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D8.2 Plan of the activities to exploit results

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FRD-CODEM

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Table of Contents

Glossary of terms.....	4
Main definitions.....	5
1. Introduction.....	6
2. Expected results and exploitation in the proposal	8
3. Exploitation plan.....	15
3.1 Knowledge management	16
3.2 Identification of exploitable results	18
3.3 Business and exploitation plans	19
3.4 Intellectual Property and knowledge protection.....	26
3.5 Dissemination and exploitation are closely linked	26
3.6 Key Performance Indicators	27
4. Quality control and monitoring	27
4.1 KPIs.....	27
4.2 Deliverables.....	28
4.3 Timeline	29
Annex 1 – References.....	1
Annex 2 – Monitoring exploitation	2
Annex 3 – Material transfer agreement	5

Glossary of terms

e.g.

CA	Consortium Agreement
CO₂	Carbon dioxide
D&E	Dissemination & Exploitation
GHG	Green House Gasses
GM	Genetic modified
GMOs	Genetically Modified Organisms
IET	Innovation and Exploitation Team
IP	Intellectual Property
IPR	Intellectual Property Rights
KERs	Key Exploitable Results
KO	Knowledge Outputs
KPI(s)	Key Performance Indicator(s)
KT	Knowledge Transfer
MTA	Material Transfer Agreement
NABC	Need, Approach, Benefit, Competition
NGP	Next Generation barley Plants
O₃	Ozone
PAER	Plan of the Activities to exploit Results
PU	Potential User
ROL	Results Ownership List
R&I	Research & Innovation
SAB	Stakeholder Advisory Board
sMTA	standard Material Transfer Agreement
TG	Target Group
WP	Work package

Main definitions

Exploitation	<ul style="list-style-type: none"> The utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities¹.
Knowledge Management	<ul style="list-style-type: none"> Knowledge Management is the process of identifying, capturing, organising, analysing, and storing knowledge to ensure its availability to be transferred effectively to specific and relevant users.
Knowledge Transfer	<ul style="list-style-type: none"> Knowledge Transfer (KT) is the overall process of moving knowledge from knowledge sources to targeted potential users, focusing the research being conducted on the wider needs of society and industry. KT consists of a range of activities that aims to capture and transmit knowledge, skills, and competencies from those who generate them to those who will transform them into added value outcomes, thus maximizing impact. This methodology focuses on capturing all the project's 'Knowledge Outputs' (Kos) and, through a series of collections and prioritisation, identifying the 'Key Exploitable Results' (KERs).
Knowledge Outputs (Kos)	<ul style="list-style-type: none"> Knowledge Outputs (Kos) are described as "a unit of knowledge that has been generated out of a scientific project. It is not limited to de-novo or pioneering discoveries but may also include new methodologies/processes, adaptations, insights, alternative applications of prior know-how/knowledge".
Key Exploitable Results (KERs)	<ul style="list-style-type: none"> Key Exploitable Results (KERs) are the 'tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature' which have been deemed to be of high priority for project transfer actions.
Results	<ul style="list-style-type: none"> Any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected.

¹ http://ec.europa.eu/research/participants/portal/desktop/en/support/reference_terms.html

1. Introduction

For European Community knowledge valorisation plays an essential role in enabling Europe's systemic transformations into a greener, digital, inclusive and sustainable society. Research and innovation (R&I), knowledge sharing and collaboration across Member States will accelerate turning publicly funded research solutions into innovative solutions with high socio-economic impact. Aiming to maximise the long-term leverage of EU R&I investment, knowledge valorisation seeks to involve all players and ensure that data, research results and inventions are transformed into sustainable products, processes and services that bring economic value and benefit to society.

Horizon Europe Programme increased importance given to Dissemination & Exploitation activities:

- “Subject to any restrictions due to the protection of intellectual property, security rules or legitimate interests, each participant shall through appropriate means disseminate the results it owns as soon as possible.”
- “Each participant that has received Union funding shall use its best efforts to exploit the results it owns, or to have them exploited by another legal entity...”
- “... participants shall provide any information on their exploitation and dissemination related activities, and provide any documents necessary in accordance with the conditions laid down in the grant agreement”.

European Commission R&I services have established a Strategy for effective dissemination and exploitation of Horizon Europe research results:

- To better put funded R&I project results to economic and social use
- To make available scientific evidence in support of policy making

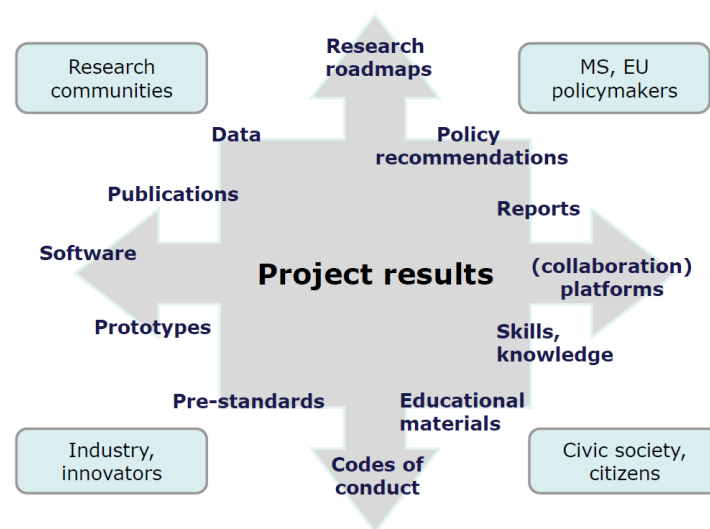


Figure 1 – Strategy for effective dissemination and exploitation of H2020 research results²

The overall objective of BEST-CROP is to develop novel crops with enhanced photosynthesis and assimilation of green-house gasses (GHG), such as carbon dioxide (CO₂) and ozone (O₃), that in turn, will result in plants with increased biomass. Assuming a constant harvest index the increased biomass will lead to both increased grain yield and

² The Plan for the Exploitation and Dissemination of Results in Horizon 2020, European IPR Helpdesk, 2015

increased straw yield. More straw could suggest to tailor straw composition to a range of specific end-uses: feed, green chemistry, construction, and composites sectors.

The BEST-CROP Plan of the activities to exploit results (PAER) aims to:

- Specify the strategy of D&E mentioned in the proposal
- Update the plan according to the progress and emerging results of the project
- Consider changes in the stakeholders, work context and potential use of results during the BEST-CROP lifetime
- Report on the updates periodically
- Allow the use of the results as broadly as possible

The Plan of the Activities to exploit Results (PAER) follows the evolution of the project until the submission of the final project report, so it will be flexible enough, ensuring that the project follows the needs and the expectations of the beneficiaries during its implementation. Thus, BEST-CROP's Plan of the Activities to exploit Results coordinated by FRD-CODEM, should be understood as a living document, developed in month 8 and :

- Updated in M34 (**D8.4**);
- Declined in M48 into Patent and agreements (**D8.7**) and M58 into Business and exploitations plans (**D8.6**).

The following sections present in detail the main characteristics of the PAER, including:

- Knowledge management
- Exploitable results identification
- Intellectual property and knowledge protection
- Dissemination and exploitation links
- Key performance indicators
- Quality control and monitoring

The PAER was drawn up following input from Innovation and Exploitation TEAM (IET) members, particularly at 3 preliminary meetings:

- January 9, 2024: coordination meeting between UMIL, IBT and FRD-CODEM
- January 18, 2024: installation meeting of the Innovation and Exploitation Team
- February 7, 2024: first periodic meeting of the BEST-CROP consortium



Figure 2 – Installation meeting of the Innovation and Exploitation Team (January 18, 2024)

2. Expected results and exploitation in the proposal

BEST-CROP will develop Next Generation barley Plants with increased overall productivity, allowing denser sowing with reduced light competition, under sustainable agriculture conditions. BEST-CROP plants will capture higher amounts of CO₂ and O₃, and by developing novel straw-based product the captured CO₂ will be accumulated in long term storage contributing to mitigate the impact of climate change.

The produced barley straw will be processed into proteins and bio-lubricants, contributing to overcoming the existing EU shortage in protein production and providing a sustainable and environmentally friendly solution to traditional lubricants produced from crude oils.

The straw will be used also in the building and construction sectors to replace traditional materials highly dependent on non-renewable resources.

BEST-CROP will provide innovations that:

- **Increased barley yield** contributing to produce more food and feed for the needs of the world population.
- **Boost the growth of the circular bioeconomy:** tailoring of barley straw for efficient transformation into high-value bio-based compounds and materials that replace products currently obtained from high-polluting industrial sectors with high dependency on non-renewable energy sources.
- **Mitigate ozone air pollution extremes during drought:** by providing a strategy of air phytoremediation through the modulation of stomatal conductivity for ozone without a negative effect on drought tolerance and yield.
- **Address the global food security crisis:** by delivering highly productive barley breeding lines. Furthermore, barley represents an optimal model species for other cereals with a view to project medium-term replicability.

BEST-CROP expected results are tailored to different type of stakeholders, and will be linked to one of the 7 specific Target Groups (TG) for communication activities:

- **Scientific and research community.** Researchers working on barley breeding programmes and the whole scientific community dealing with plant genetic improvement, GM crops and exploiting biotechnology and highly innovative approaches applied to agriculture.

SPECIFIC NEEDS: Meet the EU demand for the acceleration of the green transition, contributing to mitigating climate change and reducing air pollution; new generation of crops with increased overall productivity; straw composition tailored for transformation into high-value biobased industrial products.

- **Farmers and their representative organizations.**

SPECIFIC NEEDS: Providing an additional economic input; increased overall plant productivity.

- **Animal-feed and organic high-nutrient waste stream producers.** Producers of feed or feed ingredients.

SPECIFIC NEEDS: Offset the strong demand in recent years, unbalanced by weak global production; production of sustainable high-value bio-based products from agriculture residues to foster the green industry transition.

- **Lubricants sector.** The entire oleochemical industry.

SPECIFIC NEEDS: Replace fossil-based and plant-derived oils and make up for the future unavailability of palm oil; production of sustainable high-value bio-based products from agriculture residues to foster the green industry transition.

- **Building and construction industrial sector.** The entire building and construction sector, in particular in the building insulation materials market, and particle boards for the construction sector.

SPECIFIC NEEDS: Make this sector more environmentally friendly, using sustainable raw materials to replace those usually made from chemicals and fossil resources; production of sustainable high-value bio-based products from agriculture residues to foster the green industry transition.

- **Policymakers, regions, and territories.** The Next Generation Barley Plants will meet the EU environmental objectives, allowing sustainable agriculture and less land use and contributing to reducing Greenhouse Gas emissions, and will consent to the adoption of green products and materials.

SPECIFIC NEEDS: Greater understanding of plant biotechnology and gene-editing and of their potential for a sustainable agri-food system; increased awareness of the dangers associated with climate change; develop policy instruments and incentives that support and enhance sustainable practices in agriculture and in traditional industry.

- **Consumers and civil society.** Including the general public and young people.

SPECIFIC NEEDS: Raise consumer awareness on the need for new sustainable production and consumption models; fighting fake news and improve the understanding and trust of general public towards the NGPs.

From the communication activities described above, we expect the following types of results:

Table 1 – Example of results

Research COMMUNITY	INDUSTRIAL & INVESOR COMMUNITY
<ul style="list-style-type: none"> • Publications • PhD thesis • Further research results 	<ul style="list-style-type: none"> • Advanced breeding lines and registered varieties • Patent or trade secret • Prototype • Industrial scale up
...	...

The expected results presented in the proposal are detailed in the following table:

Table 2 – BEST-CROP expected results in the proposal

SPECIFIC NEEDS	EXPECTED RESULTS	D&E MEASURES	TG	OUTCOMES	IMPACTS
<p>A new generation of crops:</p> <p>4) with increased overall productivity</p> <p>ii) straw composition tailored for transformation into high-value biobased industrial products</p> <p>iii) contributing to mitigate climate change and reduce air pollution</p>	<p>Advanced barley breeding lines and GE/GM lines (TRL5) with:</p> <p>4) Increased photosynthesis efficiency and enhanced biomass production and grain yield (+ 15-20%)</p> <p>ii) Tailored straw with either different lignin content and properties or increased protein amount (+ 8-10%)</p> <p>iii) Enhanced O3 (+50%) and CO2 (+15-20%) uptake and increased canopy albedo</p>	<p>- Scientific articles</p> <p>- Demonstration events at industrial partner facilities</p> <p>- Farmers day</p> <p>- Participation to conferences and fairs</p> <p>- Social Media and Webinars</p> <p>- Registration in the Official Catalogue of species and varieties of cultivated plants in interested countries</p>	<p>A,</p> <p>B,</p> <p>C,</p> <p>G</p>	<p>- Advanced breeding lines registered in the Official Catalogue (by 2031) or used for pre-breeding of locally adapted varieties (by 2035)</p> <p>- Scaling up to rice and wheat to TRL7 (by 2035)</p> <p>- GE varieties ready for cultivation (depending on EU regulation)</p>	<p>- BEST-CROP strategies extended to other major crops</p> <p>- Off-set the current agriculture contribution to GHG emissions</p> <p>- Increased O3 deposition (+25%)</p>
<p>Production of sustainable high value bio-based products from agriculture residues to foster the green industry transition</p>	<p>i) Implementation of innovative barley-straw based goods such as:</p> <p>- proteins and biolubricants</p> <p>- mycelium-based construction panels</p> <p>- particle boards and composites</p> <p>ii) Business and exploitation plan for industrial scale-up</p>	<p>- Scientific and technical articles</p> <p>- Demonstration events at industrial partner facilities</p> <p>- Participation to conferences and fairs</p> <p>- Social Media and Webinars</p> <p>- Prototypes</p> <p>- Identification of knowledge to be protected (patents, trade secrets...)</p>	<p>B,</p> <p>C,</p> <p>D,</p> <p>E,</p> <p>F,</p> <p>G</p>	<p>At least 50 sectoral companies engaged in valorization of project results employing up to 100 people, in farm-based rural areas (by 2040; based on partner MOGU data)</p>	<p>- Sustainable solutions for the oleochemical industry</p> <p>- Contribution to cover the EU shortage in local protein production</p> <p>- Contribution to the decarbonization of feed, oleochemical and construction industrial sectors</p>

SPECIFIC NEEDS	EXPECTED RESULTS	D&E MEASURES	TG	OUTCOMES	IMPACTS
<ul style="list-style-type: none"> - Greater understanding of plant biotechnology and gene-editing and of their potential for a sustainable agri-food system - Raise consumer awareness on the need for new sustainable production and consumption models - Increased awareness of the dangers associated with climate change 	<p>End-users and Policymakers aware of the safety and importance of plant biotechnology and gene-editing and of their positive impact on the environment and on the mitigation of climate change</p>	<ul style="list-style-type: none"> -Two-way communication activities - Informative webinars - Policy forum - Communication package - Consumer survey 	<p>F, G</p>	<p>A legislative implementation that support:</p> <ul style="list-style-type: none"> - exploitation of targeted mutagenesis -the adoption of bio-based products and materials from agriculture residues fulfilling market requirements and EU legislation - eco-labels. 	<p>Implementation of a circular and bio-based economy sector where agriculture residues provide high-value raw materials for new products with easier market access and commercialization according to EU legislation and customer needs.</p>

BEST-CROP outcomes will reach TRL5 at the end of the project. As such, the genetic materials and the bio-based products will not be market ready, but they will be validated for technical, economic and environmental sustainability as **advanced breeding lines** and **prototypes**.

At this development stage the elaboration of **tailored business and exploitation plans** for each industrial partner is one of the key factors for the definition of the actions required to bring to the market (TRL9) the project results and finally to assure their impact on society by 2031/2035.

The BEST-CROP consortium has the technological and financial capabilities to fully cover all TRLs and further enter into the market.

Each industrial partner will address its specific market, elaborating a disruptive value proposition with the potential to contribute to more sustainable and profitable agriculture and bio-based sectors (see Task 8.3).

Thanks to our partners SIS, KWS and Nordic Seed, **worldwide leaders in barley breeding**, and FRD-CODEM, MOGU and SO.G.I.S. **leaders in manufacturing bioproducts and biomaterials**, we will not need outside investors for the main exploitable results generated during this project.

While **biolubricants** and **biocomposites** are already making their way into the market and technologies and protocols for their production from barley straw will be ready by the end of the project, in 2028, the immediate path for exploitation of the project results would be the scale-up of the new barley varieties to enable commercial production and to expand the results to other relevant crops, as indicated in the next table.

Table 3 –BEST-CROP expected exploitation in the proposal

MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	STAKEHOLDERS	TRL LEVEL IN 2028	2028-2031	2028-2035
Non transgenic barley lines <i>Operating tool: registration in the Official Catalogue of species</i>	SIS KWS	4-5	Advanced breeding lines produced in WP3 showing improved biomass and straw characteristics will directly enter the procedure for registration in the Official Catalogue of species and varieties of cultivated plants in interested countries	<p>The breeding lines produced in WP3 will further advance into breeding programs to add local agronomic adaptation, depending on the interests of the breeding companies involved in BEST-CROP and, eventually, of other investors.</p> <p>Novel varieties will be ready for registration to the Official Catalogue of species and varieties by 2035.</p>
Transfer genetic results to other crops (rice & wheat) <i>Operating tool: further research</i>	Nordic Seed CREA in cooperation with breeding companies	4-5		<p>Scaling up of other major crops, such as rice and wheat to TRL7.</p> <ul style="list-style-type: none"> - The knowledge transfer to rice will be favoured by the presence of Prof. Stefan Schillberg, coordinator of Horizon 2020 project PhotoBoost, in the BEST-CROP SAB. - The impact of BEST-CROP on wheat will be made through the action of dr. Luigi Cattivelli member of BEST-CROP, a world-renowned wheat scientist. Interaction with other investors will be crucial to promote the transfer of the knowledge into other genetic systems.
GE/GM barley lines <i>Operating tool: further research</i>	USOVSKO	4-5		Regarding advanced lines deriving from the introgression of alleles from GM or GE techniques, the process will obviously depend on the regulation that will be adopted by the EU. In the event of a favourable judgement, gene-edited varieties will be ready by 2035.
Oils and hydrolysed protein production <i>Operating tool: : intellectual protection (patents, trade secrets...), and industrial scale up</i>	SO.G.I.S	5	At the end of the project, the processes and protocols for producing the targeted bioproducts from the barley straws created in BEST-CROP will be available at TRL5 and will have enabled the production of prototypes. They can therefore be protected by patents, trade secrets documents, etc.	

MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	STAKEHOLDERS	TRL LEVEL IN 2028	2028-2031	2028-2035
Straw based panels and composites production <i>Operating tool: intellectual protection (patents, trade secrets...), and industrial scale up or further research</i>	FRD-CODEM MOGU IMT	5	<p>Transferring them to an industrial setting will require further work in conjunction with the concerned stakeholder or new investors.</p> <p>Consideration could be given to how to transfer the results obtained to other straw-based agricultural co-products (wheat straw, oat straw, rice straw, rapeseed straw, sunflower cane, etc.).</p>	

3. Exploitation plan

The PAER is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact.

We will present below the activities to be undertaken (how and by whom) in order to ensure the exploitation beyond the project itself.

The exploitation strategy reflects and is built-up as a result of sound analysis of the market trends, potential users, and financial sustainability. The target users will be precisely identified and analysed in terms of specific needs and objectives.

The exploitation activities will be coordinated by FRD-CODEM in conjunction with the Innovation and Exploitation Team (IET). IET is led by FRD-CODEM and composed of representatives of the beneficiary and associated companies MOGU, SOGIS, FRD-CODEM, IMT, ITB, SIS, KWS, Nordic Seed, USOVSKO and CREA.

- The IET will assure a successful industrial exploitation, strengthening cooperation along the value chain and enable LSEs and SMEs to commercialize their innovations, such as through the development of a detailed Exploitation Plan and Intellectual Property Rights (IPR) management strategy which will be shared and discussed with the Stakeholder Advisory Board (SAB).
- A value chain and market analysis will be performed in order to find the needs of the customers and the competitive situation for each business cases. These will be assessed quantitatively to gain better insight by applying the broadly acknowledged Stanford Research Institute NABC (Need, Approach, Benefit, Competition) methodology.

The exploitation strategy will include the participation to dedicated seminars, to which all partners will present the exploitation activities which they are involved in, and the ways they intend to exploit and disseminate the results achieved.

The exploitation approach consists of the following three overall phases and is further described in detail below:

- Collect and Understand
- Validate and Analyse
- Transfer and Exploit

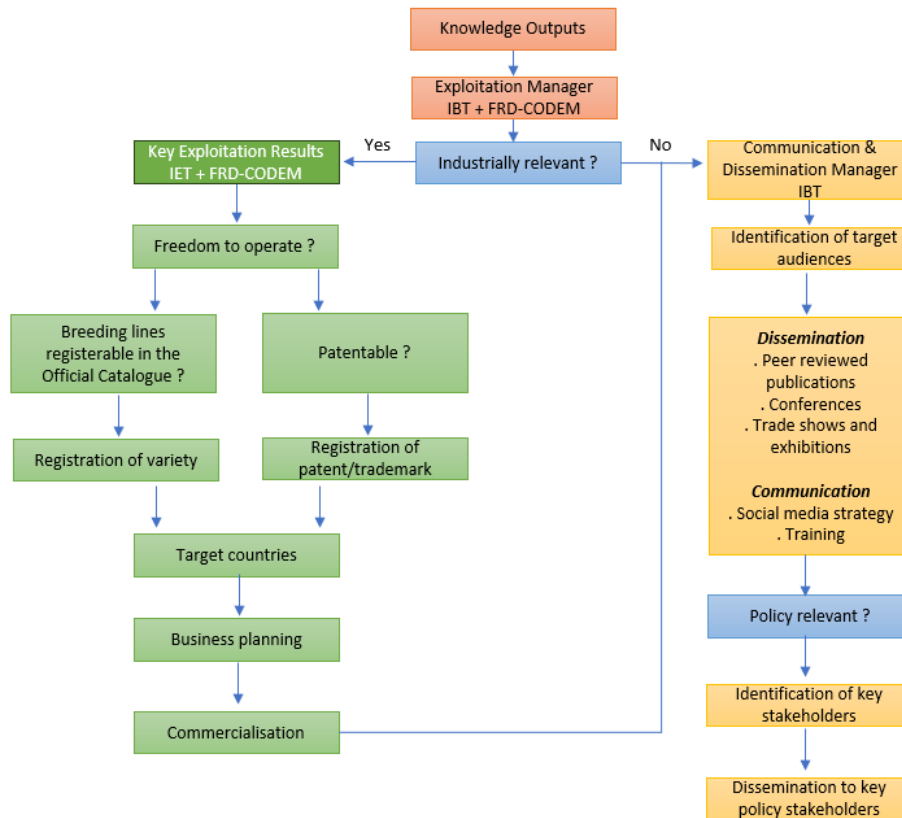


Figure 3 – BEST-CROP exploitation pathway

3.1 Knowledge management

All gained knowledge will be assessed and recorded in a dedicated file shared with the consortium, in line with the Consortium Agreement (CA), respecting privacy and Intellectual Property Rights (IPR) requirements. This approach is essential to avoid unforeseen delays or obstacles related to confidentiality or competitiveness and to provide partners with the security they need to allow them to be transparent in their findings, enabling the project to quickly identify opportunities for exploitation. The objective is to ensure the fastest route for new knowledge to where it can add value and create impact.

The Knowledge Management strategy is based on regularly collecting project Knowledge Outputs (Kos) and Key Exploitation Results (KERs). Ensuring this requires the involvement of all project participants at the earlier stage of development of the draft PAER and proper exploitation, dissemination and IPR management during the project implementation.

IBT and FRD-CODEM (WP8 and Task 9.3 leaders) will monitor knowledge generated and carry out regular collection rounds at each periodic Meeting (M13, M19, M25, M32, M37, M44, M49, M56, M60). Each partner will have to complete a dedicated questionnaire (see file shared for dissemination and exploitation activities). All outputs collected will be analysed, with support from all partners, and mainly Task Leaders, to decide if the outputs have to be protected, or can be communicated. This work will allow to identify Key Exploitable Results (KERs) with potential for

market uptake and to determine any IP protection requirements. These works will be submitted to the Innovation and Exploitation Team coordinated by FRD-CODEM.

The dedicated questionnaire is specified in annex number 2.

There will be a periodical review organised at each periodic meeting of the Kos and KERs created by each partner, and all partners will be encouraged to identify any knowledge that has potential commercial applications and have to be protected.

Each partner will treat information from other partners as confidential unless otherwise stated and not disclose it to other parties unless the information is publicly available. All beneficiaries need to note that Kos are not only the final results of research, but they can also be part of the methodology to obtain the final result, which could be an innovation for the whole research area.

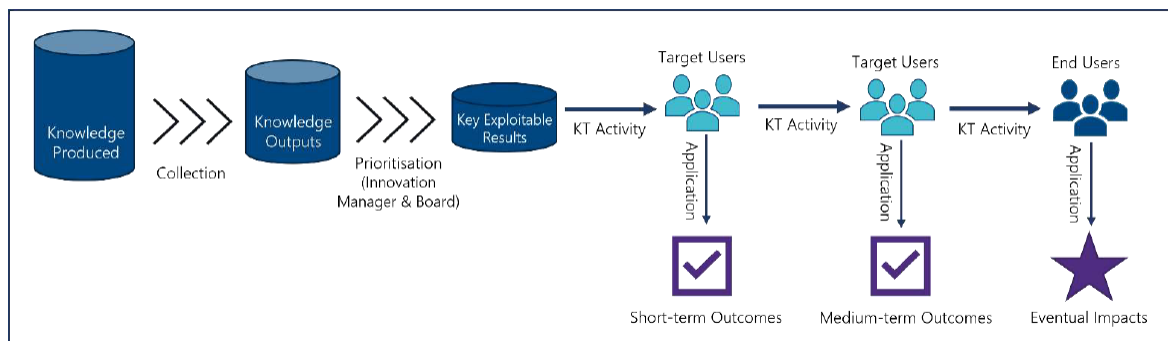


Figure 4 – BEST-CROP exploitation pathway (KT: Knowledge Transfer).

We propose to use the following protocol:

- This work will be done since the first periodic meetings in a pedagogic way in M8.
- Task Leaders and Industrial partners should send IBT & FRD-CODEM the completed Knowledge Output questionnaire every 6 months beginning in M19.
- The Mapping of the potential results that could be exploited in connection with work packages 1 to 5 will be done during an exploitation strategy seminar (M28).
- For all identified KOs from the questionnaire, FRD-CODEM will arrange, if necessary, an interview with the KO owner(s) to better understand the knowledge collected and brainstorm potential uses and users of the KO.
- After the interview, the KO owner(s) will receive a draft of the KO to check for accuracy following the discussion.
- KO owner(s) are requested to respond with any corrections or suggested additions/edits promptly. In particular, this review should focus on:
 - If the title of the KO(s) is sufficiently informative
 - If the description of the KO(s) is sufficiently comprehensive for a non-expert to adequately understand the nature of the KO and to determine its possible application.
 - If the potential end-users of the KO, as well as the potential application by each of these end-users, is reasonable/desirable and if there are any other potential end-users.

- If the KO(s) is publicly available or is subject to IPR protection, which would affect transfer potential.
- Once the interviewee is satisfied with the accuracy of their KOs, they will be marked as “confirmed” in the Knowledge Output questionnaire.
- Once confirmed, an IP review will be carried out. This involves:
 - The Exploitation Manager and the Innovation and Exploitation TEAM that will review each KO to determine whether it will require an IP assessment.
 - If an IP assessment is deemed necessary, the generating partner will be asked to complete an IP Assessment Form. Assessment Forms will be reviewed by the Exploitation Manager and appropriate board member(s) who will guide, as necessary, until all relevant parties believe sufficient the IP protection rules to be applied to the further dissemination, communication, and exploitation of the KO.
- Once the IP assessment is completed, or if an IP assessment is not deemed necessary, KOs will advance to the validation and analysis stage.

3.2 Identification of exploitable results

Collected and analysed results will be assessed based on criteria related to their innovation capacity, relevance to the sector and adherence to the project, by the Innovation Exploitation TEAM (IET).

Around the middle of the project, the consortium will start to map the potential results that could be exploited, meaning that this result will be used and further developed after the end of the project.

This mapping of the potential results that could be exploited in connection with work packages 1 to 5 will be done during a dedicated exploitation strategy seminar (M28), including all members of the consortium.

This phase aims to understand the positioning of a KO to carry out impactful Knowledge Transfer (KT) activities more efficiently. It intends to help clarifying how the KO could be beneficial to different targets and end-users. This step will also confirm potential applications, targets and end-users and the eventual impact of the KOs.

KOs will be prioritised and those with the potential to have an impact will go through to the next step. Those KOs that are validated and deemed to be of priority for the project will be re-labelled as KERs and progress to the next phase.

For each main KER a business and exploitation plan will be developed.

Any KOs that will not be classified as KER will continue to be periodically reviewed and will still be captured as evidence of impactful research for final reporting.

We propose to use the following protocol:

- At periodic intervals, FRD-CODEM organise IET meetings. The frequency and makeup of these meetings will be determined in collaboration with the Project Coordinator as well as based on the current status of knowledge collection and management in the project.

- The IET meetings will carry out a thorough examination and evaluation of the KOs (collected so far).
- Participants in these meetings will be asked to:
 - Confirm the accuracy and feasibility of knowledge transfer both within and beyond the project (but as a direct result of the project) for each presented KO, to the best of their understanding.
 - Assign to each KO a ranking to determine whether or not it should be prioritised as a KER based on its current status
 - Discuss and identify potential target end-users to whom the knowledge should be transferred to progress it towards its eventual impact
- After each expert analysis meeting, FRD-CODEM will revise the KO questionnaire to identify any progression of knowledge (such as a KO being changed to a KER).
- If any questions emerged from the expert analysis meeting, FRD-CODEM will reach out to the relevant KO owners to attempt to provide an answer.

3.3 Business and exploitation plans

An internal special seminar will be organized (M22), in connection with WP6 “Environmental, economic and political assessment” to bring together all the members of the IET and the Task leaders of WP1 to WP5. The aim of this first seminar will be to:

- Present the business model canvas we propose to use (see details in following figure).
- Validate the list of main business cases to develop.
- Review the implementation of the exploitation plan.

Each industrial partner will be responsible for the elaboration of tailored business and exploitation plans in collaboration with the Innovation and Exploitation Team (IET).

In accordance with the proposal, the following cases are envisaged:

1. Non transgenic and GE (NGT type 1) barley lines if the EU regulation will change as by the proposal of the Commission (CREA, SIS, KWS, Nordic Seed)
2. Transfer genetic results to other crops (CREA, SIS, KWS, Nordic Seed)
3. GE (NGT type 2)/GM barley lines (USOVSKO)
4. Oils and hydrolysed protein production (SOGIS)
5. Construction panels (MOGU)
6. Particle boards (FRD-CODEM)
7. Composites (FRD-CODEM/IMT)

Each effective exploitation and business plan will have to specify:

- The types of exploitable results (knowledge, methods, agreements, networks, technologies) and their direct and indirect value and impact for different stakeholders.
- The value propositions that will be brought to the customers
- The potential sales strategies (direct sales, licensing, joint venture, spin out...).

- The requirements for further technology development/scale-up to support market entry.
- The barriers and risks for exploitation (actual use of the results after project funding) will be recognised and countered with appropriate measures.
- The presentation of concrete measures to ensure that the results meet real needs, and that will be taken up by potential users (e.g. engaging them in project).
- The presentation of the roles and responsibilities of partners in exploiting results or supporting result exploitation by other (intermediate or end) users.

They will be made in connection with WP6 and Market Analysis deliverables, and use the following canvas, relatively common in European projects:

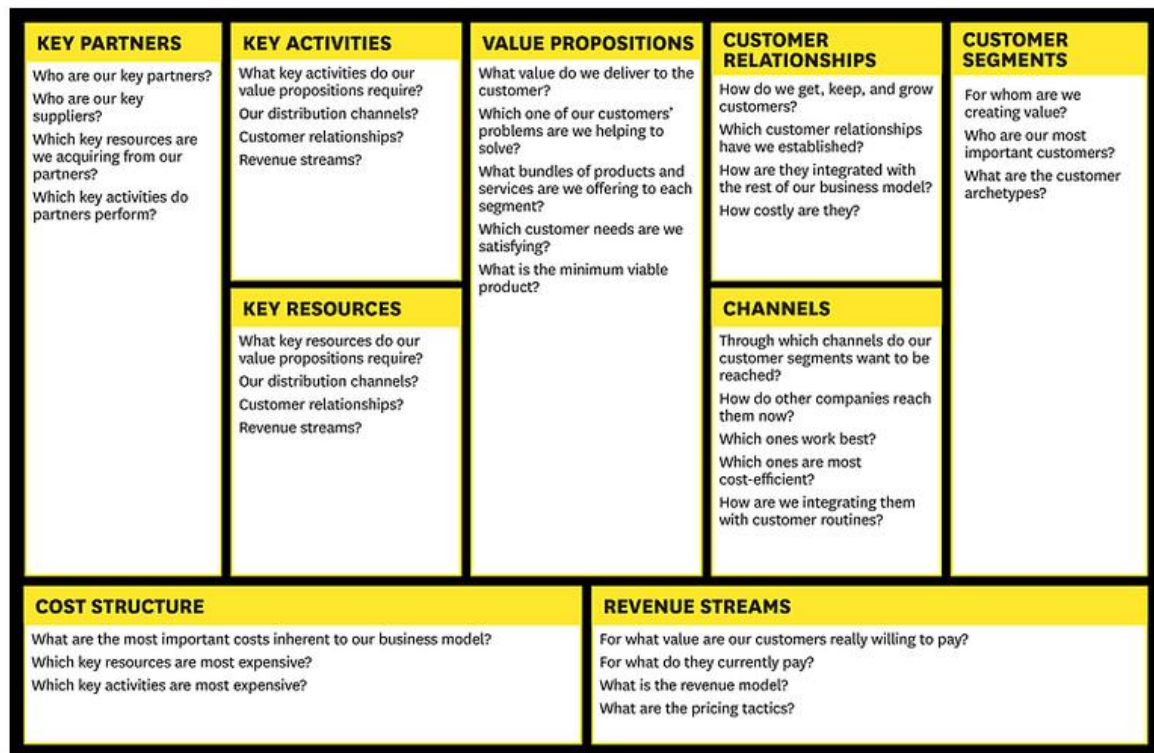


Figure 5 - BEST-CROP business model canvas

Two others workshop, linked with WP6, will be organized (M34, M56) to actualize and finalize the main business cases.

Table 4 – BEST-CROP preliminary thoughts on future business models. Example of 3 business cases.

MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	KEY PARTNERS KEY ACTIVITIES KEY RESOURCES	VALUE PROPOSITION	CUSTOMERS RELATIONSHIPS	CHANNELS	CUSTOMER SEGMENTS	COST STRUCTURE	REVENUE STREAMS
<p>Non transgenic and GE (NGT type 1) barley lines, according to the proposal of the EU commission</p> <p><i>CREA, SIS, KWS, Nordic Seed, USOVSKO</i></p>	<p>KEY PARTNERS: National and international seed associations (e.g. Euroseeds, Assosementi) representing the seed industry</p> <p>Farmers representatives and agri-cooperatives (e.g. Copa-Cogeca).</p> <p>KEY ACTIVITIES: Reinforcing the need for certified seed (>1 Mtons in 2022 in EU for barley) for stable and sustainable production</p> <p>Validating methods and technologies for pyramiding genes and traits in barley</p> <p>KEY RESOURCES: advances breeding lines carrying disease/drought resistance genes in high yielding background</p>	<p>Investment in crop genetic improvement generates attractive rates of return.</p> <p>In this sense, BEST-CROP will result in a wider barley portfolio, which includes traits poorly addressed before, an increased overall productivity and an additional revenue from straw-based by-products.</p>	<p>Management teams will be developed within seed companies, which are directly connected with farmers and the transformation industry. The close partnership between seed companies and farmers will speed up the adoption of new varieties developed in BEST-CROP.</p> <p>Additional investors will allow to expand the impact of BEST CROP.</p>	<p>The relation with stakeholders will be made through seminars, B2B contacts, etc.</p> <p>The customers will be made aware of the added values of the BEST-CROP derived varieties at demonstration events (e.g. farmers days in different countries) and with specific Social Media activities</p>	<p>The most important customers are:</p> <p>i) seed companies working in barley breeding</p> <p>ii) farmers in high-yielding environments, open to varietal renewal</p>	<p>Multi-environment trials for testing the best barley lines under different conditions across Europe.</p> <p>Registration in the Official Catalogue of species and varieties.</p> <p>Seed multiplication and certification.</p> <p>Development of farm to industry supply chains.</p>	<p>Investments of seed companies in plant breeding are rewarded through royalties (for barley ca. 3-4 Euro/ton of certified seed produced).</p> <p>Farmers will buy certified seeds of new varieties with higher yield and biomass.</p>

<p>Oils and hydrolysed protein production</p> <p>SOGIS</p>	<p>KEY PARTNERS: The original idea was to carry out breeding of BSF at farms where the raw material, straw, is produced. Once BSF larvae are produced, the downstream process is supposed to be carried out within the Company.</p> <p>In the R&D step, our key partners are Universities, for testing, and downstream users for appraisals</p> <p>Farmers will be the key suppliers</p> <p>KEY ACTIVITIES: Cropping barley ; Performing a chemical physical/enzymatic process for treating barley ; Breeding larvae ; Pressing larvae to extract oil ; Oil refining ; Production of Oleochemicals ; Proteins hydrolyzation; Selling products obtained</p> <p>KEY RESOURCES: Internal sales organization</p> <p>Barley cropping. BSF Larvae breeders</p>	<p>Farmers: increase in their income with a new additional activity</p> <p>Industry: selling oleochemical products derived from sustainable raw material, available with an added value (Fatty Acids chain length distribution, security of supply)</p> <p>The value deliver to the customer is Sustainability and Security of supply for:</p> <p>- BSF oil is the only source of lauric Acid that could be available not from Palm Kernel or from Coconut, but from BSF breded starting from by products within the food chain. This means that oleochemicals produced starting from BSF oils does not contribute to deforestation and are produced from byproducts obtained via circular economy processes. The raw material is produced starting from local sources, so that it is not subject to a lack in availability due to logistic or geopolitical problems.</p>	<p>- Oils: We do not need to look for other customers, as BSF oil is an immediate sustainable replacement for Palm Kernel and coconut Oil. Oil from BSF replaces 1 to one oil from Palm Kernel and coconut. SO.G.I.S. could further back integrate the current process adding a fractionation column in order to extract Lauric Acid.</p> <p>- Proteins: Company using vegetal proteins, mainly from Soybeans, do not need to find out other customers, as proteins from BSF are simple sustainable replacements of traditional sources</p> <p>We have informed customers that we are carrying out R&D activities in order to replace unsustainable raw materials with local sustainable Raw materials obtained from byproducts according to circular economy principles.</p>	<p>Our customer segments want to be reached by standard channels used in common practice in the Oleochemical industrial sector.</p> <p>Direct relationship with customers (Videocalls – phone calls). Explaining them value chains and plus of products.</p>	<p>We create value for those Companies looking for sustainable alternatives to the current Raw Materials supply chain:</p> <p>- Big international Companies, quoted or not, needing to present CSR,</p> <p>- Public/big international Companies producing polymers,</p> <p>- Public/big international Companies producing lubricants,</p> <p>- Public/big international Companies in the automotive sector.</p>	<p>Feeding larvae – Processing oil from larvae to get to chemical products.</p> <p>Food – energy required.</p>	<p>For SO.G.I.S., even a limited quantity of BSF larvae oil could be useful, such as 5.000 t, to increase raw materials sustainability. Availability of 20.000 t of oils from BSF could be the ideal quantity for this Company.</p> <p>About proteins, quantities required by the market are enormous, but a limited quantity (some hundred tons) could be useful for niche applications, such as cosmetic.</p> <p>The customers are really willing to pay for sustainability – circular economy – Low Carbon Footprint – Low LCA</p> <p>The revenue model is based on Biorefinery= using all outputs from the value chain.</p> <p>The pricing tactics is to be more sustainable at the same price or with a limited premium price.</p>
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MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	KEY PARTNERS KEY ACTIVITIES KEY RESOURCES	VALUE PROPOSITION	CUSTOMERS RELATIONSHIPS	CHANNELS	CUSTOMER SEGMENTS	COST STRUCTURE	REVENUE STREAMS
		<p>Oleochemical products are substances ranging from Fatty Acids and Glycerol to Esters, Amides, Metal Soaps, Hydrocarbons. They are used for a huge number of applications, ranging from plastics, paints and varnishes, building industry, animal feeding, detergent, cosmetics, pharmaceuticals, drilling, industrial lubricants and others.</p> <p>- Proteins: At the time being EU is suffering from a lack in protein sources for animal feeding. Moreover, proteins from vegetables are less noble than proteins from animals. BSF proteins are noble proteins, but not deriving from vertebrates, therefore with much less ethical problems.</p>					

MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	KEY PARTNERS KEY ACTIVITIES KEY RESOURCES	VALUE PROPOSITION	CUSTOMERS RELATIONSHIPS	CHANNELS	CUSTOMER SEGMENTS	COST STRUCTURE	REVENUE STREAMS
Straw based panels production MOGU	<p>KEY PARTNERS: Straw suppliers</p> <p>Technicians for installing the panels</p> <p>Logistics</p> <p>Architects (they create projects with our panels for customers)</p> <p>KEY ACTIVITIES: Research on strains performances R&D activities</p> <p>Find high-spending architectural projects (renovation, hotels, offices, etc)</p> <p>Find customers aware of sustainability issues and architects in search of sustainable alternative for high-spending customers</p> <p>KEY RESOURCES: Local straw supply</p> <p>Network of architects</p> <p>Strong and efficient fungal strains</p>	<p>Wall panels with good aesthetic and quality based on biological processes rooted in circular economy principles</p> <p>Products based on the collaboration with Nature thanks to the Mycelium</p> <p>A new way of looking products and bring people closer to Nature</p>	<p>Architects met in fairs, networks, events Marketing campaign</p> <p>They discover the potential of having new biobased and sustainable products and can use them in many projects</p> <p>We keep them through personal relations, commercial agreements, use of dealers and retailers</p>	<p>Marketing campaigns Commercial contacts Fair, events Promotion events</p>	<p>Architects with big projects (offices, hotels, etc) or renovation projects</p> <p>Big customer such as big brands or companies (for renovation of offices, shops, etc)</p> <p>Big events (ex: Expo)</p>	<p>R&D activities</p> <p>Straws and input materials</p> <p>Electric energy</p> <p>Equipments</p> <p>Personnels</p>	<p>Panel costs which increase while decreasing the amount and the way around</p> <p>Customers pay for having a sustainable product which is aesthetically beautiful</p> <p>They pay more than «standard» panel for having something which doesn't have an impact on the environment</p>

MAIN EXPECTED RESULTS AND OPERATING EXPLOITATION TOOLS	KEY PARTNERS KEY ACTIVITIES KEY RESOURCES	VALUE PROPOSITION	CUSTOMERS RELATIONSHIPS	CHANNELS	CUSTOMER SEGMENTS	COST STRUCTURE	REVENUE STREAMS
Straw based composites production <i>FRD-CODEM/IMT</i>	<p>KEY PARTNERS: Professional federations and trade show organizers (AVK, JEC, Polyvia, SFIP...)</p> <p>Wood Plastic Composite manufacturers, automotive suppliers...</p> <p>FRD-CODEM's customer base in this field</p> <p>KEY ACTIVITIES: Provide differentiating advantages (technical performance, environmental impact, etc.) to be determined</p> <p>KEY RESOURCES: Development of straw processing itineraries</p> <p>Results of composite processing characterization</p>	<p>Provide sustainable, high-performance composite parts with optimized environmental impact, using agricultural co-products, without competing with food needs and improving farmers' incomes.</p>	<p>Composites manufacturer met in fairs, networks, events Marketing campaign</p> <p>They discover the potential of having new biobased and sustainable products and can use them in many projects</p> <p>We keep them through personal relations, commercial agreements...</p>	<p>Marketing campaigns Commercial contacts Fair, events Promotion events...</p>	<p>This will depend on the technical, economic and environmental performance achieved, and in particular on any differentiating advantages.</p> <p>A distinction must be made between extrusion and injection technologies.</p> <p>Market segments will be key, but will depend on the points mentioned in the introduction</p>	<p>We need to distinguish between two major types of costs:</p> <p>-Qualification testing of the solutions developed, in order to prove their differentiating advantages and meet a multitude of specifications, since the needs of the composites sector are just as diverse as the processes and matrices used.</p> <p>- The cost of validation tests to be carried out on target customers is very high, piece by piece.</p> <p>One obstacle will be the lack of massification of these markets, which will initially weigh on their cost price.</p>	<p>Business model to be created and defined by the end of the project = industrial transfer of the process for valorising the straws developed.</p> <p>This raises the question of how to interest composites manufacturers, who are buyers of raw materials rather than processes.</p> <p>The COVID crisis has reinforced the need to control sourcing by securing supplies in terms of volume, price and proximity.</p>

3.4 Intellectual Property and knowledge protection

Linked to the tasks above, partners should protect their intellectual property developed during the project from possible external threats. Indeed BEST-CROP partnership involves LSEs and SMEs with competing interests. Furthermore, new investors would be engaged with the help of the Innovation and Exploitation Team and SAB in order to widen BEST-CROP impact and bring forward as many exploitable results as we will be able to identify.

Therefore, the implementation of a strategy for knowledge management and protection has been defined and a Consortium Agreement (CA) has been signed.

This strategy ensures that partners are free-to-operate adequately protecting their results, thus preventing conflicts and ensuring fair ownership.

The strategy includes:

- IP assessment to confirm the novelty of the proposed R&D work and the freedom to exploit the results
- An inventory on background IPR analysing national and institution-specific IP ownership rules for each partner
- Ownership and exploitation of the foreground knowledge as well as confidentiality to be respected by certain or all partners
- Material Transfer Agreement (MTA) to regulate the exchange and use of the genetic barley material (see Annex 3)
- Publication of results and the process for the release of publications to find an acceptable balance between protection and publication needs
- The definition of IP, especially concerning inventions, patents and trade secrets
- IPR issues within the consortium
- Compliance with national and institutional rules.

At the end of the project, we will list the final owners of the intellectual property and established a Results Ownership List (ROL).

Further details on the responsibilities and roles of the different Participants are provided in the Consortium Agreement (CA).

3.5 Dissemination and exploitation are closely linked

Dissemination and exploitation are closely linked as shown in the following Table:

Table 5 – Links between dissemination and exploitation activities

DISSEMINATION	EXPLOITATION
Describing and making available results so that they can be used	Making use of results, for scientific, societal or economic purposes
Audiences that may make use of results	Groups and entities that are making concrete use of results
All results which are not restricted due to the protection of intellectual property, security rules or legitimate interests	All results generated during project. Participant shall make best efforts to exploit the results it owns, or to have them exploited by another legal entity
Grant Agreement Art. 17	Grant Agreement art. 16

The work carried out under task 8.3 will be closely coordinated with the other tasks of WP8, which will require strong coordination between IBT and FRD-CODEM.

3.6 Key Performance Indicators

BEST-CROP's strategy of involving stakeholders and maximising the impacts includes a set of Key Performance Indicators (KPIs) designed to measure their efficiency for each product or initiative quantitatively. These KPIs are dedicated to exploitation or strongly linked to Communication and Dissemination tasks (see D8.1).

Table 6 - Key Performance Indicators dedicated to BEST-CROP exploitation and dissemination activities

DISSEMINATION	EXPLOITATION
<ul style="list-style-type: none"> • Number of publications • Number of oral presentations • Number of poster presentations 	<ul style="list-style-type: none"> • Number of advanced breeding lines • Number of prototypes • Number of patents/trade secrets... • Number of PhD thesis • List of further research including action to implement the results of BEST-CROP in other crops (i.e. wheat, rice)

4. Quality control and monitoring

FRD-CODEM will :

- Monitor the progress of the production of exploitation activities at the consortium and individual partner levels.
- Coordinate the production of 4 Deliverables (D8.2, D8.4, D8.6, D8.7).

These works will be closely linked with IBT (WP8 Leader) and UMIL (BEST-CROP Leader).

A progress update will be made at each periodic meeting, based by example on the dedicated shared file detailed in Annex 2. At the end of the project, we will list the final owners of the intellectual property and established a Results Ownership List (ROL).

During the project, the exploitation tools will be reviewed if necessary.

4.1 KPIs

Key Performance Indicators for BEST-CROP exploitation:

- Number of advanced breeding lines
- Number of patents/trade secrets...
- Number of prototypes
- Number of PhD thesis
- List of further research including action to implement the results of BEST-CROP in other crops (i.e. wheat, rice)

4.2 Deliverables

The following Table summarizes the deliverables of Task 8.3.

Table 7 - Task 8.3 Deliverables

N°	Deliverable name	Lead Beneficiary	Type	Dissemination level	Due date (month)
D8.2	Plan of the activities to exploit results	FRD-CODEM	R	PU - Public	8
D8.4	Intermediate update of the activities planned to exploit results	FRD-CODEM	R	PU - Public	34
D8.6	Business and exploitation plans	FRD-CODEM	R	SEN - Sensitive	58
D8.7	Patents and agreements	FRD-CODEM	DEC	SEN - Sensitive	48

4.3 Timeline

To conclude, the PAER timeline is described below.

At periodic intervals, FRD-CODEM will organise IET meetings. The frequency and member composition of these meetings will be determined in collaboration with the Project Coordinator as well as based on the current status of knowledge collection and management in the project. That's why these meetings are not specified in the timeline described below.

WP 8 / Task 8.3: exploitation of results																															
Tasks 8.3	Year 1						Year 2						Year 3						Year 4						Year 5						
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	
Plan of the activities to exploit Results				D													D							D					D		
Definition of Exploitation Plan, presentation and implementation at each periodic meeting				●		●		●		●		●		●		●		●		●		●		●		●		●		●	
Mapping of the potential results that could be exploited in connection with work packages 1 to 5: exploitation strategy seminar														●												●					
Business plan in connection with deliverables D6.3, D6.4 and D6.5: 7 business cases											●						●												●		

Legend:

- D = Deliverable submitted
- = Product delivered

Annex 1 - References

Key documents linked to BEST-CROP project:

- Our page on CORDIS BEST-CROP project (which will be updated to as our results come in): <https://cordis.europa.eu/project/id/101082091/fr>
- Horizon RESULTS PLATFORM as soon as we have the first exploitable results we will publish a page on HRP <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-results-platform> (“publish my result” process)

List of key documents and networks used / to be used in the development of the PAER and future updates:

- Dissemination and Exploitation in Horizon Europe. Horizon Europe Coordinators' Day, European Commission. https://rea.ec.europa.eu/dissemination-and-exploitation_en
- Your Guide to Intellectual Property Management in Horizon Europe: https://intellectual-property-helpdesk.ec.europa.eu/document/download/e10dfb28-9845-407d-aa5a-3ed250ea783c_en?filename=Your%20Guide%20to%20Intellectual%20Property%20Management%20in%20Horizon%20Europe.pdf
- Guide for successful valorisation of knowledge and research result Horizon Europe https://intellectual-property-helpdesk.ec.europa.eu/publications/successful-valorisation-knowledge-and-research-results-horizon-europe_en
- Research & innovation valorisation channels and tools <https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/f35fded6-bc0b-11ea-811c-01aa75ed71a1>
- Exploitation roadmap canvas : <https://www.meta-group.com/wp-content/uploads/2023/06/Exploitation-roadmap.pdf>
- PAER models from other european project:
 - The FOCUS EU-Project (Contract No: H2020 FoF-7-2014 – 637090) www.focusonfof.eu
 - The BBI-JU founded project CAFIPLA <https://cafipla.eu/>
 - The H2020 DREAM project <https://www.dream-euproject.eu/>

In the course of the project, depending on requirements, we may need to use the following European Commission services:

- **EU IP helpdesk** : online service dedicated to IP and IPR. https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk_en
- **Horizon Results Booster**: service to help Horizon Europe project beneficiaries define strategies for disseminating and exploiting results. <https://www.horizonresultsbooster.eu/> (if the service or another similar one continue in 2025).
- **Horizon Results Platform**: service enabling beneficiaries of Horizon Europe funds to present their results and find partners to exploit them. Its use is compulsory 1 year after the end of the project if a result has not been exploited elsewhere. <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-results-platform>
- **Enterprise Europe Network**: online service dedicated to develop partnering opportunities (business and technology): <https://een.ec.europa.eu/>

Annex 2 – Monitoring exploitation

All captured knowledge will be assessed and recorded in a dedicated file shared with the consortium, in line with the Consortium Agreement (CA), respecting privacy and Intellectual Property Rights (IPR) requirements = file “Exploitation reporting.xls”).

This approach is essential to avoid unforeseen delays or obstacles related to confidentiality or competitiveness and to provide partners with the security they need to allow them to be transparent in their findings, enabling the project to quickly identify opportunities for exploitation. The objective is to ensure the fastest route for new knowledge to where it can add value and create impact.

The Knowledge Management strategy is based on regularly collecting project Knowledge Outputs (KOs) and Key Exploitation Results (KERs). Ensuring this requires the involvement of all project participants at the earlier stage of development of the draft PAER and proper exploitation, dissemination and IPR management during the project implementation.

Each partner will have to complete a dedicated questionnaire (see below file “Exploitation reporting.xls”) at least 2 weeks before each periodic meeting.

This work will allow to identify Key Exploitable Results (KERs) with potential for market uptake and to determine any IP protection requirements. These works will be submitted to the Innovation and Exploitation Team coordinated by FRD-CODEM.

In detail, the "exploitation status", can be chosen between one of the following options:

- To define
- To protect
- Free of communication

The following items will be taken into consideration as explained in chapter 3.6 Key performance indicators:

- Thesis
- Breeding innovation
- Prototypes
- Patents/trade secrets...
- List of further research, including action to implement the results of BEST-CROP in other crops (i.e. wheat, rice)
- And any KOs that can occurred during BEST-CROP project

As a reminder, publications, oral presentations and poster presentations are already included in the communication reporting template (see D8.1).

The synthetic data required are listed below.

- **Patents/trade secrets...**

PATENTS / TRADE SECRETS

[illegible]

- **List of further research, including action to implement the results of BEST-CROP in other crops (i.e. wheat, rice)**

FURTHER RESEARCH

[illegible]

- And any KOs that can occur during BEST-CROP project

OTHER KNOWLEDGE OUTPUTS

[illegible]

Annex 3 – Material transfer agreement

We recommend using the standard MTA (sMTA) from International Treaty on Plant Genetic Resources for Food and Agriculture.

This sMTA can be found here in several languages: <https://www.fao.org/plant-treaty/areas-of-work/the-multilateral-system/smta/en/>

The English version is detailed below.

STANDARD MATERIAL TRANSFER AGREEMENT

PREAMBLE

WHEREAS

The International Treaty on Plant Genetic Resources for Food and Agriculture (hereinafter referred to as “the **Treaty**”)¹ was adopted by the Thirty-first session of the FAO Conference on 3 November 2001 and entered into force on 29 June 2004;

The objectives of the **Treaty** are the conservation and sustainable use of **Plant Genetic Resources for Food and Agriculture** and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security;

The Contracting Parties to the **Treaty**, in the exercise of their sovereign rights over their **Plant Genetic Resources for Food and Agriculture**, have established a **Multilateral System** both to facilitate access to **Plant Genetic Resources for Food and Agriculture** and to share, in a fair and equitable way, the benefits arising from the utilization of these resources, on a complementary and mutually reinforcing basis;

Articles 4, 11, 12.4 and 12.5 of the **Treaty** are borne in mind;

The diversity of the legal systems of the Contracting Parties with respect to their national procedural rules governing access to courts and to arbitration, and the obligations arising from international and regional conventions applicable to these procedural rules, are recognized;

Article 12.4 of the **Treaty** provides that facilitated access under the **Multilateral System** shall be provided pursuant to a Standard Material Transfer Agreement, and the **Governing Body** of the **Treaty**, in its Resolution 1/2006 of 16 June 2006, adopted the Standard Material Transfer Agreement.

¹ Note by the Secretariat: as suggested by the Legal Working Group during the Contact Group for the Drafting of the Standard Material Transfer Agreement, defined terms have, for clarity, been put in bold throughout.

ARTICLE 1 — PARTIES TO THE AGREEMENT

1.1 The present Material Transfer Agreement (hereinafter referred to as “**this Agreement**”) is the Standard Material Transfer Agreement referred to in Article 12.4 of the **Treaty**.

1.2 **This Agreement** is:

BETWEEN: (name and address of the provider or providing institution, name of authorized official, contact information for authorized official)* (hereinafter referred to as “the **Provider**”),

AND: (name and address of the recipient or recipient institution, name of authorized official, contact information for authorized official)* (hereinafter referred to as “the **Recipient**”).

1.3 The parties to **this Agreement** hereby agree as follows:

ARTICLE 2 — DEFINITIONS

In **this Agreement** the expressions set out below shall have the following meaning:

“**Available without restriction**”: a **Product** is considered to be available without restriction to others for further research and breeding when it is available for research and breeding without any legal or contractual obligations, or technological restrictions, that would preclude using it in the manner specified in the **Treaty**.

“**Genetic material**” means any material of plant origin, including reproductive and vegetative propagating material, containing functional units of heredity.

“**Governing Body**” means the **Governing Body** of the **Treaty**.

“**Multilateral System**” means the **Multilateral System** established under Article 10.2 of the **Treaty**.

“**Plant Genetic Resources for Food and Agriculture**” means any **genetic material** of plant origin of actual or potential value for food and agriculture.

“**Plant Genetic Resources for Food and Agriculture under Development**” means material derived from the **Material**, and hence distinct from it, that is not yet ready for **commercialization** and which the developer intends to further develop or to transfer to another person or entity for further development. The period of development for the **Plant Genetic Resources for Food and Agriculture under Development** shall be deemed to have ceased when those resources are **commercialized** as a **Product**.

“**Product**” means **Plant Genetic Resources for Food and Agriculture** that incorporate² the **Material** or any of its genetic parts or components that are ready for **commercialization**, excluding commodities and other products used for food, feed and processing.

* Insert as necessary. Not applicable for shrink-wrap and click-wrap Standard Material Transfer Agreements.

A “shrink-wrap” Standard Material Transfer Agreement is where a copy of the Standard Material Transfer Agreement is included in the packaging of the **Material**, and the **Recipient’s** acceptance of the **Material** constitutes acceptance of the terms and conditions of the Standard Material Transfer Agreement.

A “click-wrap” Standard Material Transfer Agreement is where the agreement is concluded on the internet and the **Recipient** accepts the terms and conditions of the Standard Material Transfer Agreement by clicking on the appropriate icon on the website or in the electronic version of the Standard Material Transfer Agreement, as appropriate.

² As evidenced, for example, by pedigree or notation of gene insertion.

“**Sales**” means the gross income resulting from the **commercialization** of a **Product** or **Products**, by the **Recipient**, its affiliates, contractors, licensees and lessees.

“**To commercialize**” means to sell a **Product** or **Products** for monetary consideration on the open market, and “**commercialization**” has a corresponding meaning. **Commercialization** shall not include any form of transfer of **Plant Genetic Resources for Food and Agriculture under Development**.

ARTICLE 3 — SUBJECT MATTER OF THE MATERIAL TRANSFER AGREEMENT

The **Plant Genetic Resources for Food and Agriculture** specified in *Annex 1* to **this Agreement** (hereinafter referred to as the “**Material**”) and the available related information referred to in Article 5b and in *Annex 1* are hereby transferred from the **Provider** to the **Recipient** subject to the terms and conditions set out in **this Agreement**.

ARTICLE 4 — GENERAL PROVISIONS

4.1 **This Agreement** is entered into within the framework of the **Multilateral System** and shall be implemented and interpreted in accordance with the objectives and provisions of the **Treaty**.

4.2 The parties recognize that they are subject to the applicable legal measures and procedures, that have been adopted by the Contracting Parties to the **Treaty**, in conformity with the **Treaty**, in particular those taken in conformity with Articles 4, 12.2 and 12.5 of the **Treaty**.³

4.3 The parties to **this Agreement** agree that (*the entity designated by the Governing Body*),⁴ acting on behalf of the **Governing Body** of the **Treaty** and its **Multilateral System**, is the third-party beneficiary under **this Agreement**.

4.4 The third-party beneficiary has the right to request the appropriate information as required in Articles 5e, 6.5c, 8.3 and *Annex, 2 paragraph 3*, to **this Agreement**.

4.5 The rights granted to the (*the entity designated by the Governing Body*) above do not prevent the **Provider** and the **Recipient** from exercising their rights under **this Agreement**.

ARTICLE 5 — RIGHTS AND OBLIGATIONS OF THE PROVIDER

The **Provider** undertakes that the **Material** is transferred in accordance with the following provisions of the **Treaty**:

- a) Access shall be accorded expeditiously, without the need to track individual accessions and free of charge, or, when a fee is charged, it shall not exceed the minimal cost involved;

³ In the case of the International Agricultural Research Centres of the Consultative Group on International Agricultural Research (CGIAR) and other international institutions, the Agreement between the Governing Body and the CGIAR Centres and other relevant institutions will be applicable.

⁴ *Note by the Secretariat*: by Resolution 2/2006, the Governing Body “invite[d] the Food and Agriculture Organization of the United Nations, as the Third-Party Beneficiary, to carry out the roles and responsibilities as identified and prescribed in the Standard Material Transfer Agreement, under the direction of the Governing Body, in accordance with the procedures to be established by the Governing Body at its next session”. Upon acceptance by the FAO of this invitation, the term, “the entity designated by the Governing Body”, will be replaced throughout the document by the term, “the Food and Agriculture Organization of the United Nations”.

- b) All available passport data and, subject to applicable law, any other associated available non-confidential descriptive information, shall be made available with the **Plant Genetic Resources for Food and Agriculture** provided;
- c) Access to **Plant Genetic Resources for Food and Agriculture under Development**, including material being developed by farmers, shall be at the discretion of its developer, during the period of its development;
- d) Access to **Plant Genetic Resources for Food and Agriculture** protected by intellectual and other property rights shall be consistent with relevant international agreements, and with relevant national laws;
- e) The **Provider** shall periodically inform the **Governing Body** about the Material Transfer Agreements entered into, according to a schedule to be established by the **Governing Body**. This information shall be made available by the **Governing Body** to the third-party beneficiary.⁵

ARTICLE 6 — RIGHTS AND OBLIGATIONS OF THE RECIPIENT

6.1 The **Recipient** undertakes that the **Material** shall be used or conserved only for the purposes of research, breeding and training for food and agriculture. Such purposes shall not include chemical, pharmaceutical and/or other non-food/feed industrial uses.

6.2 The **Recipient** shall not claim any intellectual property or other rights that limit the facilitated access to the **Material** provided under **this Agreement**, or its genetic parts or components, in the form received from the **Multilateral System**.

6.3 In the case that the **Recipient** conserves the **Material** supplied, the **Recipient** shall make the **Material**, and the related information referred to in Article 5b, available to the **Multilateral System** using the Standard Material Transfer Agreement.

6.4 In the case that the **Recipient** transfers the **Material** supplied under **this Agreement** to another person or entity (hereinafter referred to as “the **subsequent recipient**”), the **Recipient** shall

- a) do so under the terms and conditions of the Standard Material Transfer Agreement, through a new material transfer agreement; and
- b) notify the **Governing Body**, in accordance with Article 5e.

On compliance with the above, the **Recipient** shall have no further obligations regarding the actions of the **subsequent recipient**.

6.5 In the case that the **Recipient** transfers a **Plant Genetic Resource for Food and Agriculture under Development** to another person or entity, the **Recipient** shall:

⁵ *Note by the Secretariat:* The Standard Material Transfer Agreement makes provision for information to be provided to the **Governing Body**, in the following Articles: 5e, 6.4b, 6.5c and 6.11h, as well as in *Annex 2*, paragraph 3, *Annex 3*, paragraph 4, and in *Annex 4*. Such information should be submitted to:

The Secretary
International Treaty on Plant Genetic Resources for Food and Agriculture Food and
Agriculture Organization of the United Nations
I-00100 Rome, Italy

- a) do so under the terms and conditions of the Standard Material Transfer Agreement, through a new material transfer agreement, provided that Article 5a of the Standard Material Transfer Agreement shall not apply;
- b) identify, in *Annex 1* to the new material transfer agreement, the **Material** received from the **Multilateral System**, and specify that the **Plant Genetic Resources for Food and Agriculture under Development** being transferred are derived from the **Material**;
- c) notify the **Governing Body**, in accordance with Article 5e; and
- d) have no further obligations regarding the actions of any **subsequent recipient**.

6.6 Entering into a material transfer agreement under paragraph 6.5 shall be without prejudice to the right of the parties to attach additional conditions, relating to further product development, including, as appropriate, the payment of monetary consideration.

6.7 In the case that the **Recipient commercializes a Product** that is a **Plant Genetic Resource for Food and Agriculture** and that incorporates **Material** as referred to in Article 3 of **this Agreement**, and where such **Product** is not **available without restriction** to others for further research and breeding, the **Recipient** shall pay a fixed percentage of the **Sales** of the **commercialized Product** into the mechanism established by the **Governing Body** for this purpose, in accordance with *Annex 2* to **this Agreement**.

6.8 In the case that the **Recipient commercializes a Product** that is a **Plant Genetic Resource for Food and Agriculture** and that incorporates **Material** as referred to in Article 3 of **this Agreement** and where that **Product** is **available without restriction** to others for further research and breeding, the **Recipient** is encouraged to make voluntary payments into the mechanism established by the **Governing Body** for this purpose in accordance with *Annex 2* to **this Agreement**.

6.9 The **Recipient** shall make available to the **Multilateral System**, through the information system provided for in Article 17 of the **Treaty**, all non-confidential information that results from research and development carried out on the **Material**, and is encouraged to share through the **Multilateral System** non-monetary benefits expressly identified in Article 13.2 of the **Treaty** that result from such research and development. After the expiry or abandonment of the protection period of an intellectual property right on a **Product** that incorporates the **Material**, the **Recipient** is encouraged to place a sample of this **Product** into a collection that is part of the **Multilateral System**, for research and breeding.

6.10 A **Recipient** who obtains intellectual property rights on any **Products** developed from the **Material** or its components, obtained from the **Multilateral System**, and assigns such intellectual property rights to a third party, shall transfer the benefit-sharing obligations of **this Agreement** to that third party.

6.11 The **Recipient** may opt as per *Annex 4*, as an alternative to payments under Article 6.7, for the following system of payments:

- a) The **Recipient** shall make payments at a discounted rate during the period of validity of the option;
- b) The period of validity of the option shall be ten years renewable in accordance with *Annex 3* to **this Agreement**;
- c) The payments shall be based on the **Sales** of any **Products** and of the sales of any other products that are **Plant Genetic Resources for Food and Agriculture** belonging to the same crop, as set out in *Annex 1* to the **Treaty**, to which the **Material** referred to in *Annex 1* to **this Agreement** belongs;

- d) The payments to be made are independent of whether or not the **Product** is **available without restriction**;
- e) The rates of payment and other terms and conditions applicable to this option, including the discounted rates are set out in *Annex 3* to **this Agreement**;
- f) The **Recipient** shall be relieved of any obligation to make payments under Article 6.7 of **this Agreement** or any previous or subsequent Standard Material Transfer Agreements entered into in respect of the same crop;
- g) After the end of the period of validity of this option the **Recipient** shall make payments on any **Products** that incorporate **Material** received during the period in which this Article was in force, and where such **Products** are not **available without restriction**. These payments will be calculated at the same rate as in paragraph (a) above;
- h) The **Recipient** shall notify the **Governing Body** that he has opted for this modality of payment. If no notification is provided the alternative modality of payment specified in Article 6.7 will apply.

ARTICLE 7 — APPLICABLE LAW

The applicable law shall be General Principles of Law, including the UNIDROIT Principles of International Commercial Contracts 2004, the objectives and the relevant provisions of the **Treaty**, and, when necessary for interpretation, the decisions of the **Governing Body**.

ARTICLE 8 — DISPUTE SETTLEMENT

- 8.1 Dispute settlement may be initiated by the **Provider** or the **Recipient** or the (*the entity designated by the **Governing Body***), acting on behalf of the **Governing Body** of the **Treaty** and its **Multilateral System**.
- 8.2 The parties to **this Agreement** agree that the (*the entity designated by the **Governing Body***), representing the **Governing Body** and the **Multilateral System**, has the right, as a third-party beneficiary, to initiate dispute settlement procedures regarding rights and obligations of the **Provider** and the **Recipient** under **this Agreement**.
- 8.3 The third-party beneficiary has the right to request that the appropriate information, including samples as necessary, be made available by the **Provider** and the **Recipient**, regarding their obligations in the context of **this Agreement**. Any information or samples so requested shall be provided by the **Provider** and the **Recipient**, as the case may be.
- 8.4 Any dispute arising from **this Agreement** shall be resolved in the following manner:
- a) Amicable dispute settlement: The parties shall attempt in good faith to resolve the dispute by negotiation.
 - b) Mediation: If the dispute is not resolved by negotiation, the parties may choose mediation through a neutral third-party mediator, to be mutually agreed.

- c) Arbitration: If the dispute has not been settled by negotiation or mediation, any party may submit the dispute for arbitration under the Arbitration Rules of an international body as agreed by the parties to the dispute. Failing such agreement, the dispute shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce, by one or more arbitrators appointed in accordance with the said Rules. Either party to the dispute may, if it so chooses, appoint its arbitrator from such list of experts as the Governing Body may establish for this purpose; both parties, or the arbitrators appointed by them, may agree to appoint a sole arbitrator, or presiding arbitrator as the case may be, from such list of experts. The result of such arbitration shall be binding.

ARTICLE 9 — ADDITIONAL ITEMS

Warranty

9.1 The **Provider** makes no warranties as to the safety of or title to the **Material**, nor as to the accuracy or correctness of any passport or other data provided with the **Material**. Neither does it make any warranties as to the quality, viability, or purity (genetic or mechanical) of the **Material** being furnished. The phytosanitary condition of the **Material** is warranted only as described in any attached phytosanitary certificate. The **Recipient** assumes full responsibility for complying with the recipient nation's quarantine and biosafety regulations and rules as to import or release of **genetic material**.

Duration of Agreement

9.2 **This Agreement** shall remain in force so long as the **Treaty** remains in force.

ARTICLE 10 — SIGNATURE/ACCEPTANCE

The **Provider** and the **Recipient** may choose the method of acceptance unless either party requires **this Agreement** to be signed.

Option 1 –Signature*

I, (*Full Name of Authorized Official*), represent and warrant that I have the authority to execute **this Agreement** on behalf of the **Provider** and acknowledge my institution's responsibility and obligation to abide by the provisions of **this Agreement**, both by letter and in principle, in order to promote the conservation and sustainable use of **Plant Genetic Resources for Food and Agriculture**.

Signature..... Date.....
Name of the **Provider**

I, (*Full Name of Authorized Official*), represent and warrant that I have the authority to execute **this Agreement** on behalf of the **Recipient** and acknowledge my institution's responsibility and obligation to abide by the provisions of **this Agreement**, both by letter and in principle, in order to promote the conservation and sustainable use of **Plant Genetic Resources for Food and Agriculture**.

Signature..... Date.....
Name of the **Recipient**.....

Option 2 – Shrink-wrap Standard Material Transfer Agreements*

The **Material** is provided conditional on acceptance of the terms of **this Agreement**. The provision of the **Material** by the **Provider** and the **Recipient's** acceptance and use of the **Material** constitutes acceptance of the terms of **this Agreement**.

Option 3 – Click-wrap Standard Material Transfer Agreement*

- ☐ I hereby agree to the above conditions.

* Where the **Provider** chooses signature, only the wording in Option 1 will appear in the Standard Material Transfer Agreement. Similarly where the **Provider** chooses either shrink-wrap or click-wrap, only the wording in Option 2 or Option 3, as appropriate, will appear in the Standard Material Transfer Agreement. Where the “click-wrap” form is chosen, the **Material** should also be accompanied by a written copy of the Standard Material Transfer Agreement.

Annex 1

LIST OF MATERIALS PROVIDED

This *Annex* contains a list of the **Material** provided under **this Agreement**, including the associated information referred to in Article 5b.

This information is either provided below or can be obtained at the following website: (*URL*).

The following information is included for each **Material** listed: all available passport data and, subject to applicable law, any other associated, available, non-confidential descriptive information.

(*List*)

Annex 2

RATE AND MODALITIES OF PAYMENT UNDER ARTICLE 6.7 OF THIS AGREEMENT

1. If a **Recipient**, its affiliates, contractors, licensees, and lessees, **commercializes** a **Product** or **Products**, then the **Recipient** shall pay one point-one percent (1.1 %) of the **Sales** of the **Product** or **Products** less thirty percent (30%); except that no payment shall be due on any **Product** or **Products** that:
 - (a) are **available without restriction** to others for further research and breeding in accordance with Article 2 of **this Agreement**;
 - (b) have been purchased or otherwise obtained from another person or entity who either has already made payment on the **Product** or **Products** or is exempt from the obligation to make payment pursuant to subparagraph (a) above;
 - (c) are sold or traded as a commodity.
2. Where a **Product** contains a **Plant Genetic Resource for Food and Agriculture** accessed from the **Multilateral System** under two or more material transfer agreements based on the Standard Material Transfer Agreement only one payment shall be required under paragraph 1 above.
3. The **Recipient** shall submit to the **Governing Body**, within sixty (60) days after each calendar year ending December 31st, an annual report setting forth:
 - (a) the **Sales** of the **Product** or **Products** by the **Recipient**, its affiliates, contractors, licensees and lessees, for the twelve (12) month period ending on December 31st;
 - (b) the amount of the payment due; and
 - (c) information that allows for the identification of any restrictions that have given rise to the benefit-sharing payment.
4. Payment shall be due and payable upon submission of each annual report. All payments due to the **Governing Body** shall be payable in *United States dollars (US\$)*⁶ for the following account established by the **Governing Body** in accordance with Article 19.3f of the **Treaty**⁷:

**FAO Trust Fund (USD) GINC/INT/031/MUL,
IT-PGRFA (Benefit-sharing),
HSBC New York, 452 Fifth Ave., New York, NY, USA, 10018, Swift/BIC: MRMDUS33,
ABA/Bank Code: 021001088,
Account No. 000156426**

⁶ *Note by the Secretariat:* The Governing Body has not yet considered the question of currency of payment. Until it does so, Standard Material Transfer Agreements should specify United States dollars (US\$).

⁷ *Note by the Secretariat:* This is the Trust Account provided for in Article 6.3 of the Financial Rules, as approved by the Governing Body at its First Session (*Appendix E* to IT/GB-1/06/Report).

Annex 3

**TERMS AND CONDITIONS OF THE ALTERNATIVE PAYMENTS SCHEME
UNDER ARTICLE 6.11 OF THIS AGREEMENT**

1. The discounted rate for payments made under Article 6.11 shall be zero point five percent (0.5 %) of the **Sales** of any **Products** and of the sales of any other products that are **Plant Genetic Resources for Food and Agriculture** belonging to the same crop, as set out in Annex 1 to the **Treaty**, to which the **Material** referred to in *Annex 1* to **this Agreement** belong.
2. Payment shall be made in accordance with the banking instructions set out in paragraph 4 of *Annex 2* to **this Agreement**.
3. When the **Recipient** transfers **Plant Genetic Resources for Food and Agriculture under Development**, the transfer shall be made on the condition that the **subsequent recipient** shall pay into the mechanism established by the **Governing Body** under Article 19.3f of the **Treaty** zero point five percent (0.5 %) of the **Sales** of any **Product** derived from such **Plant Genetic Resources for Food and Agriculture under Development**, whether the **Product** is **available or not without restriction**.
4. At least six months before the expiry of a period of ten years counted from the date of signature of **this Agreement** and, thereafter, six months before the expiry of subsequent periods of five years, the **Recipient** may notify the **Governing Body** of his decision to opt out from the application of this Article as of the end of any of those periods. In the case the **Recipient** has entered into other Standard Material Transfer Agreements, the ten years period will commence on the date of signature of the first Standard Material Transfer Agreement where an option for this Article has been made.
5. Where the **Recipient** has entered or enters in the future into other Standard Material Transfer Agreements in relation to material belonging to the same crop[s], the **Recipient** shall only pay into the referred mechanism the percentage of sales as determined in accordance with this Article or the same Article of any other Standard Material Transfer Agreement. No cumulative payments will be required.

Annex 4

**OPTION FOR CROP-BASED PAYMENTS UNDER THE ALTERNATIVE PAYMENTS SCHEME
UNDER ARTICLE 6.11 OF THIS AGREEMENT**

I (*full name of **Recipient** or **Recipient's** authorised official*) declare to opt for payment in accordance with Article 6.11 of **this Agreement**.

Signature.....

Date.....⁸

In accordance with Article 6.11h of the Standard Material Transfer Agreement, the option for this modality of payment will become operative only once notification has been provided by the **Recipient** to the **Governing Body**. The signed declaration opting for this modality of payment must be sent by the **Recipient** to the **Governing Body** at the following address, whichever method of acceptance of **this Agreement** (signature, shrink-wrap or click-wrap) has been chosen by the parties to **this Agreement**, and whether or not the **Recipient** has already indicated his acceptance of this option in accepting **this Agreement** itself:

The Secretary,
International Treaty on Plant Genetic Resources for Food and Agriculture Food and Agriculture
Organization of the United Nations
I-00100 Rome, Italy

The signed declaration must be accompanied by the following:

- The date on which **this Agreement** was entered into;
- The name and address of the **Recipient** and of the **Provider**;
- A copy of Annex 1 to **this Agreement**.