

WHO WE ARE (Research group/entity/company description – maximum 700 characters with spaces)

CTAEX is a **private non-profit R&D centre** based in Extremadura, southwest Spain, founded in 2000 by a consortium of complementary agri-food entities. It addresses multiple scientific areas across the agri-food value chain, including sustainable agronomy, food production, biotechnology, and by-product management. The Centre brings together **70 partners or associates** belonging to the most representative agri-food sectors such as tomato, tobacco, wine, rice, olive, livestock, aromatic and medicinal plants, forestry, and natural ingredients, covering both primary and secondary processing as well as the valorisation of agri-food by-products.

CTAEX's research activity, whose results are transferred through its **Knowledge Transfer Office (KTO)**, is focused on two specific technological pillars: **agricultural and food research**. Within these areas, the research lines defined as strategic are established, structured around three cross-cutting technological axes: **sustainability, agri-food diversification, and information and communication technologies (ICT)**. Based on these axes, priority subsectors are identified, corresponding to groups of significant relevance in the Iberian Southwest, both due to their strategic activity and their future development potential.

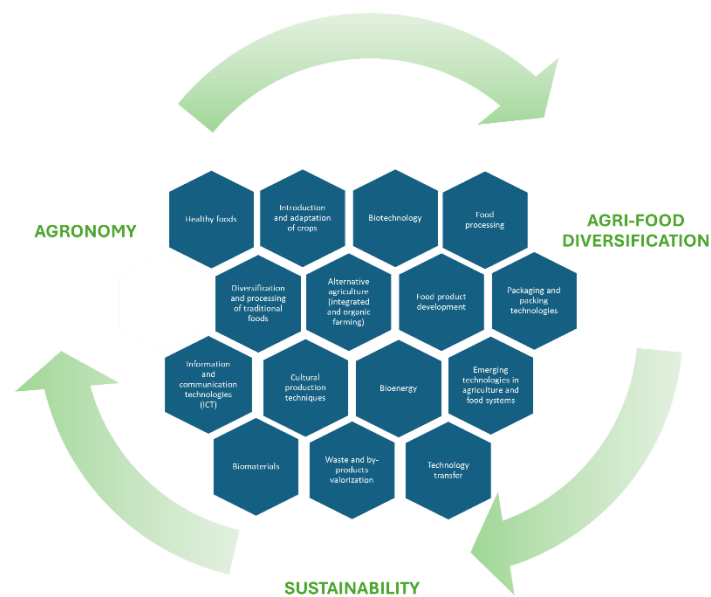


Figure 1.- CTAEX's research lines

The Centre brings with **experimental farms, food pilot plants, kitchen and tasting rooms, and food quality control, physical chemical and microbiological laboratories, and equipment and process control facilities**, so that it is possible to follow the complete agri-food process, "From Farm to Fork". CTAEX supports innovation and technology transfer from primary production to consumption to enhance sustainability, competitiveness and circularity.



Figure 2.- CTAEX's areas

Participation in **almost all steps of the value chain of several primary sectors** gives us an optimal positioning at the Centre of the quadruple helix model of the regional innovation system (science, policy, industry, and society), ensuring a multi-actor approach, bi-directional co-creation and knowledge exchange processes and between the actors in all the activities we carry out.

WHAT WE OFFER (expertise, infrastructures and skills offered – maximum 700 characters with spaces)

To support sustainable and biodiversity-friendly agriculture, it is essential to first list demonstrated farming practices that benefit the environment. **CTAEX's Agricultural Area** has at its disposal green houses and 23 hectares of experimental farms (4 ha "ECO" certified among them) indicated for pot trials and large-scale cultivation and equipped with an irrigation general installation in total covering with a 1.000 m² storage pool and irrigation water supply wells. Besides CTAEX is authorized by the regional government to work with GMOs. This infrastructure enables the implementation and evaluation of environmental-friendly practices such as reducing the use of plant-protection products, optimizing fertilization strategies and irrigation efficiency, improving soil management, and testing crop varieties with enhanced tolerance to multiple stresses.

CTAEX has the authorization as a Producer of Seeds and Greenhouse Plants, with registry entry number ES/10/06/2574 as a Multiplier Producer for forest and ornamental species groups, horticultural plants, horticultural seeds, and as a Breeder-Selector Producer for textiles species groups (*Cannabis sativa* L.), as well as for the use of PEU Plant Passport.

In addition, CTAEX actively participates as an advisor in numerous trials conducted on external plots belonging to other cooperatives, and agricultural companies throughout the country to support farmers to transition to the incorporation of new crops or more sustainable agricultural practices in the European production systems by

widely sharing practical knowledge and potentially deployed at large scale. Hereby enabling strong engagement and collaboration with other stakeholders across the agricultural value chain.

CTAEX's Food Technology Area is equipped with both: facilities and machinery that make it possible to cover a great variety of industrial food products elaboration processes at laboratory and pilot scale, supported by its pilot plant and experimental kitchen.

The Centre focuses on the development of new food products and the adaptation of existing products to meet evolving market demands, with a strong emphasis on functional and healthy foods. Traditional products are reformulated or enhanced with natural ingredients and innovative processes to improve their nutritional and functional properties without compromising sensory quality. Its services cover a wide range of product categories (semi-processed foods, ready meals, dairy, by-product valorisation and functional foods) as well as advanced processing technologies such as 4th and 5th range products, aseptic treatments, pasteurization, and sterilization. Preservation techniques aim to reduce thermal dependency, utilize natural additives, extend shelf life, and ensure energy-efficient, minimally invasive processing that meets consumer demand for high-quality, minimally processed foods.

In addition, CTAEX provides comprehensive technical and sensory services to support industrial implementation, including sensory evaluation, shelf-life studies, ingredient assessment, formulation optimization, and sample production for market studies. The Centre also offers technical consultancy, process optimization, feasibility studies, and energy valorisation of by-products. Special attention is given to consumer trends toward "superfoods" and products that are more natural, less processed, and lower in additives, contributing to sector diversification and supporting sustainable and innovative agri-food development.

In addition, CTAEX have four health registration numbers to manufacture, preparation, transformation and packaging of meat products, ready meals and sauces, condiment and spices and preserved vegetables, vegetables and pulses and extracts of products of vegetable. This enables the Centre to carry out applied research and pilot trials under conditions equivalent to those of the food industry, ensuring that the resulting products are legally fit for human consumption and that the outcomes are directly transferable to industry and market-oriented innovation.

For its part, **CTAEX's Process Area** is integrated by the Sustainability department, the analytical department and the transversal projects department.

The Sustainability department carries out the technical advice on agri-food processes, optimisation of phases, by-products valorisation (extraction and recovery of active principles and interest compounds, use in animal feed or agriculture and energy production) and decarbonisation and promotion of bioenergy. It is equipped with a by-product laboratory (processing and conditioning) and biomethanization equipment at laboratory and pilot scale to biogas production.

The Analytical department carries out analysis for the agri-food sector of the area. Apart from the external companies' agri-food matrices analysis, this Dept. addresses R&D lines related to the extraction, isolation and stabilization of chemical interesting compounds found in agricultural and food residues and by-products. This department is highly specialized in agri-food kind of matrixes. The Laboratory is accredited by ENAC in the UNE-EN ISO/IEC 17025:2017 standard with accreditation number 1467/LE2629 for medicinal cannabis and industrial hemp testing.

Additionally, CTAEX provides project results' diffusion and dissemination through its certified **Knowledge Transfer Office (KTO).** CTAEX has also launched several Technological Observatories

(<https://ctaex.com/observactaex>), as platforms to transfer the latest technologies and research results in the field of R&D&I applicable to the agri-food sector.

The use of **ICTs and digitalisation processes** are the real drivers of development in agriculture and the food industry. The demonstration of 4.0 processes is one of the pillars of the centre, through the implementation of "farm-food-labs".

CTAEX belongs to several **Platforms** such as Technological Platform on vegetal Biotechnology (**BIOVEGEN**), Technological Platform Food for Life Spain (**PTF4L Spain**) and Bio-based Industries Consortium (**BIC**). Moreover, CTAEX is a founding partner of the **Hemp Technology Pole**. CTAEX is part of the 67 centres belonging to **FEDIT** (Spanish Federation of Technological Centres) and "Cooperativas Agro-alimentarias de España" (organisation that represents the agri-food cooperative movement before national and European bodies, institutions and associations related to the agri-food sector and the social economy). CTAEX also participates in other significant alliances and agreements to achieve more efficient actions in support of the companies it serves. CTAEX is recognized as a **Cervera Excellence Centre** in the priority area of Circular Economy, is member of the **National PI+D+I Innovation Support Network**, coordinated by the CDTI, to provide advice on public aid to companies seeking the best public funding for their R&D&I activities, through regional, national, European or international programs and has been selected as an Advisor Support Service within the European **AKIS Network**.

OUR TOPIC OF INTERESTS IN Horizon Europe:

DESTINATION - FAIR, HEALTHY AND ENVIRONMENT-FRIENDLY FOOD SYSTEMS FROM PRIMARY PRODUCTION TO CONSUMPTION

HORIZON-CL6-2026-02-FARM2FORK-03: Boosting the competitiveness of protein crops in Europe

HORIZON-CL6-2026-02-FARM2FORK-10: Sustainable and healthy diets based on health status and socio-economic risk factors of ageing population

DESTINATION - CIRCULAR ECONOMY AND BIOECONOMY SECTORS

HORIZON-CL6-2026-01-CIRCBIO-09: Balancing food security, bioeconomy, climate and biodiversity objectives to unlock sustainable value chains

OUR priority interest in research collaboration in the selected topic: Please explain how you cover parts of the scope in the topic and what expected results you contribute to and how

CTAEX aims to contribute to **HORIZON-CL6-2026-02-FARM2FORK-03** by enabling innovations that enhance the competitiveness, resilience and sustainability of protein crops across diverse EU systems, with distinctive leadership in industrial hemp as a high-potential protein and multi-purpose crop with strong potential for food, feed and bioproduct markets, backed by more than 10 projects and over 12 years of consolidated experience in this value chain.

CTAEX's **agricultural research infrastructure** (experimental farms, pilot processing and analytical laboratories) integrates **sustainable crop management with digital agronomy** and supports **trials under multiple agro-climatic and edaphic conditions**, strengthening **varietal adaptation** and improving yield stability, quality

and resource-use efficiency through optimized irrigation and fertilization regimes, ensuring robust and scalable production systems for protein. This expertise is reinforced by CTAEX's active role in projects like **MARGIN-UP**, where industrial hemp is being introduced and adapted to marginal lands to enhance their productivity and resilience. CTAEX also supports the deployment of new digital tools for precision protein-crop management, in fact, is conducting collaborative initiatives such as the **WE CANN** project (national call), which applies blockchain-based traceability, monitorization and carbon-footprint assessment to industrial hemp cropping system further demonstrates its ability to bridge **agronomic research, processing innovation and value-chain adoption** within diversified cropping systems and European sustainability protein-autonomy strategies.

Our research center contributes to circular bioeconomy pathways by **valorizing by-products** from protein crop processing into safe feed ingredients or functional food components, with pilot-scale extraction and stabilization technologies linked to bioeconomy business models that enhance farmer profitability and reduce waste. Our sustainability assessments and cost-benefit analyses inform scalable practices and support evidence-based recommendations for policy and practice. A relevant project is **MULTIHEMP (FP7)**, "Multipurpose hemp for industrial bioproduct and biomass" which demonstrated full-plant valorization of industrial hemp through integrated biorefinery concepts, life-cycle assessments and market-oriented value chains

Through our Process and Analytical Departments, CTAEX conducts **comprehensive physicochemical and nutritional profiling**, soil and biomass characterizations, and protein quality analytics to support **value-chain decision-making** and compliance with food/feed safety and legality standards. CTAEX has **practical experience in cross-border protein crop valorisation's**, notably participating in **BGREENER** and **HEMPVALUE** projects (Interreg Spain-Portugal), which **promote hemp cultivation** across diverse rural areas of Spain and Portugal, while enhancing **biodiversity**, improving **soil quality** while at the same time obtaining quality seeds and stalks for biobased value chains in bioconstruction and bioplastic applications.

In addition, CTAEX characterizes the **nutritional value** of hemp seeds, along with their derivatives and **by-products**, to assess their potential for high-value food and feed applications, further supporting the development and valorisation of protein resources. This expertise is exemplified in the **PORK-MARLEY project** (regional call), "Improving animal welfare through the use of hemp in the pig industry," where hemp byproducts were incorporated into pig feed. It is also demonstrated in the **HEMPVALUE project**, where high-protein organic beverages, sauces and ready-to-eat foods are being developed from hemp-based ingredients.

CTAEX also supports evidence-based bioeconomy decision-making through sustainability assessments, business-model development, biomass-stream analysis and natural-capital integration, providing tools and recommendations to balance food security, climate mitigation, biodiversity conservation and farmer income. These capabilities strengthen local value chains, contribute to EU protein autonomy, and are fully adaptable to any protein crop.

The centre works actively with *farmers* and other value-chain actors to ensure the effective adoption of sustainable practices and the integration of crops into local agricultural and industrial systems. It also leverages its **multi-actor partnerships and advisory networks** to disseminate practical innovations and strengthens knowledge exchange through platforms such as the **Hemp Hub**, of which it is a cofounder, and **EIHA** (the European Industrial Hemp Association) of which it is a partner, reinforcing its role in supporting the development and consolidation of the value chain.

CTAEX can act as a key RTD partner in **HORIZON-CL6-2026-02-FARM2FORK-10** by covering the product–process nexus of sustainable and healthy diets for the ageing population, with a strong focus on applicability scale-up and real-world deployment.

From its Food Technology and Process Areas, CTAEX can **identify specific dietary needs of people >65 years** in terms of foods, ingredients and nutrients, translating clinical and nutritional evidence into **concrete product specifications** (nutrient density, texture, portion size, shelf-life) relevant for malnutrition prevention healthy ageing and disease risk reduction.

CTAEX can **co-develop healthy and affordable diet solutions** for home care and residential settings through the formulation and validation of **easy-to-chew and dysphagia-adapted foods**, including texture-modified matrices (soft, minced, pureed and emulsion-based products) enriched with targeted nutrients and **natural bioactive compounds**. The explicit integration of **dysphagia-friendly design** provides a clear differentiating asset aligned with unmet needs in elderly nutrition.

The Centre has demonstrated experience in the **development of functional foods with prebiotic and probiotic ingredients** aimed at improving gut health in older adults. This is exemplified by the **SYBARIOTA project** (“Intestinal health and wellbeing through microbiota”), focused on industrial research and development of adapted ingredients and foods that promote intestinal wellbeing. Within this project, CTAEX has developed **prebiotic- and probiotic-enriched food products specifically targeted to the elderly population living in care homes**, directly addressing age-related microbiota imbalance and digestive health.

Uniquely, CTAEX holds **five official health registration numbers**, enabling the **manufacture, transformation, packaging and preservation of food products under industrial-equivalent conditions**. This allows the production of **hundreds or thousands of units (e.g. canned, pasteurised or sterilised foods)**, a capability rarely available in research centres and essential for validation in institutional catering contexts, ensuring direct transferability to public catering systems, care homes and food service operators.

CTAEX further contributes **advanced process optimisation** (minimal thermal impact, natural additives, extended shelf-life, food safety assurance) combined with **sustainable processing and packaging criteria** (resource efficiency and reduced environmental footprint), feeding directly into sustainability-focused recommendations and awareness campaigns.

Finally, sensory validation is ensured through **trained sensory panels** to assess acceptability, preference and compliance, which is critical for real dietary uptake in older populations.

These actions build on CTAEX’s experience in EU and national projects aligned with this scope (e.g. SATIN, SWEET, NAT4COLOUR), reinforcing its role as a reliable partner for prototype development, pilot-scale validation and sustainability-oriented food innovation within Cluster 6 consortia.

CTAEX supports the transition towards **sustainable, competitive and resilient European agri-food systems**, contributing to **HORIZON-CL6-2026-01-CIRCBIO-09** through the development of **evidence-based tools, sustainable value chains and innovative business models** that balance **food security, bioeconomy, climate and biodiversity objectives**, while **enhancing farmers’ income diversification and profitability**.

Building on its **multi-actor mandate and extensive infrastructure** (experimental farms, pilot plants and analytical laboratories), CTAEX conducts **natural capital accounting, sustainability assessment and cost–benefit analysis** to integrate economic, environmental and social impacts into **decision-support frameworks** for farmers, value-

chain actors and policymakers. These interdisciplinary analyses, conducted from farm to macro level, assess **biomass supply and demand, market price thresholds, land-use trade-offs and food security risks**, enabling stakeholders to anticipate and manage trade-offs between food and non-food biomass uses.

CTAEX has **long-standing experience in sustainable crop diversification and biomass valorisation**, with a strong focus on **plant-based protein systems**, particularly **industrial hemp** as a high-protein, resilient and versatile crop for food and feed. The Centre carries out **varietal adaptation trials under diverse agro-climatic and edaphic conditions**, involving farmers and industrial stakeholders, to improve yield stability, quality and resource-use efficiency, and to support the integration of protein crops into diversified conventional and organic farming systems. This expertise is reinforced by **years of applied experience in hemp-based value chain development**, including cultivation optimisation, testing and market deployment, notably through projects such as **BGREENER** (Interreg VI-A España-Portugal), promoting a sustainable and competitive protein-based farming and local value chains, **Margin Up!** (HORIZON-CL6-2022-CIRCBIO-01-02) Introduction of non-food crops in marginal areas and use of biomass as raw material for producing bioproducts, **HARNESSTOM** (H2020-SFS-2018-2020-101000716), harnessing the value of tomato genetic resources for now and the future, **NEWCOTIANA** (H2020-NMBP-BIO-2017 -10.3030/760331), developing multipurpose nicotiana crops for molecular farming using new plant breeding techniques, **WASTE4GREEN** (LIFE-2017 - ENV/ES/000192), developing sustainable and green agri-waste based biopesticides or **AGROFACTORY** (national call) which use of tobacco as a biofactory plant for obtaining sweeteners proteins.

Beyond primary production, CTAEX applies a **circular bioeconomy approach** by valorising **agricultural biomass, residues and processing by-products** into **high-value food ingredients, bioactive compounds and bio-based materials**, contributing to economically viable and resilient farming models while reducing waste and production risks. This work builds on demonstrated experience in **biomass valorisation projects such as AGROMATTER** (Cervera Network), where CTAEX co-developed sustainable biobased solutions from agricultural waste (e.g. biofertilizers and functional food components) or **SUSTAINEXT** (HORIZON-JU-CBE-2022-IAFlag-01 - 101112434) about next generation, zero-waste, dynamic, multivalORIZATION route biorefinery for sustainable botanical ingredients, where CTAEX co-showcased a replicable and versatile model from Extremadura to bio-based industry in EU, demonstrating techno-economic feasibility and environmental benefits in line with the **EU Bioeconomy Strategy and European Green Deal**.

Through its **food technology, pilot processing and sensory facilities**, CTAEX also designs and validates **bio-based value chains and business models** linking the agri-food sector with **emerging bioeconomy and nature-related markets** (e.g. functional foods, natural extracts, sustainable packaging), ensuring scalability and market relevance. In this context, CTAEX leverages its expertise in **healthy and sustainable diets**, including the development of **high-protein, easy-to-chew foods for older adults**, enriched with nutrients and natural bioactive derived from plant-based and agri-food by-products, contributing simultaneously to **nutrition, resource efficiency and value creation**. This expertise is demonstrated through projects such **SWEET** (H2020-SFS-2017-2 -10.3030/774293) about impact on health, obesity, safety and sustainability of sweeteners and sweetness enhancers.

CTAEX implements a **strong multi-actor approach**, working closely with farmers, cooperatives, SMEs, startups, advisory services, research organisations and public authorities. Acting as a **knowledge and technology transfer hub**, CTAEX supports farmers' transition through **advisory services, field demonstrations, training and practice-oriented dissemination**, fostering the large-scale uptake of circular, climate-resilient and socially inclusive agri-food systems aligned with the **Common Agricultural Policy, the EU Bioeconomy Strategy and the EU Vision for**



Agriculture and Food. This multi-actor approach fosters **inclusive adoption of sustainable value chains**, strengthening local rural economies while safeguarding food security and environmental integrity in line with the **Common Agricultural Policy, EU Bioeconomy Strategy and Green Deal objectives**.

CONTACT DETAILS

Entity: Centro Tecnológico Nacional Agroalimentario “Extremadura” (CTAEX)

Contact person: Laura Moreno Cordero

E-mail:

Website: <https://ctaex.com/en>

EUROPEAN PROJECT OFFICE CONTACT

Entity: Oficina de Proyectos Europeos (OPE-SECTI)

Contact person: Carlos Cabo

E-mail: carlos.cabo@fundecyt-pctex.es

Website: <https://www.opesecti.es/>