www.liveseed.eu

Boosting organic seed and Plant breeding across Europe 2017-2021

Bram Moeskops IFOAM EU, Project Coordinator
Monika Messmer, FiBL-CH, Scientific Coordinator
www.liveseed.eu

Biozüchtungstagung FiBL Frick 19.07.2018

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230 and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00090. The information contained in this communication only reflects the author's view. Neither the Research Executive Agency nor SERI is responsible for any use that may be made of the information provided.

LIVESEED in a nutshell

- Budget: 7.4 M EUR EU funding & 1.5 M EUR Swiss funding
- Duration: 4 years
- Coordinator: Bram Moeskops, IFOAM EU
- Scientific coordinator: Monika Messmer, FiBL
- Goal: **Boosting organic seed and plant breeding in order to improve the performance, sustainability and competititveness of the organic sector**

- Approach:
  - Inter- and transdisciplinary
  - Policy – economy – science interface
  - Multi-actor & stakeholder involvement
  - Wide geographic representation

Multi-actor consortium

35 partners
14 linked parties
18 countries

23 breeding & research institutes
7 breeding companies
8 seed companies
11 organic associations

LIVESEED

Aim: 100% organic seed of adapted cultivars

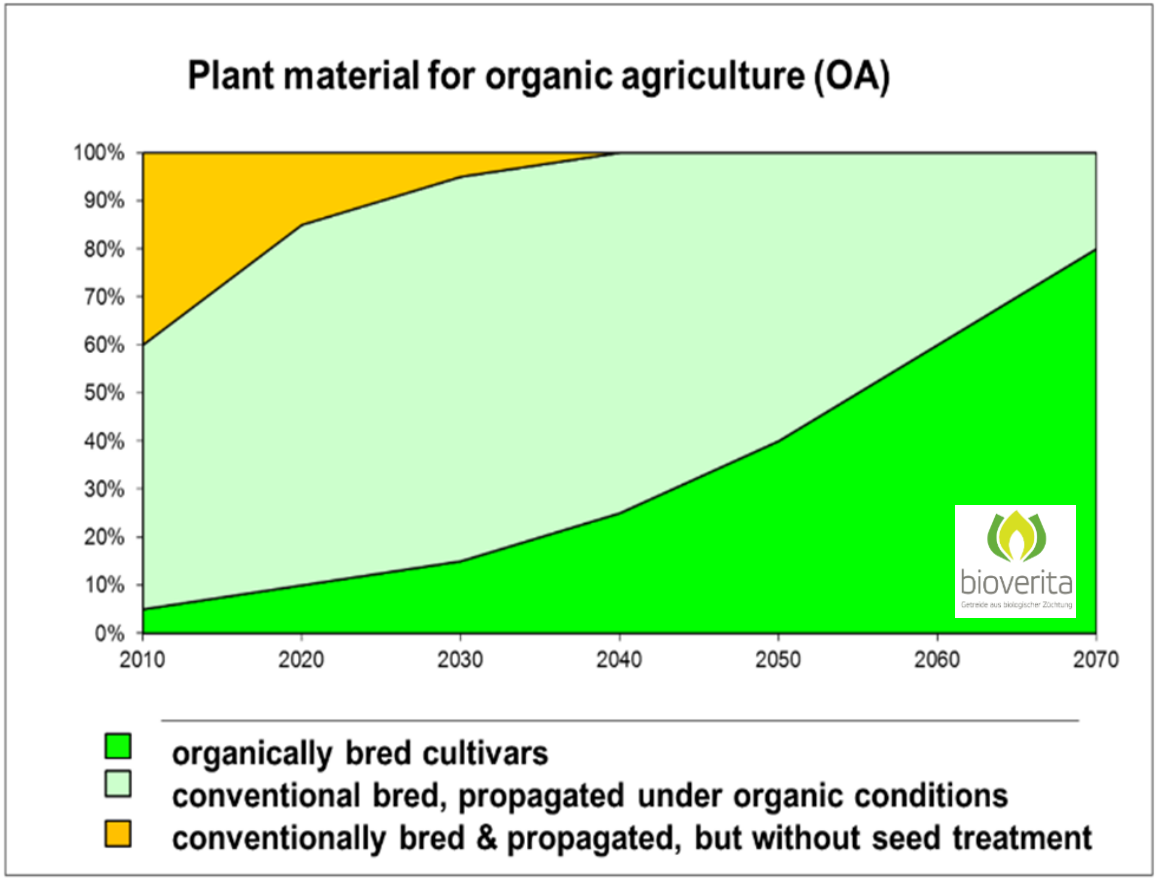


Figure 1 : Schematic time line to reach the goal of 100% organically propagated seed of suitable cultivars (light green) in short term and to foster cultivars specifically bred for organic farming systems (bright green) in the long term

LIVESEED

Main objectives

Policy & regulation
Provide a level playing field for the use of organic seed and variety registration across Europe

Research & development
Innovative approaches in organic plant breeding and improve quality of organic seeds

Socio-economics
Increase accesability of organic seed and adoption of new cultivars

Economy & market
Improve the competitiveness of the organic seed supply chain

Communication & network
Enhance knowledge & rise awareness on the benefits of organic plant breeding and seed

LIVESEED

Crop categories

Research activities of LIVESEED will cover five main crop categories:

- Legumes (lupin, pea)
- Vegetables (carrot, tomato, broccoli, cauliflower)
- Fruit trees (apple)
- Cereals (wheat, barley, maize)
- Fodder crops (lucerne, grasses)

→ considering different farming systems (mixed cropping, agroforestry) pedoclimatic zones across Europe

LIVESEEED ambitions

- Co-development of knowledge by transdisciplinary multi-actor approach
- Holistic approaches for breeding and seed production in complex environment
  - Plant – Plant interaction
  - Plant – Soil microbiome interaction
  - Plant – Seed microbiome interaction
- Enabling more sustainable food production systems
  - Mitigate risks of crop failure through breeding for diversity
  - Safeguard genetic resources for future generations

LIVESEED

Framework of organic seed and plant breeding

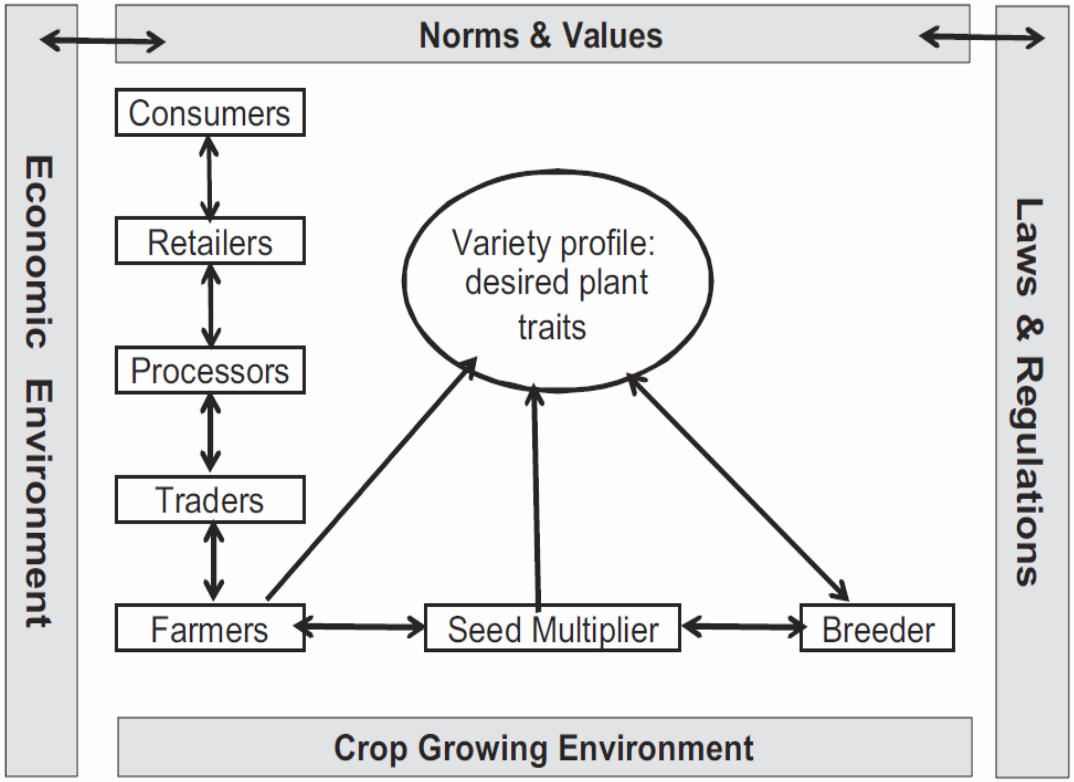
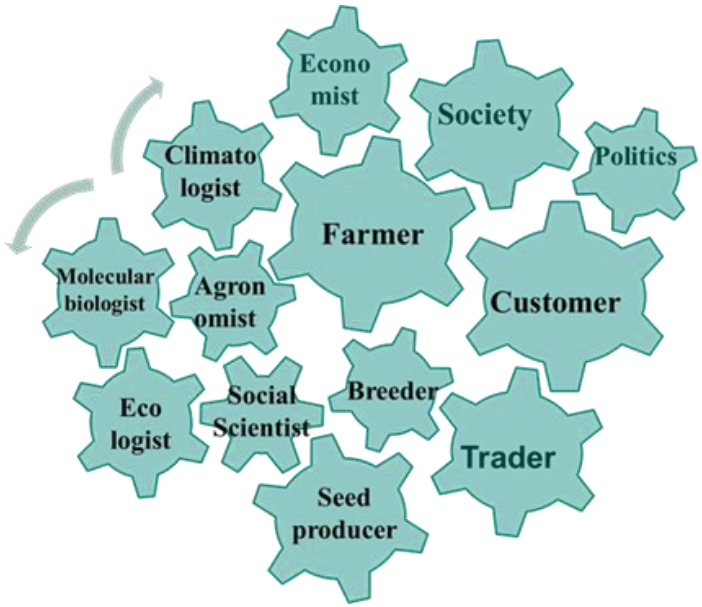
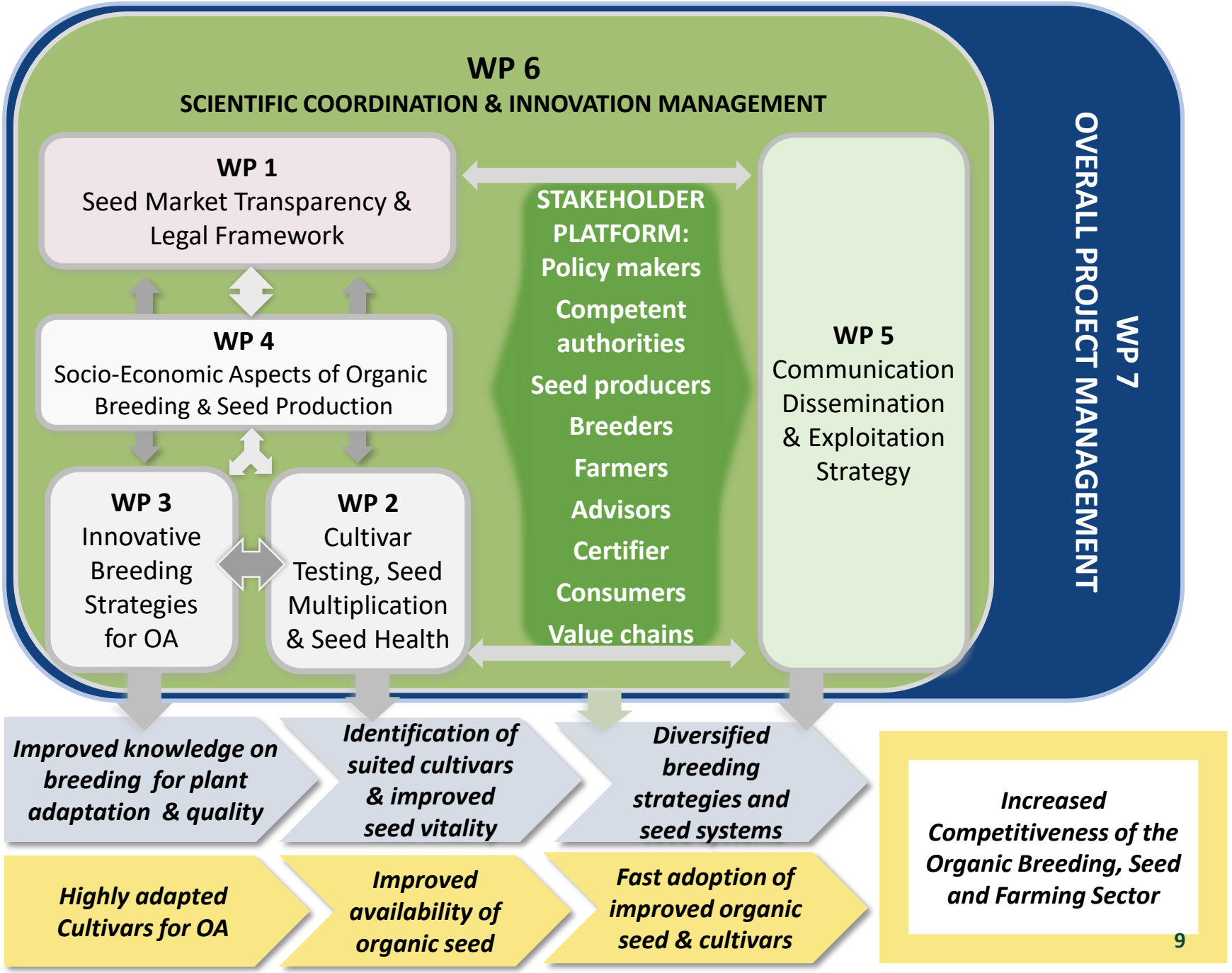


Figure 2. Situational context influencing organic plant breeding and seed production adapted from Osman et al., 2015

Support participatory processes in breeding and cultivar testing



LIVESEED


WP 6
SCIENTIFIC COORDINATION & INNOVATION MANAGEMENT
WP 1
Seed Market Transparency & Legal Framework
WP 4
Socio-Economic Aspects of Organic Breeding & Seed Production
WP 3
Innovative Breeding Strategies for OA
WP 2
Cultivar Testing, Seed Multiplication & Seed Health
STAKEHOLDER PLATFORM:
Policy makers
Competent authorities
Seed producers
Breeders
Farmers
Advisors
Certifier
Consumers
Value chains
WP 5
Communication Dissemination & Exploitation Strategy
WP 7
OVERALL PROJECT MANAGEMENT
Improved knowledge on breeding for plant adaptation & quality
Identification of suited cultivars & improved seed vitality
Diversified breeding strategies and seed systems
Highly adapted Cultivars for OA
Improved availability of organic seed
Fast adoption of improved organic seed & cultivars
Increased Competitiveness of the Organic Breeding, Seed and Farming Sector

WP1: Regulation & policy framework regarding production, use, and transparency of organic seed

Aim: Improve the implementation of the European organic regulations & achieve full transparency of the organic seed market in the whole EU

Objectives:

- Analyse the **status quo and identify bottlenecks** of organic seed production and use (T1.1)
- Develop **recommendations and tools** for a common improvement of the organic seed on a national as well as on the EU level (T1.2)
- Provide IT tool for a maximum **transparency on available organic seed** on a national as well as on the EU level (T1.3)
- Assess national contexts to **co-develop recommendations with national public authorities and other stakeholders** (T1.4)

WP2: Improving cultivar testing, seed multiplication & health for high quality seeds

Aim: Wider pool of high-quality seeds for the organic farming sector by increasing volume & quality of organic seeds derived from cultivars tested for organic agriculture

Objectives:

- Develop **new cultivar testing models** for the organic sector over Europe & develop **adjusted protocols** to facilitate variety release of new cultivars developed specifically for the organic sector (T2.1)
  - Heterogeneous material
  - Organic bred cultivars
- promoting **smart practices and knowledge exchange for organic seed production** (T2.2)
- Deliver an **integrated organic seed health** strategy for high quality seeds for the organic sector considering seed vigour, seed treatments and seed microbiome (T2.3)

WP3: Innovative breeding strategies for organic farming

Aim: develop novel and holistic breeding concepts, deliver new breeding tools based on better scientific understanding of the biological basis of crop resilience & product quality, plant-plant and plant-microbe interactions, and initiating new multi-actor breeding strategies/activities

Objectives:

- Develop innovate **breeding concepts** from trait based to system breeding (T3.1)
- Develop **breeding for more diverse and resilient cropping systems** of annual and perennial crops including agroforestry (T3.2)
- Enhance scientific understanding of the **plant microbiome interface** and the importance of the holobiont (the plant host plus all of its symbiotic microbes) as selection target to improve **resilience and product quality** (T3.3)
- Establish crop **specific breeding and knowledge networks** to close major breeding gaps (T3.4)

WP4: Socio-Economic Aspects of Organic Breeding and Seed Production

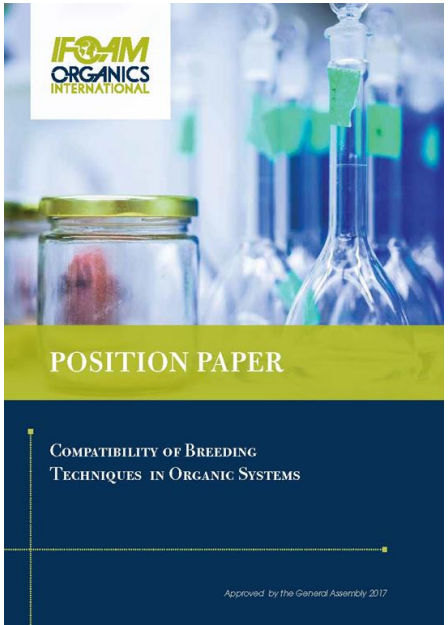
Aim: Understand social, cultural and economic factors that impact on the competiveness of the organic seed sector from the perspective of farmers, seed traders, breeders, regulators, consumers and policy makers.

Objectives:

- Identify gaps and bottlenecks along the market development of organic seed through stakeholder consultation (T4.1)
- Analyse and optimise organic seed markets, supply chains and business models of breeders and seed producers (T4.2)
- Evaluate the consumer acceptance of using New Plant Breeding techniques in the organic seed sector (T4.3)
- Contribute to the development of recommendations (T4.4)

LIVESEED involvement with key stakeholders

- Over 80 stakeholders ready to support LIVESEED project
- Visit of national authorities for organic regulation with regard to seed
- Contact with CPVO and Examination offices for heterogeneous material and adjusted DUS and VCU for organic varieties
- Contact with European Seed Association
- Contact with DG Sante
- Working Group of IFOAM International on new breeding techniques



- Updated position of the Organic Movement on new genetic engineering techniques
- Transparency and clarity on criteria used to determine which breeding techniques are compatible with organic farming systems

LIVESEED

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

LIVESEED draws attention to organic seed and plant breeding

- Webpage, Flyer, facebook, Twitter
- Demeter Workshop on Seed as Commons Oct 2017
- Poster of Organic World Congress and Pre-Conference on Seed in New Delhi Nov 2017
- Participation at Biofach special exhibition on organic plant breeding Feb 2018, Biofach Congress
- Co-organisation of Eucarpia Symposium: breeding for diversification Witzenhausen Feb 2018
- Organic Breeders Day Feb 2018 with ECO-PB
- National visits to competent authorities with respect to organic seed (IT, ES, PT, LV, HU, GR, PL, BG)

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

Your involvement

Follow our activities on

Liveseed

@LIVESEEDeu

www.liveseed.eu

Participate in:

- Surveys
- Interviews
- Workshops
- Events

LIVESEED

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

LIVESEED

www.liveseed.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230 and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00090. The information contained in this communication only reflects the author's view. Neither the Research Executive Agency nor SERI is responsible for any use that may be made of the information provided.

Verwandte EU Projekte & Termine

- Solibam 2009 – 2014 www.solibam.eu
- COBRA 2013 -2016 http://www.organicresearchcentre.com/?go=Research%20and%20development&page=Plant%20breeding&i=projects.php&p_id=42
- DIVERSIFOOD 2015-2019 www.diversifood.eu
  - **Final Congress 10. -12. Dezember 2018 in Rennes**
- ReMIX 2017-2021 www.remix-intercrops.eu
- BRESOV 2018 – 2022 www.bresov.eu (Bohne, Tomate, Brokkoli)
- ECOBREED 2018 – 2023 www.ecobreed.eu (Weizen, Soja, Kartoffeln, Buchweizen)
- Neue Ausschreibung Okt 2018: SFS-28-2018-2019-2020: Genetic resources and pre-breeding communities

LIVESEED

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

Verwandte Projekte & Termine

- Supportstelle für ökologische Pflanzenzüchtung FiBL CH & FiBL DE (SÖPZ)
  - Bedarfsanalyse für Biozüchtung
  - Unterstützung der Biozüchter im Akquireren öffentlicher Fördermittel für Züchtungsforschung
  - Durchführung von Workshops
  - Aufbau eines Netzwerks von Jungzüchtern
  - Konzept zur Finanzierung der Biozüchtung durch Beteiligung der Wertschöpfungskette → Züchtung als Investition der Branche Workshop 13. September 2018 Workshop in FiBL-DE Frankfurt

- **Bioverita**: Label für Produkte aus zertifizierter Biozüchtung, Sonderausstellung zur Biozüchtung **«Bio von Anfang an»** 13. - 16. Februar 2019, biofach, Messe Nürnberg

- Tag der offenen Tür FiBL Frick **Sonntag 19.08.2018**
- **Vielfaltsmarkt 1001 Gemüse & Getreide 8. – 9. September 2018** Rheinau www.1001gemuese.ch

bioverita
Gemüse aus biologischer Züchtung

LIVESEED

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

Political Framework

- **New organic regulation** (to be approved by the EU Parliament)
  - phasing out of derogations to the use of non-organic plant reproductive material latest by 2036
  - Definition of organic plant breeding
  - Definition of organic heterogeneous material and their use in organic farming for all crops

    → engage in temporary experiment (prolonged till 2022)

    →suggestions for the notification of heterogeneous material, description, definition of process, traceability, packaging till end of 2020
  - Temporary experiment to foster research and **to develop organic varieties suitable for organic production** shall be establish adapted DUS and VCU, as well as the definition of the production and marketing conditions for that material (2021 up to 2027)

    → suggestions to define alternative DUS and VCU testing till end of 2020
  - Regular update of national organic seed database
  - In 2026 report on the availability of organic seed and reasons of a possible limited access of organic operators

  - phasing out of derogations to the use of non-organic protein feed for poultry and porcine animals

LIVESEED

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230.

Different strategies for cultivar development

- **Conventional breeding:** **Status quo**
  - Selection with application of seed treatments, herbicides, optimal nutrient supply
  - Breeding goals and variety development for conventional / IP farming
  - Test registered varieties under organic farming (organic variety trials)

- **Breeding for organic farming** **Product oriented**
  - Considering of the breeding goals of the organic agriculture
  - No GMO (no cell fusion)
  - Selection partly under organic farming conditions
  - Last multiplication step under organic farming conditions

- **Organic plant breeding:** **Process oriented**
  - Breeding specifically /exclusively for organic agriculture
  - Every selection step under organic conditions
  - Breeding technics in harmony with the organic farming
  - Multiplication steps under organic conditions

LIVESEED

Position paper on Organic Plant Breeding from ECO-PB 2012

- **Principles of Organic Plant Breeding (OPB)**
  - **dignity of living organisms**
  - **goals of organic plant breeding**
  - **ethical criteria** – cell integrity, reproductive capacity, scope for extended breeding, respect for crossbreeding boundaries, reproducibility
  - **strategic breeding criteria** - phenotypic selection under ecological cropping conditions, possible extensions eg using molecular markers
  - **socioeconomic criteria** - no patenting, transparency regarding breeding parents and breeding techniques, participatory breeding, as many breeding programmes as possible
- **consequences for choice of cultivars from**

(I) Conventional Breeding programmes

(II) Breeding for Organic farming (BfO)

LIVESEED

Definition of Organic Plant Breeding

according to IFOAM Norms 2012

4.7 Breeding of organic varieties

General Principles

- Organic plant breeding and variety development is sustainable, enhances **genetic diversity** and relies on natural **reproductive ability**. Organic breeding is always creative, cooperative and open for science, intuition, and new findings. Organic plant breeding is a holistic approach that respects natural **crossing barriers**. Organic plant breeding is based on fertile plants that can establish a **viable relationship with the living soil**. Organic varieties are obtained by an **organic plant breeding program.**

LIVESEED

Definition of Organic Plant Breeding

according to IFOAM Norms 2012

Requirements:

4.7.1 To produce organic varieties, plant breeders shall select their varieties **under organic conditions** that comply with the requirements of this standard. All multiplication practices except meristem culture shall be under certified organic management.

4.7.2 Organic plant breeders shall develop organic varieties only on the basis of genetic material that **has not been contaminated by products of genetic engineering**.

4.7.3 Organic plant breeders shall **disclose the applied breeding techniques**. Organic plant breeders shall make the information about the methods, which were used to develop an organic variety, available for the public latest from the beginning of marketing of the seeds.

LIVESEED

Definition of organic plant breeding

according to IFOAM Norms 2012

Requirements:

4.7.4 The **genome is respected as an impartible entity**. Technical interventions into the genome of plants are not allowed (e.g. ionizing radiation; transfer of isolated DNA, RNA, or proteins).

4.7.5 The **cell is respected as an impartible entity**. Technical interventions into an isolated cell on an artificial medium are not allowed (e.g. genetic engineering techniques; destruction of cell walls and disintegration of cell nuclei through cytoplast fusion).

4.7.6 The **natural reproductive ability** of a plant variety is respected and maintained. This excludes techniques that reduce or inhibit the germination capacities (e.g. terminator technologies).

4.7.7 Organic plant breeders may obtain plant variety protection, but organic varieties shall **not be patented**.

LIVESEED

Definition of Breeding for Organic (BfO)

Breeding programs for organic are more product oriented

- have a special focus on the **breeding goals** which are specific for organic agriculture (e.g. tolerance against seed born diseases, weed tolerance, nutrient use efficiency),
- do not use **critical breeding techniques listed in IFOAM Position Paper 2017**
- **Selection occurred at least partially under organic conditions**
- **Cultivar testing and seed production** under organic conditions

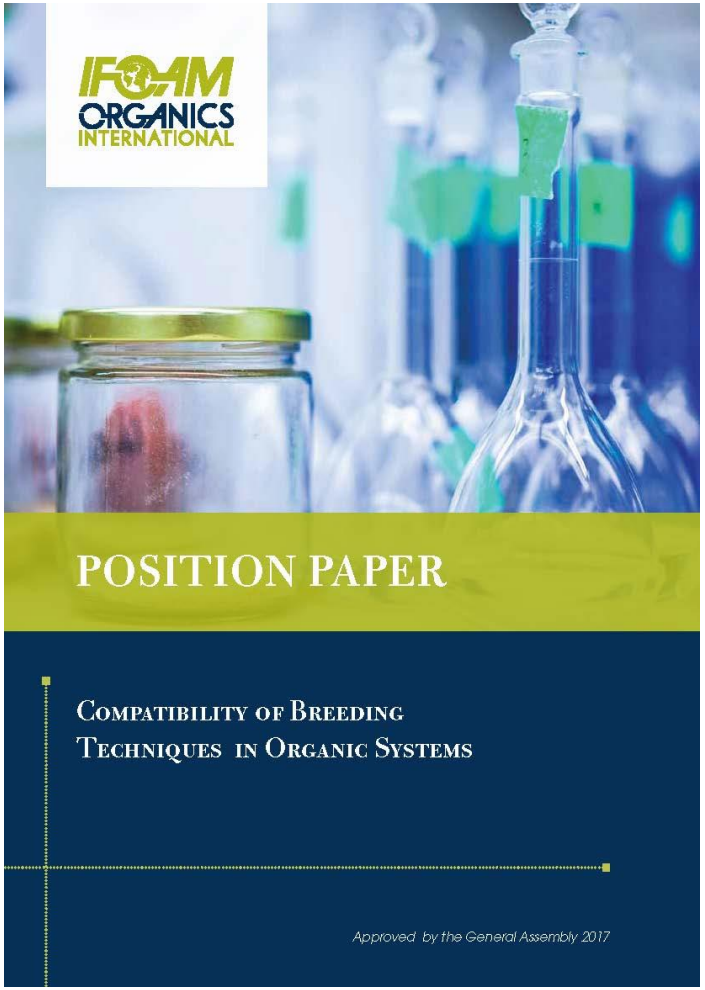
LIVESEED

Position of the Organic Sector on the complience of New Breeding Techniques (NBT)

- **Position Paper of ECO-PB on Organic Plant Breeding 2013:**
  - Organic plant breeders in Europe will refrain from any breeding technique that technically interfers below the cell level
  - www.eco-pb.org/fileadmin/ecopb/documents/ecopb_PostitionPaperOrganicPlantBreeding.pdf
- **IFOAM EU Position Paper on New Plant Breeding Techniques 2015:**
  - NBT are not compatible with organic farming
  - Should be declared as GMO according to EU regulation and labelled accordingly
  - http://www.ifoam-eu.org/fr/file/position-paper-new-plant-breeding-techniques
- **IFOAM International: Position Paper on New Breeding Techniques 2017**
  - Draft February 2017, consultation and final approval on General Assembly of IFOAM in November 2017
  - Transparency & traceability to allow freedom of choice for farmers & consumers
  - https://www.ifoam.bio/sites/default/files/position_paper_v01_web_0.pdf

Compatibility of Breeding Techniques in Organic Systems

Ifoam International Position Paper approved Nov 2017



Clarity & Transparency on the Criteria Used to determine what breeding techniques are compatible with Organic Farming Systems