

Flagship initiative





a comprehensive research and innovation cooperation programme to tackle sustainable agriculture, food security and safety in the eu and china



BACKGROUND INFORMATION

Being the two biggest food producers in the world, China and the European Union (EU), share a common goal to join forces for addressing challenges related to food security, food safety, healthy diets, animal health and sustainable agriculture.

It is in the reciprocal interest of both EU and China to ensure the moving towards more sustainable agro-food production systems, as unsustainability might have severe knock-on effects in an increasingly globalised market. The opportunity to export new advanced sustainable technologies and scale-up the potential of the market will enhance innovation in both China and Europe and contribute to growth and jobs. Ensuring sustainable food production systems will also increase global trade predictability, overall productivity, transparency of the food chain and resource-efficiency.

Research and innovation cooperation in Food, Agriculture and Bio-technology (FAB) can make a major contribution to these important common and global challenges.

Initial cooperation between EU and Chinese research entities can be traced back well before the current framework programmes addressing in particular global food safety issues for the control and mitigation of existing and emerging food risks, sustainability challenges in the food and feed chain, risk-benefit assessment of food supplements as well as global food security issues.

In this context, in 2011 a dedicated EU-China Task Force on FAB was established. The aim of this Task Force is defining priorities of common research interest and exploring possible instruments to be implemented through H2020 and relevant Chinese research programmes.

The EU-China FAB Flagship Initiative was officially launched at the EU-China Summit on 21 November 2013 with the signature of a Letter of Intent on Research and Innovation Cooperation in FAB between the European Commission and the Chinese Academy of Agricultural Sciences (CAAS) and so far it concerns 16 projects (with 4 more coming in 2019 and 2020) for a total funding of more than 120 million Euros within the Horizon 2020 Research Framework programme.



Food



Agriculture



Biotechnology



Currently, the CAAS and the EC are in the process of preparation of future calls under Horizon Europe, the Framework Programme for Research and Innovation of the EU for the period 2021-2027.

FAB FLAGSHIP WORK PROGRAMME **2014–2015**

In the context of the policy dialogue between the EU and China in the areas of Food, Agriculture and Biotechnologies (FAB), the Directorate General for Research and Innovation and the Directorate General for Agriculture and Rural development of the European Commission had organized, together with the Chinese Academy of Agricultural Sciences (CAAS) and the China Agricultural University (CAU), a bilateral thematic expert seminar in Beijing on 10-11 October 2013, back-to-back with the third 'FAB Task-Force meeting'.

The main objective of the seminar was to contribute to developing an EU-China FAB Strategic Agenda and to define an EU-China research and innovation cooperation initiative taking into account both the relevant Chinese research and innovation programmes, like for instance the CAAS Agricultural Science and Innovation Programme (ASTIP) for 2013-2025, and the EU research and innovation programme Horizon 2020.

The Task Force took note that a more strategic, focused and balanced cooperation between the EU and China was needed, in particular by developing joint and co-funded programmes, projects and initiatives with funds coming from both the EU through Horizon 2020 and China through relevant programmes.

After the identification of the priority areas of mutual interest, as a first step of the implementation of the FAB Flagship Initiative, seven topic areas targeting EU-China cooperation were jointly agreed and published in the Horizon 2020 Work Programme 2014/2015. They resulted in 10 projects covering different fields such as animal production (genetics/nutrition and animal diseases), Integrated Pest Management (IPM), soil quality, food waste along the food chain, biological contamination of crops, crop productivity and stability, and sustainable use of agricultural waste, co-products and by-products.

EUCLID

EU-CHINA Lever for IPM Demonstration

www.euclidipm.org

Total Cost : 4 M€

contribution : 3 M€
contribution : 458,500 RMB

Sep.2015 to Sep. 2019

Participants: 13 Participants: 4



LANDMARK

LAND Management: Assessment, Research, Knowledge base

www.landmark2020.eu

Total Cost : 5,3 M€

contribution : 5 M€

contribution : 100,000 RMB

May 2015 to Oct. 2019

Participants : 20

CHALLENGES:

Native and alien pests are among the major cause of losses to agriculture, forestry and plant production costs. Invasive alien species, new pests and diseases impact negatively on native species, affecting food chains, changing biodiversity patterns and disrupting terrestrial ecosystems and landscapes with further impacts on economic and recreational activities. Climate change is expected to favour the permanent establishment of many alien pests and change the distribution of already established pests. There-

fore more environmental friendly approaches in pest and disease control need to be sought. Given the high costs associated with the prevention and controlling of pests and invasive alien species and the reduction of their environmental impacts there is a need to further develop integrated mechanisms of response measures ranging from prevention of entry to novel Integrated Pest Management (IPM) approaches.

OBJECTIVES & RESULTS:

EUCLID research activity aims at developing more sustainable pest management methods in Europe and China in order to reduce the negative effects of pesticides on human health and the environment, to reduce economic losses in agriculture, and to provide scientific support to EU and China policies. Tomatoes, leaf vegetables and grapes are the main crops of research, due to their economic relevance in the targeted markets; however, research outcomes will also have an impact on other crops. The Euclid Pro-

ject has worked on delivering the optimisation of current pest management methods and the development of novel ones, and on promoting their rapid adoption through the design of IPM packages and exploitation by end-users such as farmers, consumers, industries and policy makers. This can reduce the dependence of European and Chinese farmers on chemical pesticides in selected key farming systems in both regions.

CHALLENGES:

Agricultural soils provide the basis for crop and animal production and in turn are impacted by the different types of land use, water quality, management practices, choice of crops, cultivars and genotypes. Effects include not only changes to chemical and physical soil properties but also to the composition of the soil biological commu-

nity and plant-soil-microbial interactions. Understanding this complex and fragile interplay is crucial for developing on-farm soil management and conservation practices to increase agricultural productivity whilst avoiding degradation of this virtually non-renewable resource in environmentally sustainable ways.

OBJECTIVES & RESULTS:

The LANDMARK proposal builds on the concept that soils are a finite resource that provides a range of ecosystem services known as "soil functions". The project's objectives are to comprehensively quantify the current and potential supply of soil functions across the EU, as determined by soil properties (soil diagnostic criteria), land use (arable, grassland, forestry) and soil management practices. To deliver on these specific objectives, LANDMARK is structured along 3 main Pillars. The first Pillar is to develop a user-friendly soil management Decision Support Tool for farmers and advisors. This tool will provide a menu of strategies in order to manage the soil functions on

individual farms (local scale). The second Pillar aims at developing a monitoring schema for the range of soil functions associated with different soil types, land-uses and European major five climatic zones. LANDMARK is focusing on indicators that provide the end-user with an assessment of soil functionality. The third Pillar is to provide an assessment of policy tools for optimising the supply of soil functions at EU scale. The project has developed the concept of Functional Land Management: a framework for matching the supply of, and demand for, soil functions at large spatial scales



SAPHIR

www.h2020-saphir.eu

Total Cost: 10.5 M€

contribution : 9 M€ contribution: 2,273,900 RMB

Mar. 2015 to Feb. 2019





REFRESH

Resource Efficient Food and dRink for the Entire Supply cHain www.eu-refresh.org

Total Cost : 9.4 M€

contribution : 9 M€ contribution: 1,780,000 RMB

Jul. 2015 to Jun. 2019

CHALLENGES:

Further intensification and expansion of animal production is expected due to the increasing demand for animal derived food and the mounting pressure over land use. Development of the livestock sector at EU and global level is challenging as it puts pressure on the environment, human health and the welfare of animals within the systems. Extensive livestock systems can contribute to the management and maintenance

of ecosystems and may increase biodiversity, therefore increasing efficiency in this sector is required while decreasing the environmental footprint and increasing quality. Livestock farming systems also support the development of rural communities and generate valuable products for human consumption including some from resources that cannot otherwise be converted into food

OBJECTIVES & RESULTS:

SAPHIR has developed innovative, safe, affordable and effective vaccine strategies against endemic pathogens responsible for high economic losses in livestock. By generating vaccine strategies for these pathogens in pigs, poultry and ruminants, SAPHIR is strengthening the profitability of food animal systems, improve animal welfare and reduce xenobiotic usage in farming with a 'One Health' perspective. The results obtained during the first reporting period are frameworks for assessing the economic impact

of animal diseases and the vaccine perception by livestock producers. The project also developed a framework aimed at providing a systematic way of measuring the impact of endemic diseases on the sustainability of livestock production systems relating to economic, social and environmental performance

CHALLENGES:

Food waste has taken on disquieting proportions worldwide in all steps of the food production and supply chain but especially at consumer level. Before defining measures to reduce such waste at all stages it is necessary to develop a better understanding of business and consumer behaviour in relation to waste generation, handling, reuse and by-product valorisation. Technologies

for the collection, sorting/grading, stabilisation and valorisation of food waste, by-products and packaging material need improvement or development. The aim is to optimise the performance of the whole food system, including packaging, catering and consumers, and achieve a secure and sustainable food supply also for the poor.

OBJECTIVES & RESULTS:

The overall aim of the REFRESH project is to contribute significantly towards the objective of reducing food waste across the EU by 30% by 2025 (which amounts to between 25 to 40 million tonnes of food not being wasted in 2025, worth tens of billions of Euros a year) and maximizing the value from unavoidable food waste and packaging materials. A central ambition of the RE-FRESH project is to develop a 'Framework for Action' model that is based on strategic agreements across all stages of the supply chain (backed by

Governments), delivered through collaborative working and supported by evidence-based tools to allow targeted, cost effective interventions. Success will support transformation towards a more sustainable and secure EU food system, benefitting Europe's economy, environment and society.



ISQAPER

Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience

www.isqaper-project.eu

Total Cost : 6,8 M€

contribution : 5,3 M€
contribution : 4,830,000 RMB

: 4,830,000 RMB Participants :

May 2015 to Apr. 2020



FEED-A-GENE

Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems

www.feed-a-gene.eu

Total Cost: 9,9 M€

contribution : 8,9 M€

contribution : 700,000 RMB Participants : 1

Sep.2015 to Sep. 2019

CHALLENGES:

Agricultural soils provide the basis for crop and animal production and in turn are impacted by the different types of land use, water quality, management practices, choice of crops, cultivars and genotypes. Effects include not only changes to chemical and physical soil properties but also to the composition of the soil biological commu-

nity and plant-soil-microbial interactions. Understanding this complex and fragile interplay is crucial for developing on-farm soil management and conservation practices to increase agricultural productivity whilst avoiding degradation of this virtually non-renewable resource in environmentally sustainable ways.

OBJECTIVES & RESULTS:

The main aim of iSQAPER is to develop an interactive soil quality assessment tool (SQAPP) for agricultural land users that integrates newly derived process understanding and accounts for the impact of agricultural land use and management on soil properties and functions, and related ecosystem services. SQAPP is being developed using a multi-actor approach aiming at facilitating social innovation and providing options to land users for cost-effective agricultural management activities to enhance soil quality and crop productivity. SQAPP is being tested extensively in 14 dedicated Case Study Sites in the

EU and China covering a wide spectrum of farming systems and pedo-climatic zones. A range of alternative agricultural practices have been selected, implemented and evaluated with regard to effects on improving soil quality and crop productivity. Proven practices will be evaluated for their potential applicability at EU and China levels, and to assess the related soil environmental footprint under current and future agricultural trends and various agricultural policy scenarios.

CHALLENGES:

Further intensification and expansion of animal production is expected due to the increasing demand for animal derived food and the mounting pressure over land use. Development of the livestock sector at EU and global level is challenging as it puts pressure on the environment, human health and the welfare of animals within the systems. Extensive livestock systems can contribute to the management and maintenance

of ecosystems and may increase biodiversity, therefore increasing efficiency in this sector is required while decreasing the environmental footprint and increasing quality. Livestock farming systems also support the development of rural communities and generate valuable products for human consumption including some from resources that cannot otherwise be converted into food.

OBJECTIVES & RESULTS:

Feed-a-Gene aims to better adapt different components of monogastric livestock production systems (i.e., pigs, poultry and rabbits) to improve the overall efficiency and to reduce the environmental impact. This involves the development of new and alternative feed resources and feed technologies, the identification and selection of robust animals that are better adapted to fluctuating conditions, and the development of feeding techniques that allow optimizing the potential of the feed and the animal. The project will also evaluate the overall

sustainability of new management systems and demonstrate the innovative technologies developed in collaboration with partners from the feed industry, breeding companies, equipment manufacturers, and farmers' organisations to promote the practical implementation of project results. The five-year duration will allow making a deep assessment of the impact of engineering solutions proposed by the project on the overall food processing chain to give elements to stakeholders to facilitate their adoption.

MyToolBox

Food and Feed through an Integrated Tool Box for Mycotoxin Management

https://www.mytoolbox.eu/

Total Cost : 5,2 M€

contribution : 4,9 M€
contribution : 7,600,000 RMB

Participants : 3

Mar. 2016 to Feb. 2020



MycoKey

Integrated and innovative key actions for mycotoxin management in the food and feed chain

http://www.mycokey.eu/

Total Cost: 6.4 M€

contribution : 5 M€

contribution: 4,510,000 RMB Participants: 1

Apr. 2016 to Mar. 2020

CHALLENGES:

The occurrence of biological contamination in various crops is of major concern as it has major implications for food and feed safety, food security and international trade. Worldwide, it is estimated that mycotoxins are responsible for losses of up to 5-10% of crop production. Contaminations are due to a series of events including weather conditions, possible climate

change effects, land use, crop management and varieties as well as harvest and post-harvest techniques. Integrated approaches rather than isolated solutions are required to effectively control the incidence of mycotoxins in crops and reduce contamination throughout the feed and food chains.

OBJECTIVES & RESULTS:

MyToolBox mobilises a multi-actor partnership to develop novel interventions aimed at achieving a 20-90% reduction in crop losses due to fungal and mycotoxin contamination. The project will focus on small grain cereals, maize, peanuts and dried figs, applicable to agricultural conditions in EU and China. Crop losses using existing practices is being compared with crop losses after novel pre-harvest interventions including inves-

tigation of genetic resistance to fungal infection, cultural control, the use of novel biopesticides, competitive biocontrol treatment and development of forecasting models to predict mycotoxin contamination. A major component of the project is to provide the recommended measures to the end users along the food and feed chain in a web-based Toolbox.

CHALLENGES:

The occurrence of biological contamination in various crops is of major concern as it has major implications for food and feed safety, food security and international trade. Worldwide, it is estimated that mycotoxins are responsible for losses of up to 5-10% of crop production. Contaminations are due to a series of events including weather conditions, possible climate

change effects, land use, crop management and varieties as well as harvest and post-harvest techniques. Integrated approaches rather than isolated solutions are required to effectively control the incidence of mycotoxins in crops and reduce contamination throughout the feed and food chains.

OBJECTIVES & RESULTS:

MycoKey aims to generate innovative and integrated solutions that will support stakeholders in effective and sustainable mycotoxin management along food and feed chains mainly in Europe and China. The project addresses the major affected crops: maize, wheat, barley and their associated toxigenic fungi and related mycotoxins. MycoKey aims to integrate key information and practical solutions for mycotoxin management into a smart ICT tool (MycoKey App), providing answers to stakeholders, who require rapid, customized forecasting, descriptive information on contamination risk/levels, decision support and practical economically-sound suggestions for in-

tervention. The project is developing on-site applicable and ICT new integrated solutions in the field of toxigenic fungi and mycotoxin monitoring along the chain. Integrated prediction models are under development for efficient crop management and stakeholders use. At the end of the project new validated detection methodologies and advances in knowledge on mycotoxins modified forms will be available for legislators. Tools and methodologies will be strategically targeted for cost-effective application in the field and during storage, processing and transportation. Alternative and safe ways to use contaminated batches will be also delivered.

Agrocycle

Sustainable techno-economic solutions for agricultural value chain

http://www.agrocycle.eu/

Total Cost : 7,6 M€

contribution : 6,9 M€
contribution : 1,000,000 RMB

Participants : 2

Jun. 2016 to May 2019



NoAW

Innovative approaches to turn agricultural waste into ecological and economic assets

http://noaw2020.eu/

Total Cost: 7,8 M€

contribution : 6,8 M€

contribution: 5,190,000 RMB Participants: 3

Oct. 2016 to Sep. 2020

CHALLENGES:

Agriculture generates co-products, by-products and waste streams that are currently not properly taken care of both in environmental and economic terms. Co-products or by-products are generated for instance in the wine sector which require sustainable use. In livestock production, manure, litter and other effluents management are a challenge, in particular in industrial production systems. While these effluents can be used as fertiliser, they can also be sources of bio-energy or valuable bio-products. The im-

pacts on the environment, with emissions to the air, soil and water need to be evaluated. It is important to consider the whole effluent chain to avoid pollution swapping and health issues, due to possible transmission of pathogens. Beyond reduction and recycling of agricultural waste, co-products and by-products, there may be opportunities for new processes enabling innovative uses of these materials, also outside the agricultural sector.

OBJECTIVES & RESULTS:

AgroCycle will convert low value agricultural waste from different agricultural sectors (wine, olive oil, horticulture, fruit, grassland, swine, dairy and poultry) into highly valuable products, achieving a 10% increase in waste recycling and valorisation by 2020. This will be achieved by developing a detailed and holistic understanding of the waste streams and piloting a key number of waste utilisation/valorisation pathways. It will bring technologies and systems from TRL4 to TRL7 within the 3 years of the project. A post-project commercialisation plan will bring

commercially promising technologies/systems to TRL8 and TRL9, ensuring AgroCycle will have an enduring impact by achieving sustainable use of AWCB both inside and outside the agricultural sector, leading to the realisation of a Circular Economy. The project will undertake a holistic analysis of agri-food waste value chains, from farm-to-table, including livestock and crop production, food processing and the retail sector. It will address a wide range of valorisation pathways, including: bio-fuels, high value-added biopolymers, energy and microbial fuel cells.

CHALLENGES:

Agriculture generates co-products, by-products and waste streams that are currently not properly taken care of both in environmental and economic terms. Co-products or by-products are generated for instance in the wine sector which require sustainable use. In livestock production, manure, litter and other effluents management are a challenge, in particular in industrial production systems. While these effluents can be used as fertiliser, they can also be sources of bio-energy or valuable bio-products. The im-

pacts on the environment, with emissions to the air, soil and water need to be evaluated. It is important to consider the whole effluent chain to avoid pollution swapping and health issues, due to possible transmission of pathogens. Beyond reduction and recycling of agricultural waste, co-products and by-products, there may be opportunities for new processes enabling innovative uses of these materials, also outside the agricultural sector.

OBJECTIVES & RESULTS:

The goal of NoAW project is to generate innovative efficient approaches to convert growing agricultural waste issues into eco-efficient bio-based products opportunities with direct benefits for both environment, economy and EU consumer. To achieve this goal, the NoAW concept relies on developing holistic life cycle thinking able to support environmentally responsible R&D innovations on agrowaste conversion at different TRLs, in the light of regional and seasonal specificities, not forgetting risks emerging from circular management of agro-

wastes. NoAW intends to explore the potential of agro-waste to be converted into a portfolio of eco-efficient products which are produced using fewer resources and creating less pollution such as bio-energy, bio-fertilizers, bio-packaging and bio-molecules, in symbiosis with urban waste conversion. NoAW also considers environmental and human safety risks which can emerge from circular management of agro-wastes.

FAB FLAGSHIP WORK PROGRAMME **2016-2017**

Building on the initial cooperation effort, both sides agreed at the FAB Task Force meeting in June 2014 to reinforce the cooperation under the EU-China FAB Flagship initiative in 2016/2017 by focussing on several priorities.

The second phase of the FAB Flagship in Work Programme 2016-2017 covered five topics identified by a panel of experts and for the first time drafted jointly. The five areas of common interest identified were:

- plant breeding
- resource-efficient urban agriculture
- alternative livestock production systems
- transparency of processed agro-food products
- soil & water resource management

These topics were published under H2020 Work Programme for 2016/2017 with an indicative total budget of 27 million earmarked for EU partners and resulted in 5 funded projects. From September 2015 the successful Chinese participants were receiving funding from the established EU-CN co-funding mechanism.

HORIZON 2020 – EU-CHINACO-FUNDING MECHANISM (CFM)

The Co-funding Mechanism (CFM) is a joint initiative launched by the Chinese Government and the EU to support joint research and innovation projects between European and Chinese universities, research institutions and companies in strategic areas of common interest under the framework of Horizon 2020. It has played a significant role in supporting EU-China win-win cooperation since its launch in September 2015.

It was first agreed at the 2nd EU-China Innovation Cooperation Dialogue, endorsed by the 17th EU- China Summit of June 2015, and announced in September 2015 at the occasion of the visit of European Commissioner for Research, Science and Innovation Carlos Moedas to China. Based on the results of the first calls, it was agreed at the 3nd EU-China Innovation Cooperation Dialogue, endorsed by the 19th EU-China Summit of June 2017, to extend the CFM under the Horizon 2020 to the Work Programme 2018-2020. Through CFM, funds are provided by the Chinese Ministry of Science and Technology (MOST) for European and Chinese participants based in China involved in Horizon 2020 research and innovation projects.

Building on the EU's Horizon 2020 and relevant research and innovation funding programmes on the Chinese side, CFM is going to mobilise over 500 million Euros from the EU and 1 billion RMB from China during the period from 2016 to 2020.

Up to 200 million RMB will be made available annually by MOST on the Chinese side for the benefit of entities based in China that will participate in joint projects under Horizon 2020. The EC has committed to spend about 100 million Euros per year for the benefit of other entities eligible for funding in these joint projects. These figures cover the whole China-EU cooperation and not only FAB. The funding for the projects under the FAB cooperation is ensured in a specific call text.



EU-China-Safe

Delivering an Effective, Resilient and Sustainable EU-China Food Safety Partnership

www.euchinasafe.eu

Total Cost : 11,3 M€

contribution : 4,9 M€

contribution: 24.970.000 RMB Participants: 18

Sep. 2017 to Aug. 2021

CHALLENGES:

In recent years, EU-China trade relations have grown very fast and agriculture has become an important sector for EU imports from and exports to China. However, many trade barriers relating to safety issues, standardisation and traceability (including fraud) in agri-food products persist and hamper trade predictability. In addition, there is a need to contribute to the prevention of major food safety crisis throughout

the whole food chain, to meet consumer expectations for international standards and ensure the authenticity of high quality products such as those covered by Geographical Indications (GIs). Implementing food-safety management systems along the food chain is key to creating better overall framework conditions for innovation, in particular fostering marketing of innovative products and new technologies.

OBJECTIVES & RESULTS:

EU-China-Safe is working on the core components needed for a joint EU-China food safety control system comprising: control management, food legislation, food inspection, food control laboratories, and food safety and quality information, education and communication. The project is developing an EU-China Joint Laboratory Network that will achieve and demonstrate equivalency of results, and will be used as a "showcase" to communicate and demonstrate best practices. Innovative traceability tools will strengthen the most vulnerable supply chains. New or improved detection capabilities for chemical/microbiological hazards and food fraud will be implemented in

a harmonised way across the EU-China network. The project will analyse trade barriers caused by food safety and fraud issues and will create recommendations of how to predict and prevent future events focusing on the most commonly reported foods linked to chemical and microbiological contamination and fraud (infant formula, processed meat, fruits, vegetables, wine, honey, spices). These advances, in addition to a wider range of confidence building measures towards food safety, authenticity and transparency, will address consumer expectations and facilitate an expansion of EU- China trade.

EUCLEG

Breeding forage and grain legumes to increase EU's and China's protein self-sufficiency

hhttp://www.eucleg.eu/

Total Cost : 7,8 M€

contribution : 5 M€
contribution : 13,000,000 RMB

Participants : 12

Sep. 2017 to Aug. 2021



SiEUGreen

Sino-European innovative green and smart cities https://www.nmbu.no/en/projects/sieugreen

Total Cost : 8,4 M€

contribution : 7 M€
contribution : 11,280,000 RMB

Participants : 6

Jan. 2018 to Dec. 2021

CHALLENGES:

Legume crops are a critical source of plant-based proteins for people and animals. To date, however, they have not featured high on public or private sector research agendas. EU and China are facing similar challenges, as both lack sources of protein and are increasingly dependent on protein imports for food and animal feed. In recent years China has imported increasing volumes of soybeans, reaching 60 million tonnes in 2013 (corresponding to 60% of world market

trade). This unique situation for a commodity will have important consequences on the equilibrium of the global market and might affect prices in the near future if imports increase further, as indicated by most recent long-term projections. EU and China therefore have a common interest in cooperating on long-term strategies to develop sustainable alternatives to protein imports with a view to reducing their dependency and helping to stabilise the world market.

OBJECTIVES & RESULTS:

EUCLEG aims to reduce Europe and China's dependency on protein imports by developing efficient breeding strategies for the legume crops of major economic importance in human food and animal feed. The objective is to improve diversification, crop productivity, yield stability and protein quality of both forage and grain legumes. Using diverse and extensive genetic resources and taking advantage of advanced molecular tools, EUCLEG aims to identify and develop breed legume varieties with improved performance under biotic and abjotic stresses in the

representative European and Chinese agro-ecological areas. The potential for new uses of forage species for human nutrition will be explored. Practical tools for genotyping, data management and calculation will be provided to breeders to implement marker-assisted selection and genomic selection leading to the creation of new varieties in the long-term. The project, combining public institutes and private companies of Europe and China, guaranties the transfer of knowledge from research to seed industry.

CHALLENGES:

With increasing urbanisation massive daily flows of agricultural products water and energy coming from rural and remote areas to cities generate high amounts of waste. In certain contexts urban agriculture has been shown to improve food security and to bring economic environmental and social benefits to cities. Given the

diversity of urban agricultural systems emerging worldwide there is a need to demonstrate and assess how technological and social innovation in urban agriculture can help overcome the shortcomings of urban food systems while providing cities with other ecosystem services and improving the resilience of urban areas.

OBJECTIVES & RESULTS:

SiEUGreen will demonstrate how technological and societal innovation in urban agriculture can have a positive impact on society and economy, by applying novel resource-efficient agricultural techniques in urban and peri-urban areas, developing innovative approaches for social engagement and empowerment and investigating the economic, environmental and social benefits of urban agriculture. The project consists in the preparation, deployment and evaluation of show-

cases in 5 selected European and Chinese urban and peri-urban areas. The impact measurement during and especially beyond the project period is a key component in the project's design. A sustainable business model allowing SiEUGreen to live beyond the project period is planned by joining forces of private investors, governmental policy makers, communities of citizens, academia and technology providers.



HealthyLivestock

Tackling Antimicrobial Resistance through improved livestock Health and Welfare

Total Cost: 6,9 M€

contribution : 4,9 M€ P contribution : 5,720,000 RMB P

Sep. 2018 to Aug. 2022

Participants : 12 Participants : 10



SHui

Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems

Total Cost: 8,4 M€

contribution : 7 M€

contribution: 11,280,000 RMB Participants: 6

Jan. 2018 to Dec. 2021

CHALLENGES:

Confined systems dominate in modern livestock production worldwide and often constrain natural animal behaviour and may result in health problems and product quality issues. Efforts to maximise production and ensure product safety often involve overuse of anti-microbial drugs in farm animals either in veterinary treatment, or for growth-promoting purposes in those countries where they are allowed. Drug residues may accumulate in animal products and the environment, lead to food quality issues and constitute a risk for consumers. Welfare and environmentally-friendly

production systems may improve animals' immunity and health conditions, and reduce veterinary drug use, in combination with other measures such as good husbandry practices and biosecurity. The EU has an increasingly active policy on improving animal welfare and fighting the threat of anti-microbial resistance. As China is seeing high levels of veterinary drug use in increasingly intensive production systems, it has an interest in cooperating with the EU on strategies to make those systems more sustainable.

OBJECTIVES & RESULTS:

HealthyLivestock aims to reduce antimicrobial (AM) use by the pig and broiler industries in China and Europe, and consequent residues in meat and the environment, by improving animal health & welfare without compromising productivity. The first phase of the project will include novel scientific approaches in four interlinked strategies to reduce antimicrobial need. The second phase will validate the technical innovations by establishing their societal acceptability and economic viability.

It will also assess the relationships between the Health & Welfare plans, the level of pathogens on the farm and antimicrobial residues in product and manure. In the third phase the project's industrial partners dedicate their network and expertise to knowledge exchange. Finally, HealthyLivestock will support Chinese and EU policy making in different frameworks such as International Veterinary Collaboration, EU Animal Welfare Platform and Network of Welfare Reference Centres.

CHALLENGES:

With increasing urbanisation massive daily flows of agricultural products water and energy coming from rural and remote areas to cities generate high amounts of waste. In certain contexts urban agriculture has been shown to improve food security and to bring economic environmental and social benefits to cities. Given the

diversity of urban agricultural systems emerging worldwide there is a need to demonstrate and assess how technological and social innovation in urban agriculture can help overcome the shortcomings of urban food systems while providing cities with other ecosystem services and improving the resilience of urban areas.

OBJECTIVES & RESULTS:

SiEUGreen will demonstrate how technological and societal innovation in urban agriculture can have a positive impact on society and economy, by applying novel resource-efficient agricultural techniques in urban and peri-urban areas, developing innovative approaches for social engagement and empowerment and investigating the economic, environmental and social benefits of urban agriculture. The project consists in the preparation, deployment and evaluation of show-

cases in 5 selected European and Chinese urban and peri-urban areas. The impact measurement during and especially beyond the project period is a key component in the project's design. A sustainable business model allowing SiEUGreen to live beyond the project period is planned by joining forces of private investors, governmental policy makers, communities of citizens, academia and technology providers.



FAB FLAGSHIP WORK PROGRAMME **2018–2020**

For the third phase of the FAB Flagship in Work Programme 2018-2020, a more balanced EU-China cooperation in terms of resources and participants has been envisaged.

An EU – China FAB expert seminar was held on 27 October 2016, hosted by Directorate-General for Agriculture and Rural Development, the Chinese Academy of Agricultural Sciences and a Horizon 2020 funded project DRAGON-STAR plus. The seminar brought together around 60 experts from both, EU and China to discuss and explore potential further developments of the EU-CN research and innovation cooperation in the FAB fields.

As a result of this seminar four topics have been proposed in the current Work Programme 2018-2020. The programme is covering the last three years of Horizon 2020 and the European and Chinese experts have identified four main topics:

- integrated approaches to food safety in agri-food chain
- high-efficient management of soil quality and land resources
- healthy soils for healthy food production
- use of biogas digestate for high-quality organic fertilisers

The first project awarded under the Work Programme 2018-2020 will be signed in the first half of 2019.

SFS-38-2018:

Highly efficient management of soil quality and land resources

CHALLENGES:

Production, protection and remediation are the three major components for securing global food supply on limited land resources for the growing global population. As competition between urban, industrial/transportation and agricultural land uses increases, food production needs to be maintained on decreasing land areas. To achieve a new balance on a higher output level with possibly less input is the ultimate goal of resource use efficiency, sustainable management and competitiveness of agriculture. Research should focus more on priority areas in the optimisation of land use and environmental protection taking into consideration the specific ecological and socio-personnic conditions in China and Europe





SFS-37-2019:

Integrated approaches to food safety controls across the agrifood chain

CHALLENGES:

Food safety in the food chain is a basis for effective functioning of national and international markets with trust and transparency. Food safety risks occur along the food chain from a number of biological and chemical contaminants. In addition, malpractices or fraudulent practices could also lead to increased food safety risks. Improving risk assessment and monitoring is of major importance. Developing integrated approaches along the entire food chain for detecting, assessing, and mitigating relevant pathogens and contaminant hazards is essential. This is in particular challenging for SMEs which is a predominant entrepreneurial model across the agri-food sector, both in the FLL and China



CE-SFS-39-2019:

High-quality organic fertilisers from biogas digestate

CHALLENGES:

Public policies in China and in several EU Member States have promoted the use of anaerobic digestion to treat organic wastes and to generate renewable energy. This has resulted in the production of considerable volumes of digestate as by-product, which could raise an environmental concern, prove costly and represent an inefficient use of biomass. The most straight-forward option for placing a value on digestate is to use it as an organic fertiliser and soil amender. However digestate is not highly appreciated by farmers as a soil treatment due to its significant shortcomings. These may include, amongst other things and depending on the feedstock source, potential risks of water pollution through leaching, soil contamination, or a threat to human health by food contamination. Furthermore, digestate is difficult to manage due to its fertilising properties, format and high water content

OUTSIDE FAB: THE SINO-EU PARTNERSHIP ON LAND AND SOIL

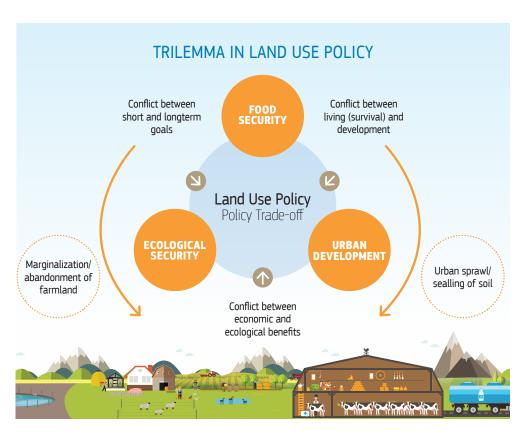
Other than the FAB cooperation EU and China are joining forces on several fronts to tackle societal challenges of the 21st century. The "Sino-EU Partnership on Land and Soil" is one of the success stories of this cooperation.

What is it?

Optimization of land use as well as integrated land, water and soil management on local, regional, national, continental and international levels encompass complex decisions on socio-economic and ecological priorities. The need for coordinated joint efforts facilitated by a formal and permanent platform on the field became evident to both Chinese and European decision makers before. The Sino-EU Panel on Land and Soil (SEPLS) was established as a scientific body on 29-30 June 2010, in Ispra (Italy). Leading soil scientists and land system researchers representing the main geographical regions of China and the EU join forces to cover a wide range of disciplines within the land resources domain. SEPLS allows the parties to exchange information in a formalized and well-structured manner and harmonize their information-base for responses to the threats arising from the natural and socio-economic pressure on soil and land resources. The Panel is led by an Executive Committee that is co-chaired by one representative of the Joint Research Centre (JRC) and one representative of the Chinese Academy of Sciences (CAS).

What do they do?

Various global policy frameworks and partnerships, mainly the UN Sustainable Development Goals (UN-SDGs), Paris Climate Agreement (COP), Habitat III New Urban Agenda and FAO Global Soil Partnership, have addressed related global mandates and approaches. However, social, economic and ecological interests often conflict. This trilemma in land use policy can only be resolved by integrating local characteristics, understanding and priorities into the decision-making process at different levels in the policy, governance and implementation frameworks of EU and China. The SEPLS identified crosscutting topics in the 'land use trilemma' which need to be addressed in priority and in smart, integrated and multi-actor ways. Through its mandate the SEPLS provides the European Commission with advice and expertise on the current state of land and soil resources and potential environmental and socio-economic consequences of their future utilization patterns.



Trilemma in land use policy (Li, 2010)

EUROPEAN COMMISSION:

DG Agriculture and Rural development: AGRI-B2@ec.europa.eu

DG Research and Innovation: RTD-F3-P0@ec.europa.eu

Joint Research Centre: JRC-SEPLS@ec.europa.eu

EU-China Research and Innovation Cooperation: http://ec.europa.eu/research/iscp/index.cfm?pg=china

EU DELEGATION TO CHINA:

EU Delegation to China Agri-Santé Section: <u>Delegation-China-Agri-Sante@eeas.europa.eu</u>

EU Delegation to China S&T Section: <u>Delegation-China-Scitech@eeas.europa.eu</u>

EU Delegation to China website: www.eeas.europa.eu/delegations/china/index en.htm

CHINESE ACADEMY OF AGRICULTURAL SCIENCES (CAAS):

Chinese Academy of Agricultural Sciences website: www.caas.cn/en
Department of International Cooperation, CAAS: diccaas@caas.cn

READ MORE: https://esdac.irc.ec.europa.eu/networkcooperations/sino-eu-panel-land-and-soil