



4CE-MED D1.1. Compilation of national settings for field trials

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Abstract

4CE-MED project aims to develop Mediterranean innovative, diversified, and resilient farming systems not competing for land with actual food chain, following a participatory approach for identifying smallholder needs, while planning, monitoring, and evaluating the project actions. To achieve this objective 4CE-MED will actively carry out communication activities aimed at reaching out different groups to meet their information needs and fulfil 4CE-MED's dissemination and exploitation objectives.

As part of this process, very soon after the start of the project several national multi stakeholder platforms have been organized with the aim to locally co-design the optimal tailor-made solutions including Camelina as a cash cover crop for the Mediterranean environments.

Local Multi-Stakeholder Platforms (LMSP) will bring an external perspective to the project helping to facilitate the establishment of key dissemination and exploitation messages and channels. They will provide strategic external points of view on how to maximize interaction with relevant segments of the agriculture, long term Camelina adopters, farmer cooperatives and food/feed industries, and will advise the consortium on where and how 4CE-MED outputs can be best transferred to and adopted.

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1 Introduction

From June 2020 to October 2020 LMSPs have been created and contacted for a first consultation in each 4CE-MED participating country (Algeria, France, Greece, Italy, Morocco, Spain, Tunisia). Special effort was made to ensure the participation of stakeholders from different fields with the aim to uncover the local agro-socio-economic barriers that prevent the widespread of Conservation Agriculture (CA) and to collect specific inputs to the field trials arranged within the project. In this sense, most LMSP managed to bring together farmers, cooperatives, practitioners, academia, industry, and long-term Camelina adopters in the discussions, bringing suggestions about how to enhance CA adoption through practical and viable socioeconomic options.

Due to COVID-19 pandemic most interviews/round tables could not be conducted in a presential way. Therefore, most of them had to be performed through phone calls or videoconferences. Some countries also reported complications to gather all the stakeholders in a single meeting, so they compiled the different outcomes and extracted those in aggregated summaries.

In all these meetings national partners of 4CE-MED project presented the opportunity to grow Camelina as a cash cover crop as well as the potential of Camelina to reduce weed pressure under CA systems, and the possibility of doing away with the so-called weedy fallow that farmers would possibly valorise as animal feed. The outcomes of each national platform will be used to co-design the local tailor-made systems to be tested in the field trials.

It must be highlighted that for Northern Africa countries Camelina is a new crop. Therefore, most local stakeholders gathered little experience and knowledge on it at the time of arranging these first consultation meetings.

2 First Local Multi-Stakeholder Platforms consultation

2.1 Algerian Multi-Stakeholder Platform

The first meeting of 4CE-MED Local Multi-Stakeholder Platform of Algeria was held on September 20th, 2020, from 2 pm to 4 pm in the “Institut De Technologie Moyen Agricole Spécialisé (ITMAS)” facilities. The 4CE-MED Algerian stakeholder platform was arranged by INRAA and includes fourteen members from farmers and cooperatives organisations, training and technical institutes, agricultural associations and academy entities from different areas of the Sétif Region. Some of these organisations may collaborate in the future to set up the demonstrative field-trials within 4CE-MED project.

Even if this first meeting was scheduled for the beginning of September, when several individual phone calls with members took place to discuss about the 4CE-MED project, the majority of members preferred a physical meeting to discuss and exchange ideas. During these calls the objectives of the project as well as the Camelina cultivation features and constraints that limit the wide adoption of CA in Algeria were discussed.

Due to restrictions on gatherings of people due to the COVID-19 pandemic, the physical meeting was delayed until last week of September (20/09/2020). In this meeting INRAA performed a presentation of the 4CE-MED project, its main objectives and a brief description of the project's WPs, including a description of the various stages of implementation. This presentation was made in Arabic to better communicate with farmers. Subsequently, information on the cultivation of Camelina concerning its biology, its advantages and the key characteristics was provided. For Algeria, like other North African countries, Camelina is a new crop for both farmers and researchers.

A debate was proposed to participants to discuss and to identify the socio-economic and technical barriers and opportunities for the adoption of CA in Algeria. Participants agreed that CA has emerged as an alternative to conventional agriculture, to guarantee the regularity of yields and to preserve water resources, protect soils against erosion and limit evapotranspiration in bioclimatic zones where rainfall is scarce and irregular. Although the region of Sétif was pioneer in the practice and adoption of CA in Algeria, its local implementation of conservation agriculture emerged in 2002 and, at present, CA is little widespread in the region.

The debate on CA adoption gave rise to the following potential constraints:

- The high cost of inputs and equipment (even if Camelina requires much lower inputs than other herbaceous crops),
- Low Algerian farm economic size does not allow innovation integration (less than 10 ha in general, in rainfed region),
- The lack of effective extension,

- Lack of farmers' associations,
- Competition with pastoralism,
- Weed management, including the genus Bromus, and the use of herbicides such as glyphosates and their impact on human health and environment (Camelina allelopathic effect might mitigate this constraint),
- Some constraints of CA adoption are inherent in the functioning of farming systems of Algeria, as the relations between crops and livestock (competition due to the graze of stubbles after the harvest of cereal). The main farming system in the region is cereal-livestock.
- Which alternative crop to replace fallow.

The participants expressed interest in the 4CE-MED research project. As previously mentioned above, Camelina is a new crop for Algeria and, in addition, oilseeds crops are not developed in Algeria. At the time of this first consultation participants did not have enough information on Camelina crop or how to cultivate it, consequently no recommendations could be raised for the field trials. On the other hand, if this crop finally shows as a successful alternative for the region, it will consist an interesting opportunity to replace the fallow and maintain the soil covered. It might also suppose an opportunity to diversify crop rotations. Aspects relating to processing (oil and cake production, etc.) were not discussed in this first meeting.

Given that Camelina is a melliferous species, participants consider this an opportunity for beekeepers to increase their productions. Attendants also posed questions about Camelina market and the easiness to control its cultivation that could not be answered at this occasion but that are likely to be once the local field trials are well established and more research is set on the topic.

Participants demanded future effort from 4CE-MED on:

- Training and assistance to farmers to boost CA adoption and Camelina cultivation.
- Dissemination and communication to reach farmers.

Since ITMAS is a training center which educate many farmers and technicians benefit from training on different agricultural topics, its director accepted to set up a field trial in his center which will be visited by farmers, technicians, students, etc.

2.2 French Multi-Stakeholder Platform

The first meeting for the French Multi-Stakeholder Platform was initially planned by Arvalis for July 2020. However, due to COVID-19 specific conditions of the companies, the meeting could not be held. For this reason, at the beginning of September 2020 phone calls were organised for bilateral discussions. Finally, the outcomes of the platform were gathered through a mix between presential and web meetings. All the consultations followed a similar structure:

- 4CE-MED project presentation, trial's models, targets and consortium.
- Determining stakeholder's knowledge about Camelina: opportunities for cropping systems, crop management, natural weed control issues, oil content, end use...
- Collection of the main questions of each stakeholder.
- Prioritization of the issues.

Nine representatives from different organisations were identified to integrate the French multi-stakeholder platform in a bottom-up approach: Producers (farmers and cooperatives), advisors, economic organisms, industry and policy makers. Knowledge on Camelina and cropping systems were not shared by all the members. Thanks to this approach, the whole chain perspective is taken into account. Since all the meetings were held separately, the outcomes from the French consultations were grouped by type of stakeholder:

- Farmers: Nowadays, oilseed rape raises more and more concerns in both Northern and Southern France: drought endangers crops emergence in the Southern conditions and high level of protection against weeds and pests generates a lot of constraints in Northern conditions (expenses, decreases of the sustainability criteria). In this context, Camelina could be a real opportunity to replace oilseed rape and diversify crop rotations. Furthermore, Camelina potential ability to compete weeds could be highly interesting to fight against ray grass or other weeds in cropping systems, especially in low tillage systems. Double cropping systems are also a real opportunity to benefit from global warming. It could be an opportunity to increase income and farm resilience.
- Cooperatives: Cooperative companies are always looking for new solutions to help their members to increase their production and income while decreasing their impact on the environment. They are really interested in innovative cropping systems. In this context, Camelina could be a great opportunity for them. Nevertheless, interrogations remain about market development because of the lack of Camelina's use in France.
- Policy makers: In the climate change context, the French Ministry of Agriculture is interested in opportunities for sustainable bioeconomy. As an oilseed crop and a methanisation substrate, Camelina could be an opportunity for both agroecological transition and economy: Biofuels development, crop diversification, double cropping systems, etc.

- Industries: Sustainability assessment of biodiesel has to be improved to reach the new Renewable Energy Directive (RED) targets. Double cropping systems including a low input crop as Camelina could be an opportunity for oilseed rape substitution in the main market of the advanced biofuels and to reach sustainability criteria. Camelina summer type seems to be a real opportunity, but growing cycles and pedoclimatic need to be characterized in order to map the best growing areas. Moreover, as in the case of the cooperative companies, market issues are their main concern.

The analysis of the stakeholders' feedback made it possible to determine four priority axes for the French platform:

- *Confirm the Camelina allelopathic effect*: The ability of Camelina to compete weeds must be confirmed. In case of confirmation, inclusion possibilities of Camelina in innovative cropping systems should be highly multiplied.
- *Confirm the Camelina low input management*: The opportunity to grow Camelina as a low input crop (low nitrogen and pesticides needs) has to be confirmed under French conditions to answer industry's questions on Camelina's sustainability.
- *Double cropping systems (three crops over two years)*: Camelina could be a possible replacement to oilseed rape in the crop rotations. However, several local issues have to be tackled first:
 - Summer double cropping (Camelina grown from late June to October): This option needs to manage Camelina emergence problem in late June/beginning of July, with low soil water content and rainfall. Depending on the date of emergence, the length of the growing cycle could be too long to reach seed maturity. These risks should be measured and modelled. This model is a main topic for industry to reach sustainability criteria, but risks are quite high for farmers.
 - Winter double cropping: Camelina spring varieties sown during autumn or winter offer early harvest opportunities. It is also a good solution for oilseed rape substitution in case of technical problems. Early harvest of Camelina allows sowing another summer crop and securing its emergence in late May/beginning of June. This is an important topic for farmers, advisors and cooperatives to secure emergence of summer crops with late sowing date and low precipitation.
 - Camelina after an energy catch crop: This model allows to maintain an oilseed crop in crop rotations, sowing Camelina in mid-May. Its drought tolerance must be analysed, not to decrease its potential yield. This is a main farmer issue, for bioeconomy and agroecology transition.
- *Characterize Camelina better growing conditions*: To secure a stable production of Camelina, mapping the best growing areas is an important work topic. This would not only imply a risk analysis, the characterization of the growing cycles and pedoclimatic needs of the crop, but also, in case of a double crop, an analysis of different sowing techniques like direct sowing into the previous crop.

2.3 Greek Multi-Stakeholder Platform

The first meeting of 4CE-MED Greek Multi-Stakeholder Platform was planned on July 2020. Because of the Covid-19 pandemic and the condition of restraining orders, the meeting could not be realised and some participants decided to quit from the project. Therefore, in the middle of September 2020, a new list of stakeholders was created and also a new date for the meeting (presential format) was set for October 2020, under strict Covid-19 prevention measures. Furthermore, two stakeholders that had agreed to participate to the 4CE-MED platform but were unable to physically attend joined through Skype system.

The 4CE-MED Greek platform is a stakeholder forum with members from the farming community, farmer advisors, farmer association representatives, industry, academia, and regional and national policy makers. The aim of this platform for all the stakeholders is to provide their views and represent their interests in an open discussion process. The Greek Multi-Stakeholder Platform is composed by ten members and was organised ensuring gender balance.

The meeting was finally organized on 13th October 2020 at the Farm of the Aristotle University of Thessaloniki. The program of the meeting was the following:

11:00-11:20 Presentation of the 4CE-MED project and objectives of the national stakeholder platform (CRES/ BIOS AGROSYSTEMS)

11:20-11:40 Agronomic and mechanization aspect of Camelina as a cash cover crop. Examples from other countries (CRES/BIOS AGROSYSTEMS)

11:40-12:00 Presentation of the trials that will be established in Greece

12:00-13:00 Roundtable on the following questions:

- *Could Camelina be cultivated as a cash cover crop or double crop in Greece?*
- *What are the restrictions of Camelina in comparison with alternative cover/cash crops? How can these obstacles be overcome?*
- *What 4CE-MED project should address?*

13.00-13.30 Final Conclusions (CRES)

The main outcomes of the national stakeholder platform carried out in Greece were:

- Greek farmers were unfamiliar with the crop of Camelina, but they were interested to obtain more information in further meetings.
- Most of the participants reported great interest towards the use of Camelina as a cover crop. However, they were sceptical about the timing for the termination of the cover crop and the sowing of the main crop under Greek environmental conditions.
- Some farmers are willing to try Camelina and will decide after getting the trials results whether they will implement it as a fix practice or not.

- Most of the participants were interested to know about the feasibility of crop mechanization (seeding, harvesting etc.) and what are the current market options for Camelina products.
- Among the different regions in Greece a diverse crop rotation might be appropriate and could be suggested to local farmers.
- Farmers and consumers are not familiar with the environmental value of cover crops, and neither of Camelina's and the benefits to the whole agro-ecosystem.
- Training activities for farmers and assistance are dramatically needed to boost the Camelina crop.
- Big need of dissemination also on technical journals/websites to reach farmers and consultants.

2.4 Italian Multi-Stakeholder Platform

The first Italian stakeholder platform consultation was set by UNIBO, with the collaboration of CREA, on 20th July 2020. It was arranged in an on-line format due to COVID-19 restrictions. It was composed by fifteen members, including farmers, farmer advisors, regional and national policy makers, and farmer association representatives. The platform, which will be open to new members in the coming months, was organised to represent different geographical areas of Italy, from north to south, and with a balanced gender. The program of the meeting was as follows:

14:00-14:15 Presentation of the 4CE-MED project and objectives of the national stakeholder platform (UNIBO)

14:15-14:45 Agronomic and mechanization aspect of CA and the use of Camelina as a cash cover crop (UNIBO/CREA)

14:45-15:45 Roundtable on the following questions:

- *Which are the main causes that limit the adoption of CA by farmers in Italy?*
- *What are the advantages and limitations of Camelina in comparison with alternative cover/cash crops?*
- *What 4CE-MED project should address?*

15.45-16.00 Wrap up and next steps (UNIBO)

Additionally, for the remaining stakeholders who agreed to participate to the 4CE-MED platform but were unable to join the online roundtable, UNIBO carried out phone interviews following the same structure of discussion as in the roundtable.

Even if CA is little widespread in Italy, generally, it has not showed a decrease in productions. The main outcomes of the Italian Multi-Stakeholder Platform were:

- Each region in Italy has defined different measures for CA development under the regional programs of agricultural development.
- Some farmers will be more interested in using CA not as a fix practice in each crop/year but as a good practice to be implemented as much as possible.
- The use of cover crops is not very widespread even if participants reported great interest toward them, both as winter and summer crops. The main limit is the timing for the termination of the cover crop and the sowing of the main crop, which might be challenging in certain soils and environmental conditions. In general, the anticipation of the main crop sowing should be a target. The possibility to use also mixes of cover crops might be of interest.
- The added environmental value of cover crops, and of Camelina in particular, need to be exploited as a claim or a promotion for the products derived from them/it, in order to make the consumers more participant of the whole Agro-ecosystem.

- A relevant added value of 4CE-MED may be the results on Camelina water use and water savings in comparison to traditional winter crops, this might promote the diffusion of the crop at larger scale.
- The use of Camelina cake as animal feed might improve the acceptance of the crop at local level since livestock farms will require it.
- Training activities for farmers and assistance are dramatically needed to boost CA.
- Big need of dissemination also on technical journals/websites to reach farmers and consultants.
- All the engaged stakeholders are willing to join the field trials organized by UNIBO in order to see into practice the 4CE-MED systems.

As a result from the first consultation, it was agreed that Italian trials must set both minimum and sod seeding trials (tillage systems). This corresponds with the willing of some stakeholders to implement the different systems according to their specific regions' conditions.

Double cropping evidenced opportunities were sunflower and soybean. In addition, one stakeholder from Lombardian Region suggested also rice, which might be fitting in terms of growing season, but which cannot be tested without the proper technologies.

Furthermore, the ability to harvest as early as possible for double cropping is an issue that must be pursued.

It was also raised as an interesting idea the possibility to survey not only the use of water of Camelina, but to measure the ability to infiltrate water at deeper layers and making it available for the succeeding crop. However, 4CE-MED project partners have a major challenge to figure out how to assess this issue with a thoroughly scientific approach.

2.5 Moroccan Multi-Stakeholder Platform

The first consultation to the Moroccan Multi-Stakeholder Platform was arranged by ICARDA at the end of July 2020. Due to restrictions derived from COVID-19 pandemic, consultations had to be carried out through phone calls to individual members. At this time the platform was mainly composed by representatives of farmers and research organisations. However, it is expected to join more members as the project evolves.

All members were first approached with a brief introduction in Arabic on CA, Camelina and the 4CE-MED project. For Moroccan stakeholders, Camelina is a new crop, hence, the participants did not have much experience on this crop at the time of the meetings. As supporting material, all the platform members received short notes in Arabic with information on the crop and CA. Despite the lack of knowledge, all platform members opined that Camelina crop could be an interesting alternative as an edible oil for Morocco. In addition, the possible use of the cake as feedstuff for poultry and fish was also appreciated.

During the meetings, several discussions emerged on the advantages and constraints for the adoption of CA in wheat-based farming systems. Main constraint identified for the adaption of CA was the availability of planting machinery for the different areas of Morocco. The participants also informed that leaving stubbles in the field after wheat harvesting is nearly an impossible task in Morocco: after each harvest the shepherds move their cattle to graze in the fields, leaving almost no residues left in the field. In that context, Camelina could be an interesting alternative as it might not be an attractive feed for the sheep and thus, organic matter would remain in the soil for the succeeding wheat crop.

Since Camelina crop is new for Morocco, it was decided to follow the recommended seed rate suggested by Camelina Company España (CCE). As complementary trials, at least two additional seed rates could be included with 25% less and 25% more than the recommended one. Furthermore, two additional trials will most probably set to test different planting dates (two weeks and four weeks after first planting date) to the ones recommended by CCE. The researchers from INRA-Morocco and ICARDA have suggested to set similar experimental trials across other 4CE-MED participating countries (as Algeria, Tunisia, Italy and Greece), so there can be comparable data from different locations. This would allow to obtain homogeneous data that could be analysed with greater statistical power and that will probably allow to generate more consistent conclusions. By harmonizing the experiments across different locations, the group can also aim for a joint publication in high impact journals. Further, fine tuning could be done during subsequent years, based on the first year's results.

2.6 Spanish Multi-Stakeholder Platform

The Spanish Multi-stakeholder Platform was arranged by Spanish Co-ops on June 22nd in a virtual roundtable format. Twelve representatives from farmers and cooperatives organisations, oil processors, soil conservation associations, research institutes and also policy makers were present at the meeting. In addition, five representatives from 4CE-MED partners organisations (CCE, INI and Spanish Co-ops) also participated in the event.

Moreover, two additional stakeholders (cooperative member and policy maker/farmer) that were already committed with the platform had to cancel the day earlier due to harvesting tasks that needed to be dealt with urgently due to weather conditions. Despite this, after the meeting they received the minutes and will be invited to participate again in the following consultations of the Spanish Multi-Stakeholder Platform. The programme followed during the meeting was as follows:

12:00-12:15 4CE-MED project presentation and introduction of the platform (Spanish Co-ops)

12:15-12:40 Presentation of Camelina crop's features and 4CE-MED trials' plan (CCE)

12:40-14.00 Round of interventions. Contributions to the project's trials, experience, and interests with Camelina & specific questions (All):

- *Is it the Camelina a promising agronomic alternative for semi-arid areas?*
- *Does it have an interesting market?*
- *Barriers for its development? legal, agronomic, logistic, markets*
- *Interesting actions to promote its development?*
- *Soil protection and CA (minimum intervention, permanent cover, crop diversification)*

14:00 Summary and closure of the meeting (Spanish Co-ops)

The session opened with a quick overview -performed by Spanish Co-ops staff- of the project followed by an introduction of the aim of the platform. After it, CCE made a thoroughly presentation of the 4CE-MED trials plan, focusing on Spanish conditions ones. Next to these context presentations, all the members of the platform were invited to share their experiences with Camelina and CA as well as their proposals and recommendations for 4CE-MED trials.

Even if some of the participants referred issues with the crop performance of Camelina such as low yields, plant bedding issues, lack of emergence, etc., most of them were associated to climatic extreme events. One aspect remarked by several members of the platform was related to the lower profitability that Camelina had in the past when compared with other crops such as sunflower, legumes, etc. However, all of them agreed that the current prices (which have experienced a significant increase during the last years) make it nowadays a very attractive alternative that they are willing to cultivate. In addition, CCE was encouraged to keep working on the genetic improvement of Camelina, which they consider a key factor for a major implantation of this crop in Spain.

Relevant remarks were also risen on the fact that Camelina can be a good alternative for direct sowing practices and CA. Direct sowing does not only imply higher water efficiency but also lower costs by removing soil tillage activities. The potential use of Camelina as a replacement for fallow lands was also very well received together with the beneficial effects that it has on pollinators and the low need of inputs. It was also suggested that the development of Camelina crop could place an opportunity for replacing the current farming practices in favour of CA ones.

In any case, all participants appreciated some of the advantages that Camelina crop presents:

- It mobilizes nutrients from deeper layers than most cereals.
- The possibility of using barley machinery without implementing any modifications.
- Replacement of the costs associated with fallow land by income from Camelina cultivation and all the associated environmental benefits (lower use of herbicides in the following crop due to Camelina allelopathic effect, lower need of nutrients/fertiliser, etc.).
- Very positive experience in the extractive part, similar or better behaviour than rapeseed.

As for the legislative aspects, it was remarked the lack of authorized herbicides for Camelina, even if this crop has an allelopathic effect that implies a lower use of this type of phytosanitary (compared with most of other oilseed crops). CCE took leverage of the presence of policy makers to raise up this issue, as it makes them less competitive.

Main suggestions for 4CE-MED trials arisen during the Spanish Multi-Stakeholder Platform were:

- To apply direct sowing.
- To consider analyzing residuality problems (herbicides).
- To quantify agri-environmental benefits as an improving species for increased farmer awareness.
- To evaluate the conditions for replacing failed crops with Camelina.
- Orientation of Camelina to the animal feed market (protein plan).
- Perform intercropping: mixed trials of Camelina with protein crops (as in France and Canada).

2.7 Tunisian Multi-Stakeholder Platform

The first consultation to the Tunisian Multi-Stakeholder Platform took place on September 4th, 2020, at INRAT headquarters. The platform had participants from farmers organisations, agricultural associations, research institutes, policy makers and industrial crop experts.

After a short presentation of the 4CE-MED project and Camelina features the attendants asked for complimentary information where they could find additional details about growing cycle, sowing, harvesting, etc. As Camelina is a new crop in Tunisia platform members are eager to get the specifics of this crop so they can understand better its benefits. However, on the information they got during the meeting they agreed that:

- Camelina could be a real opportunity to diversify crop rotations, especially for its low agronomic inputs and the possibility to grow it in marginal area suffering from erosion.
- Trials should be conducted under zero tillage.
- The ability of Camelina to compete against weeds is very interesting, however, it needs to be confirmed.
- Interesting alternative for oil production and animal feed.
- Market needs to be further developed; this represents one of the main concerns for farmers.
- Industrial crops specialists consider that varieties of Camelina should be sown in autumn using spring sowing since it grows better in the local conditions.
- Policy makers suggested to grow Camelina also under conventional farming system.
- Recommendations were made to perform an economic study in addition to the agronomic one and to concentrate in by-product valorization as earlier as possible.

Weeds are a big problem in Tunisia, even if farmers use glyphosate before sowing, in some cases it might not be enough. Regarding market development, in Tunisia there is only one industry for oil processing trituration of rapeseed, once the trials are set and there is more information on Camelina adaptation and development on Tunisian conditions INRAT will probably invite this company to join the LMSP.

Finally, the presents manifested interest in the possibility to get information about the Italian, French or Spanish experience, especially in growing and commercializing aspects.

3 Conclusions and main recommendations for field trials

Despite the difficulties to gather or reach the stakeholders due to COVID-19 pandemic many useful information for the 4CE-MED project consortium could be retrieved in the first round of consultations to LMSPs. In addition to the recommendations and suggestions raised for the trials, other relevant conclusions emerged during the course of these meetings. One of the most remarkable ones was the lack of knowledge on Camelina and the special need on specific training and dissemination activities to farmers and related stakeholders from Northern Africa countries (also reported in some European countries) to boost Camelina and CA adoption. 4CE-MED project partners will need to design an efficient strategy to overcome this barrier.

The potential adoption of CA revealed relevant constraints in some Northern Africa countries such as the ones for Algeria and Morocco due to the current performance of the farming systems. Usual practice after the harvest is to move sheep and cattle to graze in the field. This contradicts the principles of the CA regarding the constitution of the stock of organic matter in the soil. Therefore, efforts need to be carried out in order to keep identifying local Agro-socioeconomic barriers preventing the widespread of CA and to raise awareness among farmers and shepherds on this issue to enhance its adoption.

By the other hand, both the Camelina allelopathic effect and the low input requirements were seen by most LMSP as main factors to encourage the implementation of Camelina in their countries. However, they demand 4CE-MED partners to scientifically prove these facts, measuring the effect in the different local conditions. In the same line, there was a proposal to measure the ability to infiltrate water at deeper layers and making it available for the succeeding crop. A relevant added value of 4CE-MED may be the results on Camelina water use and water savings in comparison to traditional winter crops, this might promote the diffusion of the crop at larger scale. This means: 4CE-MED project is encouraged to quantify the agri-environmental benefits of Camelina crop.

The need to set a series of similar field trials (with the same experimental conditions) across 4CE-MED participating countries was drawn to partners' attention. Following this approach, it will be possible to obtain and analyse comparable data from different locations, resulting in greater statistical power and more consistent conclusions.

In countries such as France, where there are several climatic conditions, it is considered as a must the mapping of the best growing areas for Camelina production as well as the identification of the best cultivation model to follow on them. This imply a wide range of factors that should be considered at the time of elaborating this study.

A general interest was also placed on the Camelina possible alternative as feedstock for the animal feed market. Therefore, this research line should take a relevant place in the project since there is a common perception of its potential in many countries. Market development for Camelina was reported as major concern for farmers of several 4CE-MED participating countries.

Finally, there were other interesting recommendations such as the encouragement to have an early focus on the by-product valorisation since the beginning, as this would considerably affect the economic performance of the crop. In addition, some LMSP members suggested to incorporate direct sowing/zero tillage trials, to analyse herbicides residuality problems, to evaluate the adequate conditions to replace failed crops with Camelina and to learn more on crop mechanization feasibility.

Women inclusion was also taken into great consideration by 4CE-MED partners at the time of arranging the LMSP (some of them had higher women participation than men, other involved women farmers associations, etc.). Nevertheless, additional attention will be paid to this issue in order to reach gender balance in further meetings. The different aspects discussed at the various LMSPs have been gathered in the following table so the initial situation can be compared among all countries (Table 1).

Table 1. Relevant aspects discussed at LMSPs. *Source: 4CE-MED partners*

Discussed aspects	Algeria	France	Greece	Italy	Morocco	Spain	Tunisia
Camelina allelopathic effect (weed control)		X				X	X
Camelina water efficiency		X	X	X		X	
Camelina soil protection effect (cover crop)			X	X		X	
Low input requirements for camelina		X	X	X		X	
Lack of knowledge on Camelina crop	X	X	X		X		X
Camelina's benefits as a melliferous species	X					X	
Local barriers for CA adoption	X				X	X	
Training & dissemination activities (Camelina)	X	X	X	X	X		X
Double cropping systems aspects		X	X	X		X	
Camelina as an opportunity for diversification	X	X	X			X	X
Camelina sustainability aspects		X	X	X	X	X	
Little widespread of CA	X			X	X		X
Uncertainty of Camelina market development	X	X			X	X	X
Demand for trials results	X	X	X	X			
Mechanization aspects			X		X	X	
Lack of authorised herbicides for Camelina	X					X	X
Gender aspects taken into account			X		X	X	
Camelina cake as animal feed			X	X	X	X	X
Need of setting similar trials at different countries to compare results					X		
Genetic improvement of Camelina						X	
Camelina as a promising alternative for CA						X	
Camelina oil extraction process			X			X	X
Residuality aspects (herbicides)			X			X	
Zero tillage/direct sowing/minimum tillage			X			X	X
Focus on by-products valorisation							X



Horizon 2020
European Union Funding
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