



Sino-German Agricultural Centre (DCZ)

中德农业中心



Sino-German Agricultural and Food Update

中德农业与食品通讯

No. 7 August/September 2019



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Foreword

Dear readers,

Welcome to the DCZ Newsletter no. 7 which for a big part is dedicated to the role of agriculture on the issue of climate change. As mentioned in the previous edition of our Newsletter, a new component on this subject was added to the Sino-German Agricultural Centre (DCZ) and in the past few months several actions have been implemented. A cover story by two members of our international experts' team provides more background information on the topic and also outlines the objectives in this component. Reports from the study tours to Germany and to China show the specific actions that have been taken and summarize first findings.

Not only the DCZ is engaged on this important issue now, but also another bilateral cooperation project, the "Animal Husbandry and Animal Breeding Project" held a kick-off workshop for its climate component, a summary of which you will find in the section on "Activities of other Bilateral Cooperation Projects".

Another study tour on the topic "Digital tools for organic and small-scale farming" was organized by the Sino-German Agricultural Centre's Science & Technology (S&T) platform in cooperation with the Chinese Academy of Agricultural Sciences (CAAS) and the Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) in Potsdam, which could be combined with a visit to the 2nd Organic Field Days at Staatsdomäne Frankenhausen (Hessian State Domain) near Kassel.

In the section "News from the DCZ Website" you will find links to the "National Food Safety Standards Maximum Residue Limits of Pesticides in Foods" which have been jointly released by the Chinese Ministry of Agriculture and Rural Affairs (MARA), the National Health Commission and the State Administration for Market Regulation.

Furthermore, our new colleague Dr. Aihemaitijiang Rouzi took a closer look at the Amendments to China's Land Management Law 2019 which also is closely related to the subject of the DCZ's Agricultural Policy Dialogue this year. A link to his paper is included in the same section.

Last but not least, I would like to draw your attention to our upcoming Sino-German Agricultural Week, starting on 18 November in Beijing. The two key topics of the DCZ dedication this year – climate change and land management – will be further discussed during this event and approaches and recommendations will be presented at this conference.

We will provide more details for registration shortly – and look forward to meeting you there.

With our best regards

Dr. Jürgen Ritter

Managing Director

Sino-German Agricultural Centre (DCZ)

Cover Story

Addressing climate change together – China's and Germany's new efforts

Dr. Rita Merkle & Dr. Gerhard Rappold

Background

Climate change has become a top-tier global issue and scientists recognize that anthropogenic climate change contributes significantly to global warming (IPCC, 2014). Warming from anthropogenic greenhouse gas emissions (GHG) is driving unprecedented changes in the atmosphere and the global climate system impacting natural, economic and social systems in all countries. Depending on the choice of emissions scenario, Earth's surface temperature is projected to exceed a preindustrial baseline by three degrees Celsius or even more by the end of the century (IPCC, 2014).

Although the energy sector remains the primary driver for GHG emissions (34 %), agriculture, forestry and land use also play a significant role. Agriculture accounts for about 12 % of global GHG emissions, land use change and forestry (LUCF) for another 12 % (IPCC, 2014).

Despite being one of the main culprits of climate change, agriculture is at the same time a victim of its impacts. Extreme weather and climate events already affect farmers and the agricultural sector on all continents, no matter whether in rich or in poor countries. And yet, agriculture is crucial to sustaining life and the industrialization of agriculture has allowed for significant increases in animal and crop production over the past century. However, while agricultural productivity has substantially increased, it has often come at the expense of ecological sustainability and equitable development.

The Paris Agreement (2015) has once more underlined the necessity that addressing cli-

mate change requires nations to work together actively to implement policies, mobilize finance, and engage key stakeholders at all scales. It is against this backdrop that Germany and China have extended their bilateral cooperation by adding the new component "German-Chinese cooperation on agriculture and climate change" to the DCZ.

In this article, we will give a brief overview of the agricultural sectors' relevance for overall GHG emissions in China and Germany, before describing the respective political frameworks and outlining the working topics of this new component.

The agricultural sectors in China and Germany and their relevance for GHG emissions

The GHG emissions' figures of both countries need to be compared in absolute and per capita values to cope with the differences of size and population. As country with the largest population in the world and due to its prosperous economic development over the last 40 years China has become the largest emitter of GHG in the world (2014: 12 GtCO₂e/yr) while Germany ranks with 820 MtCO₂e/yr below. However, looking at per capita values, Germany's contribution is with 11 tCO₂e/yr/cap significantly higher than that of China with 8.7 tCO₂e/yr/cap (see Figure 1).

These differences are also reflected in agriculture. Germany's emissions from agriculture have remained stable for more than 20 years at around 60 Mt CO₂e/yr, while China's emissions increased from 600 Mt CO₂e/yr in the 1990s to 708 Mt CO₂e/yr in 2014. But looking at per capita emissions (see Figure 2), China remains stable at around 0.5 tCO₂e/yr while Germany's per capita emissions are decreasing.

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Figure 1: International per capita CO₂ emissions by percentage of global population 2016.
(Source: Salb et al., 2018a, p. 11)

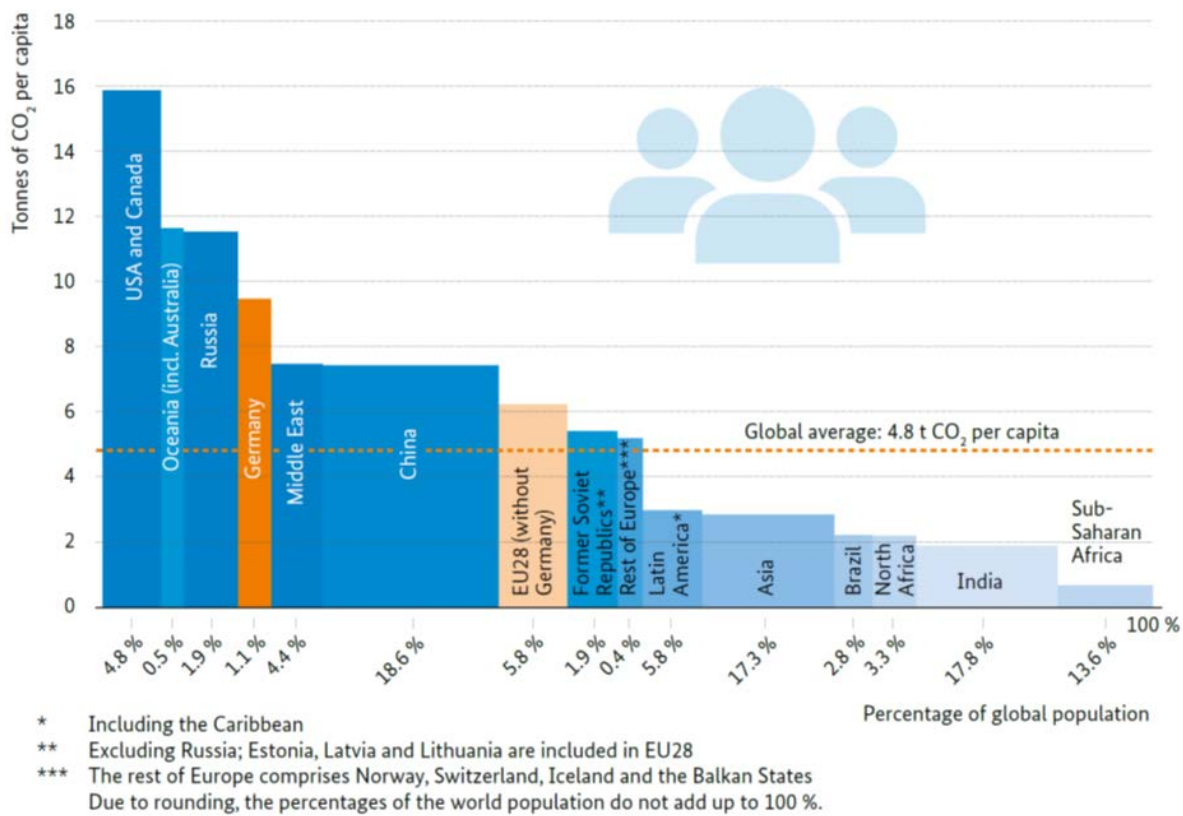
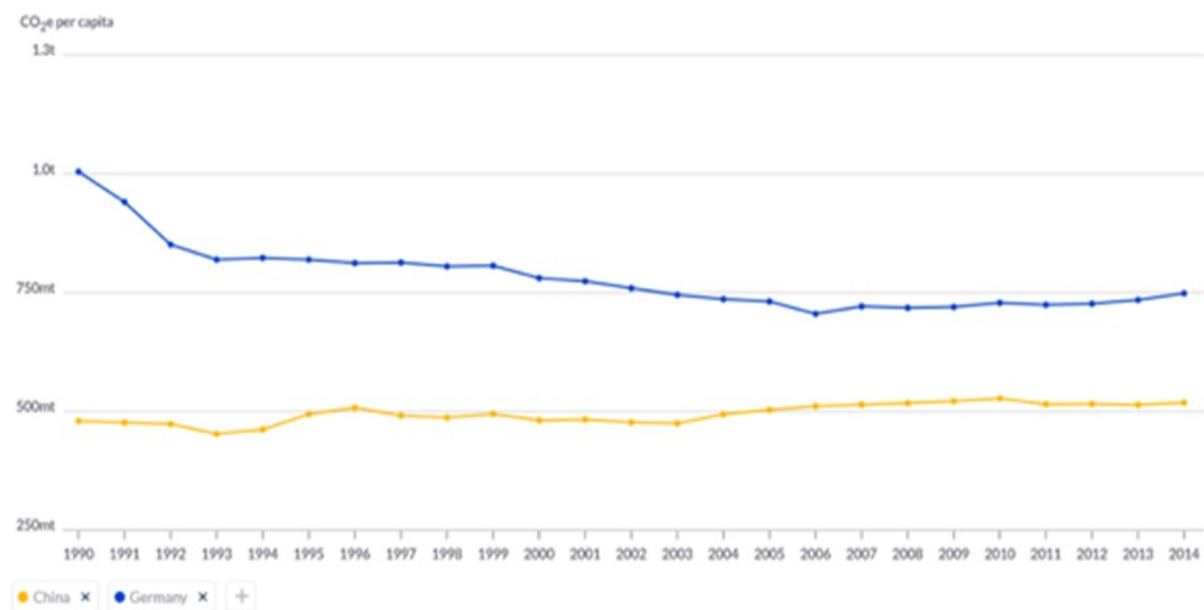


Figure 2: Emissions from agriculture per capita in China and Germany from 1990 until 2014
(Source: ClimateWatch 2019, accessed 11.09.2019)



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Political framework Germany

Germany is a strong political player for climate protection. The German Federal Government gave considerable support to the Kyoto Protocol adopted in 1997 and most recently to the Paris Declaration of 2015.

The Federal Government adopted the German Adaptation Strategy to Climate Change (DAS) in 2008 which was evaluated and ex-

tended in 2015. The states who are then responsible for the implementation have worked out their own state-adaptation strategies accordingly or will finalise them soon.

Regarding mitigation of CO₂ emissions, Germany has adopted the “Climate Action Plan 2050” in 2016 which set out the principles and goals for Germany’s climate policy.

Table 1: Emission targets related to the action fields (Source: BMU, 2016)

Action Field	1990 [Mio tons Co2 Eq]	2014 [Mio tons Co2 Eq]	2030 [Mio tons Co2 Eq]	2030 [Mitigation in % compared to 1990]
Energy	446	358	175 – 183	62 – 61 %
Buildings	209	119	70 – 72	67 – 66 %
Transportation	163	160	95 – 98	42 – 40 %
Industry	283	181	140 – 143	51 – 49 %
Agriculture	88	72	58 – 61	31 – 34 %
Sum	1,209	890	538 – 557	56 – 54 %
Other	39	12	5	87 %
Sum (total)	1,248	902	543 – 562	56 – 55 %

Table 2: Measures of the BMEL to mitigate emissions in agriculture

Measures	
1	Reduction of nitrogen surpluses and emissions, including reduction of ammonia emissions and targeted reduction of nitrous oxide emissions
2	Energetic use of manure of animal origin and agricultural residues in biogas plants
3	Emission reduction in animal husbandry
4	Expansion of the organically farmed area
5	Increasing energy efficiency
6	Humus build-up in arable land
7	Maintenance of permanent pasture
8	Protection of peat soils including reduction of peat use in growing media
9	Conservation and sustainable management of forests and timber use
10	Avoidance of food waste

Political framework China

Like Germany, China has signed the Paris Agreement and is committed to an active climate policy. It has nationally determined its actions by 2030 and defined several targets submitted in 2015 in its National Determined Contributions (NDC). As regards carbon dioxide (CO₂) emissions, the targets are two-fold: first, achieve the peaking of CO₂ emissions around 2030 and making best efforts to peak early, and secondly, lower CO₂ emissions per unit of GDP by 60 % to 65 % from the 2005 level. When it comes to agricultural sector mitigation targets, zero growth of fertilizer and pesticide utilization should be achieved by 2020.

As early as in 2007 China formulated a first “National Action Plan for Addressing Climate change” and since 2008 the State Council has published a white paper on “China’s Policies and Actions for Addressing Climate Change” every year. Over the last decade, an impressive body of legislation has been adopted to address climate change and targets in sectoral laws and policies were aligned to NDC targets. The 12th and 13th Five-Year Plans set targets to decrease the carbon intensity of GDP [*The binding indicator during the 13th Five-Year-Plan period (2016 – 2020) is to reduce CO₂ emissions per unit of GDP by 18% by 2020 against a 2015 baseline*] and in 2013, a National Adaptation Strategy was published covering five sectors, one of them being agriculture.

The overall objective of agricultural development is to secure the food self-sufficiency of the country. Furthermore, measures in the agricultural sector are addressed in the “Opinion on mechanisms to promote agricultural green development” (2017) and the “Technical Guidance on Agricultural Green Development” (2018).

Working topics of the new component and outlook

The new DCZ component “Climate change and agriculture” is embedded in these wider political contexts of Germany and China. Two working groups were set up, one on crop production, the other one on animal production. Each group is set up of four to five Chinese and German scholars who are internationally recognized experts in their respective research area. They will elaborate deeper insights into specific subjects such as integrated sustainable nitrogen management, circular manure management, mitigation options in cropping systems, plant breeding and sustainable plant production or carbon footprints in the soybean trades and publish them in specialised articles. Findings from this component will also be presented on the Sino-German Agricultural Week in November in Beijing in order to encourage a wider discussion with a wide range of stakeholders.

In a coming edition of the DCZ Newsletter, we will provide you with some deeper insights into one of these areas in another cover story.

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About the authors:

Dr. Rita Merkle is specialized in natural resource management and sustainable rural development, in China and in Europe, and in European agricultural policies. She is a graduated geographer and sinologist and the German lead expert in the DCZ climate project.

Dr. Gerhard Rappold is a hydrologist and climate change adaptation expert. Furthermore, he has in-depth knowledge in change management and systemic organisational consulting. He supports the DCZ climate project with his expertise.

For more information about the ongoing activities, please also read our reports about the kick-off workshop and the excursions of the expert teams to Germany and China in this issue.

Good to Know

Qu Dongyu elected Director-General of FAO

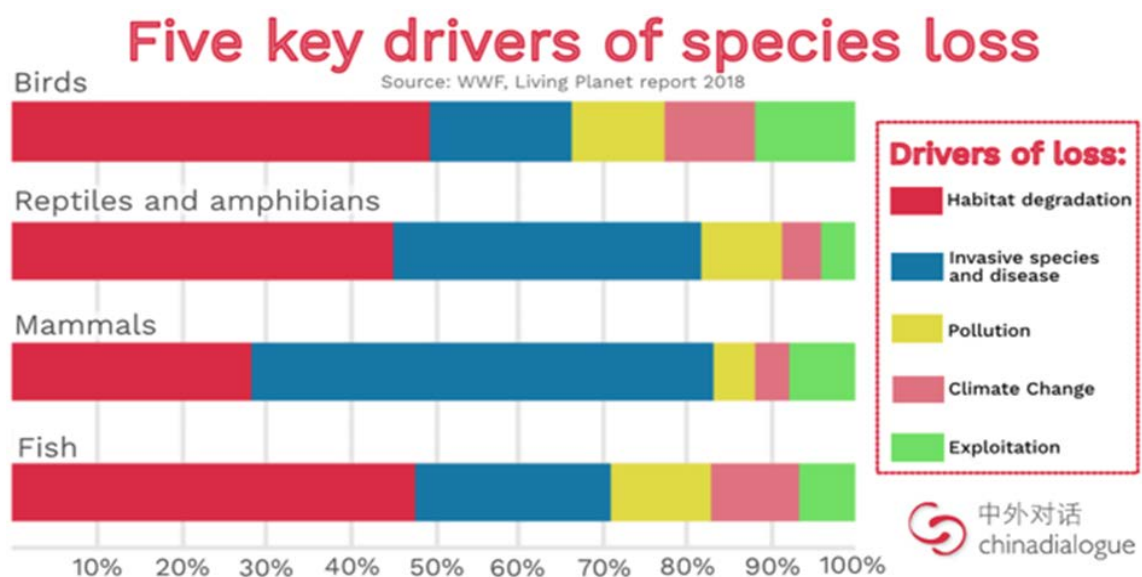
On June 23, Qu Dongyu, a former Vice Minister of China's Ministry of Agriculture and Rural Affairs (MARA) and a graduated biolo-

gist was elected Director-General of the Food and Agriculture Organisation of the UN (FAO). Qu received 108 votes out of 191 cast in the first round of the election. Qu's term started on August 1, 2019 and will end on July 31, 2023.

IPBES report warns of 'unprecedented' biodiversity loss

In a Global Assessment Report, the Intergovernmental Platform on Biodiversity and Ecosystem Services warns that biodiversity loss in recent years is accelerating at an unprecedented pace. The alarming findings of the report will certainly be a topic at the 15th Conference of the Parties to the Convention on Biological Diversity (CBD) which will be held in Kunming at the end of 2020. Representatives of more than 200 countries are expected to agree on a new 10-year framework to halt biodiversity loss and protect ecosystems.

A summary report can be downloaded at: https://www.ipbes.net/sites/default/files/downloads/spm_unedited_advance_for_posting_htn.pdf



The host country China with the size of a continent and a huge reservoir of biodiversity is facing tremendous conservation challenges for the protection of the natural habitat of endangered species. The IPBES report identifies overexploitation, pollution, extractive industries and invasive species as “key biological threats to China’s social development and ecological security”. According to the report the number of invasive species has grown at a rate of three per year since 1900, but was increasing faster in the past 15 years. The report also warns that “the loss of traditional crop varieties and associated local farming knowledge is removing options that could be crucial to efforts to adapt to climate change” (China Dialogue).

<https://chinadialogue.net/article/show/single/en/11237-Human-wellbeing-threatened-by-unprecedented-rate-of-biodiversity-loss>

Fall armyworm pest spreading – MARA promotes 25 pesticides – CAAS tests stink bug as natural predator

Apart from the African Swine Fever crisis and trade war China’s agriculture sector is facing another challenge for domestic food security and inflation of food prices. According to the National Agricultural Extension Service Centre already 92,000 ha in 18 provinces in southern China are affected by the fall armyworm (*larvae of Spodoptera frugiperda*), a pest primarily feeding on corn and sugar cane. It is now feared that the pest will travel northwards and will destroy the summer corn harvest in northern regions. The armyworm, native to regions in the Americas ranging from Argentina to Canada, was first detected in Yunnan in early 2019. Experts fear that the fall armyworm will spread to all of China’s grain producing regions within 12 months and will have impacts on production quantity and quality of corn, rice, sugar cane, cotton, soybean, and other cash crops.

According to press reports MARA instructed local authorities to recommend the use of 25 pesticides, including Indoxacarb, Chlorantraniliprole (which is harmful to bees) and Acephate. The list was drawn on the advice of experts since conventional registered pesticides against the pest are not yet available in China. The deadline for the use of the mentioned pesticides is set for Dec. 31, 2020.

Bloomberg reported that the Institute of Plant Protection at the China Academy of Agricultural Sciences (CAAS) is also testing biological pest control solutions, namely the breeding of stink bugs (*Arma chinensis*) which are natural predators of the army worm. According to field trials in Yunnan province a mature stink bug nymph can exterminate 41 fall armyworm larvae a day by anaesthetising and paralyzing the pest. CAAS has now set up a “factory” that can breed 10 million stink bugs a year.

Source: <https://www.scmp.com/economy/china-economy/article/3011248/armyworm-bite-chinas-under-pressure-food-supply-within-two>

<https://www.scmp.com/news/china/politics/article/3013253/china-recommends-pesticides-emergency-agriculture-ministry>

<https://www.theneweconomy.com/strategy/china-plans-to-breed-stink-bug-army-to-fight-crop-infestations>

ASF, criminal syndicates and search for effective vaccine

Recent press reports about crack down on “evil black societies” suggest that China’s ASF crisis may also be attributed to the criminal syndicate structures in local pork markets. It was reported that in Ganzhou City, Jiangxi province, “meat lords” force farmers and pork traders to bring their pigs to slaughterhouses under the gang’s control. In E’zhou city,

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Hubei province, a gang forced meat traders to pay 185 yuan to dispose of animal waste, without receipt. From Guangdong province it was reported that in some villages local gangs monopolize local meat and vegetable markets. A similar story was reported from Rizhao in Shandong where pork vendors were forced to sell their meat in one of the markets controlled by the gang.

End of May, the police in Jiaxing county reported the arrest of a 14 persons gang who tried to sell fake pig vaccine against ASF made of coloured water. Jiaxing in 2013 became infamous as the source for 10,000 dead pigs that floated into Shanghai. According to press reports the fake vaccine was produced in an illegal workshop in Henan province, which also produced 270 other kinds of fake vaccines, for example against foot and mouth disease, and marketed them using social media and internet (source: Dim Sums May 24 and June 1, 2019).

Meanwhile the search for an effective vaccine is going on. On June 11, the shopping mall operator Guangdong Highsun Group was questioned by the Shenzhen Stock Exchange after the group announced that they will donate 900 million RMB (about 120 million euros) for the research of a polysaccharide injection, a natural compound isolated from tropical plants. The announcement had triggered a 10 percent surge of Highsun shares, leading to a trading suspension. Highsun claimed that preliminary research showed 92 percent effective results and the Bureau of Agriculture and Rural Affairs of Hainan province is supporting the research. However, MARA, the Ministry in Beijing, issued a statement on June 11 that they so far had not received a research application and without experimental data there is no scientific proof for the effectiveness of polysaccharide injection.

More: <https://thepigsite.com/news/2019/06/no-proof-that-natural-compound-prevents-swine-fever-says-chinas-ministry-of-agriculture>

With no effective cure in sight shortages in meat supply and rising prices for pork are of highest concern for the Chinese authorities. It was reported that in August pork prices have almost doubled compared to one year earlier. It is feared that the price hikes might accelerate inflation of consumer prices. To cope with shortages and price hikes China is already tapping its national reserves of frozen pork meat. The reserves however might not be enough to make up for shortages of an estimate of 13 million tons. To speed up and promote pork production several ministries have jointly released 17 measures including preferential subsidies and insurances for pig breeders.

More: <https://www.dcz-china.org/en/nachrichten-agri-news-d-en/multiple-ministries-issued-17-measures-to-support-pork-production.html>

News from DCZ Website

National Food Safety Standards for Maximum Residue Limits in Foods, 2019 edition

The Chinese Ministry of Agriculture and Rural Affairs (MARA), the National Health Commission and the State Administration for Market Regulation jointly released the “National Food Safety Standards Maximum Residue Limits of Pesticides in Foods”. This edition sets new standards for 483 pesticides in 356 kinds of food products.

More: <https://www.dcz-china.org/en/nachrichten-agri-news-d-en/national-food-safety-standards-for-maximum-residue-limits-of-pesticides-in-foods-2019-edition.html>

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Law Monitoring – Amendments to China's Land Management Law – 2019.

DCZ agricultural advisor Dr. Aihemaitijiang Rouzi takes a closer look at the revised law. His paper can be downloaded from: <https://www.dcz-china.org/en/reports-studies-and-policy-briefs.html>

DCZ Activities

Conference and study tour “Digital tools for organic and small-scale farming”

Between June 30 and July 5, the Sino-German Agricultural Centre's (DCZ) Science & Technology (S&T) platform in cooperation with the Chinese Academy of Agricultural Sciences (CAAS) and the Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) in Potsdam organized a conference and excursion in Germany for a delegation of 13 researchers from CAAS institutes and other Chinese agricultural research institutions. The

event was designed to explore chances and challenges of digitalization for small-scale and organic farming. It brought together an interdisciplinary group of Chinese and German researchers specialized in fields such as remote sensing, precision farming, soil science, plant protection, organic farming and agricultural economics.

On July 1 and 2, the conference which was organized in cooperation with Prof. Dr. Cornelia Weltzien (Scientific Vice Director at ATB and Head of Dept. Engineering for Crop Production) and her team at ATB explored recent developments in digital farming and data acquisition, approaches for water and soil management and precision plant protection as well as recent advances in organic and small-scale farming. The experts from China had the opportunity to exchange ideas and thoughts on new developments with researchers from ATB, the Leibniz Centre for Agricultural Landscape Research (ZALF), the Eberswalde University for Sustainable Development (HNEE) and the Wageningen University & Research (WUR).



Group photo at the conference on “Digital tools for organic and small-scale farming” at ATB (Source: Leibniz-Institut für Agrartechnik und Bioökonomie ATB e.V.)

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In a break between the presentations the participants visited the labs of ATB at Bornim. Here, the conference group learned about the short rotation coppice plantation of ATB, the lactic acid production facility where lactic acid is produced from different vegetable raw or waste materials, for instance straw and grain. Lactic acid is a basic chemical for bioplastics.

In the afternoon of the second day, researchers of ATB presented their projects on-site at ATB's field lab for digital agriculture in Potsdam-Marquardt. Here, the participants saw innovative tools, for instance highly modern soil measurement devices, autonomous robotic machines that will work in orchard applications, measurement devices for crop monitoring and an introduction to drone applications.



Innovative digital tools and techniques at ATB's field lab for digital agriculture in Potsdam-Marquardt (photos: DCZ)



Short rotation coppice plantation, introduction to lactic acid production and fiber production. (photos: DCZ)



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Innovative digital tools and techniques at ATB's field lab for digital agriculture in Potsdam-Marquardt (photos: DCZ)

In the concluding session Prof. Dr. Weltzien identified common interests in image analysis for disease detection. She also remarked that there is a great potential for applying digital tools and robots for organic farming systems. Prof. Wu Wenbin from the Key Laboratory for Smart Agriculture of CAAS emphasized

that the Chinese guests learnt a lot, especially in the field of data acquisition, and expressed the desire to continue the dialogue next year.

Visit to the V 140 field and the observation of a drone flight at ZALF in Müncheberg (photos: DCZ)



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On July 3, the Chinese delegation visited the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg. The Scientific Director Prof. Dr. Katharina Helming, head of the Research Group Landscape Research Synthesis, introduced the institute's ongoing projects such as the project 'Digital Agricultural Knowledge and Information System' (DAKIS) which started just a few weeks ago. In the DAKIS project spatially and functionally diversified agricultural systems of the future are to be explored. Dr. Carsten Hoffmann introduced the BonaRes project, a long-term experiment investigating sustainable subsoil management. After the introduction the group had the opportunity to visit the long-term field experiment V 140, an experiment that has been running continuously on site at ZALF since the year 1963. The V 140 experiment is one of a few of this type on sandy soil. Different ratios of mineral and organic fertilizers are applied to the field here. After having a close look at the long-term field experiment, the participants had the opportunity

to observe a drone flight over the V 140 fields.

In the afternoon of July 3, the delegation visited the eco-village Brodowin in northern Brandenburg close to the Polish border. Franziska Rutscher from the Brodowin cooperative showed the facilities of the Demeter certified farm including cattle barn and a modern dairy facility and explained the philosophy of biodynamic farming, which was originally proposed by Rudolf Steiner. After the guided tour on the Demeter farm, the Chinese experts enjoyed the local and freshly produced organic milk and delicious cake.

On July 4, the delegation was among the more than 11,000 visitors during the 2nd Organic Field Days at the Staatsdomäne Frankenhäusen (Hessian State Domain) near Kassel, which is the research and experimental farm of the University of Kassel. This biannual event, jointly organized by the Hessian Ministry of Agriculture, the University of Kassel and the Foundation for Ecology & Farming



Group photo showing Chinese experts during the 2nd Organic Field Days at the Staatsdomäne Frankenhäusen (photo: DCZ)

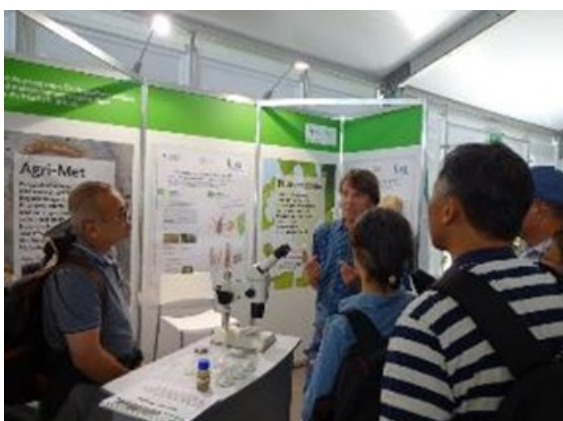
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(SÖL) provided the unique opportunity to learn about practice and research in organic agriculture and livestock husbandry. Among other topics the group observed robots for weeding and soil cultivation, saw long-term experimental fields of the farm and exchanged views with scientists of the Julius Kühn Institute (JKI) on options for biological pest control.

Professor Dr. Trautz from the University of Applied Sciences Osnabrück and Dr. Insa Kühling from the Institute for Agricultural and Nutritional Sciences, Martin Luther Uni-

versity Halle-Wittenberg accompanied the group and provided an overview of their research on “Precision Farming in Organic Agriculture and Technology Transfer into Conventional Agriculture”. At the booth of the University of Kassel the Chinese visitors also learned that the university’s department for organic agriculture has about 20 professors and more than 1,000 students.

More: <https://www.atb-potsdam.de/en/meta/news/news/news/article/deutsch-chinesischer-dialog.html>



Field experiments, robot applications and talks with experts from the Julius Kühn Institute during the 2nd Organic Field Days at the Staatsdomäne Frankenhausen (photos: DCZ)

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Photo: DCZ

Kick-off meeting of the German-Chinese Cooperation on Agriculture and Climate Change

On July 2-3, the kick-off meeting of the sub-project of DCZ, the “German-Chinese Cooperation on Agriculture and Climate change”, was held in Beijing. A total of 13 experts from the Chinese Academy of Agricultural Sciences (CAAS) and the Ministry of Agriculture and Rural Affairs (MARA) as well as 5 German experts participated in the meeting. The objective of the workshop was to set up and agree on a work plan of the cooperation. The experts established two working groups, one focusing on crop production and one on livestock production. Until the end of 2019, the project will organize two study tours to Germany and China, resp., in order to experience the current developments within the sector at first hand. Expected outputs of the cooperation will be best practice examples compiled in policy briefs and a set of publications.

Study tour “Climate-friendly Agriculture” in Germany

Between August 6 and August 10, DCZ organized an excursion to Germany for the experts of the DCZ sub-project “German-Chinese Cooperation on Agriculture and Climate Change”. The five-member delegation from China included Mr. Li Bo, Deputy Director General (DDG) of the Department of Science and Education (MARA), Mr. Xu Wenhao, Program Officer at MARA, Prof. Dong Hongmin, Deputy Director General of the Institute of Environment and Sustainable Development (IESD) of CAAS and IPCC lead author, Prof. Li Yu’e from IESD, CAAS and IPCC lead author, and Mrs. Yan Yan, Program Officer at the Foreign Economic Cooperation Center of MARA (FECC). All German experts of the project, under the leadership of Dr. Rita Merkle as the lead expert, participated in the tour: Prof. Barbara Amon, Coordinator of the Technology Assessment and Substance Cycles Programme at ATB and

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IPCC lead author, Dr. Gerhard Rappold, Dr. Daniel Müller, Leibniz Institute of Agricultural Development in Transition Economies (IAMO), and Mrs. Sophia Lüttringhaus, Humboldt Forum for Food and Agriculture (HFFA). Also participating: Dr. Eva Sternfeld, Science Advisor of the DCZ, and Ms. Peggy Günther, Project Coordinator at IAK Agrar Consulting GmbH.

The study tour included a meeting at the Federal Ministry for Food and Agriculture (BMEL) with Mr. Friedrich Wacker, DDG for International Cooperation, and Mr. Albert Wulff, DDG for Research and Innovation. In his speech Mr. Li Bo outlined MARA's efforts in the field of climate protection. He informed that the target of China's action plan to cap increase of agrochemical input by 2020 at the latest has already been reached. He further mentioned that present strategies are concentrating on the recycling of animal waste and straw residues. He expressed the wish that the Sino-German collaboration on Agriculture

and Climate will be continued beyond 2019. In his opinion, the project can make an important contribution to both global food security and mitigation of climate change. Mr. Wacker remarked that Germany has the potential to develop technological solutions for challenges created by climate change, but as a single nation is too small to have a significant impact on a global scale. A Sino-German cooperation in this field, however, can make achievements on a certain scale. In her presentation Dr. Viola Richter from the Department on Sustainability, Climate Protection and Climate Impact at BMEL, outlined the policy framework for climate protection and adaptation in Germany. In her presentation she demonstrated the German Climate Protection Plan 2050 and the Ten Climate Protection Measures BMEL has presented in April. (More: <https://www.bmel.de/SharedDocs/Pressemitteilungen/2019/077-Klimakabinett.html>.) She emphasized that agriculture in relation to climate change is



The delegation at ATB (photo: ATB)

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always in a double role of being an offender and a victim at the same time. In Germany, agriculture (without LULUCF) contributes about 7.4 % to greenhouse gas emissions (GHG). Nowadays, the sector is already confronted with the consequences of a changing climate: for extreme events, such as heat waves, droughts and floods, higher frequencies and intensities are being registered. Thus, Germany's strategies for climate adaptation were presented as well.

Dr. Monnerjahn from the Department of Research and Innovation introduced the BMEL programmes to support research in the field of agricultural sciences and outlined the achievements of the Sino-German collaboration in this field. Earlier that morning the delegation had already visited the research farm LVAT Groß Kreutz in Brandenburg (<https://www.lvatgrosskreutz.de/>) where Director Mr. Detlef May informed about the dairy farm's experiments improving farm animal welfare and mitigating greenhouse gas (GHG) emissions from livestock farming at the same time. The most effective measure for emission reduction from dairy cows is extending their life span through ensuring high animal welfare which results in more lactation periods per cow. That way, their cows reach a total milk yield of 42,000 kg per cow.

After the farm visit the delegation headed for

the [Leibniz Institute for Agricultural Engineering and Bioeconomy \(ATB\)](https://www.atb-potsdam.de/en/research-programs/precision-farming-in-crop-and-livestock-production.html) in Potsdam-Bornim. Prof. Barbara Amon introduced the ATB research programme on "Precision farming in crop and livestock production" and the institute's research on emission mitigation from animal housing and manure management as well as the ongoing research on health and welfare of dairy cows including impacts of heat stress.

More: <https://www.atb-potsdam.de/en/research-programs/precision-farming-in-crop-and-livestock-production.html>

The delegation also had the chance to visit several labs including the biochar lab and the wind tunnel, the latter one being used to study ventilation processes and thus reduce the emission potential of animal husbandry facilities.



Visit to research farm Groß Kreutz (photos: DCZ/IAK)

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Visit to ATB's boundary layer wind tunnel and biochar laboratory (photos: IAK)

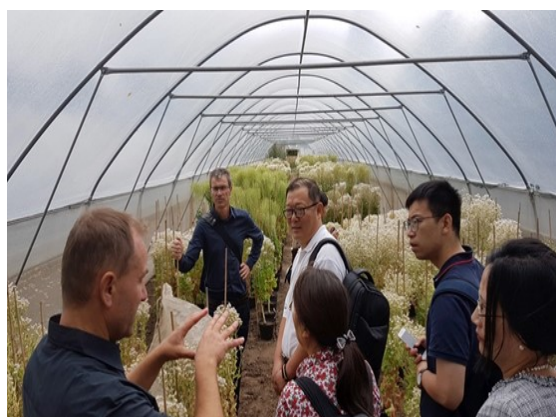
On August 7, the delegation travelled to Gatersleben to visit the [Leibniz Institute for Plant Genetics and Crop Plant Research \(IPK\)](#). Prof. Dr. Jochen Reif, Head of the Breeding Research, introduced the institute and the challenges for plant breeding in times of climate change. After that the group – shown around by Dr. Peter Schreiber – visited the experimental fields of IPK. Dr. Astrid Junker, Head of the research group of Acclimatization Dynamics and Phenotyping showed the respective labs. Especially impressive is their new “space ship”, the Plant Cultivation Hall, where climatic simulations under controlled conditions can be performed close to the reality in the field.

In the afternoon, the delegation visited a large farm, the Agricultural Enterprise Barnstädt e. G. in Saxony-Anhalt. In the field, the group observed how the enterprise has adapted its agricultural practices to the site-specific needs as well as requirements of the EU regulation on integrated agriculture and sustainable fertilizer application.

The cooperative owns 5,500 ha land and is one of the biggest pig farms in Germany (with an annual turnover of 100,000 pigs). As Managing Director Ralf Hägele explained, the cooperative has established a circular economy by using all residues from livestock production for fertilizer and biogas production.



IPK Gatersleben Plant Cultivation Hall; explanations were given by Dr. Astrid Junker (photo: IAK)



IPK Gatersleben: Dr. Peter Schreiber explains the reproduction of varieties of salad from the gene bank (photo: IAK)

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Manure application complies with the EU fertilizer ordinance. By not exceeding 170 kg/ha/year the farm is eligible to receive 230 EUR per ha in subsidies from the EU annually. He further explained the importance of crop rotation and soil cultivation for humus building. One of the biggest challenges at present are the abnormal drought conditions which are hitting the region for two consecutive years.

On August 8, the delegation visited the Thünen Institute (TI), the Federal Research Institute for Rural Areas, Forestry and Fisheries (<https://www.thuenen.de/en/>) in Braunschweig. Dr. Claudia Heidecke, Coordinator of the Climate Unit, introduced the Institute for Climate Smart Agriculture. Heidecke outlined German and international research initiatives in the field of climate protection such as the Global Research Alliance for Climate Protection and explained possible climate protection policies in agriculture, including measures such as the reduction of animal numbers and the input of mineral fertilizer, expansion of biogas production, amendment of the fertilizer ordinance and increase of or-

ganic farming from currently 7.5 % to 20 % of agricultural land by 2030.

Dr. Roland Fuß from the TI's Institute for Climate Smart Agriculture gave a presentation about GHG from Agriculture in Germany. According to Fuß one of the major issues in German agriculture is to reduce the emissions from livestock farming and the related social and economic conflicts. Following the presentation, the group had a tour through the laboratories for GHG measurements of the Institute for Climate Smart Agriculture.



Application and immediate incorporation of manure at Barnstädt (photos: IAK)

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Demonstration fields of the International Plant Production Centre of the German Agricultural Society (DLG) in Bernburg-Strenzfeld (photos: Sternfeld)

The following day, the group visited the [International Plant Production Centre](http://www.dlg-ipz.de/de) of the German Agricultural Society (DLG) (www.dlg-ipz.de/de). Dr. Klaus Erdle showed in the demonstration fields how different soil tillage systems, fertilization experiments, crop rotation trials and water saving irrigation technologies can help to be better prepared for climate change challenges.

On the last day of the study tour, Prof. Dong Hongmin, Prof. Li Yu'e, German lead expert

Dr. Rita Merkle, and Dr. Eva Sternfeld visited the agri-food pedagogical project “Weltacker”/Global Field. Project Coordinator Benny Haerlin from the Foundation for Future Agriculture (Zukunftsstiftung Landwirtschaft) guided through the 2000 m² field and explained the project’s intention to raise awareness of the link between sustainable food consumption, agricultural production and global food safety, with a special focus on urban citizens and school kids. <https://www.2000m2.eu/a-visit-from-beijing/>



Visit to the Global Field (Weltacker) in Berlin (photo: Weltacker)

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Study tour “Climate-friendly Agriculture” in China

Between September 2 and September 6, DCZ in cooperation with the Institute for Environment and Sustainable Development (IESD) of the Chinese Academy of Agricultural Sciences (CAAS) organized a study tour in China for the experts of the DCZ sub-project “German-Chinese cooperation on Agriculture and Climate Change”. The German delegation included, besides the lead expert Dr. Rita Merkle, Dr. Gerhard Rappold, Sophia Lüttringhaus, Project Coordinator Peggy Günther (IAK) and Science Advisor Dr. Eva Sternfeld (DCZ). Lead expert Prof. Li Yu’e (IESD, CAAS), Prof. Dong Hongmin (IESD, CAAS), Managing Director Tang Zhishao (DCZ, FECC), Project Officer Yan Yan (DCZ, FECC), Wang Bin (Post-doc at IESD) and Yue Caide (PhD candidate at IESD) participated in the tour from the Chinese side.

In the morning of September 2, the experts met at the Foreign Economic Cooperation Center (FECC) of MARA in Beijing. Following an introduction to the project and the purpose of the study tour by Tang Zhishao (DCZ, FECC), Mr. Li Xiang from the Department of Science and Education of the Ministry of Agriculture and Rural Affairs (MARA) gave an overview of the present policies in China regarding climate mitigation and climate change adaption. After his introduction, Xiong Hongli, Li Ping and Qiu Zhijun introduced the work of the National Science and Technology Extension Center (NSTEC) with special regard to dry land farming and pest and disease control.

In the afternoon, the group visited the National Center for Climate Change Strategy and International Cooperation. The Center is attached to the Ministry of Ecology and Environmental Protection and is an important agency in China and responsible for international climate policy negotiations. For the scientific support the center also works closely



Initial meeting with representatives of MARA and NATESC at FECC office (photo: IAK)

with the IESD and other research institutes. Ms. Wang Tian, Ms. Tian Chuan and Ms. Yang Xiu, who frequently attend international negotiations, provided firsthand information on China’s targets and plans related to climate change. In addition, Ms. Wang Tian elaborated on the issue of transparency in the context of greenhouse gas (GHG) inventories.

On September 3, the group visited the Institute for Environment and Sustainable Development (IESD) and the Institute of Crop Science of CAAS. At IESD Prof. Li Yu’e provided an overview of climate change and agriculture in China. Her talk was followed by Ms. Wei Sha who presented her research in collaboration with Prof. Dong Hongmin which concentrates on GHG emission mitigation in livestock production. After the presentations the group had a tour through the IESD laboratories.

In the afternoon of that day the group visited the Institute of Crop Science. The renowned CAAS scientist and breeder Prof. He Zhonghu introduced the CAAS achievements in wheat breeding and showed his laboratories. Prof. Zhang Weijian provided an overview of practices in Climate Smart Agriculture in China. The day was concluded with a dinner reception hosted by Mr. Li Bo, Deputy Director

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During the tour through the laboratories of CAAS, Prof. He Zhongyu shows the gallery of Green Revolution pioneers (photos: Sternfeld)

General for Research and Education at MA-RA.

The next day, the group took the train to Jinan, capital of Shandong province. They were received by Qu Zhaolin, Director of the Agricultural Environment Protection and Rural Energy Station of the Agricultural Bureau Shandong Province, and Dr. Li Yan, Deputy Director of the Institute of Agricultural Resources and Environment, Shandong Academy of Agricultural Sciences. After a meeting at the Agricultural Bureau of Shandong Province the group travelled to Binzhou City near the Yellow River estuary where they visited Binzhou Zhongyu Food Corporation, a large company in China which is well known for processed wheat products (bread and noodles). CEO Zhang Zhijun demonstrated the company's efforts for promoting circular economy in agricultural production. This includes the use of the residues from crop production, the slurry from the company's pig farms (100,000 pigs annually) and nearby rural households for biogas production. The company also experiments with low fertilizer and zero pesticide input in greenhouses.



Binzhou Zhongyu Food Corporation (photo: Sternfeld)



The biogas facility at Zhongyu company, slurry collection (photo: Sternfeld)

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Director Zhang Zhijun explains how wheat straw is processed into biogas (photo: Sternfeld)

In the morning of September 5, the group visited another biogas project in Wudi county, run by the Huiren Bioenergy Company. This large facility treats residues from crop production including straw as well as slurry from cattle farms and rural households. The slurry collection covers 90,000 households which in exchange are supplied with gas for cooking and heating. For the slurry collection the company is paid by the local administration whereas the private households pay for the gas.

Following this visit the group travelled back to the Shandong Academy of Agricultural Sciences (SAAS) in Jinan. Here they had the opportunity to visit the academy's experimental fields, including experiments on improved efficiency of maize fertilization which ultimately reduces GHG emissions.



Experimental fields of SAAS. Experimental setup to test soil types from Shandong province (photo: IAK)

In the afternoon, the delegation travelled to Jimo by train, where the Huasheng Green Agricultural Science and Technology Corporation demonstrated their achievements in modern greenhouse technology, including the installation of different types of PV panels adjusted to the greenhouse production types. Production facilities for mushroom substrate made from rotten wood of apple trees were included.

On the last day of the excursion, the group visited the Qingdao Institute of Bioenergy and Bioprocess Technology of the Chinese Academy of Sciences. The excursion was concluded with a visit of the Tianren Environment Company in Qingdao, a company specialized in energetic use of biomass in the agriculture sector with several realized projects all over China. The group was received by CEO Mr. Cao Man. Ms Wang Qiong introduced the



Model of Huasheng Greenhouse Solar Park (photos: IAK)



The experts in Qingdao (photo: Qingdao Institute for Bioenergy and Bioprocess Technology, CAS)

Agricultural Environmental Data Platform developed by the company. The system processes static and dynamic business data from livestock production and calculates the carbon footprint of a facility by processing data on regional manure production, manure management and resource utilization. The excursion was concluded with a debriefing session where further steps within the sub-project and beyond were discussed.

Activities of other Bilateral Cooperation Projects

Sino-German Animal Breeding and Husbandry project held kick-off workshop for climate project

World-wide it is being recognized that climate and environment are two major elements to be considered in livestock husbandry and therefore an integral part when considering live-

stock development. As a result, the Sino-German bilateral project on Animal Breeding and Husbandry decided to include a project component to facilitate a better understanding of the impact of cattle and pig husbandry on climate and environment. This project, titled "Establishing a network of competencies for climate and environmentally friendly animal husbandry in China" will create a network of professionals in China and Germany, and by this, will contribute to this topic.

In early May, a kick-off meeting took place between the project partners; from the Chinese side the National Animal Husbandry Services (NAHS) and from the German side ADT Project Consulting GmbH. Both sides appointed coordinators and experts: Dr. Yu-anning Zhou and Dr. Hindri Kuipers, respectively. An expert team has been formed comprising experts from the Chinese Academy of Agricultural Sciences – Institute of Environment and Sustainable Development in Agri-

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culture in Beijing, and the Sichuan Academy of Grassland Sciences in Chengdu. Together they will work on topics such as Life Cycle Assessment / Carbon Footprint, mitigation of greenhouse gases resulting from livestock husbandry and assess the impact of extensive farming systems on climate and environment.

The competence network will evolve into a platform where information and knowledge on this topic will be shared between experts and beneficiaries and where approaches and methodologies are designed such as to ensure the sustainability of this activity.

Among others, a study tour to Germany is scheduled which will initiate the exchange of information between Chinese and German experts and include technical sessions at major institutions such as universities, research organizations, farmers' organizations, and agribusiness companies. All this will lead to supporting the further development of the livestock sector in China while identifying and implementing mitigating measures, thus contributing to the minimization of the impact on climate and environment. (Sven Grupe, ADT)

Sino-German Biomass Research Center (C-DBFZ Anhui, Hefei) and recent exhibitions on the utilization of biomass and agricultural residues

Being a cooperation of the German Biomass Research Center (DBFZ) in Leipzig, the University of Rostock and the University Hefei, the Sino-German Biomass Research Center Anhui (C-DBFZ Anhui) in Hefei has dealt with the material and energetic utilization of agricultural residues and kitchen waste since the foundation in 2018. Currently, the activities for building up the C-DBFZ Anhui concentrate on the training of Chinese colleagues and students at the thermo-chemical and bio-gas labs and technical centres at the DBFZ in Leipzig as well as on the creation of lab and knowledge-based infrastructures in Hefei.

In May and June two exhibitions on the utilization of biomass and agricultural residues took place in Hefei. The smaller "Biomass energy technology and equipment exhibition" (May 28-30) focussed on current activities on the energetic utilization, emission control and sewage treatment on provincial level. The bigger exhibition from June 17-19 concerned the utilization of agricultural residues, mostly straw, and showed China-wide developments in this area. Dr. Zhang Ling (C-DBFZ, Anhui) and partly Thomas Schliermann (DBFZ/C-DBFZ Anhui) attended those exhibitions to find out about new developments in the utilization of agricultural residues and get in contact to exhibiting companies. Main developments were shown, e. g. in the fields of straw granulation, organic

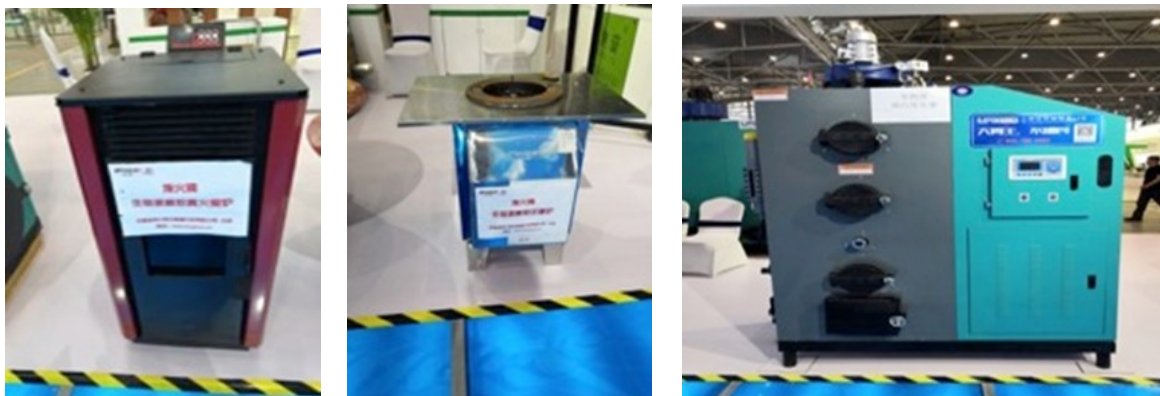


Figure 1: Combustion furnaces of different sizes and powers using compressed straw (photos: DBFZ)

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fertilizers, soil remediation and by-products such as activated carbon as well as furnace technology. Figure 1 shows combustion equipment of different sizes using compressed straw (Figure 2) (Walter Stinner, DBFZ).



Figure 2: Different types of compressed straw (photo: DBFZ)

Save the Date!

Sino-German Agricultural Week, Nov. 18-22, 2019 in Beijing

The 5th Sino-German Agricultural Week will be held from Nov. 18-22, 2019 in Beijing. Highlights include a conference on Climate Change in Agriculture, a conference on Land Management, an open day of Sino-German cooperation projects in Agriculture and excursions to agricultural projects near Beijing. More detailed information and the programme will be available soon from info-dcz@iakleipzig.de and on the DCZ website.

Reviews of Publications

Agrobiodiversity Index Report. Risk and Resilience 2019. Bioversity International. CIAT.

<https://www.bioversityinternational.org/index-report/>

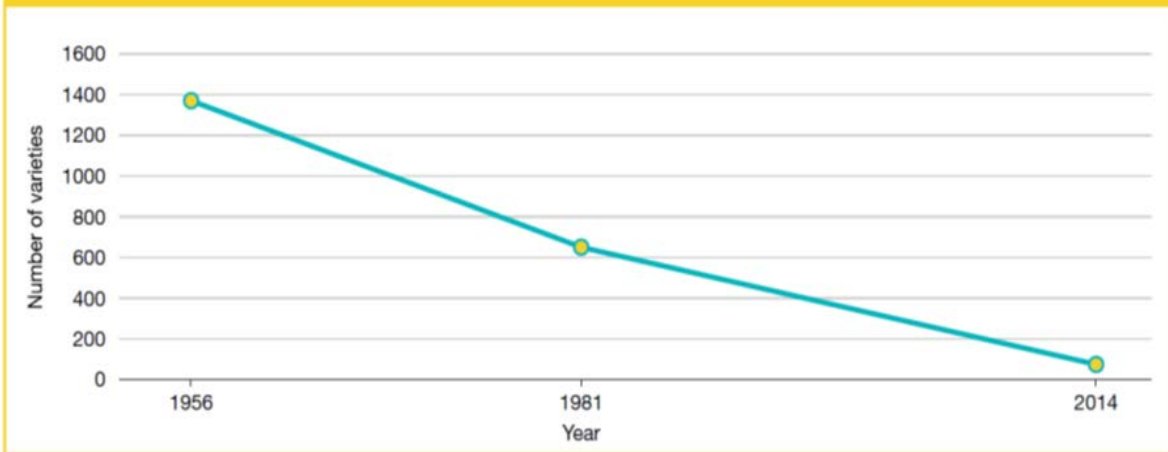
The Agrobiodiversity Index Report brings together data from ten countries to measure food system sustainability and resilience. The case study on China shows a mixed picture: As a country with the size of a continent and various climate zones as well as several thousand years of agriculture tradition China has the world's largest pool of agrobiodiversity. As early as in 1924, the Russian botanist Nikolai Vavilov (1887-1943) identified East China together with North and South Korea as the world's largest centres of origin (or diversity) of 136 endemic agricultural plants including several grains (such as rice and sorghum), legumes (soybean), roots and tubers (Chinese yam), vegetables and fruits (such as Chinese cabbage, onion, cucumber, pear, apricot, citrus) as well as drug and fiber plants such as ginseng. In addition, China is also home of traditional varieties of farm animals. Today the Institute of Crop Science at the Chinese Academy of Agricultural Sciences is hosting one of the world's largest gene banks comprising more than 180 agricultural plants. In the course of urbanization, environmental degradation, climate change, industrialization, change of land use and intensification of agriculture China's agrobiodiversity is under threat. In recent years many farmer varieties of crops have been replaced by modern ones and the number of varieties used in production decreased. Whereas in 1956 farmers in Hunan had the choice between 1366 varieties of rice, only 84 were still available in 2014.

In the early 1960s an investigation of the Chinese Academy of Agricultural Sciences identified more than 100 native pig breeds in China, many of them are on the IUCN Red List of Threatened Species today. (See also Agricultural and Food Update No. 5 "Reforming the Humble Pig".)

In 2015, the IUCN Red List recorded 1040 plant and animal species directly or indirectly related to agriculture as endangered.

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FIGURE 1 – Farmer rice varieties on farm in Hunan province have decreased dramatically since 1956



Source: *Agrobiodiversity Index Report 2019*, p. 148

Indigenous pig breeds on the decline in their native China

Endangered pig breed	Chenghua pig	Jinhua pig	Bamei pig	Bama pig	Wujin pig
					
Traditional dish	Authentic twice-cooked pork	Jinhua ham	Monguor/ethnic Tu bamei pig full feast	Bama roast pig	Xuanwei ham
Status	20 boars and 300 sows, as of 2018	On national protection list of livestock and poultry genetic resources	On national protection list of livestock and poultry genetic resources	On national protection list of livestock and poultry genetic resources	On national protection list of livestock and poultry genetic resources
Region/Province	 SICHUAN	 ZHEJIANG	 YUNNAN	 GUANGXI	 YUNNAN GUIZHOU

SCMP

Source: *South China Morning Post*

Compared with the other countries included in the Index Report, China achieves a medium ranking for the present status of agrobiodiversity and genetic resource management. The study suggests that China has a high potential for making use of these genetic resources for the future sustainable production and consumption. Information indicates that landraces

and old cultivars of rice, wheat, soybean, potato, millet and yam have been relatively well conserved while other endemic species such as tea, apple and pear need conservation actions. According to the report improvement is needed for international collaboration, namely China's reporting to the World Information and Early Warning System (WIEWS) on

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Number of species of cultivated and wild species used for food and agriculture in China			
Categories	Cultivated species	Crop wild relatives	Total
Grain crops	103	311	414
Cash crops	98	454	552
Fruits	149	420	569
Vegetables	222	150	372
Forage and green manure	196	353	549
Others	588	484	1072
Total	1356	2172	3528

Source: *Agrobiodiversity Index Report 2019*, p. 147

Plant Genetic Resources for Food and Agriculture. It is however noted that China has contributed a country report to the *FAO State of the World's Biodiversity for Food and Agriculture 2019*. This indicates that a national biodiversity monitoring network is already in place.

In section 2 of the Index Report international practitioners from the private and public sectors reflect the role of agrobiodiversity to mitigate risks and build resilience. In their contribution the genetic resource experts Liu Xu and Zhang Zongwen ask “*How to manage risks to crop genetic resources?*” (p. 144-151). The authors identify China’s genetic diversity as an opportunity to improve diets and potential income generation by promoting special local crops for organic and ecological farming and to promote crops that can better adapt to climate change and increase yield. Liu and Zhang count 3528 plant species that are currently being used in China in food and agriculture.

According to the authors China is putting great efforts in the *in situ* and *ex situ* conservation of its agrobiodiversity. Concerning *in situ* conservation about 206 protected sites in 27 provinces have been established. For *ex situ* conservation two large-scale collecting missions, one in the 1950s and one in the

1980s, have been conducted. The third mission is in progress. Through these missions about 481,000 samples of 350 crops have been collected and seeds are stored in the national and local gene banks. Scientists now evaluate these samples for resistance to pests and diseases, for nutrient content and drought, wetness, cold and salinity tolerances.

Seeding the clouds to reach the sky: Will China’s weather modification practices support the legitimization of climate engineering? Bettina Bluemling, Rakkyun E. Kim, Frank Biermann, AMBIO

<https://link.springer.com/article/10.1007%2Fs13280-019-01180-3>

This article discusses the possibility for a so-called “climate engineering” to become a legitimate intervention against climate change in China. The authors argue that the already institutionalized weather modification (i. e. cloud seeding to influence rainfall) might pave the way for a legitimization of other climate engineering technologies such as solar radiation management.

China is not only the world’s largest emitter of greenhouse gases, but it is also a country highly vulnerable to climate change impacts. China already invests considerable amounts in

the research of climate engineering (3 million US \$) next to the US and Germany. Since 2012 climate engineering has become a research issue supported by China's major funding institution, the National Natural Science Foundation (NNSF). Since then several research programmes have been sponsored. A review of articles related to the state of knowledge about climate change risks and geo-engineering suggests that climate engineering has a chance for acceptance in China.

While climate engineering such as solar radiation management is still in the state of research, weather modification has been a practice for many years. These practices include cloud seeding, rain and hail prevention, elimination of fog and frost by technological interventions into the local climate. The authors show that weather modification in China is based on an institutionalized system. Since 2002 a "Weather Modification Administration Regulation" has defined administrative responsibilities and since 2007 Weather Modification Offices have been set up at all levels of government. According to a recent survey 22 provinces have incorporated weather modification into their socio-economic development plans and 1702 counties have established weather modification offices. Weather modification received official formal recognition when it was first mentioned in 2012 in the "Document No. 1". In the same year, the state council issued "Opinions on strengthening weather modification" which stipulated the establishment of a sound weather modification system by 2020 and set specific goals to increase rainfall by 60 million tons annually and increase the area under hail protection. The National Weather Modification Plan (2014-2020) outlines "focus areas" for climate interventions for reasons of protection of food security, ecological security or water security. It defines weather modification as "service" to agricultural production and calls especially in vulnerable agricultural areas for

the deployment of weather modification.

According to a recent survey, more than 300,000 weather modifications have been carried out since 2008.

To feed its 1.4 billion, China bets on big genome editing of crops. Jon Cohen. *Science* <https://www.sciencemag.org/news/2019/07/feed-its-14-billion-china-bets-big-genome-editing-crops>

This article, published in *Science*, takes a look at recent efforts of Chinese scientists to promote genome editor CRISPR. It introduces Gao Caixia from the Chinese Academy of Sciences, one of the leading Chinese scientists in this field. But Gao and her group are not alone, in China more than 20 groups are seeking to use CRISPR for crop gene modification.

In 2017, China made a big advance in CRISPR related research, when the state-owned company SinoChem strategically invested in the Switzerland-based Syngenta with a large R&D team working with CRISPR.

Call for Papers

International Workshop and Special Issue on: **Automating the Future of Farm Work? Precision and Smart Agriculture Technologies across East Asia in the Twenty-First Century**

The Hong Kong University of Science and Technology, Division of Social Science, 20 and 21 February 2020

This workshop will investigate the automation of farm work and the emergence, development and deployment of precision and smart agriculture technologies (hereafter, referred to as precision agriculture, or PA) – Internet of

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Things (IoT), sensors, integrated circuits, drones, robotics and artificial intelligence (AI), GPS and satellite imaging and so on – across East Asia in the twenty-first century.

The goal of this workshop is to deliberate theoretical and empirical research findings with a view to identifying regulations and policies that can facilitate the broad-based development of PA technologies and their implementation across regional and rural economies. This may include, but is not limited to, questions pertaining to business models, efficiencies, ethics, profitability as well as transparency. We seek to explore, in short, just how smart is “smart” agriculture?

In particular, this workshop seeks to go beyond the topic of technical componentry and explore the *processes* and *outcomes* of precision and smart agriculture technologies.

Scholars interested in participating in this workshop and a special issue of a Science & Technology-related journal devoted to precision and smart agriculture technologies and their application across East Asia in the twenty-first century should submit an abstract (at least 1,500 words) by August 30, 2019.

For more detailed information about the workshop please contact Sacha Cody: sacha-cody@ust.hk

Calendar - Upcoming Events

Date	Location	Event	Contact
October 2019			
14-18	Hanoi, Vietnam	2019 International Conference on Chinese Food Culture – Cross-Cultural Interaction and Chinese Foodways in Southeast Asia. Vietnam National Institute of Culture and Arts Stories	http://foodconference2019.fcde.org.tw/en.aspx/default.aspx
19-21	Zhengzhou	Leman China Swine Conference	http://en.lemanchina.com
30-Nov1	Qingdao	CAMDA CAIME fair 2019 China International Agricultural Machinery Fair	
November 2019			
8-9	Hanover	Landtechnik 77 th International Conference on Agricultural Engineering	www.vdi-international.com/ageng
8-10	Beijing	2019 Future Food Forum & Veggie World Pro	CPBFA www.pbfa.org.cn/futurefood2019
10-16	Hanover, Germany	Agritechnica – the world’s leading trade fair for agricultural technology	https://www.agritechnica.com/en/
12-14	Shanghai	International Meat Industry Exhibition	www.meatexpo.com.cn
20-22	Beijing	World of Food	www.anu-foodchina.cn
18-24	Beijing	Sino-German Agricultural Week	www.dcz-china.org
February 2020			
20-21	Hong Kong	Automating the Future of Farm Work? Precision and Smart Agriculture Technologies Across East Asia in the Twenty-First Century – International Workshop	Hong Kong University of Science and Technology Deadline for papers: Aug. 30, 2019

Sino-German Agricultural and Food Update

Imprint

This issue was compiled by the international DCZ team. For enquiries and subscription please send an email to info-dcz@iakleipzig.de

Any news about upcoming events and conferences to share? Please send your information to e.sternfeld@iakleipzig.de

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