

PE&RC Research Master 2016 Agricultural Systems Resilience: The road to sustainable production

This document describes the set-up of the PE&RC Research Master Programme which will start in September 2016 to support MSc students in applying for an NWO PhD grant under the NWO Graduate Programme call 2017, entitled "Agricultural Systems Resilience: The road to sustainable production".

The PE&RC Research Master Programme is linked to the current 2-year science-oriented MSc programmes within Wageningen University that encompass 120 ECTS. It is an option within the regular MSc programmes and can be chosen in the MSc programmes Biology, Plant Sciences, Organic Agriculture, Soil Science/Earth and Environment and Forest and Nature Conservation, but also inflow from other study programmes is foreseen.

The aim of the programme is to train and deliver what has been defined as "new-generation scientists". This entails: well-rounded young academics who are well embedded in fundamental research but can also provide clear added-value and thrive in a diverse set of professional environments (i.e. academia, public bodies, policy and enterprise) and are able to address both fundamental and societal relevant research questions. The societal demand for a new-generation scientist with a diverse set of competences and skills led PE&RC to have the "T-shaped Skills" (figure 1) approach as the basis of its training programme.

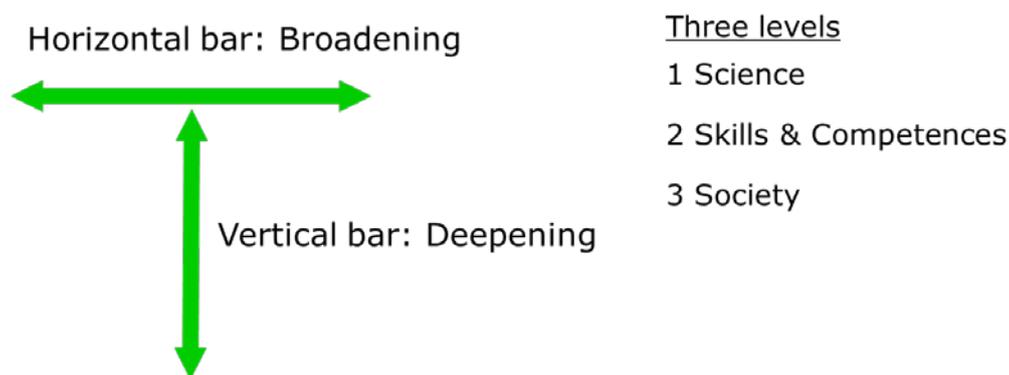


Figure 1: The P&RC T-shaped skills approach depicting the in-depth as well as overarching knowledge, skills and competences required to function as a new-generation scientist who knows how to function in academia and beyond as well as how to translate societal relevant issues (horizontal bar) into fundamental research (vertical bar), the outcome of which is accordingly translated to applicable solutions.

Moreover, to be able to address societal issues and to accordingly translate these to fundamental research questions, an interdisciplinary research approach is required where the system under investigation will be regarded from a biophysical and socio-economic perspective and where relevant stakeholders contribute to the formulation of the research questions. These are then transformed into outlines of research proposals to be defined by consortia composed of one or more university groups and one or more partners outside academia. To this end the overall methodological approach will be that of co-learning where stakeholders are involved in the research process following a revised approach of Giller et al. (2008) (Figure 2). Setting up the stakeholder platform will be done in close collaboration with the relevant branch organisations of "Akkerbouw" and "Tuinbouw en Uitgangsmaterialen".

Resilience can be linked to the following themes:

- Better plants for new demands: plant breeding to develop robust plants
- The new approach to plant health: robust, resilient plants and crops
- Sustainable horticulture (low inputs and emissions)
- Sustainable soil management
- Decision support systems in sustainable horticulture and arable farming

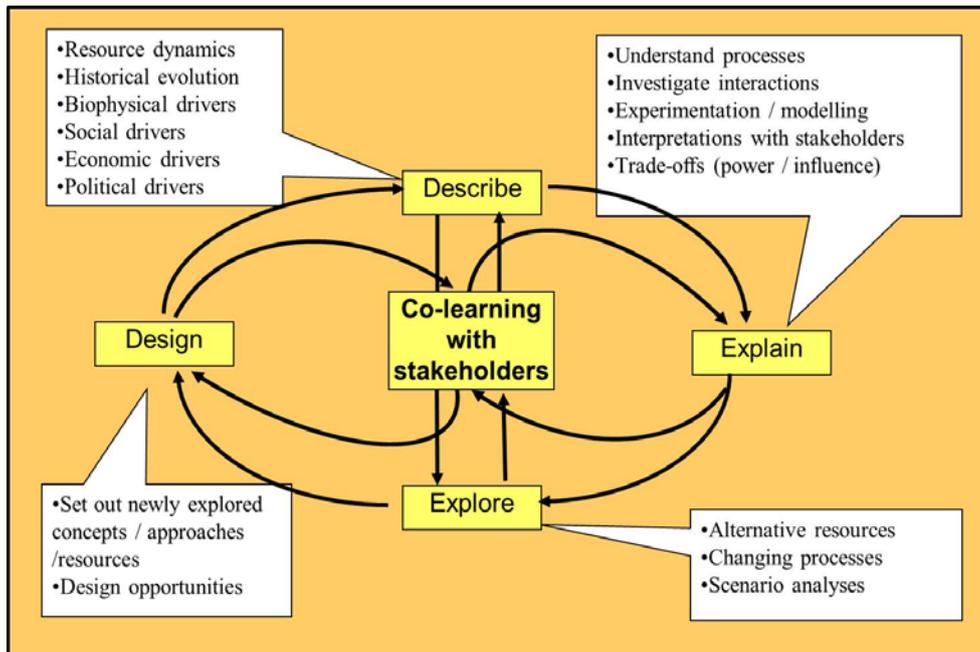


Figure 2: Methodological approach depicting the iterative cycle of stakeholder-negotiated research phases to determine key factors of soil dynamics in sustainable highly productive cropping systems. Revised version (Giller) of the NE-DEED diagram (Giller et al, 2008, *Ecology and Society* 13(2): 34)

Programme set-up

The research master will focus on the required insight, knowledge, competences and skills that are required to write a high quality fundamental project proposal where the central research issue is well embedded in issues that the stakeholders are confronted with in the field of systems resilience and sustainable production.

The Research Master Programme focusses on MSc students in their second year. Three main elements must be followed to fulfil the requirements:

1. Internship

The internship is used to get insight in the issues that stakeholders, in the domain of arable farming and horticulture, are confronted with that accordingly will be translated in a research question. This will be done via the process of co-learning as described above. More specifically this entails:

- Via the interest groups (“belangenorganisaties”) in the domain, students get insight in the issues at stake. This will be done via the network offered by PE&RC and PSG
- Via a general introduction that gives a birds-eye view of the issues at stake, participants can identify which domain they are keen to look into after which they will be introduced to the relevant stakeholder. This will be done in a set of plenary sessions for the whole cohort of research master students.
- Issues at stake must be related to systems resilience and sustainable optimisation of system performance and can fall in the following domains:
 - Weed/Pest control / multi-trophic interactions
 - Optimisation of crop/plant growth
 - Bio-physical soil dynamics and processes
 - Optimisation of production systems in a landscape context
 - ...
- Students select an issue of their interest and accordingly visit stakeholders confronted with the issue. Based on on-site visits and research the student gets more insight in the issue.
- Accordingly the student presents his/her analysis of the issue at the stakeholder platform (co-learning platform) where stakeholders support the student to refine and adjust the definition and analysis of the issue at stake and translate these into testable research questions. This process is repeated several times (2-3). In the final round the student translates the questions in clear fundamental questions. These questions will be the basis of the central research question to be elaborated on in the project proposal
- Before or at the beginning of the internship students will be offered a training on participatory research methods, co-learning and stakeholder analysis
- Internship students will be supported by WU staff and a supervisor from the interest groups (“belangenorganisaties”).

- The internship report consists of a full analysis of the process explained above that leads to the fundamental research question to be addressed in the project proposal. This will be used as the starting point for the final phase of the research master, the Research Master Cluster (RMC)
- Note that when the process described above can be realised well within the duration of the internship, the MSc student can still perform regular internship activities to reach the number of credits that he/she want to obtain for the internship (minimum requirement is 24ECTS)

2. Research Master Cluster (RMC) Proposal Writing

Students will write a PhD project proposal that falls in the scope of the Programme “Agricultural Systems Resilience: the road to sustainable production”. This will be done under the guidance of an independent academic (not involved in the project) who has insight in the topic that the student wants to write his/her proposal on. Furthermore a process facilitator will support the writing process, teaching students the required skills. This element will be done in the Research Master Cluster: Proposal Writing (12 ECTS; YEI-60312) and will run in period 6 of the 2016-2017 academic year. Output of the RMC is a PhD project proposal in the NWO format that can be submitted in the NWO Graduate Programme call 2017. The content of this RMC is in accordance with its description in the study guide (YEI-60312).

3. Skills and Competences

During the Internship, RMC and extra-curricular elements the following skills and competences will be taught:

1. Project proposal (scientific) writing and presentation
2. Communication skills
3. Interdisciplinary skills, stakeholder involvement and participatory research
4. Research methodology
5. Time planning and project management
6. Effective leadership
7. Literature search and review / Information literacy

Besides the compulsory elements of the Wageningen MSc programme, the above-mentioned elements will also be incorporated in the free choice options of the MSc Programme, such as the capita selecta. Moreover, research master students will be able to participate in capacity and skills development training organised by the Graduate School.

Evaluation and crediting

Based on the Research Master curriculum (a total of 120 EC), students will receive a regular MSc Degree with an additional PE&RC certificate indicating the specific skills, competences and insight as obtained from the activities specific for the Research Master Programme (as listed above).

The formal responsibility for the Research Master Programme lies with the MSc programmes (in Wageningen governed by Education Institute (OWI)). PE&RC therefore will discuss all suggested options as explained above with the relevant MSc programme directors.

Application and Admission to the Research Master Programme

To participate in this research master programme the candidate must submit:

1. A one page letter of motivation (max 400 words)
2. A one page CV.
3. Letter of recommendation

These will be evaluated by an admission committee, composed of members of the Graduate School PE&RC who are involved in the topic of the programme. We aim at approximately 15 participants.

Relevant links:

- Research Master Cluster (writing proposals): <https://ssc.wur.nl/Studiegids/Vak/YEI-60312>