**中荷AGD-CSC项目招生课题目录**

**Proposal List for 1+3 AGD-CSC Students Call in 2021**

**No.1 Exploring pathways towards more sustainable farming systems in the North China Plain from a circular economy perspective**

***Project description***

This project is under the umbrella of the Sino-Dutch Agriculture Green Development (AGD) Programme, which is a collaborative PhD program of China Agricultural University (CAU) and Wageningen University & Research (WUR). The aim of this project is to analyse the consequences of the current specialisation of plant and animal production in the North China Plain (NCP) and to explore opportunities for enhanced circularity at farm and regional level and improve land use efficiency, to reduce dependency on external resources such as mined phosphates, synthetic N fertilizer and to increase resource use efficiency and environmental performance at the farming system level. The three PhD students in this project will (1) assess biomass and nutrient flows in farming systems of the NCP, (2) explore options for enhanced circularity and a more circular food system at the regional level with implications on land use management, and (3) assess policy bottlenecks and options for the improvement of circularity of crop-livestock systems in the context of sustainable development.

***Job description***

We are looking for two PhD candidates who will do joint PhD research at CAU and WUR. The PhD researcher will be 1 year at CAU and 3 years at WUR (graduation and degree at WUR), and work closely together on the project with a PhD researcher who will be 2 years at CAU and 2 years at WUR (and will graduate at CAU). The tasks within this project for a PhD researcher will be to:

* Map the spatial distribution of farm types across the NCP and analyze spatial relationships between farm types and distances to urban centers and markets.
* Develop tools to analyze impacts of current farming systems and future integrated and coupled crop and livestock systems (ICLS) on selected production, environmental and economic indicators in the context of the NCP.
* Evaluate options to improve circularity on farm types by adopting ICLS approaches and utilization of food waste and urban residues.
* Evaluate impacts of structural adjustments and distribution of farm types in the landscape that result in improved circularity on selected production, environmental, and economic indicators.
* Present the work at (inter)national meetings and publish scientific articles in international journals.

The tasks within this project for another PhD researcher will be to:

1. assess NCP food demand and identify supply chains of food to markets and evaluate food losses and residues from the food processing industry. This will allow to map nutrient and material flows within the current food system in the NCP;
2. assess options for increasing the circularity of the food system, including through the recycling of food waste, food by-products, crop residues and manure. This will include an assessment of the implications regarding land use, nutrient losses, GHG emission, and public health and a discussion about regulatory and consumer’s acceptance implications;
3. develop a regional model integrating consumption and crop and livestock production archetypes to explore land use trends under different conditions of food demand and circularity; and
4. carry out an assessment of how food production costs evolve for selected value chains under different levels of circularity. Results will be used in combination with focus group consultations to propose policy recommendations.

***Requirements***

* MSc degree in agricultural sciences, biology or agronomy.
* Affinity with quantitative systems analysis or modelling of ecological systems.
* Preferably hands-on experience in questionnaire design, farm surveys, qualitative (in-depth) interviews, and secondary data collection.
* Experience with data analysis and statistical analysis tools (e.g. R).
* Affinity with working in a multidisciplinary group in an international context.
* Language skills: Fluency in English writing and speaking required; for details see <https://www.wur.nl/en/Education-Programmes/PhD-Programme/English-language-requirements.htm>

**No.2 Diversity of intercropping systems across China: tailoring species combinations in intercropping to soils and climates and the future needs of society**

***Project description***

This project is under the umbrella of the Sino-Dutch Agriculture Green Development (AGD) Programme, which is a collaborative PhD program of China Agricultural University (CAU) and Wageningen University & Research (WUR). The aim of this project is: To identify the current state, trend and potentials of intercropping systems in China, and to analyse the production possibilities of different intercropping systems across China’s climatological zones. This project will (1) result in maps of the distribution of intercropping and related climatic conditions and socio-economic variables in China, and (2) provide a framework to promote well-adapted intercropping systems in different regions of China. The results will provide guidance on species choice and management of intercropping at a household scale for farmers and provide guidance for policy makers on incentives and policies in China.

***Job description***

We are looking for a PhD candidate who will do a joint PhD research at CAU and WUR. The PhD researcher will be 1 year at CAU and 3 years at WUR (graduation and degree at WUR), and work closely together on the project with a PhD researcher who will be 2 years at CAU and 2 years at WUR (and will graduate at CAU). The tasks within this projects will be to:

• Interview farmers in four different regions in China to investigate the constraints and benefits of using intercropping and how these have changed over time.

• Build up a dataset on intercropping systems in China, based on official statistics and own farm survey data.

• Map the intercropping distribution and related socio-economic factors in different regions of China.

• Present the work at (inter)national meetings and publish scientific articles in international journals.

***Requirements***

• MSc degree in agricultural economics, social science, or agronomy

• Hands-on experience in questionnaire design, farm surveys, qualitative (in-depth) interviews, and secondary data collection.

• Experience in statistical analysis (Stata or R), preferable including meta-analysis and/or panel data analysis

• Affinity with working in a multidisciplinary group in an international context

• An economics knowledge test may be part of the selection procedure for candidates with an MSc degree in agricultural economics

• Language skills: Fluency in English writing and speaking required; for details see <https://www.wur.nl/en/Education-Programmes/PhD-Programme/English-language-requirements.htm>

**No.3 Assessment of national fertilizer and manure policies in China on farm income, food production, soil quality and environment**

***Project description***

This project is under the umbrella of the Sino-Dutch Agriculture Green Development (AGD) Programme, which is a collaborative PhD program of China Agricultural University (CAU) and Wageningen University & Research (WUR). The aim of this project is: 1) quantify the impacts of two national nutrient policies, i.e. zero increase of chemical fertilizer application and replacement of chemical fertilizer by manure on manure markets development and its economic (crop yield, famers incomes) and eco-environmental (soil quality, N and P losses) impacts benefits, and (2) formulate policy recommendations on interventions that would contribute to green development of livestock as well as arable farms in China. The results of this project will support the formulation of policies and regulations for the realization of “Green” and “Agricultural Development” in China.

***Job description***

We are looking for a PhD candidate who will do a joint PhD research at CAU and WUR. The PhD researcher will be 1 year at CAU and 3 years at WUR (graduation and degree at WUR), and work closely together on the project with a PhD researcher who will be 2 years at CAU and 2 years at WUR (and will graduate at CAU). The aim is the design of an integrated decision support framework for nutrient management practices given both socio-economic as natural factors This conceptually includes i) the quantification of the fate of nutrients (given ecosystem properties) as well as ii) the economic benefits and costs on both the short and long term. The tasks within this projects for the 1+ 3 PhD applicant will be to:

• Collect data on soil properties, crop rotations, crop yields and nutrient inputs from statistics and a questionnaire survey with relevant stakeholders (latter with PhD 2).

• Carry out a spatial analysis on agronomic desired and current fertilizer practices and consequences for crop production, soil quality and environmental indicators.

• Carry out a Farm System Analysis of current and desired nutrient fluxes so that regional policy targets are coupled to objectives and targets on farm level, including the coupling with socio-economic aspects (latter in collaboration with student 2).

• Present the work at (inter)national meetings and publish scientific articles in international journals.

***Requirements***

• MSc degree in soil science, plant science or agronomy

• Hands-on experience in questionnaire design, farm surveys, and secondary data collection.

• Experience in statistical analysis (Stata or R), preferable including meta-analysis

• Experience in modelling to enable the development of a decision support system

• Affinity with working in a multidisciplinary group in an international context

• Language skills: Fluency in English writing and speaking required; for details see https://www.wur.nl/en/Education-Programmes/PhD-Programme/English-language-requirements.htm

**No.4 Uncovering plant-soil-microbe interactions in intensive farming for enhancing nutrient efficiency and ecosystem service \*updated\***

***Project description***

This project is under the umbrella of the Sino-Dutch Agriculture Green Development (AGD) Programme, which is a collaborative PhD program of China Agricultural University (CAU) and Wageningen University & Research (WUR). The project is focused on the mutualistic endosymbiosis between plants, nitrogen-fixing rhizobia, and arbuscular mycorrhizal fungi. Arbuscular mycorrhizal fungi and rhizobia activate the same signalling pathway. However, the readout of this common symbiosis signalling pathway is fundamentally different when activated by rhizobium, when compared to arbuscular mycorrhizae. We hypothesize that the readout -at least in part- is determined by the plant's nutrient status. The project aims to uncover the molecular mechanisms of how plants discriminate between mutualistic endosymbionts and how plants can control the readout of the microbe induced common symbiosis signalling pathway.

***Job description***

We are seeking highly motivated PhD candidates who will conduct a joint PhD research at CAU and WUR. The PhD researcher will be 1 year at CAU and 3 years at WUR (graduation and degree at WUR), and work closely on the project with a PhD researcher who will be 2 years at CAU and 2 years at WUR (and will graduate at CAU). During this project, the 1+3 PhD student will apply molecular genetic tools and physiological studies in the legume model *Medicago truncatula* and the nodulating non-legume *Parasponia andersonii*. Tasks within the project for 1+ 3 PhD applicant will be to:

(i) Determine the importance of the plant's nutrient status on the readout of the common symbiosis signalling pathway.

(ii) Identify the molecular components that master the specificity of a key transcription factor of the common symbiosis signalling pathway.

***Requirements***

• MSc degree in Plant Biology, Molecular Biology, Systems Biology, Molecular Life Science, Plant Biotechnology or related topic

• Experience in molecular biology.

• Teamwork spirit and good skills in communicating with others.

• Language skills: Fluency in English writing and speaking required; for details see https://www.wur.nl/en/Education-Programmes/PhD-Programme/English-language-requirements.htm

**No.5 Designing and optimizing sustainable food supply chains for healthy diets in China**

*This vacancy has been fulfilled.*

**No.6 Sustainable management of agricultural chemicals and pathogens for green eco-environment: A systematic modelling approach**

***Project description***

This project is under the umbrella of the Sino-Dutch Agriculture Green Development (AGD) Programme, which is a collaborative PhD program of China Agricultural University (CAU) and Wageningen University & Research (WUR). Antibiotics, pathogens and Antimicrobial Resistant (AMR) microorganisms are still a large threat to environmental and human health across the world and also in China. The aim of this project is to develop a systems approach that simulates the spread of antibiotics, pathogens and antimicrobial resistant bacteria in the surface water, their environmental and human health impacts and assessment of the effectiveness of policies. Insights from the model experiments development are expected to aid the increase of sustainable agriculture practice and green eco-environment.

***Job description***

We are looking for a PhD candidate who will do a joint PhD research at CAU and WUR. The PhD researcher will be 1 year at CAU and 3 years at WUR (graduation and degree at WUR), and work closely together on the project with another PhD researcher who will be 1 years at CAU and 3 years at WUR working on plastics and a PhD student who will be 2 years at CAU and 2 years at WUR (and will graduate at CAU) working on pesticides. Close collaboration with ongoing PhD students from the AGD programme is also envisaged. The tasks within this project will be to:

* Develop a water quality model for antibiotics and bacteria.
* Develop a (conceptual) water quality model for antimicrobial resistant bacteria.
* Develop health risk approaches for antibiotics, bacteria and antimicrobial resistant bacteria.
* Develop intervention technology and policy scenarios to evaluate the effectiveness of the interventions.
* Present the work at (inter)national meetings and publish scientific articles in international journals.

***Requirements***

* MSc degree in environmental science or a related study programme.
* Understanding of processes relevant for water quality.
* Experience in modelling.
* Preferably programming experience, or willingness to learn programming (through taking courses).
* Affinity with working in a multidisciplinary group in an international context
* Language skills: Fluency in English writing and speaking required; for details see <https://www.wur.nl/en/Education-Programmes/PhD-Programme/English-language-requirements.htm>