



EUBCE 2024

32nd European Biomass Conference & Exhibition

EXPERT WORKSHOP ENVIRONMENTAL SUSTAINABILITY OF CROPS FOR BIO-BASED INDUSTRIES IN EUROPE

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Question 1: Select the 1-2 types of primary crops used in industrial biorefineries producing bio-based chemicals, materials, products that you will present: what are the volumes or areas of such crop(s) in the EU and what are the uses (e.g., final products, intermediate chemicals, etc.)? Kenaf (*Hibiscus cannabinus* L.) and Hemp (*Cannabis sativa* L.)

- **Overview.** Fibre crops with high lignocellulosic biomass yields. Replace fossil-derived plastics and other materials. Significant potential to overcome environmental challenges.

Key applications. Prefabricated panels, biogas and organic fertilizer, bioproducts. Reduce reliance on mineral fertilizers.

Geographical distribution and volumes. Kenaf: World area cultivation 200 k ha (FAO). Main producers Thailand, China, India and Mexico. Still pilot scale in Europe. Suitable potential areas: South of Europe. Biomass yield: 15-20 t/ha
Hemp: In EU has increased significantly from 20 k ha in 2015 to 33 k ha in 2022 (60% increase). The production increased from 97,130 t to 179,020 t (84.3% increase). France largest producer. Suitable potential areas: Europe, from North to South.

Uses in bio-based products. Bioplastics, sustainable textiles, building materials, bioenergy...

Question 2: What are the main relevant environmental impacts related to the cultivation of the selected crops?

Key environmental impacts (mainly hemp):

- Sequestration of 9 to 15 t of CO₂ per hectare annually.
- Reduction of fossil fuel.
- Lower emissions due to reduced need for synthetic fertilizers. 50% N reduce use compares to traditional crops in rotation in Spain 100 kg/ha N to 200 kg/ha N (corn grain).
- In Spain: up to 50% less water required compared to traditional crops. 3,000 m³ ha⁻¹ to 6,000-7,000 m³ ha⁻¹ (corn grain).
- Crop rotation. Enhances biodiversity by providing habitats for pollinators and other wildlife and soil biota.
- Improves soil fertility, prevents erosion, and contributes to carbon sequestration through a better cropping practice.
- High biomass production efficiency with low input requirements. Residual biomass used for energy production.

Question 3 - What are the main ‘best available practices/technologies’ to grow such agricultural crops minimizing the impacts and maximizing the benefits for the environment? If the cultural practices are adequate, the environmental impact will be positive, increasing biodiversity, benefits for pollinators, more crops to rotation.

- The best practices to grow these agricultural crops: to reduce or not use of herbicides and pesticides with adequate agricultural practices. Reduce the water added, only use when it is necessary, and of course lower than other traditional crops of the rotation.

- Cultural, social and local factors matter when it comes to adoption.

Key good practices (mainly Hemp)

- Minimize herbicides and pesticides through integrated pest management and organic inputs **to improve soil health**.

- Efficient storage of raw biomass.

- Implement efficient irrigation systems, like drip irrigation, and monitor soil moisture to optimize water use.

- Integrate hemp and kenaf into crop rotations to improve land use efficiency, break pest cycles and enhance biodiversity.

- Utilize residual biomass for renewable energy. Optimize biogas production processes for better nutrient recovery.