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TOOLKIT
TO FOSTER MULTI-ACTOR RESEARCH ON AGROBIODIVERSITY


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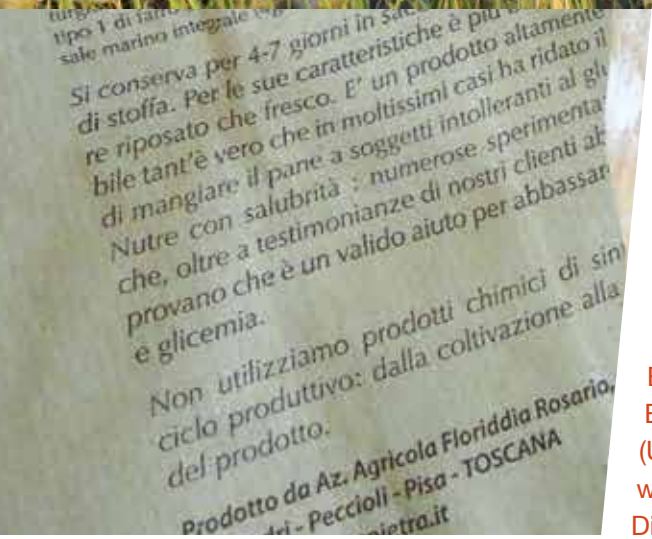

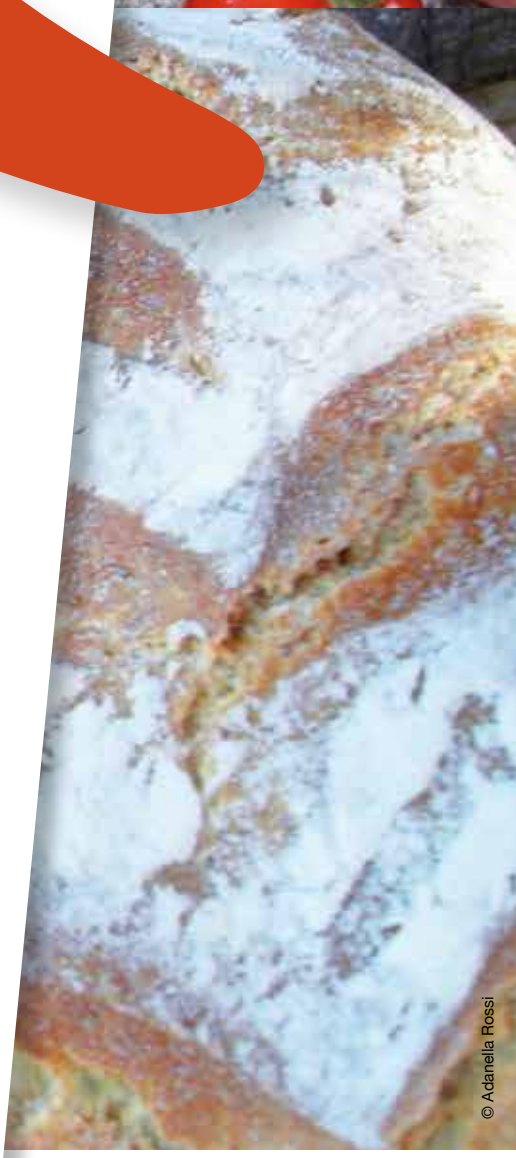
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Building blocks to develop multi-actor research projects and examples of community based plant breeding and management of agrobiodiversity from Diversifood experience.

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DIVERSIFOOD

DIVERSIFOOD is a European H2020 project facing the challenge of promoting a new way of thinking about agriculture. Its ambition is: "*embedding crop diversity and networking for local high quality food systems*".

INTRODUCTION

The toolkit presented here provides building blocks for a multi-actor approach applied to participatory plant breeding and action research with the aim of embedding agrobiodiversity in food systems. It results from a wide range of experience developed within the Diversifood project to boost cultivated diversity for organic and low-input agriculture and from the collective reflection of all the project partners.

WHAT IS MULTI-ACTOR RESEARCH?

Multi-actor research is a research process in which **different types of actors** are **actively involved** and **contribute their knowledge and experience** in different ways. Thanks to their **different perspectives** inherent to their diverse professions (different types of practitioners, researchers, policy makers, etc.) as well as **skills** (for example, agronomy, farming, breeding, processing, economics, food quality, etc.), this type of research can develop **a broader, holistic approach**.

The **different actors** involved in such a research process have a **common question** to answer and, to that end, a **common will** to work together. In Diversifood, **multi-actor research** is conceived as the **broadening of participatory research** collectively developed with **all actors of the food chain**.

The actors engage in a **collective, iterative and mutual learning process** in which the **different types of knowledge** are used, **integrated** and **continuously questioned**. This process **generates new questions** hand in hand with their **translation into new practices**.

WHY DOES DIVERSIFOOD DO MULTI-ACTOR RESEARCH ?

Diversifood's objective is **embedding crop diversity in the food supply chain and fostering networking** to promote **local high quality food systems**. To achieve this aim, the **research process itself is embedded in its environmental and social context** within a **horizontal dynamism** that differs from the usual top-down approach.

The results can be used immediately and implemented; **each actor** is therefore **a beneficiary** of the research process.

HOW TO DEVELOP MULTI-ACTOR RESEARCH?

The aim of the toolkit is to **share the variety of Diversifood experiences**. However, the toolkit does **not simply provide recipes to apply** but **illustrates** some common prerequisites and traits that emerge in such projects. In other words, the toolkit proposes strategic **«building blocks»** to support the successful **implementation of the approach**. The building blocks have emerged from the feedback provided by **Diversifood**, based on their experiences, as well as from the **literature**.

SUMMARY

BUILDING BLOCKS FOR A MULTI-ACTOR APPROACH IN COMMUNITY BASED PLANT BREEDING

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Farmers observing a population of dynamic wheat in a farmer's field

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Tasting onions on the farm

In Diversifood, the **multi-actor plant breeding approach** is also considered as **a systemic research approach** aiming at a **holistic conception of the food chain** from soil to plate.

A multi-actor research project is concomitantly implemented by **several actors with different skills** (fields of knowledge and know-how), thereby providing **complementary resources, methods and tools.** The organization of the research mainly relies on the **interactions between actors** and on the **combination of the resources, methods and tools provided,** depending on the specific **agro-ecological and socio-cultural context** (but not on the methods or tools per se). Successful interactions can take place if sufficient **key elements** (building blocks) are implemented. These key elements have been **collectively identified** based on the variety of Diversifood activities.

COMMON WILL

A common will to investigate certain aspects or to solve certain problems is crucial. A common question or set of questions can emerge and drive the design and implementation of the research. According to the multi-actor approach, these common questions result from and respect the specific questions or sub-questions asked by each type of actor.

The Diversifood project experience confirmed that the research process is more successful when questions originate from practitioners. A multi-actor project is not the implementation of a scientific development project in which some practitioners are asked to check the validity of certain hypotheses.

COMMON VOCABULARY

When actors with different types of knowledge, know-how and experience work together, the first step is to develop and share a common vocabulary. A word may have different meanings depending on the professional context, which may lead to confusion in the group. It is important to be aware that the vocabulary may need to be continually updated throughout the process.

Specific expressions can also be exchanged to expand the glossary of the actors and to improve the information exchange and understanding circulate during the course of the project. Sufficient time should be dedicated to clarifying this point at the beginning of the project.

TRUST

Building trust among the different actors is crucial, particularly during the early stages of the project. It creates cohesion and consolidates the involvement of the participants in the group. It also moderates the power dynamics in the relationships.

Some research activities start with actors who do not yet know each other, and they may appear to be not completely involved. In such cases, trust can be built through shared activities during the implementation of the research, and may even create conditions for future collaboration between the partners.

TRANSPARENCY

Transparency is needed when different actors interact. It complements trust and helps build mutual confidence. Partners have to be aware of the need for transparency and have to find ways to collectively design the allocation of resources and the time needed for a variety of research activities.

Farmers and researchers in a farmer's experimental field of cereals

FACILITATION

Multi-actor research implies a lot of dynamics in human relationships and discussions in groups of people with different backgrounds (knowledge, experience) and points of view, visions, etc. There is thus a specific need to facilitate and stimulate interactions between different types of actors, for example between farmers and scientists. It is important (and sometimes difficult) to bridge the gap between scientists' and practitioners' objectives and expectations.

Indeed, specific skills are required to facilitate and moderate crucial collective moments of the projects (such as defining the research question, choosing the methods and tools, discussing the results, see «Appropriate distribution of the work: collective tasks»).

The facilitator plays a key role in multi-actor research; it can be played be someone who only has this role, but also by other actors (e.g. scientists, practitioners). The role is also important because it helps create (or maintain) trust.

RESOURCES

In addition to research operationalization, time and resources have to be considered for the collective and collaborative process. Multi-actor research is different from academic research. It may seem to be less time or resource consuming. In practice, time (especially collective time) is one of the main resources of such projects. It has to be translated into budget items and specific skills (see «facilitation»).

APPROPRIATE DISTRIBUTION OF WORK

Different levels of participation are possible during the research process. The approach developed in Diversifood is based on collegiality, which implies that some tasks, especially those concerning decision making, have to be carried out collectively to increase the democracy level, while other particular actions are left to dedicated actors. These specific actions are mainly related to the trans-disciplinary process, in which some detailed or specialized knowledge needs to be provided by competent partners. This can imply the use of high-tech tools by scientists or artisan's tools by practitioners. Both can provide very important information, and hence stimulate interactions between scientists and practitioners. Participation may seem to be easier in the decision-making process than in the implementation. However, this may not always be a problem.

A list of tasks is given below. The tasks were identified by Diversifood partners and include some that need to be carried out collectively to insure the success of the collaborative process. Other tasks may be left to competent actors according to their skills.

COLLECTIVE TASKS

- Identification of the issue (e.g. a problem to be solved, or an opportunity to be seized)
- Definition of the goals
- Clarification of the research question
- Choices for research operationalization (methods, tools)
- Discussion/interpretation of the results
- Drawing of conclusions

TASKS TO BE LEFT TO COMPETENT ACTORS

- Artisanal processing
- Laboratory analysis
- Statistics
- Management of experimental plots on farms.

Other tasks (e.g. collecting data) can be carried out collectively, by a few, or specific people, depending on resources and availabilities.

Ladybird on a rivet wheat spike


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Observing an on-farm wheat collection

DIVERSIFOOD EXAMPLES OF MULTI-ACTOR RESEARCH AND BREEDING PROJECTS TO EMBED DIVERSITY IN THE FOOD CHAIN

PRESENTATION OF THE CASES

The examples were chosen to illustrate how diverse ways of developing multi-actor plant breeding research can be.

The overall research process of each case is presented first, followed by the connections that exist between actors, methods and resources (including knowledge fields). Finally, the main methods and tools used in the case are described. These examples show that there is not only one way of doing anything but rather different possibilities that are developed depending on the choices done by the actors involved in each project.

The different methods, actors and resources listed here emerged from the collective work of all the partners, and the lists would certainly be different in another research context. Among all the cases implemented by the partners, we chose to present cases at different stages of development. The building blocks underline the multi-actor process and are used in different ways in each project, and are sometimes implemented to a lesser extent than the actors would have liked.


© RSP

Meeting for participatory tomato breeding

CASE 1

VARIETIES OF EMMER *(TRITICUM DICOCCON)* FOR ORGANIC PRODUCTS

Species concerned	Emmer
Country and area	Hungary, national level
Diversifood partner in charge of the project	Ökológiai Mezőgazdasági Kutatóintézet (OMKI)

ISSUE

Developing new emmer products from suitable old landraces or new varieties adapted to Hungarian organic production conditions.

This work is being conducted in collaboration with other European partners in the Diversifood project.

GOAL

Describing the suitability of emmer varieties and landraces for organic production in Hungary. The same varieties are tested by different partners in order to share information about their specificities under different management practices.

New cultivars or adapted old landraces are expected to be in production.

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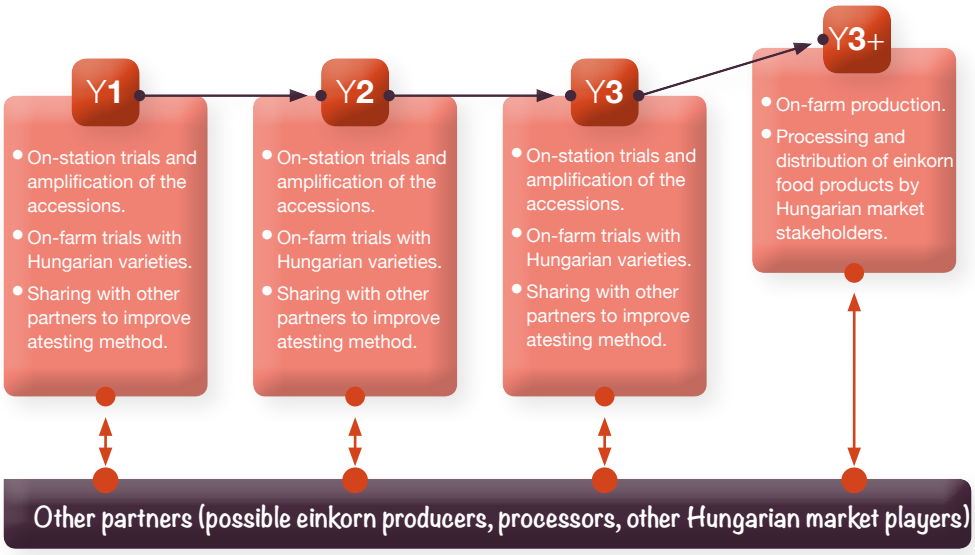
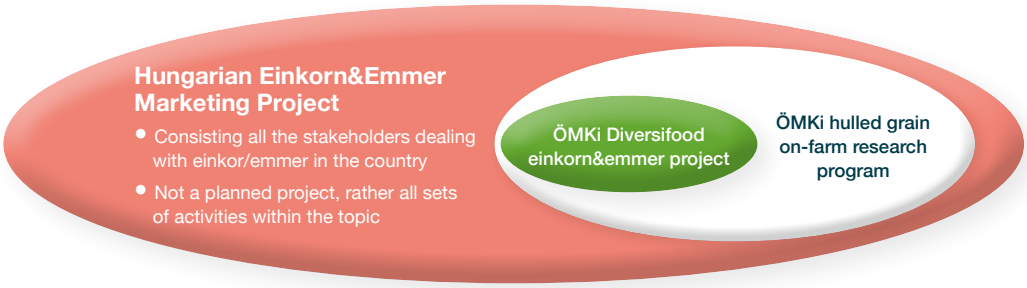
Observing an experimental field of emmer

RESEARCH OPERATIONALIZATION OF THE PROJECT

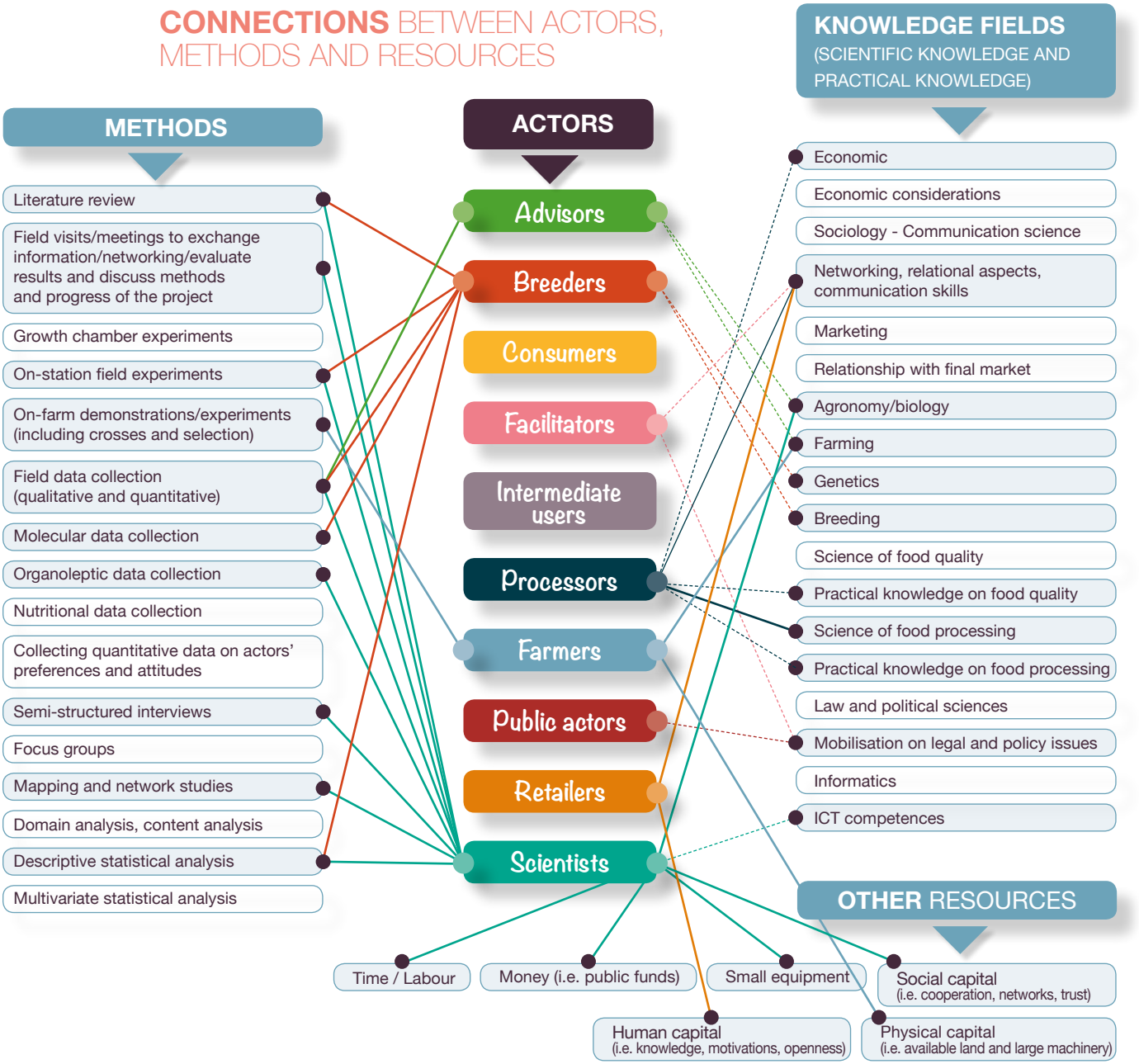


RELATIONSHIPS BETWEEN ÖMKI PROJECT AND NATIONAL EMMER&EINKORN MARKETING PROJECT



Experimental emmer plot

CONNECTIONS BETWEEN ACTORS, METHODS AND RESOURCES



MAIN METHODS AND TOOLS USED IN THE PROJECT

Methods	Tools
Seed multiplication	Small plots at different places (partners)
On-station trials	Randomized block trials and plant measurements
Statistical analysis	Software to analyse the data (SPSS software)

This project is recent and because it is integrated in a bigger national project, it deals with quite a large number of methods and knowledge fields, thus allowing a broad approach to the subject. Practitioners are not yet really involved.

Observing a field of rivet wheat

CASE 2

DEVELOPING UNDERUTILIZED CROPS THROUGH A PARTICIPATORY AND MULTI-ACTOR APPROACH

Species concerned	Emmer, einkorn and rivet wheat
Country and area	The Netherlands, national level
Diversifood partner in charge of the project	Louis Bolk Institute (LBI)

ISSUE

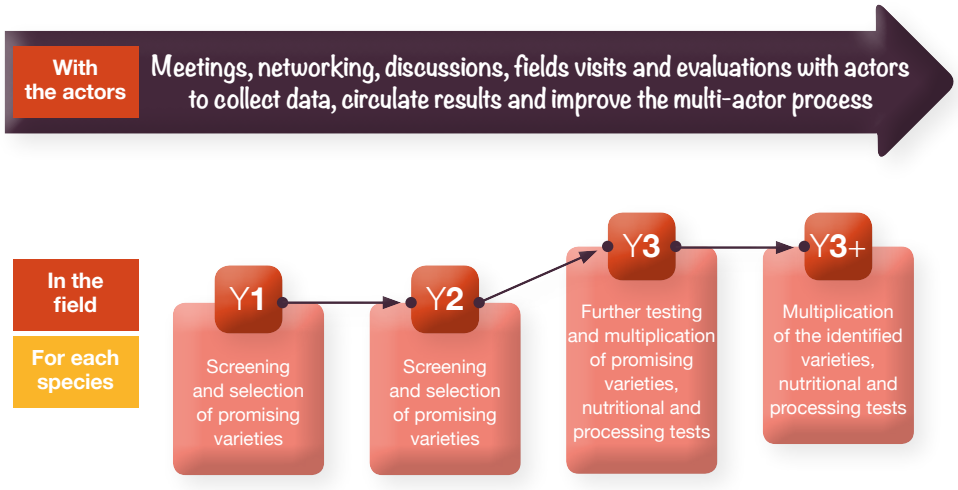
Using and improving a participatory and multi-actor approach to test and develop adapted varieties of underutilized cereal species from field to bread (involving farmers, bakers and consumers).

GOAL

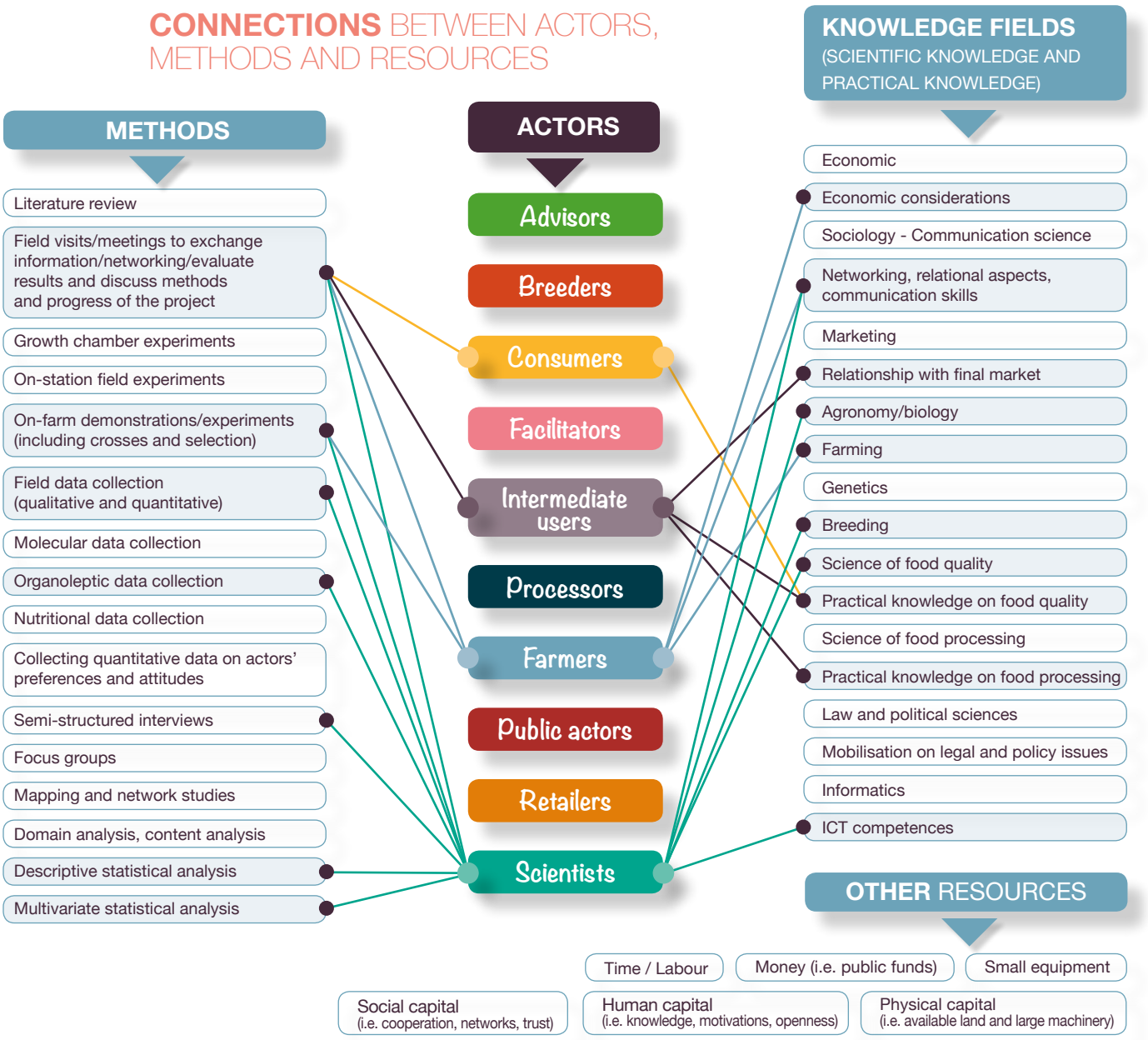
Involving all the actors of the chain in the selection of good varieties of einkorn, emmer and rivet suitable for use in the Netherlands (not only for cultivation, but also for processing and baking), in order to broaden the diversity of cereals cultivated.

RESEARCH OPERATIONALIZATION OF THE PROJECT

Harvesting ancient cereals



CONNECTIONS BETWEEN ACTORS, METHODS AND RESOURCES



MAIN METHODS AND TOOLS USED IN THE PROJECT

Methods	Tools
Field **trials on-farm**	**Completely randomized block design**
Quantative and **qualitative data collection**	**Measure** plants traits, **field walks with stakeholders, interviews** for **additional information**
Statistical analysis	**Software** to analyse data (quantitative analysis)
Integrated approach	**Combine agronomic plant traits,** with **processing opportunities** and **nutritional quality** to **select** most **promising accessions**

The project started with Diversifood, and is consequently recent, although it builds upon previous experience. For plant evaluation, it successfully combines quantitative and qualitative data, which is an advantage for getting more practitioners involved.

CASE 3

FARMERS' TOMATOES

Species concerned	Tomato
Country and area	Austria, national level
Diversifood partner in charge of the project	Arch Noah

ISSUE

Building collaboration between farmers and other stakeholders to develop tomato varieties that combine outstanding fruit quality and the ability to adapt to organic production systems and also satisfy our claims concerning seed sovereignty and farmers' rights.

GOAL

To develop tomato varieties with significantly higher levels of partial resistance to leaf mold through participatory on-farm trials (in a network of small-scale farms).

RESEARCH OPERATIONALIZATION OF THE PROJECT

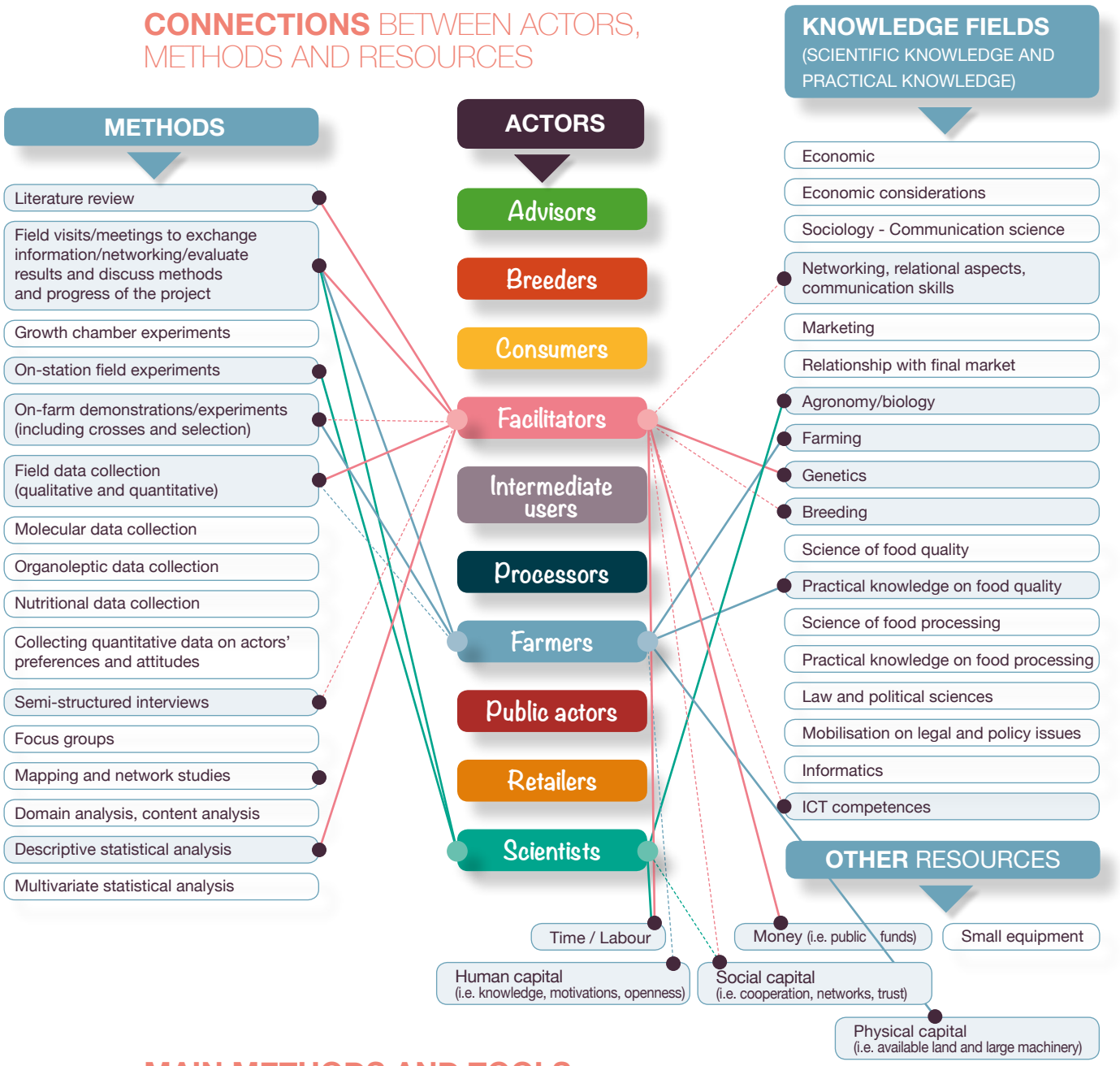
Planning
- Overview previous experiences
- Defininig a common approach (participatory)

Implementation
- Identifying resistant varieties
- Beginning farmers led selection program

Documentation
- Presenting and discussing the results with the farmers
- Publication of the results

Group observing tomatoes

CONNECTIONS BETWEEN ACTORS, METHODS AND RESOURCES



MAIN METHODS AND TOOLS USED IN THE PROJECT

Methods	Tools
Interviews with farmers (to collect previous experiences and identifying potentially resistant cultivars)	
Agronomical **trials on-farm**, with replicates or not (to get a better overview by quick screenings of generally grown cultivars in the network, to identify potentially resistant varieties and to test potentially resistant varieties in on-farm trials)	**Rating scheme** for leaf mould infestation and other traits (single plants)
On-farm **selection programs** **Statistical analysis**	**R** (to analyse the on-farm screenings and the selection program)

The project involves only a few different types of actors as it is focused on the disease. Its strength is a collaborative approach that was implemented right from the beginning of the project. The research question and the goal were first defined by the farmers, and then translated into research questions by facilitators and scientists. The trials were all built together.

Data collection is very time consuming and it is thus important to find a good way of distributing data collection work between farmers and outsiders (researchers, students, facilitators, etc.).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Researcher and farmer in an experimental field of cereals

CASE 4

EINKORN *(TRITICUM MONOCOCCUM)* PARTICIPATORY PLANT BREEDING

Species concerned	Einkorn
Country and area	France, national level
Diversifood partner in charge of the project	Réseau Semences Paysannes (RSP) and Institut National de la Recherche Agronomique (INRA)

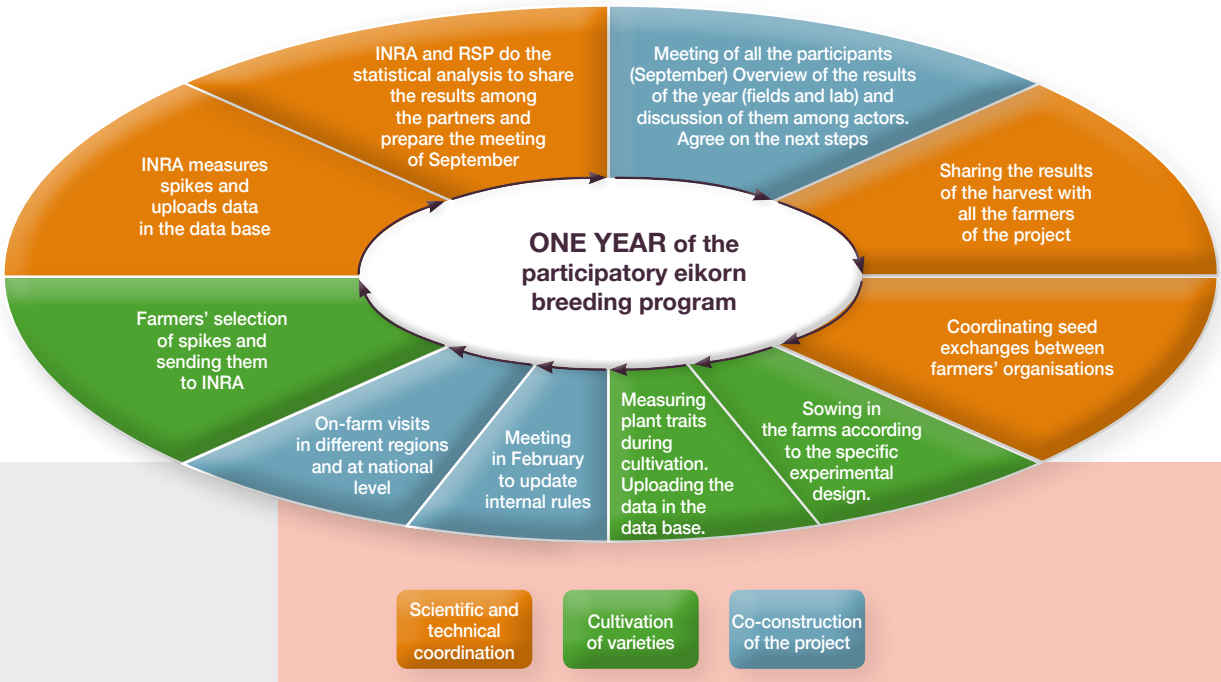
ISSUE

Developing new diversified varieties of locally adapted einkorn suitable for organic agriculture through a national participatory breeding program (PPB, or collaborative organization) that enhance the autonomy and empowerment of farmers' collectives.

GOAL

Adapting and extending the existing (wheat) program to include einkorn by creating methods and tools and organizing training sessions. Particular attention is paid to collaboration between different actors (research team [researchers, technicians, students], facilitators of farmers' organisations, farmers) to establish organizational rules in this PPB project, based on multi-actor approaches.

RESEARCH OPERATIONALIZATION OF THE PROJECT



CONNECTIONS BETWEEN ACTORS, METHODS AND RESOURCES

METHODS

- Literature review
- Field visits/meetings to exchange information/networking/evaluate results and discuss methods and progress of the project
- Growth chamber experiments
- On-station field experiments
- On-farm demonstrations/experiments (including crosses and selection)
- Field data collection (qualitative and quantitative)
- Molecular data collection
- Organoleptic data collection
- Nutritional data collection
- Collecting quantitative data on actors' preferences and attitudes
- Semi-structured interviews
- Focus groups
- Mapping and network studies
- Domain analysis, content analysis
- Descriptive statistical analysis
- Multivariate statistical analysis

ACTORS

- Advisors
- Breeders
- Consumers
- Facilitators
- Intermediate users
- Processors
- Farmers
- Public actors
- Retailers
- Scientists

KNOWLEDGE FIELDS (SCIENTIFIC KNOWLEDGE AND PRACTICAL KNOWLEDGE)

- Economic
- Economic considerations
- Sociology - Communication science
- Networking, relational aspects, communication skills
- Marketing
- Relationship with final market
- Agronomy/biology
- Farming
- Genetics
- Breeding
- Science of food quality
- Practical knowledge on food quality
- Science of food processing
- Practical knowledge on food processing
- Law and political sciences
- Mobilisation on legal and policy issues
- Informatics
- ICT competences

OTHER RESOURCES

- Time / Labour
- Money (i.e. public funds)
- Small equipment
- Social capital (i.e. cooperation, networks, trust)
- Human capital (i.e. knowledge, motivations, openness)
- Physical capital (i.e. available land and large machinery)

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Multiplication plots of spelt landraces, associated with faba bean (experimental station before being proposed to farmers in the framework of the participatory plant breeding program of RSP and INRA)

MAIN METHODS AND TOOLS
USED IN THE PROJECT

Methods	Tools
Experimental design with regional farm (2 or more blocks with replicates) and satellite farms (no blocks and one entry replicated twice). The farmers chose the varieties to observe in their farms, apart from the "control"; the number of entries may vary between farms.	• **Plants measurements,** 4 spread sheets register the observations (at each season) • **Data base** (SHiNeMaS)
Statistical analysis of the results. All the data being in the data base.	**R software** and **data base**
Co-construction of the project	**Internal Regulations** and charter

The einkorn project itself is quite recent but is based on a tried and tested approach to wheat (about 10 years of experience in the case of the national participatory cereal plant breeding project). A few types of actors are involved in the einkorn program and the collective process is very important.

The assumption is that it is possible to create a collective organization with people from different fields to manage cultivated biodiversity and breed new varieties.

This collective organization (the national wheat project) has designed and developed specific tools for its needs: a particular experimental design for the network of farms, plant measurement sheets, management of statistical analysis (R package) through a dedicated data base (SHiNeMa). These specific tools are now being used for other species (including einkorn) and are also being proposed to a wider audience (all Diversifood partners) through a dedicated website. All this work is part of a collaborative process and internal rules for working together have been drawn up.

The stages of the research process are repeated each year, and, based on the experience gained in the wheat project, new actors with new knowledge fields will probably join the einkorn project. As this is a national project (implying large distances between the project members), the role of facilitators is crucial for maintaining links between scientists and practitioners.

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Spelt landrace in multiplication

CASE 5

PARTICIPATORY PLANT BREEDING FOR MAIZE POPULATIONS RESISTANT TO DROUGHT AND FUNGI

Species concerned	Maize
Country and area	Portugal, regional level
Diversifood partner in charge of the project	Instituto Politécnico de Coimbra (IPC) and Instituto de Tecnologia Quimica e Biologica – universidade Nova de Lisboa (ITQB)

ISSUE

Enhancing and valorizing the market for Portuguese maize landraces (diverse maize populations suitable for bread production that are resistant to drought and fungal diseases) through multi-actor, participatory and integrated approaches.

GOAL

Set up a value chain for landraces of maize (for bread) based on a multi-actor approach, through local production-consumption systems and local knowledge, based on a «overall philosophy concept» as an alternative to the industrial model (role of IPC). This goal is supported by the development of powerful tools to screen large numbers of maize populations for stress resistance in field trials as well as integrative statistical analysis for breeding for diversity (role of ITQB).

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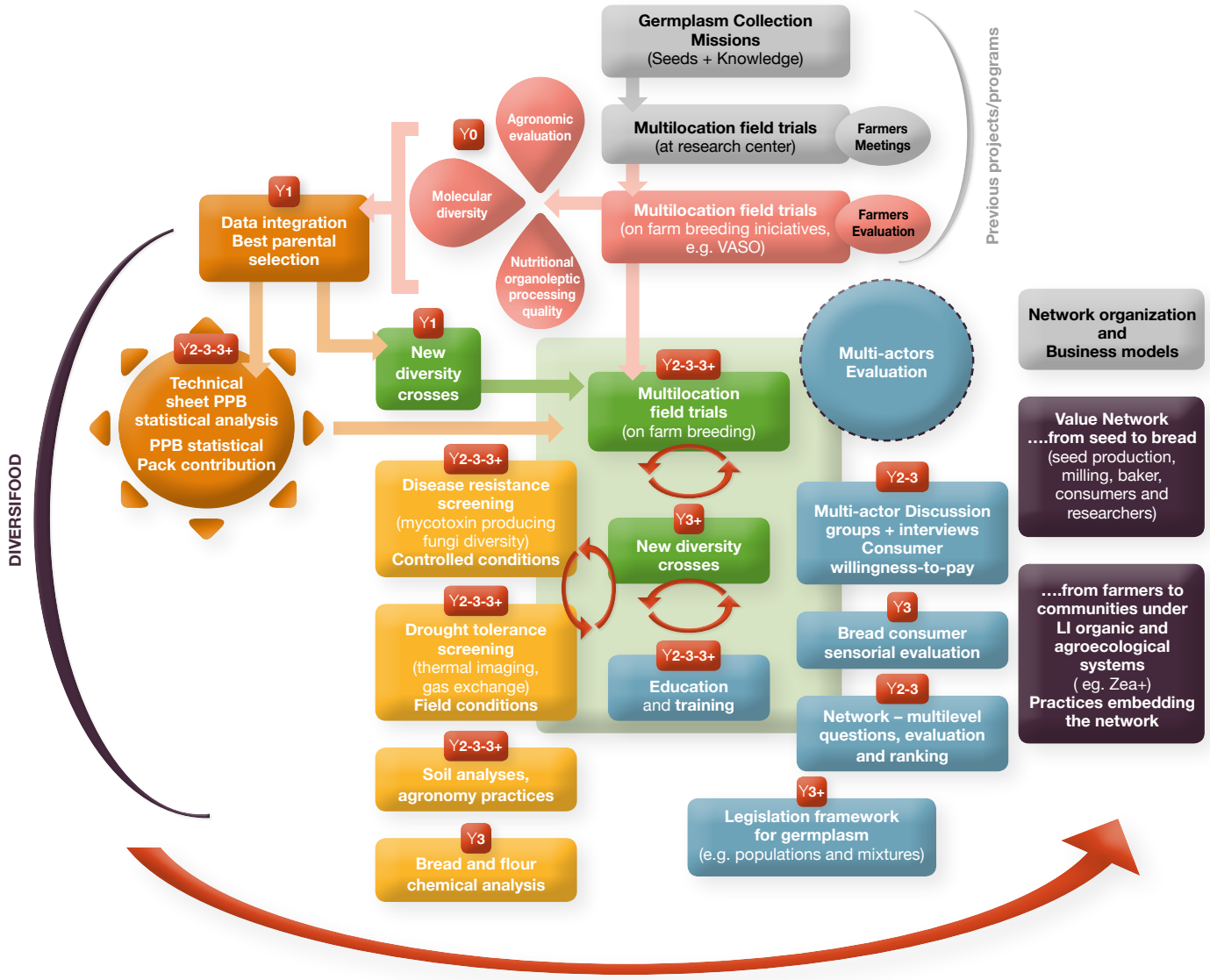
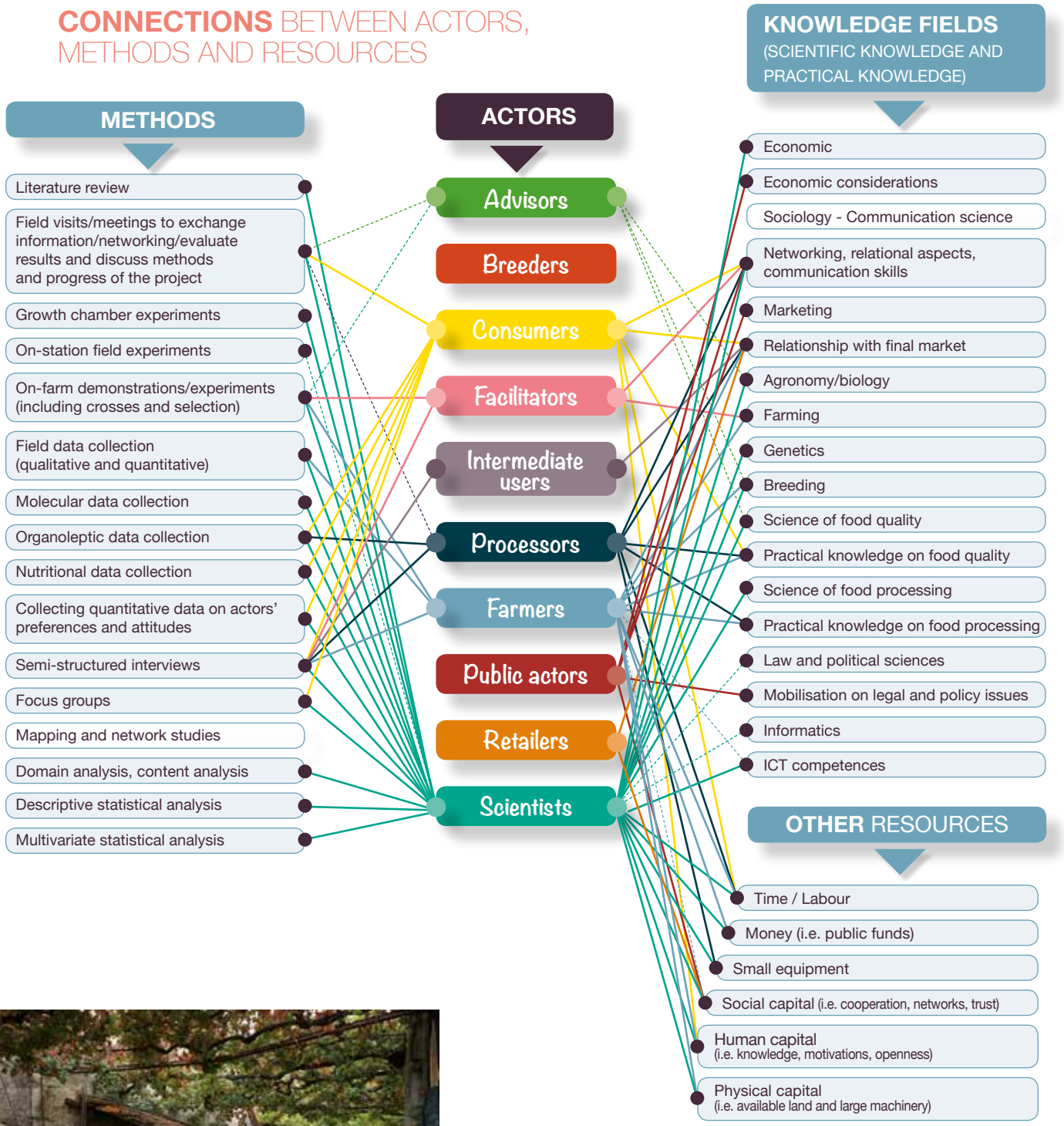
Group observing a farmer's collection of maize varieties

RESEARCH OPERATIONALIZATION OF THE PROJECT



Portuguese maize bread waiting to be tasted at a Diversifood event

CONNECTIONS BETWEEN ACTORS, METHODS AND RESOURCES



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Researchers and farmers meet to organize participatory research

MAIN METHODS AND TOOLS
USED IN THE PROJECT

	Methods	Tools
Tools for participatory plant breeding activities (tPC)	• Multi-actor and integrated approach to merge the information from field trials selection, from molecular, technological and organoleptic tests, on actors' needs and preferences • On farm experiments, field demonstration • Field visits/meetings to exchange information • Sampling and collecting of germoplasm performance data (various measures of plant traits) • Analysis of trials and test results • Collecting information on actors' preferences (farmers, bakers, consumers) • Develop statistical methods to help farmers in the selection procedures • Discussion groups/meetings to evaluate the results	• Documents collection and systematic literature review • Protocols for agronomic, molecular, technological and organoleptic data collection and analyses • Database for data management and software for data (including statistical) analysis • Questionnaires to collect information from the various actors • Statistical softwares • SWOT analyses
Tools for drought resistance evaluation (tTQB)	**Drought resistance maize populations evaluation** (growth chamber)	• ThermaCAM, FlirSystems (Thermal Imaging instrument) and LCpro+, ADC BioScientific (IRGA instrument) • ITS fungal DNA region sequencing for fungi species confirmation, LC-MS mycotoxin production confirmation
	Statistical analyses (PCA: data Integration of molecular and quality data + collected resistance evaluation)	PCA with software for statistical analysis: FSTAT, GENEPOP, ARLEQUIN, PHYLIP, SAS.
	Sensorial analysis of maize bread (from new populations)	Consumer panel evaluation.

This project involves many types of actors and fields of knowledge with many connections between the different types of actors and fields of knowledge. This experiment has been underway for more than 20 years and new types of actors and fields of knowledge have been integrated during this period. This led to a very complete integrated approach, with the possibility of a variety of in-depth focuses. The complexity of research operationalization is the consequence of longevity of the collective experience.

SUMMARY OF CASES

Using a multi-actor approach to plant breeding can take different forms depending on different elements, in particular, the age of the project. The iterative process sometimes requires several years of collective practice to be fully integrated. We observed that almost all the actors involved in the projects are familiar with different methods and several fields of knowledge. This facilitates the holistic approach required for such projects and increases their effectiveness.

FURTHER THOUGHTS ABOUT MULTI-ACTOR RESEARCH

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Farmer's dynamic population of wheat

A SPECIFIC TYPE OF RESULTS

Multi-actor research implies a broader conception of «research results», which are not only academic or scientific results, but also other socially recognized achievements, such as trust (as already mentioned in the building blocks). These specific results contribute to the success of the process. In other words, the results are both the research process and the end products.

Multi-actor research facilitates the implementation of innovation. Indeed, there is a complementarity between traits observed by practitioners and other 'less visible traits' informed by scientists. This benefits the practitioners, who acquire a better understanding of what they do, and are consequently in a better position to improve their practices, but also the scientists, who often acquire different perspectives by observing and understanding things and processes. In the end, farmers (and other practitioners) may themselves become researchers, and scientists may become more involved in the practical aspects and more open to other meanings. Empowerment of actors is one of the main results of multi-actor research projects.

DIVERSITY OF ACTORS

In some cases, such as in emergent fields of research, it may not (yet) be possible to get many actors involved, which means the focus will inevitably be narrower. However, this does not mean it is «inferior» multi-actor research; but, given the context (a new question to address), it is easier to start with small groups of actors. When the research project deals with more applied questions, it will be possible (and necessary) to work with larger different groups of actors (and hence with more methods and fields of knowledge) in order to successfully implement a multi-actor research process.

CONTINUOUS AND ITERATIVE PROCESS, BASED ON MUTUAL LEARNING

Multi-actor research is not a linear process, but rather an iterative and continuous process, which concerns all the research phases. Nothing is completely definitive, not even the goals defined at the beginning. They may be called into question by unexpected results that oblige the group to think about the originally defined research question, and about the methodology and methods used. This means that new questions can emerge, leading to the need to redesign the initial project, and this is not a failure, but rather the result of continuous interaction between doing and corroborating, and between scientific and practical knowledge and know-how. This iterative process, based on mutual learning, is the heart of multi actor-research.

Decision making is an important part of such an iterative process, and is itself a continuous process that may take different forms - through varying combinations of individual meetings and group meetings - depending on the questions and issues to be discussed. Sometimes a common decision is not easy to take and may lead to conflicts, but conflicts are also the expression of strong involvement and, if properly managed, may represent a positive contribution to the progress of the process. In this regard, technical approaches can be based on compromise, while the rules of the process need to be based on consensus.

Farmers observing cauliflower genetic resources

POINTS OF ATTENTION

EXPERIMENTAL DESIGN

If there are too many constraints in the experiments, only a few farmers and practitioners will be able to be involved. It is thus important to optimize the experimental design (and adapt the statistical methods) to involve as many people as possible and to increase participation.

INTELLECTUAL PROPERTY RIGHTS

The question of intellectual property rights has to be considered right at the beginning of a project: what kind of results could be concerned, what type of intellectual property rights would be the most suitable for the consortium? This question needs to be raised even if none of the actors involved think it is important.

SOCIAL IMPACT

Multi-actor research projects always have a social impact on the people involved; the impact will vary depending on the type of question addressed. This has to be taken into account in the research process.

INTERPRETATION OF THE RESULTS

The results may be subject to different ideological interpretations by different kinds of actors. All the participants involved need to be aware of this possibility, and deal with it. This can lead to conflicts and participants will need to put things into proper perspectives (socio-economic, cultural and historical) and to help each other to do so.

FIELDS OF KNOWLEDGE

Multi-actor research projects may be easier to implement in applied sciences than in social or theoretical sciences. Indeed, in applied sciences, there is something concrete to work with or to observe collectively and scientific knowledge is connected to practical know-how. This may not be the case (or maybe yes, but to a lesser extent) in theoretical and social sciences, although social scientists' capacity to involve practitioners in a process of reflexivity on their actions may make the difference.

AS A CONCLUSION

In DIVERSIFOOD, multi-actor approach helps create conditions for food democracy because the actors participate actively in shaping their food systems. This approach fosters social learning and participatory processes, and thus, empowerment and responsibility of the actors in the different food-related practices (breeding, farming, processing, food preparation, distribution and consumption), creating and promoting a «food culture». The proposed multi-actor process is particularly suited to the reality of local and regional food systems, where it can help identify and tailor solutions to specific situations that will be all the more effective for sustainability. Projects involving practitioners and scientists are more promising when practitioners are the initiators, calling the scientists to contribute, and not the contrary («proof of usefulness»).

> *Don't narrow the focus from the start! It may reduce the opportunity to investigate unexpected important variables. Adapt the methods and tools to the context and encourage an open atmosphere right from the beginning. Leave room for needs, serendipity (unexpected outcomes) and creativity.*

From this feeling of freedom, a co-evolutionary process will emerge with the dynamic integration of several dimensions of the agroecosystem and its socio-cultural context, including ethical values (e.g. respecting organic principles). A true transdisciplinary skill will emerge crossing different types and sources of knowledge originating in the interaction between different researchers and actors of the food chain (farmers, processors, cooks, craftspeople), and the capacity of this new shared pool of knowledge to be more than the sum of the parts.


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This toolkit provides building blocks to help create a multi-actor approach to participatory and collaborative plant breeding, and action-research for high quality food systems. It results from the wide range of experience acquired during the Diversifood project to boost cultivated diversity for organic and low-input agriculture and from the collective reflection of all the partners of the project.


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