uniform European

---

system, which will enrich the IACS system with data from audits in private standards and internet-of-things data.

The Farm Accountancy Data Network should be broadened to include the monitoring of sustainability issues. It could be used to analyse and publish (true) cost prices of efficient farmers, to have an orientation for contracts of food processors (that then can be challenged to explain why they pay less in long-term contracts) and farmers (who have a signal from benchmarking to change their business model if they are less efficient). A similar data network should survey food consumption in relation to lifestyle and health.

The design principle for Pillar E should be the deployment of reflective citizen science in support of adaptive governance. Agriculture has traditionally been run in a productivist way, bringing us a great deal of progress and food security. However, it has also resulted in wider gaps in perspective between city and countryside on how food production should be organised in the future (although there are marked differences between member states in this regard). This fosters misunderstandings. As a starting point several implementation scenarios for a CAFP 2020-2025 could be developed, estimating social and budget costs as well as sustainability improvements, and discussed with the public.

New innovations cause distrust. An attitude in the agricultural sector of 'leave us alone' could quickly lead to a feeling of marginalisation. A Common Agricultural and Food Policy can overcome such divides if it includes a policy to actively engage citizens in creating a resilient food system for a good and healthy life.

Modern technologies have made such engagement much easier. In science, we have to learn to incorporate the real-time data and knowledge of farmers, consumers and businesses in our processes in a far more transdisciplinary and interactive way. Such co-creation in science and policy evaluation will teach us what can work in a Common Agricultural and Food Policy and what cannot, or how much should be governed from Brussels and what can be left to the regions and cities, for example. Citizen science in food and agriculture can be a reality, just as it is in the health sector.

---

## Time to start

Europe's Common Agricultural Policy must evolve into a Common Agricultural and Food Policy to develop a resilient and sustainable agriculture and food system that addresses the grand challenges of our times: providing healthy and safe diets for Europe and the world, mitigating climate change, preserving biodiversity and landscapes, addressing inequality and building a vibrant food and bio-based industry. There are few challenges that are more urgent or more relevant. They are wanted by Europe's citizens.

---

## About the authors



Louise O. Fresco (1952) is the President of the Executive Board of Wageningen University & Research, one of the world's leading centres in agriculture, food and environment. Before that she served as University Professor at the University of Amsterdam (UvA), and, earlier, held a chair in Wageningen, as well as several guest professorships in other countries. For more than nine years she worked at the UN Food and Agriculture Organization (FAO) in Rome, first as director of research, then as Assistant Director-General. She is a member of six scientific Academies. She published over 160 scientific publications and policy papers as well as eight non-scientific books in Dutch. She has published widely outside her scientific field as a columnist, a literary critic, and as a writer of novels and essays (in Dutch) and is an acclaimed public speaker. She served on the Boards of the Rabobank and Unilever, and several national and international institutions. Her latest book is *Hamburgers in Paradise* (Princeton). She has received several awards for her contributions to food and agriculture.



Krijn J. Poppe (1955) is an economist at Wageningen University & Research, currently employed as a Research manager at Wageningen Economic Research. During the period 2009-2011, Krijn Poppe was Chief Science Officer of the former Dutch Ministry of Agriculture. He provides science-based support to decision makers in policy and business to understand and act upon trends in agri & food and manages and co-manages various research programmes for the European Union on the European food industry, ICT and on research infrastructure for food and health. For several years he was co-leading SCAR's strategic working group AKIS. Recently, the Dutch government appointed him as member of the Council for the Environment and Infrastructure.



A selection of relevant literature

---

Bakas, A. (2013). *The future of food*. Dexter, Amsterdam.

Bijman, J., C. Iliopoulos, K.J. Poppe, C. Gijselinckx, K. Hagedorn, M. Hanisch, G.W.J. Hendrikse, R. Kühn, P. Ollila, P. Pyykkönen and G. van der Slangen (2012). *Support for Farmers' Cooperatives – Final Report*. Wageningen.

Clapp, J. and D. Fuchs (2009). *Corporate power in global agrifood governance*. MIT Press, Cambridge USA.

Cumming, G.S., A. Buerkert, E.M. Hoffmann, E. Schlecht, S. von Cramon-Traubadel and T. Tschardt (2014). Implications of agricultural transitions and urbanization for ecosystem services in: *Nature* Vol.515 (6 November 2014), p. 50-57.

DG RTD (2015). *Commitment and Coherence - essential ingredients for success in science and innovation; Ex-post evaluation of the 7<sup>th</sup> EU Framework programme*, Brussels.

Ellen MacArthur Foundation and the McKinsey Center for Business and Environment (2015). *Growth Within: A Circular Economy Vision for a Competitive Europe*. Available online.

Emorine, J.P. (2007). *L'avenir de la filière agricole à l'horizon 2050*. Sénat of the French Republic. Downloaded from <https://www.senat.fr/rap/r06-200/r06-200.html>

EU SCAR (2015). *4<sup>th</sup> SCAR Foresight Exercise - Sustainable Agriculture, Forestry and Fisheries in the Bioeconomy: A Challenge for Europe*. European Commission, Brussels.

EU SCAR (2015). *Agricultural Knowledge and Innovation Systems Towards The Future – A foresight paper*. European Commission, Brussels.

European Political Strategy Centre (2016). *Sustainability Now! – a European vision for sustainability*. European Commission, Brussels.

Expo 2015 EU Scientific Steering Committee Recommendations (2015). *Research and Innovation in Global Food and Nutrition Security*, Brussels.

---

Foresight. The Future of Food and Farming (2011). Final Project Report. The Government Office for Science, London.

Fresco, L.O. (2015). *Hamburgers in Paradise: The Stories behind the Food We Eat*. Princeton University Press.

Manosa, B., Th. Bournarisa, P. Chatzinikolaou, J. Berbelb and D. Nikolovc (2013). Effects of CAP policy on farm household behaviour and social sustainability in: *Land Use Policy* 31 (2013) 166–181.

Mattas, K. and E. Tsakiridou (2010). Shedding fresh light in food industry's role: the recession's aftermath in: *Trends in Food Science and Technology* 21 (2010) 212–216.

OECD (2009). *Managing Risk in Agriculture: A Holistic Approach*. OECD Publishing, Paris.

OECD (2013). *Policy Instruments to Support Green Growth in Agriculture*. OECD Publishing, Paris.

OECD/FAO (2016). *OECD-FAO Agricultural Outlook 2016-2025*, OECD Publishing, Paris.

Oskam, A., G. Meester and H. Silvis (2011). *EU policy for agriculture, food and rural areas*. Wageningen Academic Publishers, Wageningen.

Poppe, K.J., M.J. Bogaardt and T. van der Wal (2016). *The Economics and Governance of Digitalisation and Precision Agriculture*. Briefing paper for the European Parliament's Science and Technology Options Assessment Panel, Brussels. (in press)

Poppe, K., S. Wolfert, C. Verdouw and A. Renwick (2015). A European Perspective on the Economics of Big Data in: *Farm Policy Journal*, Vol. 12, no. 1, autumn quarter 2015 p 11-19.

Raad voor de Leefomgeving en Infrastructuur (2013). *Ruimte voor Landbouw*, Den Haag.



---

Schaart, J.G., C.M. van de Wiel, L.A.P. Lotz and M.J.M. Smulders (2016). Opportunities for Products of New Plant Breeding Techniques. *Trends in Plant Science* 21:438-449.

Sociaal Economische Raad (2008). *Waarden van de Landbouw*, SER, The Hague (abridged versions in English and French downloadable: CAP Reform and Public Services of Agriculture / Réforme de la PAC et biens publics fournis par l'agriculture).

Stichting Toekomstbeeld der Techniek (2015). *The Future of Technology in Agriculture*. STT, The Hague.

Taguasa, E.V. and J.A. Gómez (2015). Vulnerability of olive orchards under the current CAP (Common Agricultural Policy) regulations on soil erosion: a study case in Southern Spain in: *Land Use Policy* 42 (2015) 683–694.

The Economist (2016). *The Future of Agriculture in: Technology Quarterly Economist*, June 9, 2016.

Vogelzang, T.A., P. Berkhout, A.M. van Doorn, R.A. Jongeneel, K.J. Poppe, A.B. Smit and I.J. Terluin (2016). *Het GLB na 2020: schets voor een herontwerp*, LEI Wageningen UR, The Hague (with English executive summary).

Wetenschappelijke Raad voor het Regeringsbeleid (2015). *Naar een voedselbeleid*, WRR The Hague. (Synopsis in English available: WRR -The Netherlands Scientific Council for Government Policy (2015): *Towards a Food Policy*).

Wijnands, J.H.M., B.M.J. van der Meulen and K.J. Poppe (eds.) (2007). *Competitiveness of the European food industry – an economic and legal assessment*. Luxembourg.

---

## Wageningen Economic Research

*To improve the quality of life, we analyse and design effective incentives and policies*

Wageningen Economic Research, formerly known as LEI Wageningen UR, contributes to the mission of Wageningen University and Research *to explore the potential of nature to improve the quality of life* by supporting the analysis of opportunities and responses for transitions towards integrated agro-food systems and sustainable inclusive growth. Given today's global challenges we dedicate our knowledge and expertise to identify, assess and create solutions for providing healthy and safe food for everyone that is produced in a sustainable way.

Wageningen Economic Research carries out applied scientific social and economic research for government bodies, companies and societal organisations. Our strengths are to analyse current systems and to develop new insights through an interactive approach based on market intelligence, unique models and data, sector and domain expertise and in interaction with a wide variety of stakeholders. We ensure that the latest scientific knowledge in the field is applied. We explore and explain, so that you can enhance your policy or strategy, thus laying the foundations for 'earning' more value for your organisation, your clients and partners, the environment, citizens and society.

---

## Explore

We identify and analyse trends in regions, countries and markets and assess possible development pathways. The horizon of our studies ranges from short term to several decades, depending on the client's question. We combine expertise on the sector and state-of-the-art scientific knowledge with data from a wide range of sources. This results in unique and innovative insights for business opportunities and policy strategies.

## Explain

We explain what has happened, what is happening, and what may happen by measuring, monitoring, modelling and predicting the effects of government and company policies, of (inter)national market reforms and value chain upgrading, on competitiveness, food security, health, the environment and climate change. We provide insights for our clients, showing why and how these events take place and what are the likely implications. We use clear indicators and transparent change models and are able to look at results at the company, sector and country levels, considering all possible effects and likely influences.

## Enhance

Based on insights obtained from explorations, we present concrete options, scenarios and strategies for improvement of policies and business designs. This may enhance the impact of policy instruments and marketing strategies on product standards, supply chain performance, consumer choices and a sustainable environment. This enables our clients to work more efficiently and to operate more effectively in the complete agro-food system and to create sustainable inclusive growth.

## Earn

The insights and opportunities for improvements provide a basis for 'earning'. We consider earning not only as financial gain, but also as the creation of added value for organisations, communities, consumers and society. We work with companies to develop and implement innovative and sustainable business models and with governments to design and monitor sustainable inclusive policies. We challenge entrepreneurs to look at their processes, companies, chains and markets in a different way and we challenge governments to make an integral assessment of their policies. In complex transition processes, we also consider social acceptance and societal embedding.

[www.wur.nl/economic-research](http://www.wur.nl/economic-research)

---

## Authors

Louise O. Fresco

Krijn J. Poppe

## Text editing

Writewell Quality Text

Zayd Abdulla (Wageningen University & Research)

## Publication coordination

Jan Hugo Nuijt (Wageningen University & Research)

Kristel Vermeulen (Wageningen University & Research)

## Design

MediaCenter Rotterdam

## Photography

Westend61 GmbH/Hollandse Hoogte, Gilles Lougassi/Shutterstock.com, Lucky Business/Shutterstock.com, mtr/Shutterstock.com, muratart/Shutterstock.com, Nolanberg11/Shutterstock.com, Rawpixel.com/Shutterstock.com, sezer66/Shutterstock.com, Shestakov Dmytro/Shutterstock.com

Wageningen, September 2016

This publication can be downloaded at <http://dx.doi.org/10.18174/390280>  
or at [www.wur.eu/economic-research](http://www.wur.eu/economic-research).



---

The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Within Wageningen University & Research, nine specialised research institutes from the Wageningen Research Foundation and Wageningen University have joined forces to help answer the most important questions in the domain of healthy food and living environment. With approximately 30 locations, 5,000 employees, and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain worldwide. An integrated approach to problems and the cooperation between various disciplines are at the heart of the unique approach of Wageningen.

---