DYNAVERSITY

DYNAmic seed networks for managing European diVERSITY

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H2020 – Coordination and support action

D5.6

Proceeding of the Summer School

"Participatory Plant Breeding & Resilient Seed Systems: Options for Stakeholder Engagement and Benefit Sharing"

Due date: M33 (July 2020)

Actual submission date: 20 January 2021

Project start date: November 1st, 2017 **Duration:** 42 months

Work package concerned: WP5

Concerned work package leader: FormicaBlu

Dissemination level:

X PU: Public (must be available on the website)

☐ **CO: Confidential, only for members of the consortium (including the Commission Services)**

☐ **CI:** Classified, as referred to in Commission Decision 2001/844/EC

Prepared by Veronique Chable (INRAE) and Riccardo Bocci (RSR)
With contributions from Matteo Pettiti (RSR)

Abstract

- A DYNAVERSITY Summer School was conceived as a bottom-up training plan to increase diversity in food systems, thanks to *in situ* dynamic conservation and renewal of cultivated/wild biodiversity. Due to the COVID-19 overall context, the course which was planned in summer 2020 was delayed and organised online in December 2020. It was co-organised by Wageningen University, LIVESEED[1], and DYNAVERSITY teams.

- This proceeding of the course "*Participatory Plant Breeding & Resilient Seed Systems (PBB/RSS): Options for Stakeholder Engagement and Benefit Sharing"* reminds the organisation process and the content (programme and links to the presentations). The course has covered four mains themes:

  (1) Participatory Plant Breeding Experiences;

  (2) Involving actors of the value chain" and group work in break-out sessions;

  (3) Facilitating Seed System Innovations" and group work in break-out sessions; and,

  (4) Policy options. Then the participants have worked in groups and presented their results to the whole group during the last day.

- The two annexes provide the entire and detailed programme of the course and the text of an abstract to communicate about the course experience.

[1] See www.liveseed.eu

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Abbreviations

CGIAR: Consultative Group on International Agricultural Research
CIMMYT: International Maize and Wheat Improvement Center
CIP/SSA: International Potato Centre/ Sub-Saharan African Countries
CRP: CGIAR Research Program
FiBL: Forschungsinstitut für biologischen Landbau
GAFF: Global Alliance of the Future of Food
ICRISAT; International Crops Research Institute for the Semi-Arid Tropics
IFPRI: International Food Policy Research Institute
INRAE: Institut national de recherche pour l'agriculture, l'alimentation et l'environnement
LBI: Louis Bolk Institute, NL
PE&RC: Graduate School Production Ecology & Resource Conservation
PIM: Policies, Institutions, and Markets
RSR: Rete Semi Rurali, IT
RTB: Roots-Tubers-Bananas
USC: Unitarian Service Committee, Canada
WUR: Wageningen University and Research, NL

Introduction

During the last year of the H2020 DYNAVERSITY project, a Summer School was planned directly targeting young agronomists and plant breeders. This activity has been jointly organised with the University of Wageningen and the EU LIVESEED project.

Initially, the event was supposed to take place at the Congress Centre De Werelt in Lunteren (www.dewerelt.nl/congrescentrum/lunteren), from 16 to 21 August 2020. It was including courses and a one-day visit in the field on collaborative potato breeding model in the Netherlands.

Due to Covid-19, the event was postponed to 30 November to 4 December 2020) and took the form of a full one-week online course, without any visit but maintaining group activities for the participants.

The DYNAVERSITY Summer School was co-organised by Edith Lammerts van Bueren (WUR/LBI/GAFF) with Riccardo Bocci (RSR) and Véronique Chable (INRAE), representing the project consortium. A team with more organisers/speakers was then established by Edith Lammerts van Bueren to cover several continents and different experiences and practices.

1. Objective/Target

The initial objective of the Summer School was to increase awareness of the interest of crop diversity and to share specific scientific approaches and experiences from the ground accumulated to date by innovating communities of practice (farmers' networks, participatory plant breeding, *in situ* conservation programs, organic small-scale breeders) in different European countries, for meeting the changing societal demands for quality and healthy food. Connecting an enlarged organising team, we have covered all continents.

The online course, called **"Participatory Plant Breeding & Resilient Seed Systems: Options for Stakeholder Engagement and Benefit Sharing",** was targeting postgraduate participants.

2. Organisation/tools/Presentation

Local organiser:

• Graduate School Production Ecology & Resource Conservation (PE&RC) will host the course (Claudius van de Vijver) together with Edith Lammerts van Bueren (Wageningen University and Research - Wageningen, NL).

The course has been held online through Zoom.

Scientific organisers:

• Edith Lammerts van Bueren (WUR/LBI/GAFF) and Eva Weltzien (on behalf of Global Alliance of the Future of Food-GAFF);

• Conny Almekinders (on behalf of the CRP Roots-Tubers-Bananas-RTB);

• Veronique Chable/INRAE and Riccardo Bocci/RSR (on behalf of DYNAVERSITY); and,

• Monika Messmer/FiBL (on behalf of LIVESEED).

Organisation and agenda:

- Conferences (one topic per day) and group works:

  Day1: "Participatory Plant Breeding Experiences" and introduction to group work (questions on the set-up, defining groups (Claudius van de Vijver).

  Day2: "Involving actors of the value chain" and group work in break-out sessions.

  Day3: "Facilitating Seed System Innovations" and group work in break-out sessions.

  Day4: "Policy options" and group work in break-out sessions.

  Day5: Short presentations by participants of group work.

  Each presentation was limited to one hour (half of an hour from the speaker and the other half used for questions from the attendees).

- The participants were invited to prepare a poster to present their background and activities. In addition, to better understand the context of each presentation, participants received prior to the course at least one paper from each lecturer.

The course lecturers

The organisers lecturers:

1 - Conny Almekinders Wageningen University & Research/CRP RTB, Africa conny.almekinders@wur.nl

2 - Riccardo Bocci RSR/Dynaversity riccardo.bocci@semirurali.net

3 - Veronique Chable INRA, Rennes/Dynaversity veronique.chable@inra.fr

4 - Edith Lammerts van Bueren Wageningen University & Research/GAFF edith.lammertsvanbueren@wur.nl

5 - Monika Messmer FiBL-CH/Liveseed monika.messmer@fibl.org

6 - Eva Weltzien University of Wisconsin-Madison/GAFF eva.weltzien@gmail.com

7 - Fred Rattunde University of Wisconsin-Madison/GAFF f.rattunde@gmail.com

8 - Claudius van de Vijver Graduate School PE&RC claudius.vandevijver@wur.nl

The invited lecturers:

9 - Gareth Borman Wageningen University & Research gareth.borman@wur.nl

10 - Martha Cameron Willcox CIMMYT, Mexico/GAFF martha.willcox@gmail.com

11 - Salvatore Ceccarelli RSR/ DYNAVERSITY ceccarelli.salvatore83@gmail.com

12 - Jan Low CIP/SSA CRP RTB j.low@cgiar.org

13 - Margaret McEwan CIP/CRP RTB M.McEwan@cgiar.org

14 - Baloua Nebie ICRISAT-Mali B.Nebie@cgiar.org

15 - Pratrap Shrestha USC, Canada pshrestha@weseedchange.org

16 - David Spielman IFPRI/CRP PIM D.Spielman@cgiar.org

17 - Bert Visser Oxfam Novib (Bert.Visser@oxfamnovib.nl from DYNAVERSITY SKEP)

The detailed programme and the biography of each of the lecturers can be found in Annex 1.

Six topics have been identified as topics for the working groups and break-out sessions, as follows:

1. How can a national germplasm collection of an indigenous crop be used as a resource for improving farmer's resilience in the face of climate change? Choose one case: e.g. Pearl millet in Ghana; sorghum in Kenya; cowpea in Nigeria; yam in Benin, or flax in Europe; Then, develop an outline for a three-year project.
2. Improving seed security for vulnerable farming households: propose, justify and possibly compare pro s and con s of two or three pathways for achieving significant improvements. Select a crop and context.
3. Develop a process and key research questions for defining Product Profiles in the context of participatory breeding programs. The product profiles should lead to improving the efficiency and impacts of breeding efforts. Possibly, choose one case or two cases for comparison.
4. How can a public gene bank be involved in a multi-actor project on participatory and decentralised organic plant breeding aimed at increasing organic seed production? Select one case: soft wheat, maize for human consumption, tomato, rye, rice.
5. Develop a multi-actor project on participatory and decentralised (organic) plant breeding (organic, or community-led program on a minor crop), paying attention to the different actors involved and the overall 3 seed systems, including the seed production phase. Select one case: e.g. soft wheat, maize for human consumption, tomato, rye, quinoa, rice.
6. Design a research project to improve organic principles implementation in plant breeding. How to translate them in the successive steps from genetic resources to seeds? Possibly choose one example/case study.

3. List of participants/Evaluation

The complete list of the 39 participants can be found in Annex 1. Among the participants, we counted 17 PhD and 7 MSc students, as well as academic staff. An evaluation of course was sent to the participants after the Summer School to seek for individual level of satisfaction: the 26 forms received from participants have been compiled by Jacqueline Verhoef-te Brake. The overall score of 4.7 out of 5 points reflects a true success of the event.

General questions	**Average score**
Was your starting level appropriate for the course?	**4.3**
Did the course meet your expectations based on the information?	**4.4**
Was the level and pace at which the course was given OK?	**4.8**
General questions about the lectures	
Were the lectures well-structured and clear?	**4.5**
Were the lectures of appropriate level (in depth and overview)?	**4.6**
Did you appreciate the topics that were discussed?	**4.6**
Was there enough room for discussion after the lectures?	**4.4**
Were the discussions stimulating and fruitful?	**4.8**
General score for the lecture sessions	**4.6**
Group work questions	
Did you appreciate the set-up of the group work sessions?	**4.2**
Did the group-work reveal new, relevant issues on the topic at stake?	**3.9**
What would be your overall score for the group work assignment?	**3.9**
Overall questions	
Do you think this course was beneficial to you?	**4.7**
What is your overall rating of the course?	**4.7**

4. Work groups

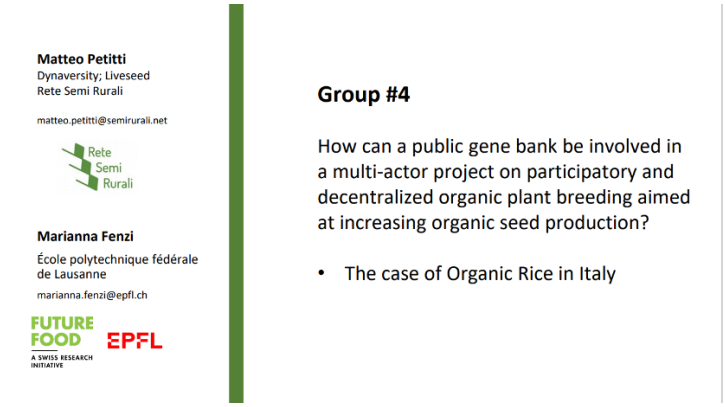
The participants have worked in six groups according to the six suggested topics.

Group 1:

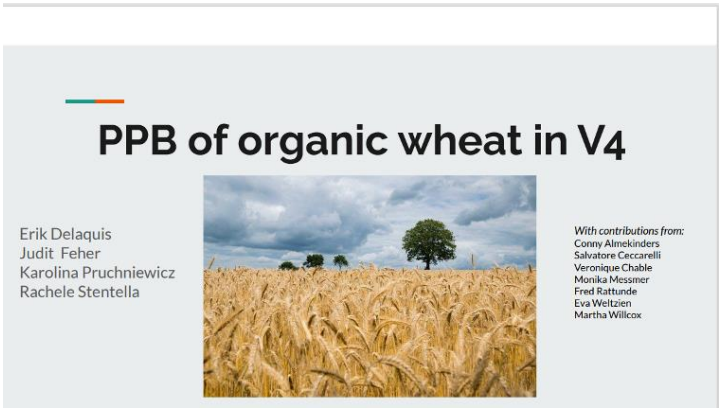
Group 2:

Group3:

Group 4:



Group 5:



Group 6:

5. Communication/Dissemination

5.1. Dissemination of the programme and presentations

All lectures and presentations can be found on the Organic E-print website. With help of one of the participants (Leone Ferrari) and Edith Lammerts van Bueren, an updated version of course guide, and the presentations and reading materials are archived at Organic E-prints (https://orgprints.org/38731/). Therefore, these documents will be accessible for all persons who would like to organise similar or adapted courses in other parts of the world or other languages.

5.2. Communication about the courses

The courses will be further disseminated e.g. at the LIVESEED scientific congress, planned in Latvia in March 2021 which will be online due to COVID-19 (https://www.eucarpialiveseedconference2021.lv/).

The congress will be co-organised by the Eucarpia section Organic and Low-input Agriculture and LIVESEED conference: Breeding and Seed Sector Innovations for Organic Food Systems.

The title of the abstract/conference to be presented at that event is:

The title of the abstract/conference to be presented at that event is POSTGRADUATE COURSE ON PARTICIPATORY PLANT BREEDING AND RESILIENT SEED SYSTEMS: Collaborative design, implementation, and resulting experiences.

It is co-signed by the organisers and the full text can be found in Annex 2.
It will be presented at the session 6. Multi-actor & participatory approaches, co-chaired by Véronique Chable (partner of both projects DYNAVERSITY and LIVESEED)

Annex 1: Programme of the Online Postgraduate course ('Train-the trainers') - 30 November – 4 December 2020

Participatory Plant Breeding & Resilient Seed Systems:

Options for Stakeholder Engagement and Benefit Sharing

Set-up and Program

of the

Online Postgraduate course ('Train-the trainers')

Participatory Plant Breeding & Resilient Seed Systems:

Options for Stakeholder Engagement and Benefit Sharing

30 November – 4 December 2020

Organisers:
Edith Lammerts van Bueren, Conny Almekinders, Eva Weltzien, Veronique Chable, Riccardo Bocci, Monika Messmer, Fred Rattunde, Claudius van de Vijver

With contributions of:
Salvatore Ceccarelli, Baloua Nebie, Martha Willcox, Pratap Shrestha, Jan Low, Bert Visser, Gareth Borman, David Spielman, Margaret McEwan



Participatory Plant Breeding and Resilient Seed System Development: -Options for Stakeholder Engagement and Benefit Sharing-

Scope of the course

Resilient seed systems play a central role in sustainable food systems that are robust, dynamic, equitable, diverse, healthy and interconnected. Developing and strengthening these systems offers vital entry points for responding to critical global challenges of climate change, agricultural biodiversity, and sustainable development. Training in participatory breeding and seed system concepts, issues and approaches will support engaged professionals and graduate students to contribute to resilient seed system development. In the Shared Action Framework for Resilient Seed Systems of the Global Alliance of the Future of Food it defined as one the most important actions needed (https://futureoffood.org/wp-content/uploads/2020/02/Resilient-Seed-Systems-Shared-Action-Framework-English.pdf).
This course serves professionals who seek longer-term solutions for sustainable, agro-ecological agriculture and answers to the question: How can food systems be moved forward in the South and the North?

Key aspects of this course include:

- Concepts, strategies, methods and experiences with decentralised and participatory approaches to plant breeding and seed system development to increase agrobiodiversity and cope with climate changes
- Governance issues such as seed quality control, property rights, co-ownership and benefit sharing
- Specific approaches for different crop types and socio-economic contexts
- Multi-actor approaches, collaborative learning, knowledge sharing and networking approaches to engage food system and value chain actors into participatory plant breeding and resilient seed system programs
- The interaction of technical solutions and social choices: considering trade-offs and issues of inclusion/social equity and other values

Participants

This workshop is aimed at PhD candidates, postdocs, and other academics. This course may be of particular interest for programs and partners engaged in seed system development and is supported by Global Alliance for the Future of Food, EU projects LIVESEED and DYNAVERSITY, and the ROOT TUBER AND BANANAS CRP.
In the course of 2020, some 40 participants joined this course; 25 followed the full program including the afternoon sessions with group work. Among the participants were practical breeders, MSc students, PhD candidates, postdocs and other professionals. Countries they originated from: 21 Europe, 9 Africa, 4 Asia, 2 Latin Amerika and 3 USA. Besides, we had 17 lecturers from all parts of the world; many of them participated during a large part of or during the whole week, and were also actively involved in the afternoon sessions as source persons/advisors.

Local organiser:

Graduate School Production Ecology & Resource Conservation (PE&RC) hosted the course (Claudius van de Vijver and Jacqueline Verhoef-te Brake) together with Edith Lammerts van Bueren (Wageningen University and Research - Wageningen, the Netherlands)

Scientific organisers:

- Edith Lammerts van Bueren and Eva Weltzien, on behalf of Global Alliance of the Future of Food-GAFF
- Conny Almekinders, on behalf of the CRP ROOTS-TUBERS-BANANAS RTB
- Veronique Chable and Riccardo Bocci, on behalf of DYNAVERSITY
- Monika Messmer, on behalf of LIVESEED.

Preparation for participants:

- Provide a poster to introduce yourself and your work and involvement with this topic. PE&RC will provide the poster format to the participants. The posters will be sent to the participants ahead of the course week.
- Each speaker will provide one paper relevant to his/her topic. The papers will be sent to the participants before the course starts. Participants should read the papers as preparation for the presentations.
- Each participant should prepare a question to open up the discussion after each presentation.

Set-up

Due to the COVID-19 measures this course had to be transformed from a live course to an online format. Mornings start off with a set of lectures of 30 minutes where each lecture is followed by a 30-minute discussion. Participants have prepared themselves for these discussions by formulating a question before the lecture, based on the paper that the speaker has submitted to the course prior to the start of the course.

Group work

The afternoon will be spent on group work. Participants will be split into 4 - 6 groups (max. 5 participants per group). Each group will be elaborating on one of the topics listed below where they must work on gathering and analysing the following elements of the topic:

- The state of the art (where do we stand? What are the major challenges?) (Problem description)
- What 'million dollar question' must be addressed to bring the topic a large step forward, given the challenges) (Research goal)
- Short description of the research that must be set up to address the question, including material and methods and expected outcome.

Information will be obtained via online literature search, websites, within group knowledge and from the experts present. The groups will be supervised and guided by the staff members (organisers) and can also interact with the speakers as resource persons.

The outcomes of the group work will be presented on Friday morning in a 10-minute presentation (in PowerPoint) followed by 20 minutes of questions and discussion.

Group work topics

1. How can a national germplasm collection of an indigenous crop be used as a resource for improving farmer's resilience in the face of climate change? Choose one case: e.g. Pearl millet in Ghana; sorghum in Kenya; cowpea in Nigeria; yam in Benin, or flax in Europe; … Develop an outline for a three year project.
2. Improving seed security for vulnerable farming households: propose, justify and possibly compare pro s and con s of 2 or 3 pathways for achieving significant improvements. Choose a crop and context.
3. Develop a process and key research questions for defining Product Profiles in the context of participatory breeding programs. The product profiles should lead to improving the efficiency and impacts of breeding efforts. Possibly, choose one case or two cases for comparison.
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5. Develop a multi-actor project on participatory and decentralised (organic) plant breeding (organic, or community-led program on a minor crop), paying attention to the different actors involved and the overall seed systems, including the seed production phase. Choose 1 case: e.g. soft wheat, maize for human consumption, tomato, rye, quinoa, rice.

6. Design a research project to improve organic principles implementation in plant breeding. How to translate them in the successive steps from genetic resources to seeds? Possibly choose one example/case study.

Location

Due to COVID-19 restrictions the course will be held online through Zoom.

Credits points (ECTS): **1.5**

Only those participants who join the full program, including the group work assignments, will receive a certificate.

COURSE ORGANISERS AND LECTURERS

#	Name	Institute / University
Course organisers and lecturers		
1	Conny Almekinders	Wageningen University & Research/CRP RTB Africa
2	Riccardo Bocci	RSR/Dynaversity
3	Veronique Chable	INRA, Rennes/Dynaversity
4	Edith Lammerts van Bueren	Wageningen University & Research/GAFF
5	Monika Messmer	FiBL-CH/Liveseed
6	Eva Weltzien	University of Wisconsin-Madison/GAFF
7	Fred Rattunde	University of Wisconsin-Madison/GAFF
8	Claudius van de Vijver	Graduate School PE&RC, Wageningen, NL
Invited course lecturers		
9	Gareth Borman	Wageningen University & Research
10	Martha Cameron Willcox	CIMMYT, Mexico/GAFF
11	Salvatore Ceccarelli	RSR/Dynaversity
12	Jan Low	CIP/SSA CRP RTB
13	Margaret McEwan	CIP/CRP RTB
14	Baloua Nebie	ICRISAT-Mali
15	Pratap Shrestha	SeedChange, Canada
16	David Spielman	IFPRI/CRP PIM
17	Bert Visser	Oxfam Novib

BIOGRAPHY LECTURERS AND ORGANISERS

Conny Almekinders works as a social scientist in the Knowledge, Technology and Innovation (KTI) group in Wageningen University, the Netherlands. She obtained a PhD from the same university, based on her potato crop physiology research carried out at CIP (International Potato Centre), Peru.
She worked for many years on issues related to seed systems and farmers' management of plant genetic resources, including participatory plant breeding and in situ conservation. Her shift in focus from plants to farmers, the interaction between them and with scientists has brought her into socio-technical studies of agriculture.

Riccardo Bocci is the managing director of the Italian farmers' seed network "Rete Semi Rurali" (http://www.semirurali.net/). On behalf of Rete Semi Rurali he has worked on the DIVERSIFOOD and CERERE and is working on the H2020 EU projects DYNAVERSITY and LIVESEED. He is one of the five European experts of the Ad Hoc Technical Expert Group on Farmers' Rights and vice chair of the Ad Hoc Technical Committee on Sustainable Use (ACSU) under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). He has been the AIAB's coordinator for the VIFP EU project "Farm Seed Opportunities" (2007-2009) and the VIIFP EU project "Strategies for Organic and Low-Input Breeding and Management" (SOLIBAM – www.solibam.eu 2010-2014), and an advisor of the Italian Ministry of Foreign Affairs for issues related to the ITPGRFA, and for the promotion of on-farm biodiversity management in Southern countries, including a bilateral cooperation project between Italy and Brazil (2002-2007). He has participated to the working group that delivered the Italian Guidelines for the Conservation of PGRFA, coordinated by the Ministry of Agriculture.

Gareth Borman, I am adviser sector transformation at the Wageningen Centre for Development Innovation, a part of Wageningen University & Research, where my responsibilities include advancing the organization's value proposition Guiding Sector Transformation; advising technically in programme design and implementation; managing project client and partner relations, and financial and human resources; and facilitating planning, monitoring, evaluation and learning. I have co-designed and led several multi-annual agri-sector investments including ISSD Ethiopia, ISSD Africa, and the Sesame Business Network, and currently lead a community of practice on creating demand for quality seed in ISSD Africa. I am also a regular trainer in short courses for professionals, like Integrated Seed Sector Development. I obtained my MSc by dissertation in 2010 from the school of Animal, Plant and Environmental Sciences at the University of the Witwatersrand (Wits) in South Africa. Although an ecologist by training, my research assessed the economic sustainability of Jatropha-based biodiesel initiatives and their implications for labour and rural livelihoods. I have the ambition to complete a PhD, and am enrolled at the Knowledge, Technology and Innovation chair group of Wageningen University. My research looks at understanding farmers' beliefs, motives and attitudes regarding seed and its attributes.

Martha Cameron Willcox is originally, from North Carolina, USA, she received a BS in Agronomy and an MS in Crop Science from North Carolina State University and a PhD in Plant Breeding and Plant Genetics from the University of Wisconsin-Madison in a collaborative project between corn breeding and dairy nutrition. She worked as a post-doc at the International Maize and Wheat Improvement Center in Mexico (CIMMYT), in the Stress Breeding Unit, on selection for host plant resistance to southwestern corn borer. Upon finishing her post-doc she was hired as a permanent scientist at CIMMYT where she addressed biosafety issues of

experimental trials of transgenic maize in collaboration with Mexican experts in genetic resources from 1995-1997. She then worked in the Corn Host Plant Resistance Research Unit of USDA-ARS in molecular mapping of resistance to aflatoxin production. She returned to CIMMYT in 2011 as the phenotyping coordinator for the Seeds of Discovery Project, which sought to identify novel alleles in the CIMMYT Maize Germplasm Bank. Since 2014, she has worked as the Maize Landrace Coordinator at CIMMYT, focusing on farmer participatory improvement of native maize landraces in the states of Oaxaca, Michoacán and Mexico in marginalized, mostly indigenous, communities. As part of this project, she has worked very hard to connect traditional farmers with culinary markets.

Salvatore Ceccarelli has been full professor of Agricultural Genetics at the Institute of Plant Breeding, University of Perugia. From 1980 has conducted research at ICARDA (the International Center for Agricultural Research in Dry Areas, Aleppo, Syria) until 2006, and eventually served as a consultant until 2014. Currently is consulting for both International and National Organizations. During his career, he supervised nearly 25 MSc and PhD students, trained several scientists in China, Australia, South Africa, Philippines, Yemen, Jordan, Ethiopia, Eritrea, India and Bhutan and published more than 290 papers of which nearly 170 in peer review journals; has been an invited speaker at nearly 30 international conferences. He is currently involved in projects in Uganda, Ethiopia, Jordan, Iran, Nepal, Bhutan and Europe. His areas of expertise are international plant breeding, genotype x environment interactions, breeding strategies, drought resistance, participatory and evolutionary plant breeding, crop adaptation and use of genetic resources.

Véronique Chable is a senior scientist based at INRAE - Rennes (Institut national de recherche pour l'agriculture, l'alimentation et l'environnement) in France. She has led research programs on cauliflower breeding and Brassica genetic resources, including genetic, epigenetic and plant development aspects. Commencing in 2001, she has established Participatory Plant Breeding (PPB) and transdisciplinary projects for organic and low input agriculture with French farmer networks across several crop species. She has coordinated a number of EU projects, including Farm Seed Opportunities-FP6 (2007-2010) and SOLIBAM-FP7 (2010-2014) and DIVERSIFOOD (2015-2019), a H2020 project. She is currently involved in two on-going H2020 projects as WP leader (DYNAVERSITY) and WP co-leader and Task leader (LIVESEED). Through multi-actor, transdisciplinary approaches, these programs evaluate and enrich the diversity of cultivated plants within diverse agroecosystems so as to increase their performance, resilience and quality, re-discovering genetic resources of diverse plant species and developing adapted biodiversity management/plant breeding for organic and low-input agriculture or marginal/specific conditions. One issue is to facilitate cooperation between participatory research networks, professional breeders and policy makers in connecting formal and informal seed systems in Europe.

Edith Lammerts van Bueren has worked for more than 40 years in research and education on organic farming and organic plant breeding in particular, and retired in December 2017, but remains active in the field of seed systems. She is regarded as the pioneer in plant breeding for organic and low-input agriculture and has put this subject on the European agenda. She pleaded in her farewell speech for an integrated, systems-based approach in breeding. She has been senior researcher and program leader at the Louis Bolk Institute, an independent knowledge institute for Natural Inclusive Agriculture and Positive Health. Since 2005 she is also a special professor of Organic Plant Breeding at Wageningen University. Edith was co-founder and chairman of the European Consortium for Organic Plant Breeding (ECO-PB) and Section leader of the European breeders' association Eucarpia (Section Organic and Low-input Agriculture). She is currently chair of the interdisciplinary, scientific Council for Integral Sustainable Agriculture and Nutrition (RIDLV) and leads the BioAcademy, a platform for education for organic agriculture.

Jan Low is currently a principal scientist with the International Potato Center (CIP), based in their regional office for Africa in Nairobi, Kenya. During the past decade, she managed the Sweetpotato Action for Security and Health in Africa (SASHA) research project and co-led the Sweetpotato for Profit and Health Initiative (SPHI). The SPHI was a multi-partner, multi-donor initiative that reached 6.3 million African households in 15 target countries with improved varieties of sweetpotato, promoting their diversified use. Dr. Low obtained her doctorate in agricultural economics at Cornell University, minoring in nutrition. Having worked over 25 years in sub-Saharan Africa, she has focused with her team at CIP on developing and promoting biofortified orange-fleshed sweetpotato to combat vitamin A deficiency. Dr. Low also served as President of the African Potato Association (APA) from 2011-2013. In 2016, along with two CIP sweetpotato breeders and Dr. Howarth Bouis of HarvestPlus, Dr. Low was awarded the World Food Prize for her work on biofortification.

Margaret McEwan is a senior scientist leading sweet potato seed systems research with the International Potato Center. She joined CIP in 2009 and is based in the regional office for sub-Saharan Africa in Nairobi Kenya. She also co-leads CGIAR Research Program of Roots Tubers and Bananas (RTB) cross cutting cluster on improving small holder farmer access to quality seed and improved varieties. Margaret's research focuses on the social technical interactions and institutional arrangements for seed systems. Prior to joining CIP, she was with FAO and has over 30 years' experience working in multi-disciplinary teams focused on rural development, farming systems research, household food security and nutrition in Kenya, Uganda, Somalia, North Sudan, Zambia, Mozambique, and Afghanistan. She has a MSc in Human Nutrition, from the London School of Hygiene and Tropical Medicine, a B.A. in History of Africa from the London School of African and Oriental Studies and is currently pursuing a PhD at Wageningen University and Research, Netherlands.

Monika Messmer made her PhD in plant breeding in 1993. For six years she worked as scientist in the cereal breeding of Agroscope, before she joint the the start up company VitaPlant AG on medicinal plant breeding. Since 2009 she is leading the plant breeding team at the Research Institute of Organic Agriculture (FiBL) Switzerland. FiBL is an independent, non-profit, research institute conduction cutting-edge science and participatory research involving farmers to develop innovative solutions to boost organic agriculture (www.fibl.org). Main focus of research is breeding for mixed cropping systems and for plant microbe interaction. She is president of the European Consortium for Organic Plant Breeding (ECO – PB www.eco-pb.org), board member of bioverita (www.bioverita.eu), member of the IFOAM Seed Platform and EUCARPIA section of organic and low input agriculture. She is engaged in several national and European project and the scientific coordinator of the EU project LIVESEED (www.liveseed.eu). She is involved since 9 years in decentralized organic cotton breeding in India in the projects Green Cotton www.greencotton.org and Seeding the Green Future www.sgf-cotton.org.

Baloua Nebie is a Senior Scientist-Plant Breeder, working with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) based in Bamako, Mali. He is Leading the Sorghum Open Pollinated Varieties (OPV) and Hybrids improvement for the West and Central Africa (WCA) region. His research activities are focused on multi-purpose, micronutrient-dense varieties and hybrids development using participatory methods with farmers' organizations. From his team research activities, were released over 15 varieties in WCA among them, the first multi-purpose sweet sorghum variety, and 15 commercial hybrids are in regional trials for their release by National Research Systems. He recently focused some of his activities on hybrid parents development to serve breeding programs in the region and globally. Baloua coordinated over 10 projects, on participatory plant breeding and local seed systems, from different donors including the McKnight foundation, GIZ, European Union, USAID and Royal Norwegian Embassy.

Fred Rattunde is a plant breeder. His career with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) focused on sorghum improvement through a collaborative network of national breeding programs and farmer organizations in West Africa. A particular challenge he addressed was how to create varieties with higher economic yield for smallholder farmers, both men and women, under their low-input and poor-soil fertility conditions. The use of local (Guinea-race) germplasm, testing under poor (low-Phosphorus) soil conditions, and establishing a farmer-breeder collaborative network for breeding- and seed-activities are key approaches that he pursued to address this challenge. The development and adoption of novel variety types (e.g. "dual-purpose" grain plus fodder OPVs and hybrids with Guinea-race grain) that open new options for smallholder farmers are successes of the farmer-breeder network activities. Since 2016 he works as a free-lance consultant and Honorary Associate at the University of Wisconsin-Madison.

Dr. Pratap Shrestha is from Nepal holds a Master's degree in agricultural economics from the University of East Anglia, UK, and a PhD in local knowledge and participatory technology development from the Bangor University, UK. Dr. Shrestha has more than 29 years of experiences in participatory research and development in the field of agriculture, biodiversity and natural resource management. He worked initially as a socio-economist and later as Head of the Planning, Monitoring and Evaluation Unit at Lumle Agricultural Research Centre in Nepal (funded by DFID, UK) from 1990-1998. He is a founder member of Local Initiatives for Biodiversity, Research and Development (LI-BIRD), a Nepal-based NGO, and headed the organization as its Executive Director from 2003-2009 before joining SeedChange (previously USC Canada) as Programme Specialist, Seed Systems and Plant Genetic Resources. He provides technical inputs and advice to SeedChange's international programs in more than 10 countries in Latin America, Africa and Asia on strengthening farmers' seed systems and on-farm conservation of agricultural biodiversity, including participatory plant breeding (PPB) and participatory variety selection (PVS). Dr. Shrestha has extensive experience working with smallholder farmers in farmer-led and conservation-oriented PPB both in Nepal and other SeedChange program countries.

David Spielman is a senior research fellow with the International Food Policy Research Institute (IFPRI). He joined IFPRI in 2004 and is currently based in Kigali, Rwanda where he leads the Rwanda Strategy Support Program, a partnership with the Ministry of Agriculture and Animal Resources. David's research agenda covers a range of topics including agricultural science and technology policy; plant genetic resources and seed systems; agricultural extension and advisory services; community-driven rural development; and, more recently, gender and nutrition. Through early 2020, David led IFPRI's research theme on science, technology, and innovation policy, and also headed a flagship program on technological innovation and sustainable agricultural intensification for the CGIAR Research Program on Policies, Institutions, and Markets (PIM), among other projects. From 2004 to 2010, David was based in Addis Ababa, Ethiopia with IFPRI working on a wide range of activities. Earlier in his career, he worked on agriculture and rural development issues for the World Bank (Washington, D.C.), the Aga Khan Development Network (Pakistan), and several other organizations. David received a Ph.D. in Economics from American University in 2003, an M.Sc. in Development Studies from the London School of Economics in 1993, and a B.A. in International Relations from Tufts University in 1992.

Bert Visser He obtained a MSc in studied Molecular from Wageningen University and acquired a PhD in the area of medical virology at Utrecht University. He then worked as a scientist in the area of genetics and agriculture. For 20 years he was the director of the Netherlands genebank (crops and farm animals) based in Wageningen. In this period he participated in a series of projects focussing on-farm management of plant genetic resources for food and agriculture. He has been internationally active in promoting crop and food diversity, including as a policy advisor to the Ministry of Agriculture and the European Commission. Since 2016, after retiring from Wageningen, he joined Oxfam Novib as the scientific advisor to the SD=HS programme, that supports farmers to maintain their diversity for the purposes of food security and improved livelihoods.

Eva Weltzien's research has focused on the effective use of sorghum, pearl millet and barley genetic resources for variety development and seed systems that best meet women and men farmers' needs in dryland production areas, such as the Syrian Steppe, the Thar Desert of Rajasthan, India, and sub-Saharan zones of West Africa. She has coordinated research on sorghum improvement in West-Africa for ICRISAT focusing on methodologies for participatory plant breeding to address farmers' production constraints and meet family needs for food and other products. Her research on enhancing local seed systems has resulted in an active network of farmer seed producer cooperatives in several West-African countries. In 2015 she was awarded the 'Justus von Liebig Prize for World Nutrition', jointly with her husband Fred Rattunde. She received her Doctorate degree from the Technical University of Munich, Germany, after studies at the University of Hohenheim, Germany, and Iowa State University, USA. She is presently an Honorary Fellow of the Agronomy Department of the University of Wisconsin-Madison, USA.

PROGRAMME

Monday 30 November 2020

Chair: Eva Weltzien

08:30 – 09:00h Log-in open to participants	
09:00 – 10:30h Introduction to the course	
09:00	**Welcome and opening: technical/logistic set up of the course** *Edith Lammerts van Bueren and Claudius van de Vijver, PE&RC*
09:30	**Participatory Plant Breeding and its challenges – local solutions to global problems** *Salvatore Ceccarelli (RSR; DYNAVERSITY)*
10:00	**Questions and Discussion**
10:30	**Break**

Topic of the day: Participatory Plant Breeding Experiences

Short content: Alternative options for organizing PPB, taking biological concerns into consideration e.g. propagation biology, annual versus perennial, high and low multiplication ratios, intra-varietal diversity, that have implications for organizing plant breeding and seed dissemination; what can be done by whom and where?

Intro: The collaboration of farmers and plant breeders throughout the major steps of a variety development program is referred to as participatory breeding. To compare different cases and scenarios it is helpful to look at individual stages of the breeding cycle, describing priority setting, action points, decision making, and possibly financing options. The details of what works where depends not only the crop biology, seed multiplication ratios and types of pollination, but also on the cropping systems, organization of field work, and specific expertise required (e.g. How farmers do their sowing, how flexible they are with sowing dates, size of plots; and what expertise they have with selection, keeping seed lots separate, etc., all influence how and what can be done by whom. e.g. the terraces in Yemen; or the extremely narrow planting window for pearl millet in Rajasthan).

Learning goals for participants:

- Overview of how to organize the collaboration between farmers and breeders: how are objectives/priorities determined? Who does what and how along the breeding cycle? Who takes which decisions? Who pays for what?
- Trial designs that have worked for achieving the primary objective(s).
- Tools that have worked for sharing knowledge and for joint learning.
- Types of progress made together? Types of varieties developed.

11:00	**Participatory research for organic agriculture: the case of Brassica plant breeding in Brittany** *Veronique Chable (INRA Rennes (F), DYNAVERSITY)*
11:30	**Questions and Discussion**
12:00	**Example of PPB cotton in India (including involvement/financing by cotton industry)** *Monika Messmer (FiBL-CH, LIVESEED)*

12:30	**Questions and Discussion**
13:00	**Break**
14:30	**Sorghum breeding for grain and stover quality through a farmer-researcher network in West Africa: case of Mali** *Baloua Nebie (ICRISAT-Burkina Faso/Mali)*
15:00	**Questions and Discussion**
15:30 – 16:30h Introduction group work, questions on group work format and defining groups (*Claudius van de Vijver*)	

Tuesday 1 December 2020

Chair: Edith Lammerts van Bueren

08:30 – 09:00h Log-in open to participants

Topic of the day: Involving actors of the value chain

Short content: Multi-stakeholder science, collaborative learning, knowledge sharing and networking approaches to engage food system and value chain actors into PPB programs for enhancing resilience in seed systems.

Intro: Different stakeholders can bring in different knowledge which is needed to arrive at a better understanding of the conditions, preferences and needs that have to be met in order to make the seed system function. Different stakeholders need however to be identified, mobilised and engaged; thus, there needs to be an incentive or benefit – which is sufficient for a sustainable involvement. Also, different stakeholders have different understandings (knowledge) of and interests in what varieties to develop, how to distribute and use their seeds. To arrive at a common understanding and shared interest is not always easy and carries a cost. And, who to include in the initiative(s), i.e. who were not included? For who was/is it a success, for who was/is it not a success?

Lead for the speakers on the content of their cases: Whose initiative is it? What were the considerations/ purposes to do so? Who were the other stakeholders (or value chain actors) and how were they identified? How did the agendas of different stakeholders differ? How were they aligned? What challenges were encountered and how were they addressed (especially where it relates to different interests, different knowledge)? What has been achieved (in terms of joint learning). Lessons? Remaining points of discussion/debate?)

Learning goals for participants:

- Understand the role/importance of different types of knowledge of the involved stakeholders.
- Be able to give examples where seed system issues were critical for the functioning of a crop-value chain examples of how different roles and knowledges were aligned or combined.
- Integrate a multi-stakeholder approach in the design of a breeding initiative or seed system intervention.

09:00	**Involving actors of the value chain in valuing Native Maize and Indigenous Communities.** *Martha Willcox – (CIMMYT, Mexico; GAFF)*
09:30	**Questions and Discussion**
10:00	**PPB creating a value chain for breeding new plant varieties meeting farmers' needs and supporting on-farm conservation.** *Pratap Shrestha - (SeedChange, previously USC Canada)*
10:30	**Break**
11:00	**Questions and Discussion**
11:30	**Establishing gender-aware value chains for biofortified sweet potato products in Rwanda** *Jan Low (CIP/SSA CRP RTB)*
	Questions and Discussion
12:30	**Break**
14:00 – 17:00h Time for group work assignments in break-out sessions	

Wednesday 2 December 2020

Chair: Veronique Chable

08:30 – 09:00h Log-in open to participants

Topic of the day: Facilitating Seed System Innovations

Short content: Experiences with seed-system assessment approaches, in the context of development goals, will be presented. Facilitating sustainable seed system development depends on understanding the underlying culture (norms and values: e.g. you don't sell seed, but share seed), actors' motivations and the effectiveness of their relationships. Identifying priorities and entry points for strengthening seed systems through collaboration among diverse actors. We will consider issues dealing with for financial and entrepreneurship options (cooperatives, seed savers groups) communication and marketing opportunities and regulatory framework.

Learning goals for participants:

- What do we mean by seed systems innovations?
- Assessment approaches to support seed system development – to build on existing capacities, knowledge and norms. (e.g. RTB Toolbox)
- Insights into contrasting challenges for different crop and variety types.
- Collaborative learning for seed system development with all types of actors.
- Presentation of case studies.

09:00	**Collaborative learning for sustainable seed-system development** *Eva Weltzien (Mali/GAFF)*
09:30	**Questions and Discussion**
10:00	**Break**

10:30	**Pathways of Seed System Development and the politics of knowledge** *Conny Almekinders (WUR, CRP RTB Africa)*
11:00	**Questions and Discussion**
11:30	**General Discussion on seed system development issues**
12:30	**Break**
14:00 – 17:00h Time for group work assignments in break-out sessions	

Thursday 3 December 2020

Chair: Riccardo Bocci

08:30 – 09:00h Log-in open to participants

Topic of the day: Policy options

Short content: Experiences with seed-system assessment approaches, in the context of development goals, will be presented. Facilitating sustainable seed system development depends on understanding the underlying culture (norms and values: e.g. you don't sell seed, but share seed), actors' motivations and the effectiveness of their relationships. Identifying priorities and entry points for strengthening seed systems through collaboration among diverse actors. We will consider issues dealing with for financial and entrepreneurship options (cooperatives, seed savers groups), communication and marketing opportunities and regulatory framework.

Learning goals for participants:

- Understanding the rules and policies affecting PPB: from ABS to intellectual property.
- Understanding seed market legislation and the new opening at European level.
- Providing experiences about policy bottlenecks and solutions from different countries.

09:00	**Introduction to the topic by Riccardo Bocci**
09:20	**Participatory Plant Breeding and implications for seed and IPR policy: the Oxfam Novib project on seed systems** *Bert Visser (OXFAM NOVIB)*
09:40	**Questions and Discussion**
09:50	**Guiding seed sector transformation in Ethiopia** *Gareth Borman (WUR)*
10:10	**Questions and Discussion**
10:20	**Break**
10:50	**The new openings on seed marketing in Europe (e.g. organic heterogeneous materials, conservation varieties)** *Riccardo Bocci (RSR, DYNAVERSITY)*

11:10	**Questions and Discussion**
11:20	**Framing policy options for seed market development for low/middle-income countries** *David Spielman ((IFPRI, CRP PIM) and Margaret McEwan (CIP, CRP RTB)*
11:40	**Questions and Discussion**
11:50	**General Discussion on the topic of the Day**
12:30	**Break**
14:00 – 17:00h Time for group work assignments in break-out sessions	

Friday 4 December 2020

Chair: Conny Almekinders

08:30 – 09:00h Log-in open to participants	
Topic of the day: short presentations by participants of group work *(10 minutes presentation and 20 minutes discussion per group)*	
09:00	**Group 1**
09:30	**Group 2**
10:00	**Group 3**
10:30	**Break**
11:00	**Group 4**
11:30	**Group 5**
12:00	**Group 6**
12.30 - 13.00h Feed-back comments on the whole course and closing	

Annex 2: Text of the abstract (LIVESEED congress, March 2021)

A POSTGRADUATE COURSE ON PARTICIPATORY PLANT BREEDING AND RESILIENT SEED SYSTEMS: Collaborative design, implementation, and resulting experiences.

By Edith T LAMMERTS VAN BUEREN, Conny JM ALMEKINDERS, Eva WELTZIEN-RATTUNDE, Veronique CHABLE, Riccardo BOCCI, Monika MESSMER, Fred RATTUNDE, Claudius ADM VAN DE VIJVER

A POSTGRADUATE COURSE ON PARTICIPATORY PLANT BREEDING AND RESILIENT SEED SYSTEMS: Collaborative design, implementation, and resulting experiences

Edith T LAMMERTS VAN BUEREN[1], Conny JM ALMEKINDERS[2], Eva WELTZIEN-RATTUNDE[3], Veronique CHABLE[4], Riccardo BOCCI[5], Monika MESSMER[6], Fred RATTUNDE[3], Claudius ADM VAN DE VIJVER[7]

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Keywords: participatory plant breeding, seed systems, seed policies, value chain actors, training

Participatory plant breeding (PPB) and resilient seed systems (RSS) can play a central role in promoting sustainable food systems (i.e. diverse, robust, healthy, and equitable). Developing and strengthening PPB and RSS offers vital entry points for responding to global challenges ranging from climate change to promoting agricultural-biodiversity and sustainable development. Despite this promise, exposure to-, critical thinking about and training in participatory breeding and seed system concepts, issues and approaches is insufficient to support professionals and graduate students who seek to contribute to resilient seed system development. Establishing such programmes, in regular academic- and other fora, was identified to be a top priority by the Shared Action Framework for Resilient Seed Systems of the Global Alliance of the Future of Food (GAFF 2020).

An alliance of diverse programs and practitioners collaborated to design and implement a postgraduate course that addresses PPB and RSS issues and opportunities in the Global South and North. The purpose of this paper is to highlight key aspects of the course design and explore the experiences and insights gained by the first participants and trainers of this course, in order to contribute to and support similar initiatives in the future.

The course content addressed five topic areas: i) Decentralised and participatory approaches to plant breeding and seed system development; ii) Governance and policy issues regarding seed control, (co-)ownership and benefit sharing; iii) Specific needs and challenges for different crop types and socio-economic contexts; iv) Approaches for multi-actor collaborative learning;

and v) Interactions and trade-offs between technical solutions and social choices. Learning goals were set for each key topic area. For example, learning goals included gaining understanding and insights into organizing farmer-breeder collaboration, approaches, tools and concrete cases of joint learning by diverse crop value-chain actors, and the consequences of alternative regulatory and policy approaches for PPB and RSS in different contexts and countries.

Key elements of the course design included a) invited lectures by practitioners for each thematic area, based on their engagement in different geographic and disciplinary contexts, b) follow-up discussion (dedicating equal time to lecture and discussion), c) small-team group work to identify key opportunities and prepare proposals to address a concrete issue, and d) presentation and discussion of group projects. The course organizers requested each lecturer to share one publication relevant to their topic. Course participants were invited to read these publications and prepare questions prior to each topics' presentation.

Both participant feedback and reflections by the course organizers are presented. The advantages and disadvantages of format (on-line vs. in presence), mode of organizing the small group project-work and lecturer's engagement with these groups, options to include farmers- and other-presenters, and balance between addressing concepts vs. practical experiences and tools are discussed. We reflect on need and possibilities of design and implementation of similar courses in other contexts. The course materials are available at Organic E-prints (https://orgprints.org/38731/)

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References

GAFF (2020) Shared Action Framework for Resilient Seed Systems. Global Alliance of the Future of Food available at: https://futureoffood.org/wp-content/uploads/2020/02/Resilient-Seed-Systems-Shared-Action-Framework-English.pdf