POLICY BRIEF N°1

How to design "intercrops friendly" policies? Lessons from the analysis of the barriers to intercropping in Europe

INTERCROP VALUES

- *Despite its potential to increase the sustainability of our agricultural system, intercropping has virtually disappeared from the agricultural landscapes of European member states,*
- *The spread of intercropping is hindered by barriers of different types (e.g., cultural, financial, organisational, technical) affecting all levels of the food value chain,*
- *Barriers emerge from a complex web of interactions and may reinforce one another. When it comes to identifying solutions, the whole causal chains linking barriers together should be considered.*
- *Intercropping won't develop without a coordinated commitment from all stakeholders of the food value chain, including policy makers.*
- *Policymakers can foster the use of intercropping by promoting the development of coordinated value chains adapted to intercropping, enhancing the involvement of stakeholders in policy making, ensuring coherency between policy objectives and instruments, increasing and facilitating the access to financial support for all actors involved in intercropping value chains, and fostering advisor training and knowledge transfer. These actions should be implemented altogether to address the systemic aspect of the intercropping lock-ins.*

Over the past decades, the green revolution, and the technologies it brought, e.g., fertilizers, pesticides, and efficient machinery, led to an increase food, and feed productivity in Europe, but also to a major drawback: the specialization of rotations, farms, and territories[1,2]. This specialization resulted in multiple well-documented negative effects: loss of biodiversity, decrease in the resilience of agricultural systems, shortage and contamination of water resources, disruption of nutrient cycles, general decrease in macro- and micro-nutrient content of staple crops and precariousness of farmers[3,4]. These multiple negative impacts make a strong case for the need of creating fairer, healthier, and more environmentally -friendly food systems[4,5], an objective pursued by Europe's "Farm to Fork" strategy (Figure 1).

Intercropping is an agroecological practice corresponding to multiple crops grown simultaneously on the same field. In the last years, there has been a growing awareness that intercropping delivers numerous environmental, economic, and nutritional benefits to our society[6–8]. This practice thoroughly contributes to the targets of the "Farm to Fork" strategy (Figure 1). Additionally, intercropping may enhance the production of plant-based proteins as legumes are often associated with cereals in intercropping systems[9–11], and may contribute to Europe's protein autonomy as encouraged by the

EU parliament. Despite its potential to increase the sustainability of our agricultural system, intercropping has almost disappeared from the agricultural landscapes of European member states since the Green Revolution due to agriculture specialisation. However, to play an effective role in Europe's agri-food transition, intercropping needs to be applied on a large scale. An important question is therefore: **How can we speed up the use of this sustainable farming practice by farmers and its integration into the food value chain (i.e., collection, processing, distribution, consumption)?**

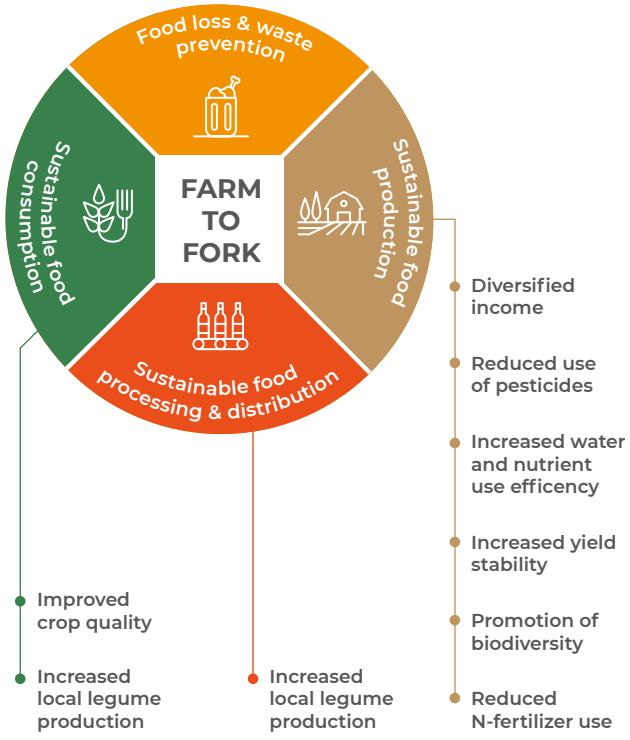
Key Results

The development of intercropping faces many obstacles

In Europe, actors of the food value chain trying to implement intercropping face many obstacles, called "barriers". To promote the use of intercropping, first and foremost, there is a need to identify these barriers to be then able to propose relevant solutions to lever those obstacles. Most importantly, barriers must not only be identified at the farm level but throughout the whole value chain, as downstream actors may also face difficulties with crops and products coming from intercropping.

Thirteen European Co-Innovation Case Studies aiming at developing intercrop-based value chains are involved in the IntercropVALUES project. They cover a wide range of situations (organic and conventional farming, various countries, soils and crops) and differ in their purpose, the diversity of actors involved, the length of food value chains, the end products, and the associated crop species. Data regarding the barriers faced by their different actors was collected through various interactions with the case study leaders (survey, in-person workshop and interviews), resulting **in the identification of nearly 200 barriers to the use of intercropping**.

Contribution of intercropping to the dimensions of European «Farm to fork» strategy



▲ **Figure 1** – Contributions of intercropping to the dimensions of Europe's Farm to Fork strategy. Figure adapted from https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en

The barriers are diverse in nature and impact all actors of the food value chain

The identified barriers are of diverse natures (technical, but also financial, organizational, related to the market, etc.) and concern a diversity of actors of the value chain from farmers, as expected, to collectors, processors, distributors, and consumers, all of whom play a key role in the development of intercropping.

Whether in conventional or organic farming, three main aspects can be highlighted from the barrier characterization within the IntercropVALUES project.

Firstly, **barriers are present at all levels of the food value chain with, nevertheless, a predominance of barriers affecting farmers** (Figure 2 A). However, although the number of barriers reflects to which extent each level of the food value chain is impacted, it does not translate the difficulty of overcoming these barriers. In other words, it may be that farmers face many barriers that are easier to lever than the few barriers faced by processors.

Secondly, **farmers are often affected by a high number of external barriers, i.e., barriers imposed by other actors of the food value chain** rather than by farmers' own means (e.g., purity standards imposed by collectors and processors). This underlines the relevance of involving the whole food value chain in discussions about the development of this agroecological practice. Tackling the intercropping barriers faced by farmers is a necessity but not sufficient to facilitate and promote its use.

Thirdly, **intercropping barriers concern many aspects of food production, from machinery availability, to food processing, communication between actors, presence of market and consumer reluctance.** However, **knowledge-related barriers are predominant** (Figure 2 B). Knowledge is lacking in all aspects of intercropping, from production to market development including processing and storage. These knowledge gaps can be of two kinds: either the knowledge is non-existent, or the knowledge exists but was not properly transferred to the stakeholders within the food value chain (e.g., farmers, processors, etc.).

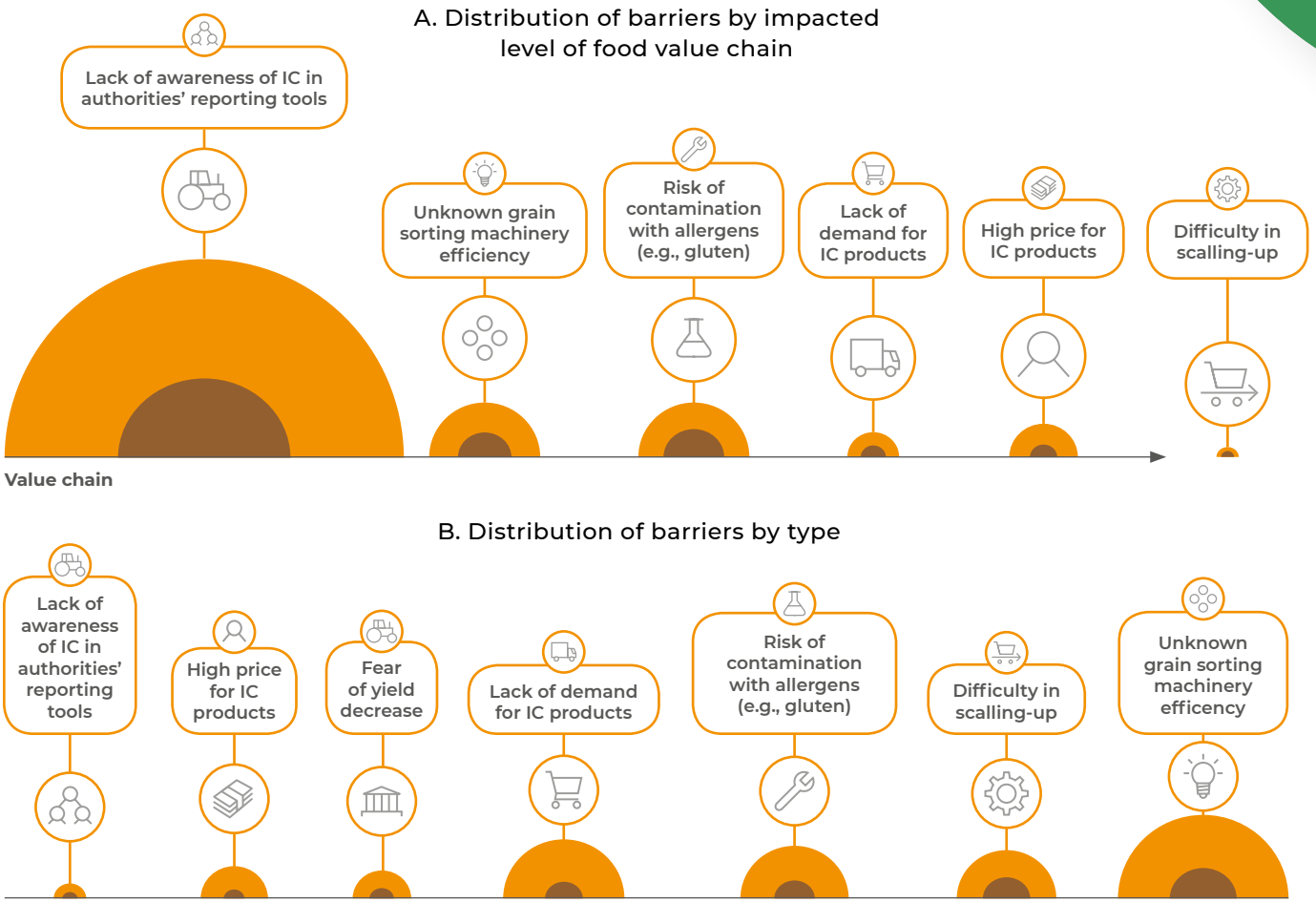
In conclusion, the barrier analysis conducted by the IntercropVALUES project across 12 European case studies, provides a comprehensive "check-up" of the system considering all actors and all barrier types. It gives a first glimpse of the difficulties one must tackle to promote intercropping and provides a common framework for initiating discussions between different value chain actors.

Barriers are interrelated

Barriers are often presented as a list of blocking elements. However, the interactions with case studies leaders emphasized the **existence of causal links and interrelations between barriers, which further reinforce the intercropping lock-ins**. The identification of these links is of crucial importance to understand the complexity of intercropping barriers. The causal links between barriers were represented in the form of causal maps, as illustrated in Figure 3 for the issue of grain sorting. Two main findings stand out on these maps.

Firstly, the maps clearly show that barriers affecting different levels of the food value chain are related to one another, making it even more obvious that intercropping won't develop without a coordinated commitment from all stakeholders of the food value chain, including policy makers.

Distribution of barriers to the use of intercropping by level of the food value chain



▲ **Figure 2** – Intercropping barriers are faced by different value chain actors (A) and are of different types (B). An example of barrier is given for each level of the value chain and each type (brown-edged boxes).

Secondly, the maps highlight the systemic aspect of the intercropping lock-ins. Instead of being isolated elements, barriers emerge from a complex web of interactions and may reinforce one another. Therefore, when it comes to identifying solutions, **instead of addressing each barrier individually, it is the whole causal chains linking barriers together that should be considered**. This would allow the identification of several points of action at different levels of the food value chain to solve a particular issue. As an illustration, based on the causal chain represented in Figure 3, one can see that the issue of grain sorting in intercropping could be addressed at various levels, e.g., by jointly improving farmer training in sorting, adapting the European impurity thresholds for intercropping products, providing subsidies to compensate for the additional costs linked to grain sorting, etc.

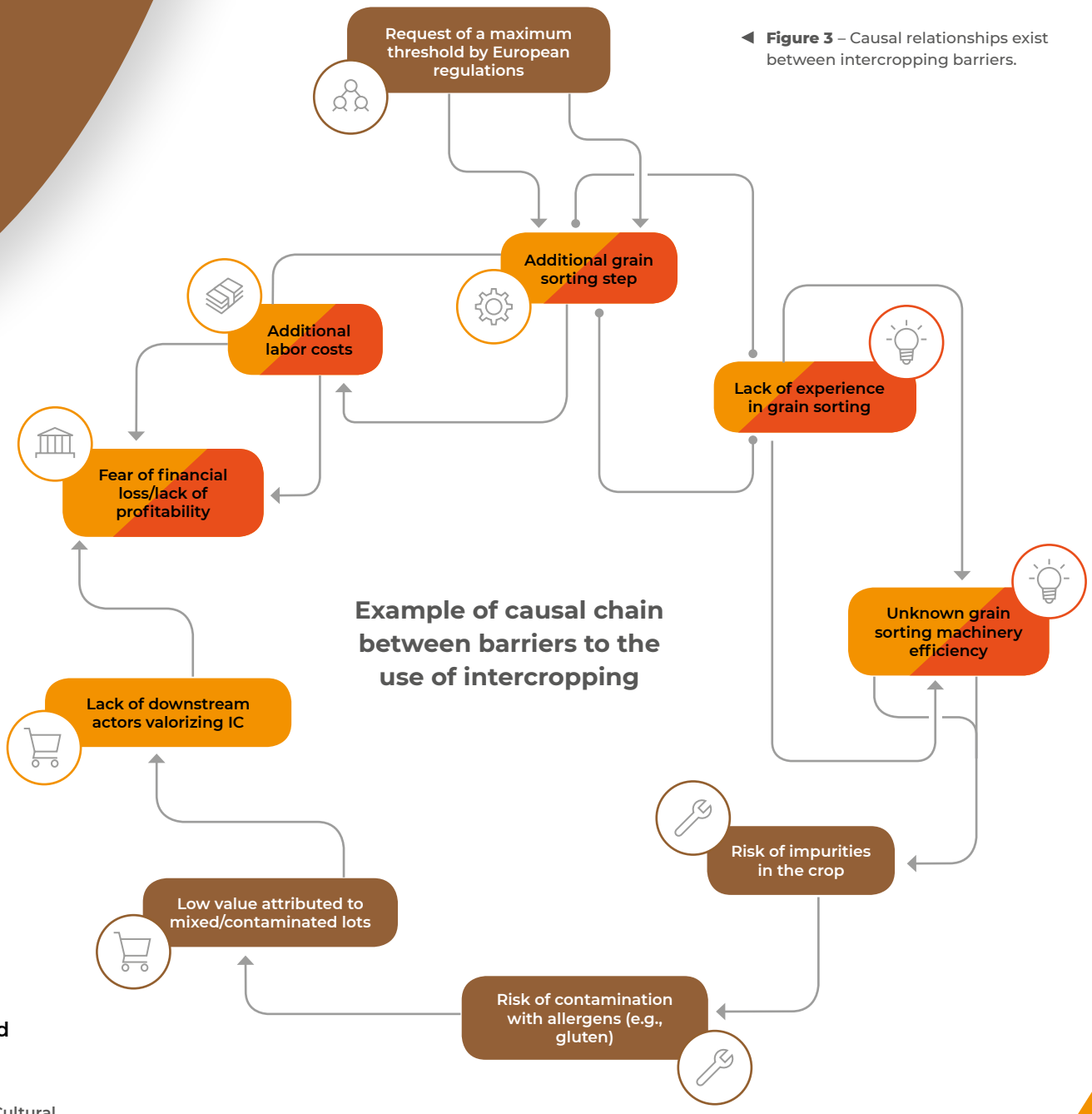


Figure 3 – Causal relationships exist between intercropping barriers.

Legend

- Cultural
- Disabling context
- Knowledge-related
- Financial
- Market-related
- Technical
- Organisational
- Related barriers
- Causal relationship
- Farmers
- Collectors
- Processors

IC = Intercropping

Policy recommendations

The involvement of actors and policymakers at all levels of the food value chain is a prerequisite for the spread of intercropping. The IntercropVALUES project suggests five policy actions that would enable the promotion of intercropping in Europe. The proposed actions emerge from the process of barrier identification and a consultation of case study leaders to underline major lock-ins. They tackle various levels of the food value chain and various barrier types and should be implemented altogether to address the systemic aspect of the intercropping lock-ins.

1

Promote the development of coordinated value chains adapted to intercropping

Barrier analysis pointed out that external barriers, defined as barriers imposed by other actors, are often faced by farmers, e.g., farmers have to face the burden of grain sorting while not being rewarded for it by downstream actors and still taking all the risks. Consequently, we advocate for the development of coordinated value chains adapted to intercropping by:

(i) **Promoting and funding research and development projects aiming at developing new value chains dedicated to intercropping** (e.g., change the structure of research calls in the cluster 6 of Horizon Europe in favour of projects encompassing this dimension of value chain coordination, promote measures linked to cooperation in the rural development programmes of EU member states),

(ii) **Imposing rules obliging downstream actors of the food value chain**, and not just farmers, **to participate in the transition of the agri-food system** (e.g., ban on refusing produce from intercropping, set minimum impurity thresholds that processors are not authorized to refuse).

2

Enhance the involvement of stakeholders in policy making

Following the observation that barriers to the use of intercropping are present at all levels of the food value chain, it is inconceivable that this agroecological practice could be promoted without consulting all the agrifood stakeholders and establishing a dialogue between them. With this in mind, we advocate for **an improvement of the stakeholder involvement in negotiation processes for policies and regulations** (e.g., negotiations for the next Common Agricultural Policy), an objective stated in the Better Regulation agenda. Policymakers should:

(i) **Adopt "the system in a room" approach**; representatives from all levels of the food value chain, from input providers to farmers, collectors, processors, distributors, and consumers should be present to guarantee consideration of the differences in stakes between them,

(ii) **Improve the inclusiveness of the stakeholder consultation**; consulted stakeholders should cover the existing diversity of each level of the food value chain (e.g., small vs big processors).

3

Ensure coherency between policy objectives and instruments

The identification of intercropping barriers and the consultation of case study leaders has highlighted inconsistencies in the CAP that are holding back the development of sustainable farming practices such as intercropping. Firstly, in some member states, there is no information on how to register intercropping in CAP declarations and how to make the practice comply with GAEC 7 about crop rotation. Secondly, some member states do not allow Agri-Environmental Climate commitments (e.g., growing a non-productive plot of legumes and/or cereal) to comply, and therefore be rewarded with Eco-schemes (e.g., intercropping a productive plot of legumes and cereal). This incompatibility discourages changes in farming practices and distorts support for farmers implementing the same practices in different member states.
Based on these observations, policy makers must:

(i) **Ensure a political recognition of intercropping as a farming practice contributing to the Farm to Fork Strategy's objectives,**
(ii) **Guarantee the compatibility between GAEC and farming practices answering to the Farm to Fork Strategy's objectives,**
(iii) **Take a stance on "double funding"** (i.e., reward of a single practice by both Agri-Environmental Climate Commitment and Eco-schemes in some member states) as a remuneration for virtuous agricultural practices proportionally to the provided the ecosystem services.

4

Increase and facilitate the access to financial support for all actors involved in intercropping value chains

One of the lock-ins identified as major by case study leaders is linked to the additional labour and investment costs (e.g., for specific machinery) and financial risks associated with intercropping. The implementation of intercropping involves investment at several levels of the food value chain (e.g., purchase or adaptation of farming and processing equipment). The financial risks associated with intercropping are linked to e.g., higher labour costs due to a heavier workload, a risk of downgrading of food crops to fodder by downstream actors, and a risk of lack of consumer interest in intercropping products. The development of intercropping would benefit from an increased financial support to help actors implementing it coping with the risks they take. This can be done by:

(i) **Re-orientating existing subsidies towards sustainable agricultural practices**, by increasing the share of the budget allocated to Eco-schemes in order to make them more attractive to farmers, and ensuring the compatibility of Agri-Environmental Climate Commitments with sustainable agricultural practices (cf. recommendation 3),
(ii) **Ensuring long-term subsidy sustainability**, i.e., longer than the CAP duration, to allow farmers to innovate/engage in transition that will last several years,
(iii) **Easing the access to current subsidies** through better information dissemination and less red tape,
(iv) **Creating a specific financial support for investment in machinery used in intercropping** through the investment subsidies of the rural development budget and harmonising the financing of second-hand equipment between member states (second-hand equipment is eligible for subsidies in Flanders but not in Wallonia, for example).

5

Improve advisor training and knowledge transfer

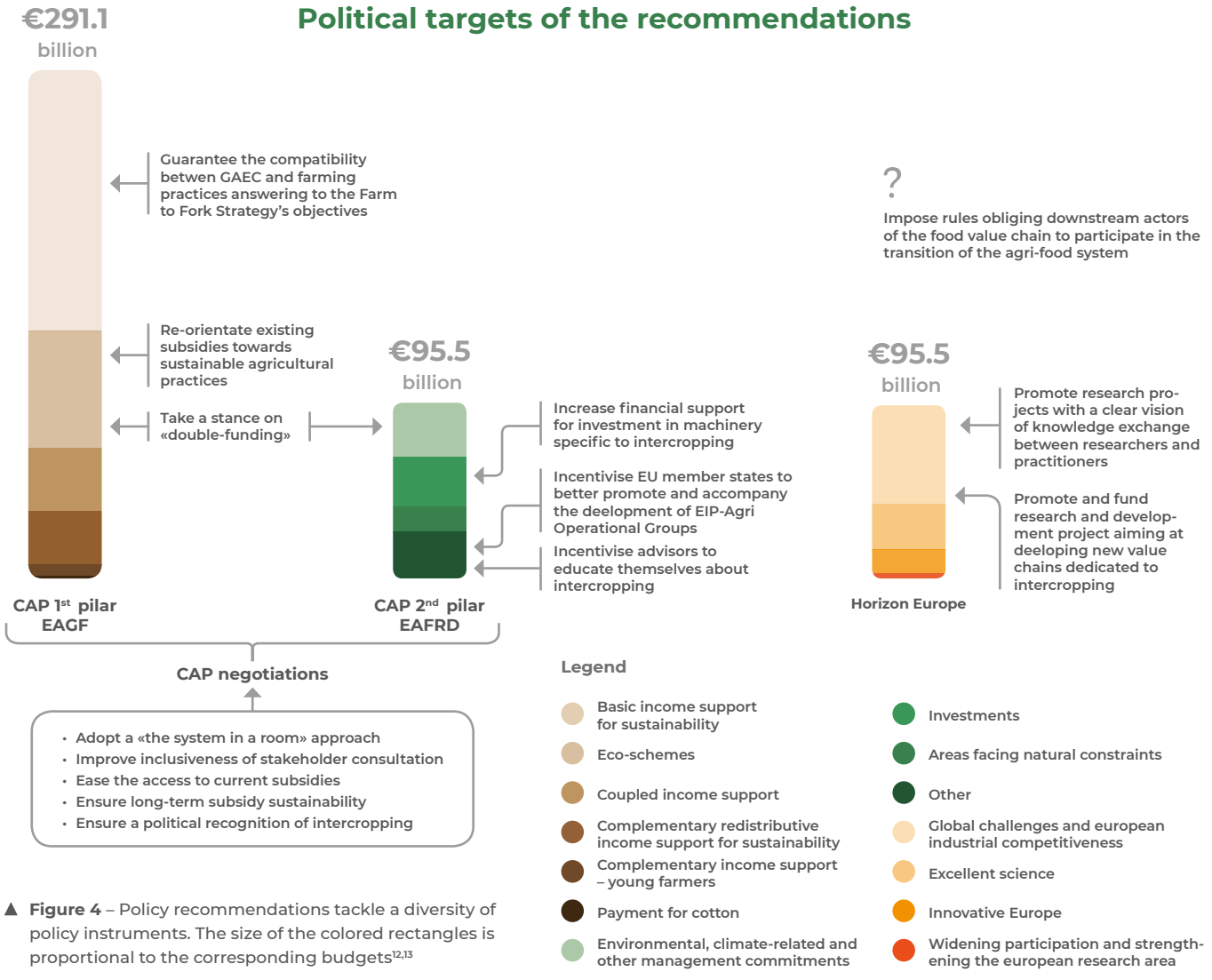
As emphasized previously, many of the barriers to the use of intercropping are linked to knowledge gaps regarding intercropping. This can be explained by a lack of knowledge exchange between researchers and field actors, and a lack of awareness of food value chain actors about the benefits of intercropping products, two issues on which policy makers can act by:

(i) **Incentivising advisors to educate themselves about intercropping**, including post-harvest steps and marketing, e.g., through the allocation of a higher share of EU member states rural development programmes budget into the "knowledge exchange and information" policy measures,

(ii) **Incentivising EU member states to better promote and accompany** (e.g., through innovation support service) **the development of EIP-Agri Operational Groups with local stakeholders**,

(iii) **Promoting research projects with a clear vision of knowledge exchange between researchers and practitioners**, popularization actions and/or participatory research through the Cluster 6 of the Horizon Europe programme and ensuring financial compensation for the involvement of field stakeholders in projects, i.e., no free actors.

Policymakers have the power to take actions allowing to remove barriers at different levels by implementing a systemic public policy plan considering all actors of the food value chain. **The development of intercropping will not happen without forthright measures really taking into account the complexity and the systemic aspect of the problem.**



▲ **Figure 4** – Policy recommendations tackle a diversity of policy instruments. The size of the colored rectangles is proportional to the corresponding budgets[12,13]

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