

NEIKER

MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

2021 report

Research and innovative
solutions for the agro-food
and forestry sector

EUSK

CAST

ENG



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Y MEDIO AMBIENTE

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In 2021, NEIKER, a technological centre that helps to develop a more competitive Basque agro-food and forestry sector, devoted itself to accompanying the sector in the digital transformation that heralds the years to come.

The Basque Government is keenly aware that this digital transformation will affect how we produce, distribute, and consume. It will entail huge challenges, but also new opportunities that we must know how to use. Moreover, the projects and technologies intended to advance transformation in farming practises will provide for more sustainable production, in line with the agro-farming policies promoted by Europe and the Basque Country. With this, I am referring to the Plan de Fomento de la Agricultura Ecológica (Plan to Promote Ecological Agriculture) (FOPE), the Plan Estratégico de Gastronomía y Alimentación (Strategic Gastronomy and Food Plan) (PEGA), and the Plan Estratégico de la Madera (Strategic Wood Plan) (PEMA), just to name a few, but also the priorities set forth in The European Green Deal and the “farm-to-table” strategy.

In this context, NEIKER is a key player, because it knows the sector and is experienced in sharing solutions and knowledge. In 2021, it worked with a cross-cutting vision and large, multidisciplinary team to guide the sector. The aim was for the incorporation of cutting-edge technology to be feasible and streamlined and to solve real problems or create new opportunities.

**“NEIKER is a key player,
because it knows the sector
and is experienced in sharing
solutions and knowledge”**



President

Bittor Oroz Izagirre

“innovative and highly technical solutions, so that the sector can undertake the digital transformation it needs”

NEIKER tackled 2021 as the year to reactivate the agro-food and forestry sector after a complicated patch. We did so by prioritising the greatest challenge that lies ahead: the technological revolution that is here to say.

For this reason, over the past year, NEIKER has worked on innovative and highly technical solutions based on artificial intelligence, digitisation, sensors, the Internet of Things, etc., so that the sector can undertake the digital transformation it needs, all while improving its profitability and appeal to guarantee transfer between generations or to promote entrepreneurship with new ideas and new professionals.

Some important projects we closely collaborated in include the use of Artificial Intelligence to reduce the use of fertilisers and irrigation, sensor-based water management, the use of virtual fences with GPS, using biotechnology to improve plant varieties, and the implementation of a circular bioeconomy to obtain products with a high added value.

We developed all this under the framework of the Sustainable Development Goals 2050, which set forth the path to follow to fight climate change and move toward a healthier and more sustainable food system. We supported the Basque Government’s lines of action to achieve a competitive Basque agro-food and forestry sector that is prepared to face the many challenges to come.



**Director
General of
NEIKER**

Leire Baraňano Orbe

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Representative of the workers at NEIKER



About NEIKER

About us...

We are a technology centre specialising in the creation of innovative solutions for the agri-food and forestry sectors. As an entity dependent upon the Basque Government Ministry of Economic Development, Sustainability, and the Environment, at NEIKER we work to bring knowledge and value to said sectors.

We are part of the Basque Research and Technology Alliance (BRTA), a Basque Government consortium that brings together different technological agents in the Basque Country to tackle industrial challenges in the Basque Country and compete with large leading international research and technology-development corporations.

Moreover, we are part of the Basque Network of Science, Technology and Innovation, which groups scientific and technological bodies and entities. Working as a network enables us to conduct a balanced R&D&i activity, aimed at improving the productivity and competitiveness of the Basque Country's agricultural production systems.



...and what we do

We develop new technologies to improve profitability and management of farms, in order to meet the quality and safety requirements of the agri-food industry and the end consumer.

We create scientific knowledge and transferable solutions that contribute wealth and well-being to our society and surroundings.

We contribute to the development of an agro-food and forestry sector in the Basque Country, the preservation and sustainability of our agrarian and natural environment and developing policies that drive the circular bioeconomy in the Basque Country.



Expertise

Plant research

- Production systems and good agricultural practices.
- Improved plant genetics.
- Alternative crops and biomolecules of agri-food interest.
- Epidemiology and plant crop infection control.
- Diagnosis and detection of plagues and plant diseases.
- Precision agriculture.

Environmental research

- Conservation and sustainable use of agricultural and natural resources.
- Recovery of degraded soils.
- Environmental monitoring.
- Impact, mitigation, and adaptation to climate change.
- Greenhouse gas emissions in agro-livestock systems.
- Circular bioeconomy.

Animal research

- Genetic improvement.
- Animal feed and nutrition.
- Animal production systems.
- Applied ethology and well-being.
- Epidemiological diagnoses, control, and observance of animal diseases.
- Zoonosis and food safety.
- Environmental biosafety, wildlife, and vectors as sources of infection for production livestock and people.

Forestry research

- Plant physiology and tissue culture.
- Genomics.
- Forestry pathology.
- Sustainability and ecosystem services.
- Genetic improvement.



Contribution to sustainable development goals



The United Nations' Sustainable Development Goals 2050 (SDGs) are a set of global measures launched in 2015 to eradicate poverty, protect the planet and ensure prosperity for all as part of a new sustainable development agenda. Each goal has specific objectives that must be reached over the next 15 years. Each and every one of us must play our own role in reaching these goals.

NEIKER'S contribution falls in line with SDGs 3, 5, 12, 13, and 15: we work to guarantee a healthy life and promote well-being at all ages (3), achieve gender equality and empower all women and girls as one of the essential basics to build a peaceful, prosperous, and sustainable world (5), promoting sustainable consumption and production modalities (12), adopting urgent measures to fight the climate crisis (13), and sustainably managing forests, fighting against desertification, stopping and inverting soil degradation, and stopping the loss of biodiversity (15).

Helping the sector

We contribute to the competitiveness and sustainability of the agro-livestock and forestry sector through research and applied science.

Genetic improvement

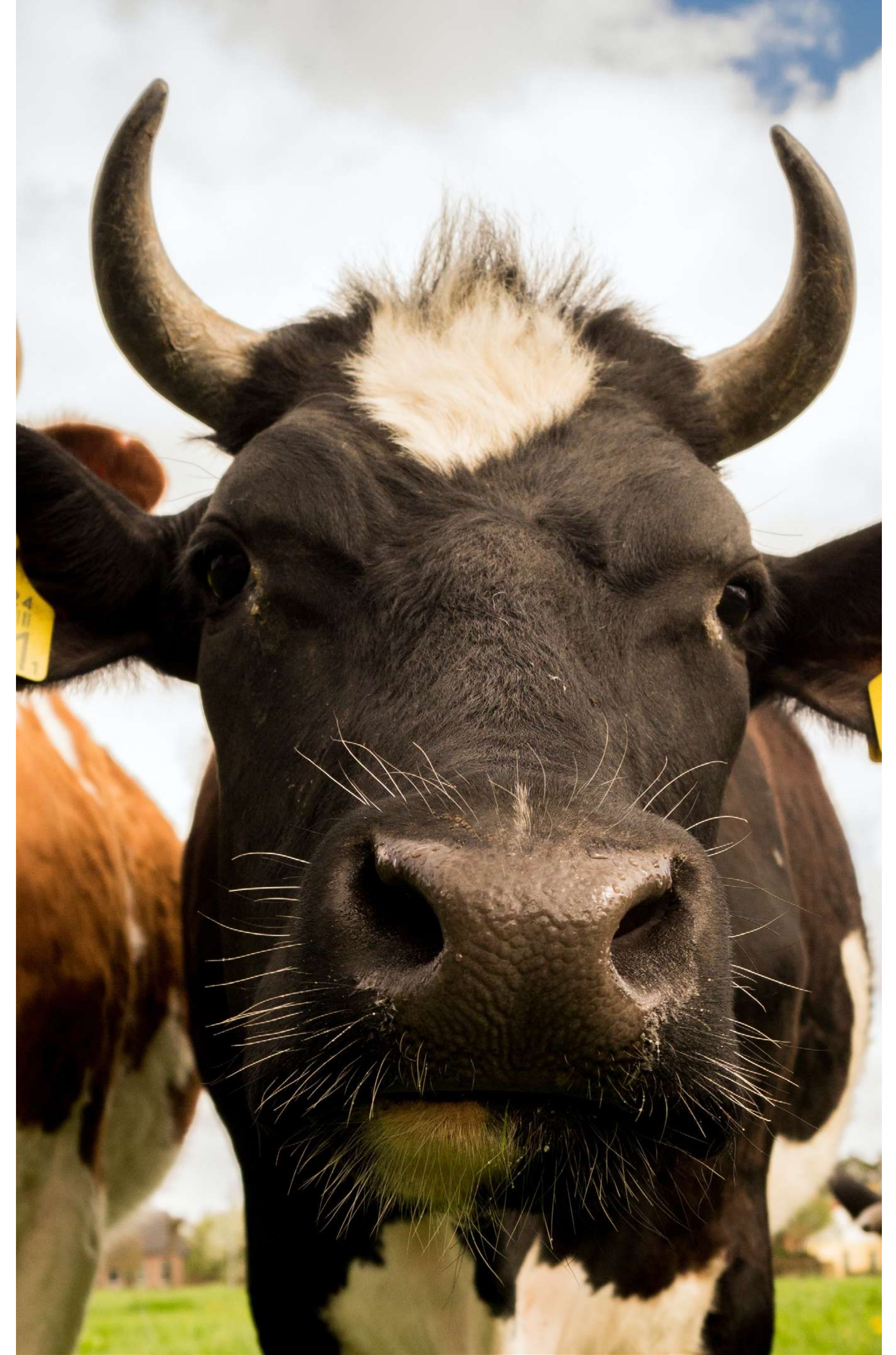
We obtain more competitive products that are more focused on industry and consumer needs, better-adapted to climate change and with a reduced environmental impact through genetic improvement.

Improving competitiveness of agricultural-livestock and forestry activities

We use cutting-edge technologies and new production systems to increase profitability, competitiveness, and sustainability for operations, guaranteeing their continuity.

Promoting sustainable and environmentally respectful production processes

We defend farming activity and share its contribution to preserving biodiversity, mitigating climate change, and maintaining the landscape.





One Health

We study the relationship between animal, human, and environmental health to offer alternatives to rationalise application of plant protection products in agriculture and to reduce the use of antibiotics in livestock.

Fostering ecological production

We research and generate objective and scientific knowledge that helps to foment and strengthen this type of agriculture, making it compatible with the sector's competitiveness.

Response to the climate crisis

We predict future scenarios and seek possible channels to mitigate and adapt to climate change, suggesting alternatives to current production systems. We inventory greenhouse gases emitted by the livestock sector.

Circular bioeconomy

Production processes should not generate waste. Reducing and converting this waste into materials for new products is a way for us to fight climate change, reduce dependency on raw materials, and create new economic activities.

NEIKER in numbers

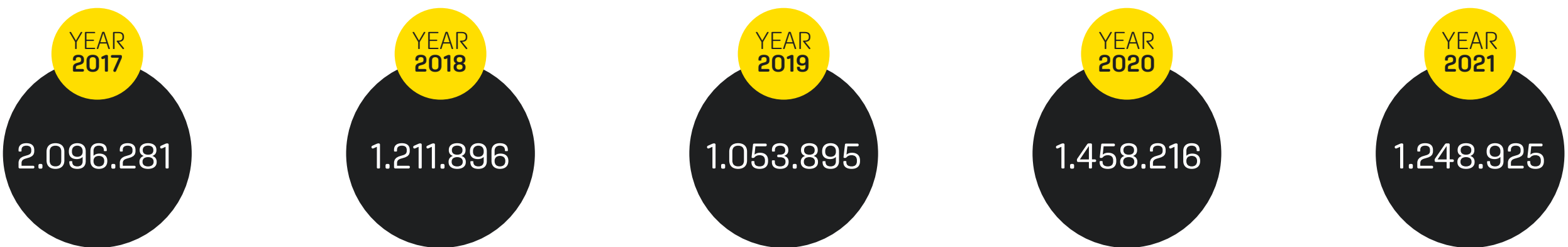
Professionals

Commitment, scientific excellence, focus on results, and client satisfaction are what define us.



Financial-economic indicators

Investments



Scientific and management excellence

Publications



Patents

The European patent (EP20382291.1) that we presented in 2020 is now in the evaluation phase. NEIKER developed it to diagnose bovines infected with microbacteria. Its main contribution is that it provides early diagnosis of paratuberculosis and has medical and veterinarian applications.

Register of new varieties

In 2021, we registered two new horticultural varieties, MADDIPER and IZARTXO peppers. These two new fruits join the list of varieties obtained by NEIKER and fall under the Gernika pepper type. They were selected to use their dry ripe fruit as pepper for chorizo.

MADDIPER and IZARTXO, which will soon be reaching the market, shine for their homogeneous fruit and good colour once ripe (carmine red) and high yield.

NEIKER began working on this project in 2012, after the request received from Eusko Label to select pepper varieties suitable for this sort of consumption and production.



Members of...



Aclima



Basque Food Cluster



BRTA



elhuyar



EFI



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Eit Food



Lekunberriko Instituto Laktologikoa

Alliances



AZTI



Basque Know Fundazioa



BCC Basque Culinary Center



BC3 Basque Centre for Climate Change



BCAM Basque Center for Applied Mathematics



CICbioGune



CICbiomaGune



Cidetec



CIEFAP Centro de Investigación y Extensión Forestal Andino Patagónico (Argentina)



Gaiker



IRTA Instituto de investigación de la Generalitat de Cataluña



Tecnalia



Tekniker




UPV-EHU Universidad del País Vasco-Euskal Herriko Unibertsitatea




VICOMTECH


Main clients




Aberekin




ABRA




Agromillora




Azurmendi Jatetxea




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Bodegas Luis Cañas




Bodegas Itsasmendi




CERTIS




Garlan




GARAIA




Harakai -Urkaiko




GOIMAR




Ihobe




InsektLabel




IRTA




Kaiku Coop.




Lursail




Medcamm




Pascual




Syva




Timac Agro




Udapa



Uaga (Unión Agroganadera de Álava)



UPV/EHU



USSE

Collaborations

With **IHOBE**, to establish lines of work to mitigate and adapt the farming sector to climate change and to preserve soil.

With **BC3**, to define future lines of work to create knowledge to guarantee a primary sector resilient to climate change in the Basque Country.

With **UDAPA** to conduct market tests, farmer acceptance, and commercialisation of potato varieties BELTZA and EDURNE.

With **MEDCANN**, to characterise varieties of medicinal cannabis after obtaining authorisation from the Spanish Agency of Medications and Health Products.

With **BIOBIZZ**, to create new products and develop new cultivation techniques, such as organic hydroponic fertilisation.

With **EITFOOD**, to drive and spread regenerative agriculture because it helps to protect soil and mitigate climate change



Certifications



ISO 9001 ER-12012005

certification for the management of R&D and technology transfer projects in agri-food (agricultural, livestock and forestry sectors, and the natural environment).



Accreditation no. 615/LE 1321 from ENAC for the carrying out of chemical, microbiological, immunological and molecular tests on agro-food products at the Derio centre.



NEIKER has an R&D&I management system in compliance with Standard UNE 166002:2014

for research, development and innovation activities in the field of agri-food (agricultural, livestock and forestry sectors) and in the natural environment. Number: IDI-0009/2019.

Analytical services and reference facilities

Analytical services



Our analytics

Animal health

Reproductive and viral diseases in ruminants, microbacteriorosis, microbiology for feed and raw materials, detection of pathogens in milk, antibiotic resistance, etc.

Preservation of natural resources

Fertility and hydric properties of soil, physiological and biological parameters of soil, consulting for transition toward agro-ecology, consulting on mitigating climate change, etc.

Plant health

Certification of seed potatoes and consumption, tests on purity and viability of botanical seed, quarantine organisms, disease diagnosis, varietal identification of plant species, etc.

11 accreditations

We have 11 accreditations in

- Microbiology-immunology departments.
- Molecular department.
- Biotechnology department.

In 2021, we obtained a new AENOR accreditation. In this case, for PCR detection of xylella fastidiosa, a pathogen that threatens crops like wine grapes, olives, fruit trees, etc.



Laboratory infrastructures

- Level-2 biocontainment laboratory (BSL-2).
- Level-3 biocontainment laboratory (BSL-3).
- Soil and plant matter analysis laboratory.
- Plant analysis laboratory.
- Facilities for animal experimentation with levels 2 and 3 of biocontainment.
- Greenhouse for plant testing with level 2 biocontainment.
- Chromatography department.
- Molecular biology departments.
- Analytical chemistry department.

**OVER 300
CLIENTS**

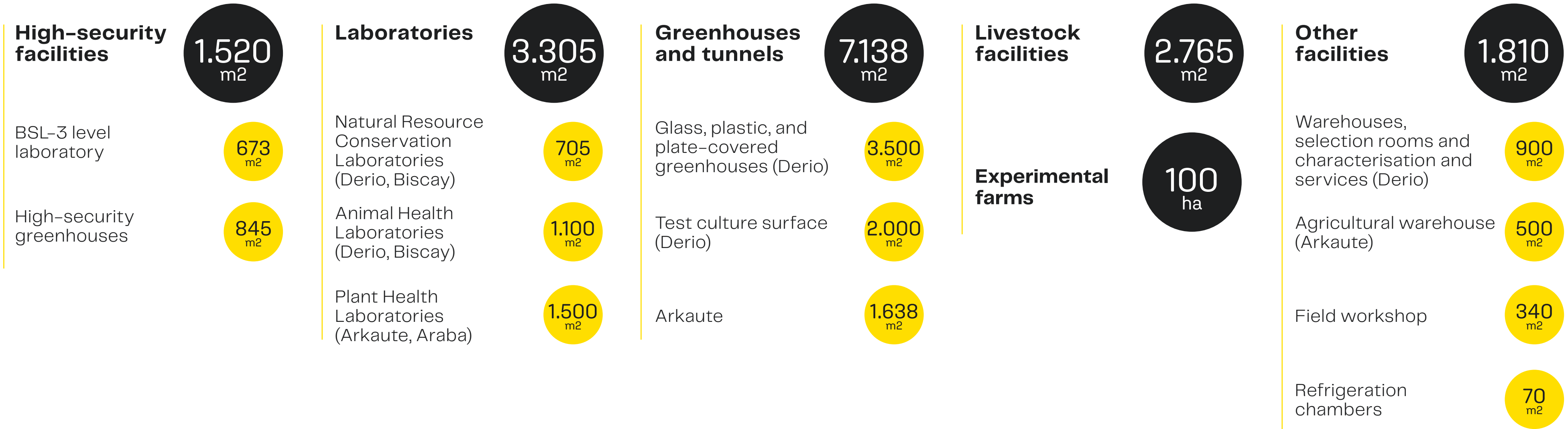
from all links on the
chain of value

**MEMBERS OF
THE NETWORK OF
BIOLOGICAL ALERT
LABORATORIES
(RE-LAB)**

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Reference facilities



Research and transfer

#agritech



We reduced fertiliser
consumption in a pioneer
pilot test by using
precision agriculture

We developed precision
tools to optimise
water use for irrigating
potatoes, reducing
production losses by half

Microsoft AI for Earth
awards a predictive
model developed by
NEIKER to adjust
the dose of nitrogen
fertiliser needed to
cultivate wheat

#sustainability and #competitiveness



By means of genetic improvement, we managed to preserve and protect milk production with Latxa, Manech, and Basco-Bearnesa sheep

We proved that giving heifers paratuberculosis vaccines during the first three months of life reduces mortality by 35%

We help to strengthen projects on growing walnut trees to help the sector to diversify

Nutritional needs and testing for internal parasites, main concerns in the sheep sector regarding food and health

By changing animal diet, we obtain healthier meat, milk, and meat and dairy products

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#climate crisis



→

Climalert, a project to prevent risks stemming from climate change that we participate in, reduces the impact of a flood in France

→

By using plant cover, we reduced erosion in vineyards located on slopes in Rioja Alavesa by over 60%

→

We study the biodiversity of wine grapes, fertilisation, and use of plant cover to preserve wine quality with climate change

→

We validated new strategies to mitigate the effect of livestock on climate change

→

We proved that genetic selection and food can reduce dairy cow methane emissions by 20%

→

We monitor the introduction and establishment of new vectors capable of transmitting pathogens that may affect human and animal health

#ecological production



We obtained the ecological production certificate for seven hectares for our Arkaute farms (Álava)



We showed the latest developments in ecological crops, during the traditional annual tour of our tests



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#bioeconomy



We prepared the STRATEGIC CIRCULAR ECONOMY AND BIOECONOMY PLAN in collaboration with IHOBE

We converted coffee grounds into food for livestock

We coordinated a European project to turn tonnes of fishing industry waste into bio-fertiliser

The Latxa sheep debuts on the catwalk with María Clé, NEIKER, and Latxaesnea

New fertilisers and bio stimulants through sustainable use of organic waste

Circular economy to turn grape waste into a feed ingredient

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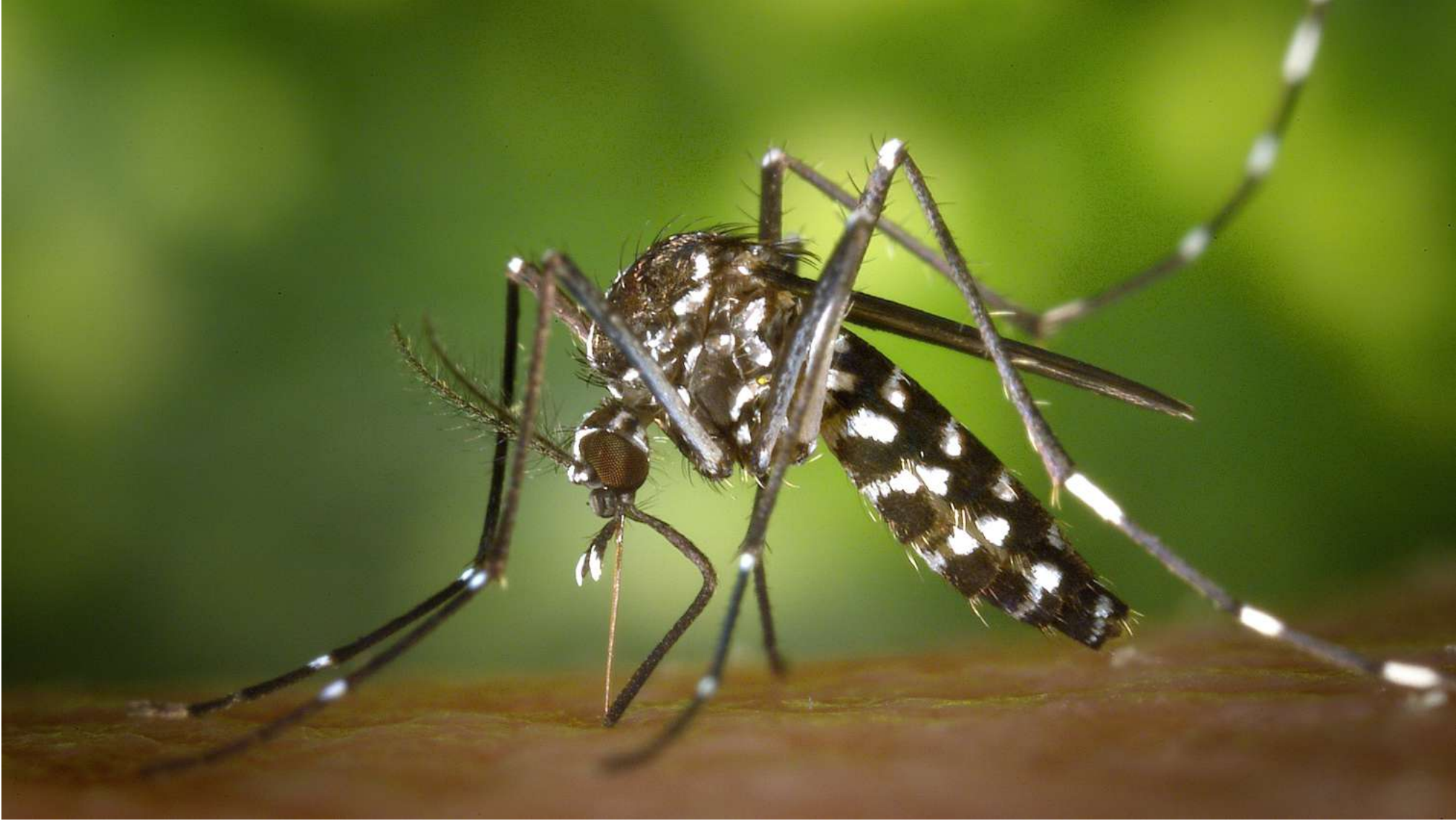
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#onehealth



We continue our epidemiological surveillance of vectors and wildlife to detect the possible arrival of new diseases, some of them zoonotic



We published two guides for prudent use of antibiotics in daily bovine livestock

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#animal welfare



We promoted creation of the CIBA Network, a scientific network to research Animal Welfare

The animal welfare Welfair™ stamp, developed by IRTA and NEIKER, recognised for innovation

We designed Euskal Okela's Welfair™ certification strategy

#forestry improvement



Our actions are part of the Basque Forest Improvement Plan, EUSKOBASOA 2050, with four main lines of work and two cross-cutting ones. The core ones are health, alternative species, wood quality and the reactivation of the genetic improvement plan, and the cross-cutting ones, which affect all the core ones, sustainability and climate change



We study the interaction between soil, water and forest vegetation to propose guidelines for sustainable forest management in watersheds with water catchments for human consumption, because the quality and quantity of the water we drink depends on it

Last year we continued to study pathogens that put our trees at risk and to work on alternatives to combat brown and red pine banding within the Experimental Pilot Plan 2019-2021



We identify trees that are tolerant to the new conditions caused by global warming and multiply them using the technique known as somatic embryogenesis, in order to have elite specimens that will adapt to the new predicted scenarios (more heat, less water, etc.)

We are researching how to improve the management of forests and the trees we plant so that the forestry value chain has alternatives that allow for a stable, sustainable and quality supply

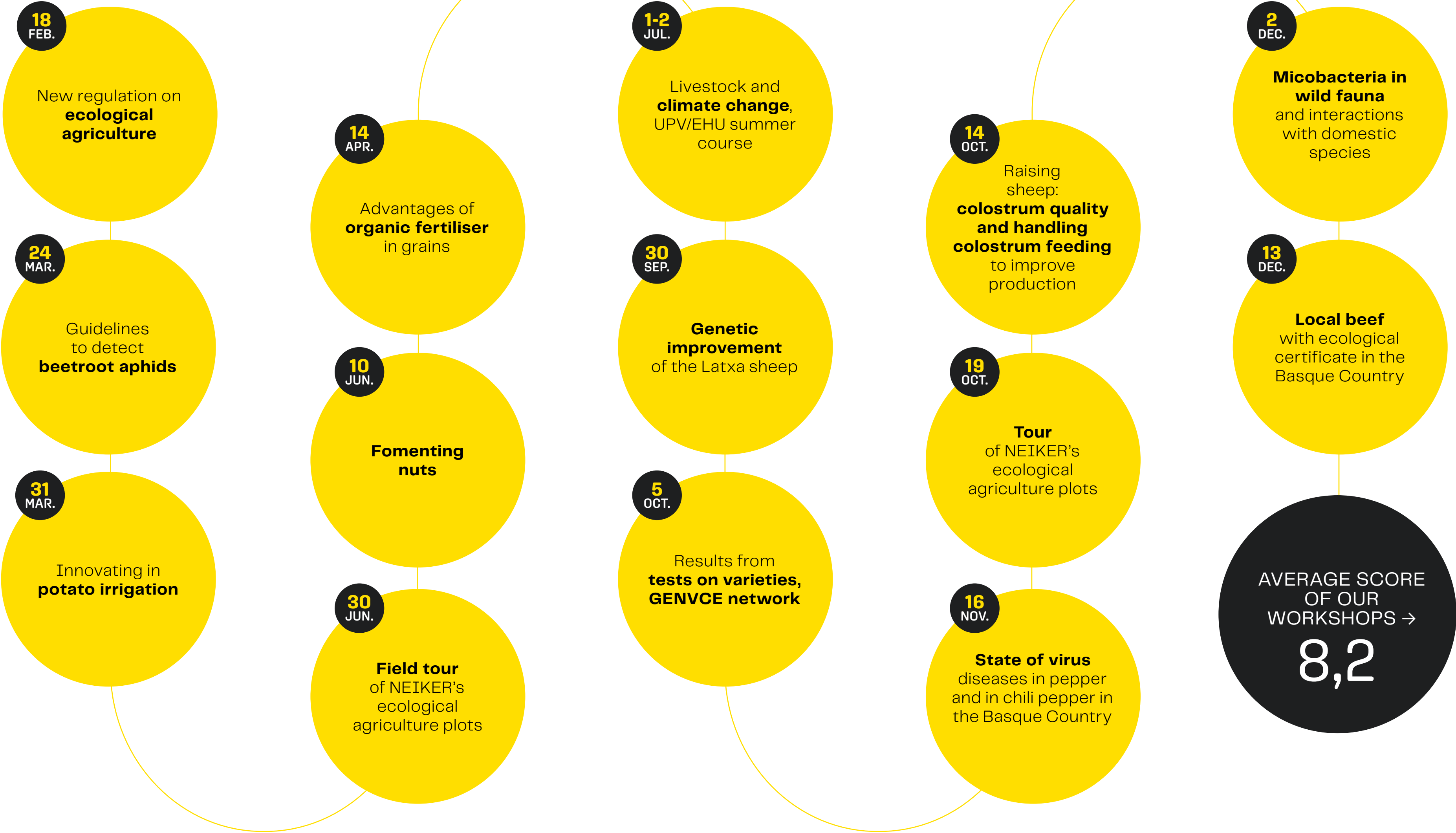
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#webinars and transfer days

We share our knowledge, research, and solutions with the sector



Food 4 Future

We present at Food 4 Future 2021, international trade fair for the foodtech industry, food products and beverages developed together with leading brands reference brands in the agri-food sector.



Socially responsible

NEIKER saria

With the “Neiker saria” award, we promote sharing science in Basque, under the framework of the CAF-Elhuyar awards. In 2021, we completed our fifth edition, won by an article on the bovine breed Betizu.

Zientzia Azoka

We participated in Zientzia Azoka, an initiative by Elhuyar Fundazioa to drive scientific culture through projects designed by youth. We were on the jury to select winning proposals and we welcomed participating schools for a two-day stay.



30

kutxa kultur



NGO Saluganda

We continue to support the NGO Saluganda, created in 2010 to improve the quality of life of women, girls, and boys in rural areas of Uganda. Saluganda's lines of action are education, water and sanitation, agriculture and livestock, and health and nutrition.

30,000 kilos of potatoes

We have collaborated with Banco de Alimentos (Food Bank) since 2015, donating excess generated through our research activities to the entity. In 2021, we delivered 30,000 kilos of potatoes that helped over 1,200 families.



Women and Girls in Science

As an entity that believes in and works toward equality, last year we supported and participated in different initiatives to make our stance clear. These include STEAM Sare and International Day of Women and Girls in Science (11 February) which, through talks at school centres, raises visibility for the work that women do in STEM (Science, Technology, Engineering and Mathematics).

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Awards and recognitions



Stanford University includes three researchers from NEIKER in the most prestigious scientists in the world



We were recognised as one of the most prestigious soil research centres in the world



Our Micobacteria group earns the Zendal award for animal health for their innovative work in improving diagnosis and testing for animal diseases



The European Commission recognises NEIKER'S human resource strategy

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