NEIKER MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE neiker.eus

Research and **innovative solutions** for the **agricultural** and **forestry** sector





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NEIKER

MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE



EKONOMIAREN GARAPEN, JASANGARRITASUN ETA INGURUMEN SAILA

DEPARTAMENTO DE DESARROLLO ECONÓMICO, SOSTENIBILIDAD Y MEDIO AMBIENTE – neiker.eus





Introduction







PRESIDENT
Bittor Oroz Izagirre

Deputy Minister for Agriculture, Fisheries and Food Policy with the Basque Government.

Those of us who work supporting the agricultural, livestock and forestry sector from the Basque Government and from technology centres such as NEIKER have experienced a year 2020 that we will find difficult to forget.

Our sector faces great challenges such as competitiveness, differentiation, generational replacement or sustainability, and last year we had to add to these the challenge of not leaving anyone behind due to the pandemic, of being closer than ever to the sector.

NEIKER's activity has been fundamental during 2020, it has not ceased and has continued to respond to the policies designed by the Basque Government to promote the development of the sector, to respond to the growing concern for health and environmental sustainability as well as the production of local and innovative products.

Within the Strategic Wood Plan (PEMA), NEIKER has continued to coordinate the search for solutions and alternatives that the wood sector needs. Within the framework of the Plan for the Promotion of Organic Farming (FOPE), led by the Basque Government and promoted by NEIKER, among others, it has obtained the organic production certificate and has continued to transfer its knowledge in this field. All this within the framework of the Strategic Plan for Gastronomy and Food (PEGA).

The commitment to the bioeconomy is here to stay and, following the creation in 2019 of the Basque Alliance for the Bioeconomy, in 2020 we presented and launched the Facility Bioregions with the support of NEIKER. This entity will promote cooperation between regions in Europe —where the Basque Country is at the forefront of the bioeconomy— to foster a forest-based bioeconomy.

Finally, I would like to remind you that after joining the Basque Research and Technology Alliance (BRTA) in 2019, in the past year the NEIKER technology centre has gradually joined the management bodies of the BRTA and now forms part of its steering, scientific and market committees.

Report 2020





2020 will remain in our memory as an extremely complicated year due to the pandemic caused by COVID-19. At NEIKER, we wanted to be more than ever in line with the demands of the agricultural and livestock and forestry sector and our customers.

We have adapted quickly to the new scenario and we have continued to offer innovative and transferable solutions to the sector to make it more sustainable and competitive.

We have also worked to help it face the challenges that lie ahead, beyond the pandemic: the incorporation of new technologies, digitalisation or the response to market demands. We have not forgotten the adaptation to regulations such as the European Green Pact or the Farm to Fork strategy, compliance with which will help us to combat climate change and move towards a healthier and more sustainable food system.

For this reason, over the past year we have continued to deepen the lines of work initiated in previous years, such as our actions to promote the forest bioeconomy (with projects that promote the transition towards an economy based on biological resources), sustainability (implementing innovative practices on farms) or the mitigation of the climate emergency (with our participation in LIFE URBAN KLIMA 2050, within the Basque Climate Change Strategy 2050).

Forestry research continued to play a major role in our activity in 2020. We have executed the second phase of the Experimental Pilot Plan, testing substances that can combat the red band and the brown band and studying alternative species suitable for our territory, among other actions.

Transferring our knowledge to the sector is part of our DNA and in 2020 it has remained so, despite the circumstances. In close collaboration with the sector and its main agents, we have worked to digitise farms (using Artificial Intelligence to minimise the use of fertilisers or irrigation), diversify crops (such as nut trees or hops), obtain and bring to market new varieties (Beltza and Edurne potatoes) and support local produce (recovering plant varieties in disuse or ensuring the continuous supply of organic beef from the Basque Country).

In addition to these collaborations, we have also carried out some twenty events and webinars, which have been very well received and have focused on current issues for the sector.

And we have done all this while taking the utmost care of the people who form part of NEIKER, whom I would like to thank for their enormous commitment and good humour during the toughest moments of the pandemic.

NEIKER BOARD OF ADMINISTRATORS, INSTITUTO VASCO DE INVESTIGACIÓN Y DESARROLLO AGRARIO, S.A.

President

Bittor Oroz Izagirre

Deputy Minister for Agriculture, Fisheries and Food Policy with the Basque Government.

CEO

Leire Barañano

General Services

Joaquín Salazar

Secretary, non-Board member

Sonia Masip Moriarty

NEIKER Legal Services Officer.

Member

D. Iñaki Aldekogarai Labaka

Services Director of the Basque Government Department of Economic Development, Sustainability and Environment

Member

D. Javier Plasencia Cuadrado

Director of Quality and Food Industries with the Basque Government Department of Economic Development, Sustainability and Environment.

Member

Jorge Garbisu Buesa

Director of Agriculture and Livestock with the Basque Government Department of Economic Development, Sustainability and Environment.

Member

Xabier Patxi Arrieta

Director of IT and Telecommunications of the Department of the Treasury and Finance of the Basque Government.

Member

Federico Saiz Alonso

President of Baskegur.

Member

Unai Ibarzabal Goikoetxea

Director of Harakai-Urkaiko.

Member

Salvador Gorostola Arrieta

Aberekin, S.A.

Member

José Luis Fresno Santamaría

Director of Garlan S. Cooperativa.

Member

Begoña Angulo

Representative of the workers at NEIKER.

About **NEIKER**







ABOUT **US**

We are a technological centre specialised in creating innovative solutions for the agro-food and forestry sectors. As an entity dependent on the Ministry of Economic Development, Sustainability, and the Environment of the Basque Government, we work to provide knowledge and value to these 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 develop a balanced R&D&I activity, aimed at improving the productivity and competitiveness of the Basque Country's agricultural production systems.

WHAT WE DO

We develop technologies, knowledge, and innovations aimed at improving the productivity and management of farms, in order to meet the quality and safety requirements of the agro-livestock 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-livestock and forestry sector in the Basque Country, the preservation and sustainability of our natural environment, and developing policies that drive the circular bioeconomy in the Basque Country.

10 Report 2020

SCOP OF ACTION

Our actions are guided by different external inputs to which we must pay heed to appropriately steer our work and be one step ahead of sectorial needs and contextual demands.



CONSUMER

- More natural products
- Safer products
- Healthier products
- Local products
- New consumer types
- · Solutions to lack of time
- Ageing
- Ecological



LEGISLATION

- Environment
- Quality
- Food security
- Labour



CTI SPANISH STRATEGY 2021-2027

- R2 Food security and quality-
- R5 Climate change, natural resources and raw materials



SECTOR

- Differentiation
- Prevention
- Cost conpetitiveness
- Value-added alternatives
- New production systems
- Better yields



ECONOMIC BUSINESS ENVIRONMENT

- International uncertainty
- Scarce resources
- Tangible values R&D&i
- Displacement of the economic focus and innovation



STRATEGIC PLAN AND TECHNOLOGY PLAN 2018-2023

Sectorial plans



MARKET

- Increased cost of foodstuffs
- Competition
- Difficulty in differentiating value-added alternatives





HORIZON EUROPE 2021-2027

- Food security
- Sustainable agriculture and forestry
- Climate action
- Green Deal
- From farm to fork
- Biodiversity



BASQUE COUNTRY SCIENCE, TECHNOLOGY AND INNOVATION PLAN 2030

- R153 Food niche
- R153 Ecosystem niche





BASQUE GOVERNMENT STRATEGIC PLANS

- Strategic gastronomy and food plan (PEGA)
- Strategic wood plan (PEMA)

OUR CHALLENGES

We improve the competitiveness and sustainability of the primary sector through research and applied science. We worked on the following strategic lines: 04

One Health

Increased antibiotic resistance is one of the huge issues facing humanity. For this reason, we are researching how to ration the application of plant protection products in agriculture and reduce the use of antibiotics with livestock. We are seeking alternatives to obtain safer food for human health.

 $\mathbf{O1}$

New molecular techniques for genetic improvement

Molecular techniques provide for more precise results in a much faster manner than traditional techniques. By applying them, we seek to obtain more competitive, higher-quality products that are more focused on industry and consumer needs, better-adapted to climate change and with a reduced environmental impact.

02

Improving competitiveness of agricultural-livestock and forestry activities

By introducing cutting-edge technologies and new production systems, we can increase profitability, competitiveness, and sustainability for farms, guaranteeing their continuity with production systems that encourage passing from one generation to the next.

03

Promoting sustainable and environmentally respectful production processes

Society is demanding production processes that are sustainable and respectful towards the environment. At NEIKER, we study and share the positive aspects of farming activity: biodiversity conservation, their contribution to mitigating climate change and maintaining the landscape, economic activity, and the rural population.

05

Foresting ecological production

The demand for ecological products in our environment is growing every year, and at great speed. However, there is still a great lack of knowledge in the sector and in society. At NEIKER, 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.

06

Response to climate change in agroecosystems: impact, mitigation, and adaptation

We must prepare for the consequences of climate change. At NEIKER, we work to predict future scenarios and to seek out possible ways to mitigate and adapt. We analyse and suggest alternatives to current production systems, applying technology and our knowledge.

07

Circular bioeconomy

Production processes should not generate waste. Reducing and converting this waste into materials for new products is a way to fight climate change, reduce dependency on raw materials and create new economic activities. At NEIKER, we focus on production processes related to the primary sector, and especially the forestry sector.

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS 2030

The United Nations' Sustainable Development Goals (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 goals has specific objectives that must be reached by 2030. Each and every one of us must play our own role in reaching these goals.

NEIKER'S contribution is aligned with the **SDGs 3, 12, 13,** and **15**: we work to guarantee good health and promote well-being for all ages **(3)**, promoting sustainable consumption and production modalities **(12)**, taking urgent measures to fight climate change **(13)**, sustainability managing forests, fighting desertification, halting, and reversing land degradation, and halting the loss of biodiversity **(15)**.









EXPERTISE



PLANT RESEARCH

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





ENVIRONMENTAL RESEARCH

- Conservation and sustainable use of agricultural and natural resources.
- Recovery of degraded soils.
- Environmental monitoring.
- Impact, mitigation, and adaptation to climate change.
- Gas emissions in agriculturallivestock 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 lives tock and people.





FORESTRY RESEARCH

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





PROFESSIONALS

Numbers













advanced degrees

Higher degrees

Mid-level degrees



THE OWN INTERNS 35 45 YEARS AVERAGE AGE



Professionals

We are a team of motivated and committed people, working to:

Create opportunities for development.

Achieve scientific excellence.

Constantly improve.

Obtain the satisfaction of customers and society.

Contribute to a 100% sustainable environment.

FINANCIAL-ECONOMIC INDICATORS

INVESTMENTS

REVENUE

YEAR 2016 1.372.268€

YEAR 2017 2.096.281€

YEAR 2018 1.211.896€

YEAR 2019 1.053.895€

YEAR 2020 1.458.216€

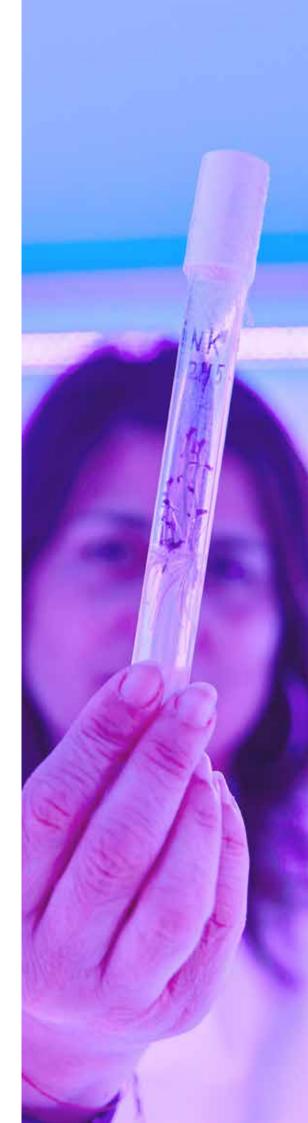
YEAR 2016 11.095.354€

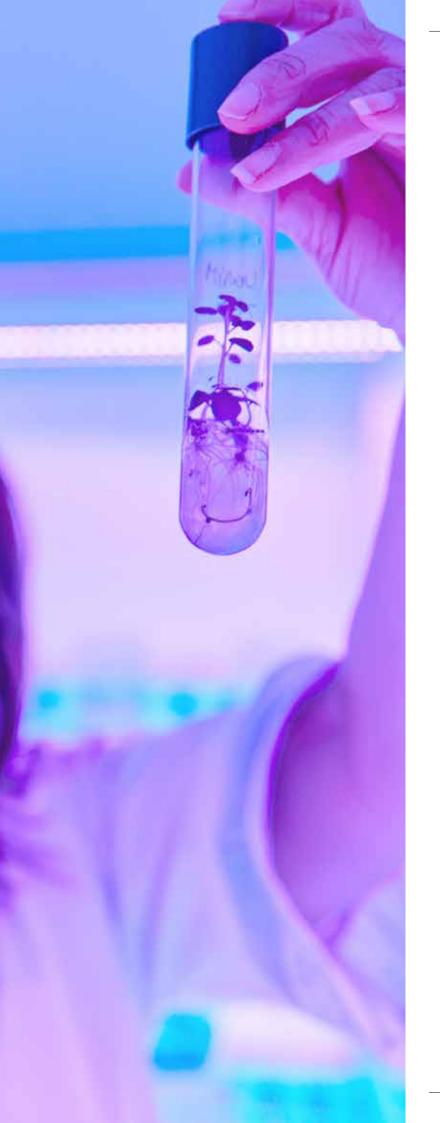
YEAR 2017 11.825.643€

YEAR 2018 12.328.288€

YEAR 2019 13.136.102€

YEAR 2020 13.024.645€





SCIENTIFIC-TECHNOLOGICAL EXCELLENCE

PUBLICATIONS

YEAR 2016

68

YEAR **2017**

YEAR **2018**

YEAR 2019

YEAR 2020

80.000

ANALYTICAL SERVICES 2020

In addition to creating scientific knowledge and transferrable solutions, for the last 25 years, NEIKER has been offering specialised analytical and advisory services to the agri-food sector in order to guarantee the health of livestock farms, the safety and quality of food and greater returns in the Basque agricultural and forestry sector.

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ANIMAL HEALTH LABORATORY

- Diagnosis of animal and zoonotic diseases
- Ruminant reproductive diseases
- Mycobacterial infection (tuberculosis and paratuberculosis)
- Viral ruminant diseases (IBR, BVD, Border-disease, Maedi-Visna...)
- Leptospirosis
- · Health testing of bulls
- Microbiology of feed and its raw materials
- Detection of pathogens in milk.

02

LABORATORY FOR THE CONSERVATION OF NATURAL RESOURCES

- Soil fertility and production capacity + fertilisation and liming recommendations.
- Soil hydric properties + irrigation recommendations.
- Physiological and biological soil parameters + soil health cards.
- Analytics and consulting for transition to agro-ecology.
- •Determination of heavy metals in soils, erosion, compaction, and biodiversity-loss studies.
- Consulting on climate-change mitigation (fractioning carbon and measurement of greenhouse gases)

03

PLANT HEALTH LABORATORY

- Seed and food potato certification.
- Tests on botanical seed purity, count, germination, and viability.
- Quarantine organism detection.
- Diagnosis of diseases caused by fungi, bacteria, viruses, and nematodes in plant material.
- Identification of varieties of plant species (potato, pepper, tomato, etc.)





10 accreditations*

- Microbiology-immunology departments
- Molecular department.
- *At Derio laboratories, according to the scope of the Accreditation ENAC UNE-EN ISO/IEC 17025;2017. Latest revision 02/10/2020.

MEMBER OF THE NETWORK OF BIOLOGICAL ALERT LABORATORIES (RE-LAB)



Infrastructures

- Microbiology and immunology laboratory (BSL-2).
- Level-3 biocontainment laboratory (BSL-3).
- Soil and plant matter 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.
- Plant analysis laboratory.

300

clients from all links on the chain of value **20** Report 2020

NEIKER IS MEMBER OF...



Basque Research & Technology Alliance



Elhuyar



European Forest Institute



Lekunberri Diary Institute



Basque Foundation for Food Safety



Basque Innovation Agency



Innovative Community of EIT

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 agri-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.



























































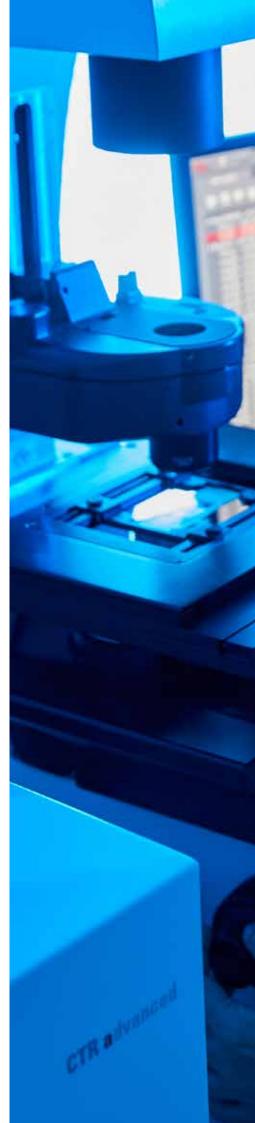






INFRASTRUCTURES

	High-security facilities	1.520 m ²
	BSL-3 level laboratory	···· 673 m²
	High-security greenhouses	···· 845 m²
<u></u>	Laboratories	3.305 m ²
	Natural Resource Conservation Labora (Derio, Biscay) ······	
	Animal Health Laboratories (Derio, Biscay)······	··· 1.100 m²
	Plant Health Laboratories (Arkaute, Araba) · · · · · · · · · · · · · · · · · · ·	··· 1.500 m²
	Greenhouses and tunnels	7.138 m ²
	Glass, plastic, and plate-covered greenhouses (Derio, Biscay)	· 3.500 m²
	Test culture surface (Derio)	· 2.000 m²
	Arkaute	· 1.638 m²
	Other facilities	1.810 m ²
	Warehouses, selection rooms and cha and services (Derio, Bizkaia)	
	Agricultural warehouse (Arkaute)	500 m²
	Field workshop · · · · · · · · · · · · · · · · · · ·	342 m²
	Refrigeration chambers	70 m²
	Livestock facilities	2.765 m ²
**	Experimental farms	100 ha







An abnormal year





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We will remember 2020 as an abnormal year, marked by uncertainty at all levels due to the impact that the COVID-19 pandemic has had on our lives.

As a technological centre that provides services to guarantee essential activity on the food production and supply chain, NEIKER has demonstrated great capacity to adapt. We have agilely responded to the needs of the agro-livestock and forestry sector, our partners, and our clients, and we have done so under very complex circumstances.

We also sought to care for NEIKER'S team, for those of us who make up this company. To this end, we implemented different healthcare, technological, administrative, public-service, and organisational measures in order to continue conducting our activity with the utmost safety and health, combining work and personal life in the best way possible.



OUR ACTIVITY DID NOT STOP, WE ADAPTED QUICKLY

We never closed, and we were always available to our clients, partners, and collaborators. This was the case because the services that NEIKER offers to the agro-livestock and forestry centre are considered an essential activity.

Our Animal Health, natural Resource Conservation, and Plant Health laboratories in Derio and Arkaute continued to operate. We also continued to work on the projects in which we participate, and at our greenhouses and testing fields in Derio and Arkaute.

We did all this while adopting the following measures to protect NEIKER'S team:

- → We quickly implemented remote work for all roles that could normally operate without travelling to our office.
- When physical presence was essential, we established rotating shifts with the minimum number of people necessary to create work bubbles.
- We used digital resources to continue attending meetings and to facilitate work coordination.
- We cancelled trips and stays outside our facilities, and only allowed essential visits to our centres.
- We adapted our facilities with dividers, safety distances, etc., to provide a safe working environment to the people who make up NEIKER.

WE ACTIVELY AND INTENSIVELY COLLABORATE WITH THE BASQUE GOVERNMENT'S MINISTRY OF HEALTH

Since the beginning of the COVID-19 crisis, we provided health authorities with our knowledge, facilities, highly-qualified professionals, and our vast experience in biosafety and vectors as a source of infection for humans and animals.

Actions conducted in 2020:

- → We optimised a PCR test in our laboratory for detection of SARS-CoV-2, designed by the Pasteur Institute, which could be useful in the event of lack of supply in commercial kits
- → We passed the validation test for the optimised PCR given to us by OSAKIDETZA, and we were available to them to analyse samples if they deemed doing so necessary.
- → The Directorate for Health and Consumption from the Ministry of Health recognised NEIKER's Animal Health Department laboratory as a Clinical Diagnosis Laboratory for diagnosing COVID-19 with the ELISA immunoassay

- → We inventoried our infrastructures and equipment and sent a complete listing of those that could be useful under these circumstances.
- We granted several pieces of equipment to the Cruces University Hospital: one for real-time PCR testing, and another to extract NRA-DNA.
- → We loaned 1,000 safety suits (PPE) to Osakidetza.



WE RESEARCHED WITH **BRTA CENTRES**

We took part in several collaborative projects related to SARS-CoV-2 to provide reliable, fast, and affordable methods for early detection of coronavirus infections.

- → With a test-like assay to detect coronavirus in saliva, along with SOMAprobes, BIOEF, BIOCRUCES, BIODONOSTI, BIOARABA, BIOMAGUNE, ASPARIA, GLYCOMICS, BIODO-NOSTI, and VICOMTECH.
- → With a microarray technique (advanced genetic analysis) to detect antibodies against SARS-CoV-2.
- → With an antibody microarray technique to detect viral antigens.

WE PARTICIPATED IN THE PRAP EUSKADI PILOT PROJECT

This initiative, supported by the Basque Government's Department for Economic Development, Sustainability, and the Environment, seeks to reduce the economic impact that companies in the Basque Country may suffer due to the COVID-19 pandemic. It combines technologies that can be integrated into the occupational hazard prevent strategy with an offer of analytical testing.

NEIKER participated in the PRAP pilot project in different ways. On one hand, our laboratories conducted PCR testing and immunoassays in 2020 to detect antibodies, in coordination with CICbioGUNE, GAIKER, TECNALIA, and the Osakidetza and Health Cluster. On the other hand, people from NEIKER'S team who wished to do so could take the tests to detect the illness, in order to provide anonymous data to assess the technological tools that were being implemented. Moreover, we tested EPIDig and RAPID digital tracking apps.

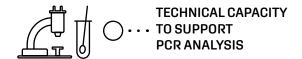




THE CARLOS III HEALTH INSTITUTE ACCREDITS OUR LABORATORIES TO ONDUCT PCR TESTS

As a result of the technical capacity of NEIKER'S Animal Health group to detect viral RNA through PCR testing, our facilities, and our available equipment, we were authorised by the Carlos III Health Institute as a support laboratory for PCR analysis of human clinical samples for COVID-19.

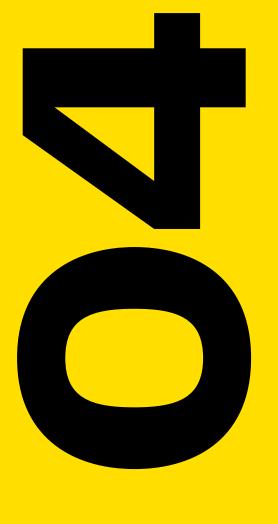
In addition to NEIKER, CIC nanoGUNE, Gaiker, CIC bioGUNE, and Tecnalia were also validated in the Basque Country.



WE SUPPORT PUBLIC ACCESS TO RESULTS FROM RESEARCH AGAINST COVID-19

NEIKER signed the manifesto Maximising the accessibility of research results in the fight against Covid-19, an initiative implemented by the European Commission in order to encourage the exchange of conclusions between different projects financed with European funds, to thus accelerate control of the illness.





Noteworthy research proyects 2020







GENETICIMPROVEMENT

NEW METHODOLOGY TO IMPROVE THE DAIRY CONTROL PROGRAMME

Native dairy sheep breeds in the Pyrenees (Latxa, Manech, and Basco-Bearnesa) hold a high economic and social value. However, their survival is threatened by the presence of other breeds with much more intensive production systems that are not linked to the region, like the Latxa breed's system. NEIKER, a leading centre in the genetic improvement programme for these breeds, implemented a new methodology for genetic assessment of fat and protein content in milk in 2020. This initiative shall provide a more precise assessment in a greater number of animals, thus improving the efficacy of the dairy control programme and, by extension, the profitability of herds, since genetically best sheep can be selected for cheese production.

PINE GENETIC IMPROVEMENT

NEIKER is reactivating the improvement plan for Pinus radiata, based on identifying pines with qualities that allow them to adapt to future scenarios, especially climate change. In 2020, we broadened the already-existing list with noteworthy trees due to their plant characteristics and added new candidates from improved seed that are international in origin. The performance of these new materials is being assessed with the field testing begun last year in the Basque Country, Asturias, Galicia, and Castilla y León. Moreover, since 2018, we have been monitoring and controlling pines that are supposedly tolerant to "bandas" disease, in order to obtain more candidates to be added to the improvement programme list.

GENETIC DIVERSITY IN PINUS RADIATA ON THE CANTABRIAN COAST

Given that genetic diversity is essential to develop and maintain improvement programmes, in 2020, we studied Pinus radiata populations on the Cantabrian Coast by analysing 48 plots from the National Forestry Inventory 2017 and the materials from the genetic improvement programme for Pinus radiata by NEIKER. The results show that the genetic diversity of these lots is low, and that differentiation between populations is scarce, but we were able to identify crosses that would help to increase diversity. To this end, we deem necessary the inclusion of new materials to increase diversity and contribute to the sustainability of a genetic improvement programme for Pinus radiata adapted to the needs of the forestry sector in the Basque Country.





IMPROVED COMPETITIVENESS IN FARM OPERATIONS

INNOVATION, KEY FOR THE SUSTAINABILITY OF THE COW DAIRY SECTOR

The cow dairy sector is in the midst of a transition toward sustainable production systems, where socioeconomic, cultural, and environmental factors are taking on increasing importance. Within this context, NEIKER is participating in the Dairy4Future project to identify and transfer innovative practises to technicians and livestock workers in Europe. In 2020, an analysis of the cow dairy sector from several regions of the European Atlantic Arc was presented, which listed up to 165 services offered by the sector. Of note was the reduced environmental impact, thanks to circular economy strategies.

Moreover, the carbon footprint of 100 commercial operations was assessed, which is one of the most complete analyses conducted in the Atlantic region. Of innovative strategies to reduce this footprint, using emissions data obtained at an experimental scale, NEIKER calculated that this can be reduced by 5% by changing livestock food.



WE ARE PART OF INNOTUB, A SCIENTIFIC NETWORK OF EXCELLENCE ON ANIMAL TUBERCULOSIS

Animal tuberculosis is still a top-level problem for live-stock, even though we are close to eradicating it in the trans-Pyrenees region. Maintaining this status or reaching absolute eradication requires an immense effort. In 2020, we participated in starting up the scientific network of excellence INNOTUB, which addresses the problem based on collaboration between scientific entities, administrations, and livestock operators. Given that one of the most concerning problems is the appearance of positive animals in official diagnostic tests where they cannot confirm the infection, last year, we focused on several lines of work to improve the effectiveness of these techniques. Thus, we could avoid unnecessary slaughter of livestock and losses in terms of genetic value and productivity.

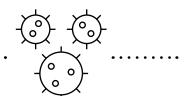
EARLY DIAGNOSIS AND SELECTION OF ANIMALS RESISTANT TO BOVINE PARATUBERCULOSIS

Paratuberculosis is a disease with serious health and economic consequences on bovine livestock operations around the world. At NEIKER, we seek out innovative solutions so that livestock operators have diagnostic techniques to identify infected animals before they display clinical symptoms and cause production losses, and new tools for genetic selection to select animals with natural resistance to paratuberculosis.

In 2020, we began the process to patent a new diagnostic tool based on detection of immunological markers produced by the host.

Moreover, we were able to identify genetic markers associated with paratuberculosis resistance, some of which had appeared in association with resistance to other important diseases such as bovine tuberculosis and mastitis in previous studies. These results suggest that there is a possibility of being able to select animals with an immune system capable of effectively dealing not only with paratuberculosis, but also other important illnesses. As such, we are working in close collaboration with the National Confederation of Spanish Friesians (CONAFE), the INIA, the UPV-EHU, and the SERIDA.

INNOVATIVE SOLUTIONS
DIAGNOSTIC TECHNIQUES
NEW DIAGNOSTIC TOOLS
FOR GENETIC SELECTION



DETECTION OF
IMMUNOLOGICAL MARKERS
ANIMALS WITH AN EFFECTIVELY
IMMUNE SYSTEM



SUSTAINABLE MANAGEMENT OF AGROSYSTEMS AND NATURAL ECOSYSTEMS

HEALTH SURVEILLANCE OF WILD SPECIES IN THE BASQUE COUNTRY

It is fundamental to determine the prevalence and distribution of infections and/or illnesses in the natural environment that affect wild species and may be concerning for domestic livestock and humans. For this reason, NEIKER keeps surveillance over different viruses, bacteria, and parasites in different wild species. The most transcendent agents are viruses that cause bird flu and the mycobacteria involved in animal tuberculosis, which are mainly found in wild boar and deer. Additionally, also of note is our monitoring of brucellosis in wild boar, or mange and hydatid disease in carnivores (fox, wolf, badger, and others) and hoofed animals (wild board, deer, and roebuck). Moreover, we keep watch over the possible entry into the Basque Country of emerging illnesses, such as African swine fever virus or West Nile.

SURVEILLANCE OVER **Q FEVER**

Zoonosis is a disease or infection transmitted from domestic and/or wild animals to people, so it is essential to monitor this to guarantee human health. Q fever is a zoonosis caused by the bacteria *Coxiella burnetii*, whose main source of infection are small ruminants (ovine and caprine livestock). In 2020, we analysed environmental samples from 272 operations, and detected *C. burnetii* DNA in 36% of them. The main variables associated with risk of infection were the farming region, the census, contact with other herds, and others.

SURVEILLANCE OVER INVASIVE MOSQUITOS

Mosquitos are hugely relevant to human and animal health because they can transmit illness to humans. In terms of invasive exotic species, since 2013 and in collaboration with the Basque Government's Ministry of Public Health, NEIKER has kept surveillance over Aedes albopictus or the tiger mosquito in the Basque Country. It was detected for the first time in 2014. Since then, a greater expansion has been observed every year. In 2020, it was found in 65% of the municipalities examined. Also identified, and for the first time, was another invasive species, Aedes japonicus, in several municipalities of the Basque Country. While Aedes albopictus is mainly found in urban areas, Aedes japonicus was found in peri-urban and rural zones.

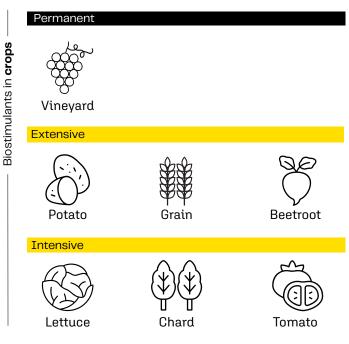




RATIONALISATION OF THE USE OF MEDICINE AND PLANT PROTECTION PRODUCTS

ADVANTAGES OF **BIOSTIMULANTS**

The line of research on biostimulants took on special relevance at NEIKER in 2020. We are studying how to use them, and their results in permanent crops (vineyard) and extensive crops (potato, grain, and beetroot), and intensive crops (lettuce, chard, and tomato). Specifically, NEIKER is analysing their suitability in application, especially for hydroponic crops, and their effect on the quantity and quality of harvests. We are also analysing their role as stimulants for disease resistance and how they can help to boost crops' use of fertilisers.

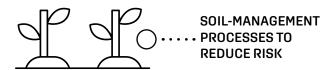


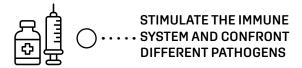
FIGHTING AGAINST THE DISSEMINATION OF ANTIBIOTICS IN THE ENVIRONMENT

The application of organic fertilisers in agricultural soil can increase yield of crops and improve soil properties. However, the use of fertilisers of animal origin entails environmental risk, such as contamination with antibiotic residue, antibiotic-resistant genes, and mobile genetic elements. Moreover, we must add that antibiotic-resistant bacteria pose a growing threat to worldwide public health. In this context, in 2020, we studied soil-management processes to reduce the risk associated with the use of these products of animal origin as fertilisers. We verified that anaerobic digestion (technology to treat organic waste) and applying biochar or plant charcoal significantly reduce the risk of spreading antibiotic resistance.

VACCINES AND PROBIO-TICS TO STRENGTHEN THE IMMUNE SYSTEM OF DAIRY COWS

One of the pathologies that leads to the greatest economic losses at dairy livestock farms is paratuberculosis. At NEIKER, we seek solutions to control this by developing vaccines and probiotics. Moreover, we study the non-specific effects of using these substances on other pathologies that are also important, such as mastitis and diarrhoea in calves. As an alternative to the use of antibiotics, we are looking for one single product to stimulate the immune system and prepare the animals to confront several different pathogens. In 2020, we made progress in preparing the probiotic we want to test. We also described a new defence mechanism against paratuberculosis for bovine neutrophils. This finding will help us to design new vaccines.





RATIONALISING THE USE OF ANTIBIOTICS IN LIVESTOCK

Throughout 2020, we incorporated mass sequencing techniques to study complete bacteria genomes. With these techniques, we characterised the resistant genes from bacteria isolated in ruminant operations in the Basque Country, under the epidemiological resistance surveillance programmes for livestock. Moreover, we completed the pilot study begun in 2019 on dairy cow livestock operations to identify points for improvement that help to reduce the rate of infectious diseases, thereby promoting the prudent use of antibiotics, under the motto "as little as possible, only when necessary."



LOCAL ADDED-VALUE PRODUCTION AND ECOLOGICAL PRODUCTION

ECOLOGICAL AND LOCAL BEEF

Until this point, ecological production in the Basque Country has undergone limited development in comparison with other European regions. According to the Basque Government and focusing on meat, only 14% of the meat consumed in the Basque Country is produced, slaughtered, and transformed here, and 64% is directly imported for consumption. The operational group HAREKO, of which NEIKER is a part, arose to design a comprehensive strategy for constant supply of local beef in the Basque Country. In 2020, NEIKER monitored

feeding calves in the three livestock operations participating in the project and began commercialising the first animals. In 2021, Leartiker shall determine the fatty acid profile of meat produced under this system. With all the information collected at the end of the project, different sustainability indicators shall be assessed (technical-economic, social, and environmental).

Produced, slaughtered and transformed in Euskadi





WE OBTAINED THE ECOLOGICAL PRODUCTION CERTIFICATE

In 2020, we completed the cycle for conversion to ecological production for seven hectares of our farms in Arkaute (Araba). The process was certified by Ekolurra, the Ministry

of Agriculture and Ecological Food of the Basque Country, in charge of controlling, certifying, and promoting ecological food in the Basque Country. This initiative was conducted under the Plan to Foment Ecological Production (FOPE, in Spanish), led by the Basque Government's Department for Economic Development, Sustainability, and the Environment, and boosted by NEIKER and Ekolurra. Moreover, it falls under the European Union's strategy "From Farm to Fork," which foments ecological agriculture as an environmentally respectful practise and seeks for 25% of all agricultural land in the EU to be devoted to this sort of crop by 2030.



CLIMATE CHANGE IN AGRO-ECOSYSTEMS:

IMPACT, MITIGATION AND ADAPTATION

RESILIENCE TO CLIMATE CHANGE

TRIPLE-C is focused on the analysis, assessment, and capitalisation of the successful European projects on the prevention and management of risks deriving from climate change. Its objective is to identify and share best practises. Throughout 2020, we were able to collect, organise, and update the results, methodologies, and tools obtained from different projects in this field. We also identified good practises worthy of greater dissemination and exploitation and, finally, we exchanged experiences with partners from the different projects identified. This will all contribute to using previously–generated knowledge to strengthen the region's resilience to the climate and natural risks.





INITIAL ACTIONS UNDER URBAN KLIMA 2050

In 2019, NEIKER was one of the Basque Country's 20 entities that joined the project LIFE URBAN KLIMA 2050, under the Basque Climate Change Strategy 2050, which will transform the Basque region with 40 projects and actions for adaptation to climate change.

Throughout 2020, we started up different actions to execute our contribution to this macro project. On one hand, we began sampling and analysing soil to monitor carbon sequestration in projects managed by consortium partners. We also began identifying agricultural lots for ecological transformation, locating soil for agrological classification, and restoring degraded lots with phytoremediation techniques. Other actions we launched include obtaining climate change indicators for integration into a mapping viewer, drawing up future rain erosion potential maps, and adapting soil health cards as an instrument for citizens.

In actions related to health, one of the objectives is to identify potential risks in urban hubs in relation to the presence of vector arthropods (mosquitos, ticks, etc.) that can transmit diseases, and make predictions on their expansion within a context of climate change. In 2020, we sampled mosquitos in city parks and cemeteries in Bilbao, Donostia, and Vitoria–Gasteiz. As a result of this work, we identified a total of 19 species, with *Culex pipiens*, the common mosquito, being the most plentiful.



BIOECONOMY

FISHING WASTE CONVERTED INTO BIOFERTILISER

Every year, the world fishing industry generates over 20 million tonnes of sub-products that are not used and that contain compounds that could be recovered and used for agricultural production. Moreover, around 80% of fertiliser consumption in Europe comes from fossil and external sources. In this context in 2020, NEIKER began the SEA2LAND project to improve technologies to recover nutrients and produce biologically-based fertilisers from sub-products from fish and aquaculture transformation. It falls under the European strategy to drive the bioeconomy (an economy based on biological resources) as the economic model of the future. This also falls under the Basque Government's strategy to promote the transition toward bioeconomy.

ADDED-VALUE PRODUCTS WITH WOOL SURPLUS

The generation of 1,500 tonnes per year between the Basque Country and Navarre of "coarse" wool, difficult to use, from sheep operations, has made this material a sub-product that is complex to manage. It brings about high economic costs for producers.

NEIKER is working to define new uses for this wool from our native sheep, developing new prototypes and products, increasing its added value, and therefore creating new opportunities for the local economy. To this end, we collaborated in developing several prototypes: degradable markers, 3D printer thread, replacement filler for polyester, felt, and fabrics, etc.



MORE SUSTAINABLE LIVESTOCK WITH BIOCHAR

Biochar is a product obtained from combustion of plant biomass, and it has several applications in more sustainable agriculture. NEIKER assessed its potential use in animal feed, specifically for growth, digestibility, fermentation, and the microbial populations in the digestive tract of broiler chickens. As a result, we verified that included it in feed improves productive yield, fundamentally because it also decreases the amount of feed they must ingest to deposit one kilo of meat. This effect is more marked when corn is the main ingredient in the ration. Based on these results, we are attempting to study further in depth and optimise their use, both for fowl and for feeding ruminants.



FORESTRY SCIENCE

Research in forestry is one of NEIKER'S current main lines of action, with huge weight on our activity in 2020. The sector still requires knowledge and solutions to tackle its challenges: diseases that are difficult to control or eradicate, the effects of climate change, etc.

Our activity falls under EUSKOBASOA 2050, the Basque Country's Plan for forestry improvement prepared by NEIKER. If consists of four lines of action: health, alternative species, wood quality and the reactivation of a genetic improvement plan (with another two cross-cutting lines: climate change and sustainability).

Within the line of healthcare, in 2020, we continued to research alternatives to combat "banda marrón" and "banda roja" in the Experimental Pilot Plan 2019–2021. The objective of this plan,

created and coordinated by NEIKER, is to seek out innovative and sustainable solutions to find the "bandas" and improve competitiveness for the Basque Country's forestry-wood sector. In 2020, we worked on the second phase.

The main lines of action in this second phase were actions to obtain "banda"-resistant pines, to study soil and climate characteristics to make maps to decide which species are suitable for the region, and to assess other pine species that could be alternatives to the laricio and radiata in zones that are highly affected and bear a high presence of "bandas." Regarding land field tests, we continued assessing the 5 most promising active substances (derived from Saccharomyces cerevisiae, Equisetum arvense, hydrochloride chitosan, soya lecithin, and potassium bicarbonate). We also studied the effect of soluble biostimulants and fertilisers applied from the air with a helicopter on 500 hectares in Araba, Biscay, and Gipuzkoa.

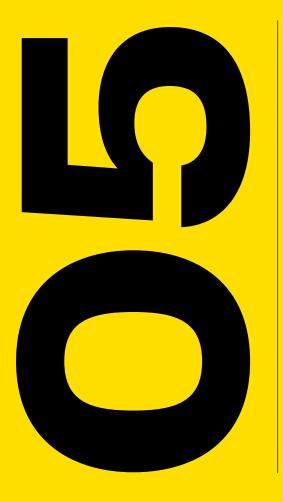




COLLABORATION WITH THE WOOD FORESTRY CHAIN

In 2020, we also participated in the Innobandas project. Its objective is to find effective and sustainable substances and methods to treat "banda marrón" and "banda roja" in forest masses of Pino radiata and Pino Iaricio in Navarre, Cantabria, and the Basque Country. NEIKER focused on proposing the type of trials and substances to test, assessing their efficacy,

and studying the impact they might have on the environment. After applying 3 treatments, we verified that copper derivatives are the most effective substances to control them. We collaborated on this project with BaskEgur, HAZI, The Navarre Forestry Association (Foresna, the Cantabrian Association of Wood and Furniture Trade (ACEMM), and the forestry phytosanitary treatment company GALCA.



Transfer to the industry and to society







COLLABORATIONS WITH THE SECTOR

INSECTICULTURE, HERE TO STAY

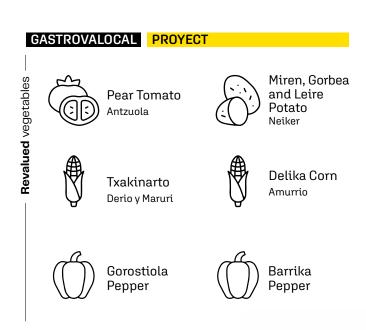
Around 70% of the protein used in the EU for animal feed is imported, which influences our search for alternative sources for greater protein self-sufficiency. The FAO not only approves insecticulture in Europe, but also considers it necessary for more sustainable development. In 2020, we began working with Insekt Label on the use of insects (Tenebrio Molitor) to add them to the agro-food chain in the form of freed for the fowl sector in the Basque Country, using local and sustainable protein. Our preliminary results indicate that the formulas that include Tenebrio at 15% during the growth phase and 10% during the fattening phase allow for a reduction in use of soya flour at between 50%-60%, without affecting productive yield. Moreover, we have the knowledge to develop feed to increase concentration of biomolecules of interest in insect flour.

MORE LOCAL VEGETABLES

Demand for local, fresh vegetables currently exceeds supply. To remedy this situation, a new work dynamic was established, based on close collaboration between a large-distribution company like EROSKI with growers in the Basque Country, along with the Barrenetxe Cooperative, and the technological centre NEIKER. Thus, we managed to introduce new crops such as aubergine, escarole, and broccoli into production strategies, and in other cases, lengthen production periods for leek and chive. These conjoint actions increased the supply of local vegetables for consumers. The excellent results of this project, called "Diverhortaliza", were acknowledged by the Observatory of Innovation in Wholesale Spain as one of the twenty most innovative in the sector in 2020. This project is co-funded by FEADER (AEI-AGRI) and the Basque Government.

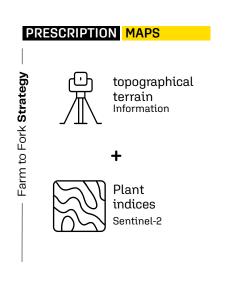
WE RECOVERED OLD PLANT VARIETIES TO RE-INTRODUCE THEM TO THE MARKET

With the Gastrovalocal project, we sought to place culinary value once again on old plant species from the Basque Country that are currently not used. These are the yellow pear tomato (from Antzuola), Delika corn (from Amurrio), Txakinarto (from Derio), and Maruri (from Maruri), Miren, Gorbea, and Leire potato (NEIKER) and the Gorostiola and Barrika pepper. These plants, representative of the Basque Country's plant wealth and highly relevant in other times, ceased to be cultivated for different reasons, such as lower productivity, their sensitivity to pests, or changes in market habits and demands. It should be noted that this selection was based on the culinary potential of each variety and the availability of seeds/tubers in our NEIKER germplasm bank. Co-funded by the FEADER (AEI-AGRI) and the Basque Country, this project was in cooperation with the Basque Culinary Center, Azurmendi Restaurant, Makro Supermarkets, and agriculturalist Guillermo González.



20% SAVINGS BY ADJUSTING THE FERTILISER DOSE

The EU's Farm to Fork Strategy's objective is to reduce the use of fertilisers by 20% in 2030. To this end, NEIKER is studying the use of technologies that help to provide the necessary amount of fertiliser based on the crop's needs, distinguishing between zones even within each lot. In 2020, we drew up fertiliser prescription maps, combining topographical information from the terrain and plant indices from satellite images (Sentinel-2) with artificial intelligence–based algorithms. The prescription maps we obtained were validated with yield maps from previous years. We verified that, without reducing harvests, this technique saves up to 20% on fertiliser, in line with European requirements. This project was funded by the Basque Government, and UAGA, GARLAN, two agriculturalists, and HAZI also took part.





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OPTIMISING WATER USE IN IRRIGATING POTATOES

High atomisation and heterogeneity in managing irrigation in Araba motivated NEIKER to work to optimise irrigation water use in cultivating potatoes in this province. To this end, we used tools to compare irrigation patterns used today with others based on using less water, reducing productivity losses. The idea is to be prepared for future scenarios with possible irrigation water restrictions.

Within this context, we assessed the usefulness of soil moisture sensors and IT tools based on soil water balance models in two pilot potato plots selected in the 2020 campaign. We also studied the relationship of these tools with satellite images. We also simulated different irrigation strategies to define the most optimum one.

Thus, we observed that, without excessively reducing irrigation intervals, going from irrigation every 10 days (the typical pattern in one of the zones of study) to irrigation every 6–8 days and to field capacity, would mean achieving similar production with an even lower volume of irrigation water. These projects are based on the results of NEIKER'S research from over 10 years, and were validated and transferred to agriculturalists

2 IRRIGATION PATTERNS

Optimising the water use

REDUCING IRRIGATION INTERVALS

FROM 10 DAYS TO
IRRIGATION
EVERY 6-8 DAYS

10 YEARS OF RESEARCH

VALIDATION AND
TRANSFERRATION OF
UDAPA, UAGA Y GARLAN



NUT TREES, A REALITY IN THE BASQUE COUNTRY

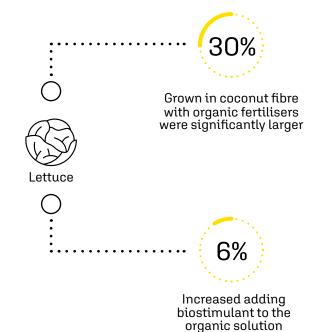
In 2020, we continued to actively contribute to researching and transferring results to foment nut trees in the Basque Country, such that the sector has options to diversify its business.

The evaluation test on varieties located in Zambrana, where NEIKER has been working for 5 years, is firmly entrenched: last year, we planted 8 hazelnut and 4 almond varieties, whose production potential we will see in approximately 5 years. These hazelnut and almond trees are in addition to the 3 walnut varieties planted in 2018 that gave their first fruit in 2020, displaying perfect adaptation to Araba's agronomic and climate conditions. Moreover, in the 2020 campaign, 5 more hectares of walnut trees were planted in Araba, and one of the farms is already equipped with 4.0 technology to record and assess the risk of disease and efficient use of irrigation water. Collaborating in the project are the Rural Development Association of Añana, UAGA, UTEGA Group, and the Administrative Board of Zambrana.



ORGANIC AND BIOSTI-MULANT FERTILISERS TO IMPROVE PROFITABILITY

Increasing the profitability and sustainability of crops without soil is a great challenge for agrarian operations. To help them to this end, in 2020, conjointly with the company BioBizz Worldwide, we suggested developing organic nutritive solutions. We worked on a compound that included organic and biostimulant fertilisers made with 5 active microorganisms, in addition to protein and sugar catalysing enzymes. Results showed that lettuce grown in coconut fibre with organic fertilisers were significantly larger (up to 30%) that lettuce grown with mineral fertiliser, and that adding biostimulant to the organic solution increased production by 6%.



THE BELTZA POTATO, OBTAINED BY NEIKER, REACHES THE MARKET

The last Christmas campaign, the cooperative from Alava Udapa launched the Beltza potato to market, a new variety created by NEIKER. It stands out with its intense purple colour and high anti-oxidant compounds that provide health benefits. Beltza is the result of NEIKER'S knowledge and our long history in research, in order to help the sector with new products to diversify and adapt to consumer demands. We registered this new variety in 2019 with the European Register of Protected Varieties, which is a perfect example of collaboration and transfer between a technological centre and a company.



PATENTS, REGISTERS AND NEW VARIETIES

EDURNE, OUR NEW POTATO

Obtaining new varieties is part of our DNA, and even more so in the case of potatoes. We developed tubers with improved features, adapted to new market demands. In recent years, one of our projects was the EDURNE potato, which we sent to the European Register of Protected Varieties in 2020. Preferably for the fresh-consumption market, EDURNE stands out with its very thin skin, surface "eyes," and ease in washing, which makes it a perfect candidate for large-distribution lines. It is oval in shape, with light yellow flesh and exceptionally good traits for household cooking and frying.

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WE PATENT A NEW TOOL FOR EARLY DIAGNOSIS OF PARATUBERCULOSIS

In 2020, we filed a European patent (EP20382291.1) to protect the new tool that NEIKER developed to diagnose bovines infected with mycobacteria. Its main contribution is that it provides early diagnosis of paratuberculosis and has medical and veterinarian applications.

WE REGISTERED THE TURKEY ANIMAL WELFARE ASSESSMENT PROTOCOL

In 2019, along with the Institute of Agro-Food Technology and Research (IRTA), we launched the Welfair™ seal, the first certification for animal welfare focused on assessing the state and behaviour of the animals. This animal welfare seal initially included protocols to rate the bovine, porcine and ovine livestock, and meat and egg chickens. In 2020, we added turkey to the protocol, registered by NEIKER. Currently, around 25,000 farms all around the nation have the Welfair™ certification and sell food under this seal (meat, eggs, milk, shakes, cheeses, butter, yoghurt) in more than 4,000 establishments.



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ALLIANCES

Our work is possible thanks to the collaboration of entities that contribute their knowledge in order to promote and share projects.





























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MOST RELEVANT CON-GRESSES, COURSES AND EVENTS IN 2020 The pandemic has not stopped NEIKER in its mission to transfer our knowledge and the results of our research to the sector.

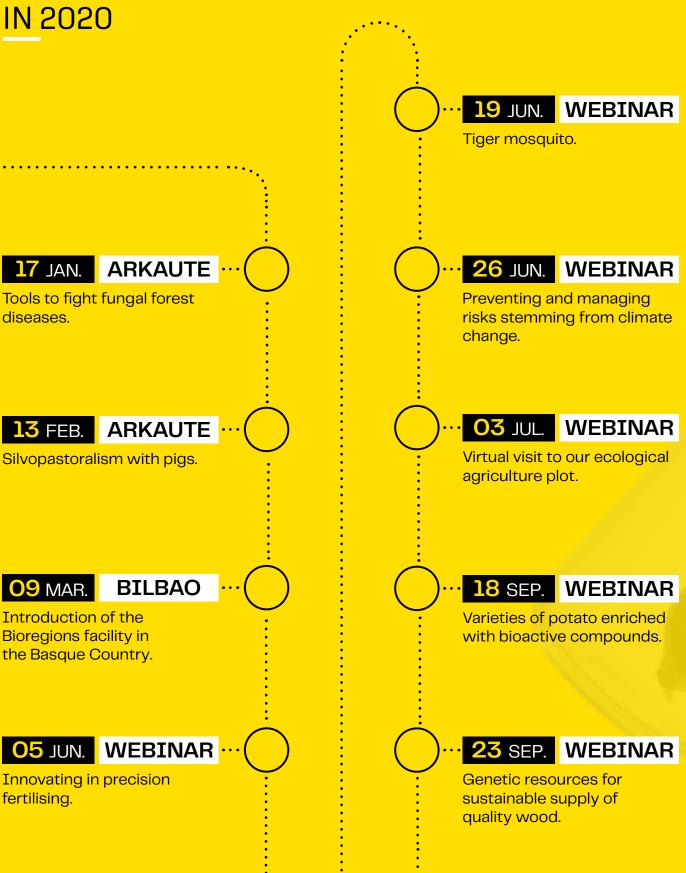
We agilely adapted to new times, making use of new technologies and using new ways of communicating. The fruit of this effort are 15 webinars in 2020, along with three in-person meetings during the first months of the year.

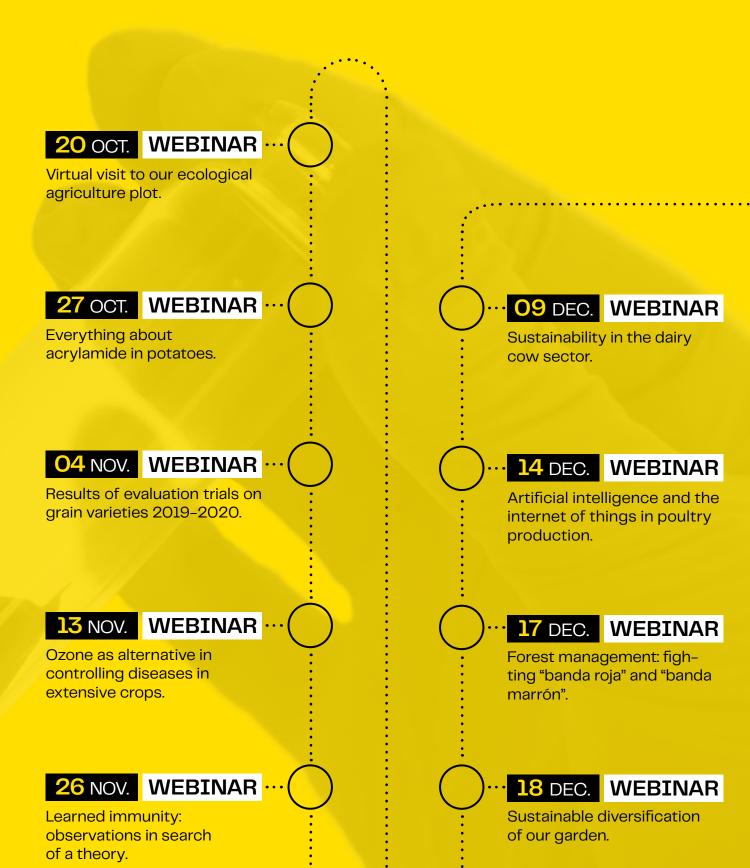


WE ORGANISED
INTRODUCTION OF THE
EUROPEAN BIOREGIONS
NETWORK IN THE
BASQUE COUNTRY

The Basque Country is one of the three Europe regions leading promotion of sustainable development and decarbonisation of the economy. A result of this position was the selection of Bilbao to introduce the launch of a new Bioregion Network to foment the bioeconomy in 2020. NEIKER took part, as organiser, in the initiative's inaugural event, coordinated by the European Forest Institute (EFI), held in Bilbao.

OUR TRANSFER EVENTS CONTINUED IN 2020





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WE HAVE

BEEN...

20 FEB. 2020

Buring the
#Horticultura2020
(Horticulture2020) of
Usurbil Event (Gipuzkoa),
sharing our progress
in creating Gernika
#pimiento (pepper) and
Ibarra #guindilla (chili
pepper) varieties, resistant

to #Tobamovirus.

2 FEB. 2020

In Lisbon, at the second annual #AIMCOST meeting, an action whose objective is to create a network of researchers and institutions to study and control invasive #mosquitos.

16 JUL. 2020

The summer course organised by @upvehu on resistance to #antibióticos (antibiotics, contributing our perspective on the matter with the talk "#OneHealth, healthy animals and people and safer environment".

06 MAR. 2020

During the event "#Sostenibilidad en los suelos
de #terroir (Sustainability
in regional soil)," an event
for #viticultores (wine
grows) that analyses
strategies to fight the long
periods of drought caused
by #CambioClimático
(Climate Change).



FEATURED NEWS FROM 2020



In 2020, a new edition of the programme EIT Food Accelerator Network (FAN) was held and NEIKER took part. This programme is oriented toward accelerating growth and the impact of innovative start-ups in the food sector. It is also conducted on the Bilbao campus. The plan includes complete training and entry into a network with leading industry companies. NEIKER provides start-ups with access to our facilities and the possibility of testing and developing their products.



WE PARTICIPATED IN CREATING THE ANIMAL HEALTH RESEARCH NETWORK (RISA, IN SPANISH)

NEIKER is a founding member of this network, created in 2020 and coordinated by the High-Security Biological Laboratories Network (RLASB, in Spanish), Singular Technical and Scientific Infrastructure (ICTS, in Spanish). Participating are universities, research centres, and the Vet+i Foundation to promote technological transfer and scientific dissemination in animal health.





THE PRESIDENT OF THE BASQUE GOVERNMENT INAUGURATES OUR NEW FACILITIES TO MEASURE LIVESTOCK METHANE EMISSIONS

Iñigo Urkullu, President of the Basque Government, visited our Arkaute centre to discover the cutting-edge equipment we installed to measure methane emissions from ovine livestock. He also visited the in vitro Plant Tissue Cultivation Laboratory, where we multiply trees resistant to new diseases and the new conditions that will be brought about by climate change.

In short, he learned more about our sustainability work in the sector, the fight against the climate emergency, and forestry improvement. Moreover, during his visit, he highlighted NEI–KER'S work to "anticipate responses and opportunities within the scope of the ecological challenge that we must face."



PALOMA MONCALEAN JOINS THE EDITORIAL BOARD OF THE MAGAZINE "FRONTIERS IN PLANT SCIENCE"

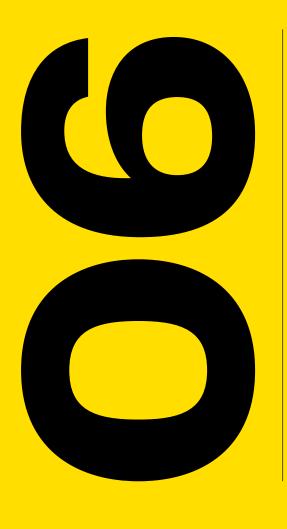
EVA UGARTE JOINS CITA'S NEW SCIENTIFIC BOARD



A researcher at NEIKER since 2002, Moncaleán has joined the editorial board of the prestigious magazine "Frontiers in Plant Science," the most-quoted magazine in its category and with the greatest worldwide prestige. She holds a doctorate in Biological Science from the University of Oviedo. After her stay at CNB (CSIC), she currently carries out her activity at our Department of Forest Sciences.



The Agro-Food Research and Technology Centre of Aragón (CITA, in Spanish), selected Eva Ugarte, manager of Technology and Innovation at NEIKER, for her vast experience in improving animal genetics and her numerous scientific publications. Dr Ugarte is also a member of the Working Group on small ruminants from the International Committee of Animal Recording (ICAR).



People and the organisation





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2020 was a year where the people who form a part of NEIKER made a difference. Without their commitment and devotion, it would not have been possible to keep pushing forward in our mission to support the sector, clients, and collaborators in such a complicated year.

PEOPLE

We strive to increase the satisfaction and well-being of the people who form NEIKER, and to continue improving their education and working conditions.

PROFESSIONALDEVELOPMENT

Even in such a turbulent, abnormal year, in 2020, practically everyone working at NEIKER managed to conduct some sort of training to improve their skills and abilities. In this area, we experienced the huge challenge of adapting training to the circumstances and turning basically face-to-face training into virtual training with a high degree of satisfaction.

Thus, we conducted 31% more training actions than in 2019, providing the NEIKER team with training in new ITCs to adapt to this new remote situation. As usual, we continued working to increase our skill set, so as to offer the agro-livestock and forestry sector the best version of ourselves, and to continue with the high qualification of our laboratory services.

HEALTH AND SAFETY

70

Within the COVID-19 pandemic context, just like the rest of society, NEIKER made a preventive effort in coordination with the Basque Government Ministry of Health to confront the health crisis situation in 2020.

Designing and executing different action plans throughout the year, with different kinds of measures in terms of organisation, collective and individual protection, limitations on use of spaces, training and information, and reinforced cleaning of facilities, allowed us to safely move forward with our activity as a technological centre.

Like the other members at the Basque Research and Technology Alliance (BRTA), we participated in the pilot project PRAP,

led by the Basque Government's Department for Economic Development, Sustainability, and the Environment in close collaboration with the Ministry of Health, focused on establishing COVID-19 monitoring plans at companies to help recover and maintain social and economic productive activity in the Basque Country.

In closing, in 2020, we decided to integrate occupational hazard prevention into the organisation's other management systems, to thus move forward in the process of implementing a safety and health management system at the workplace.

PROMOTING **BASQUE**

In 2020, we began rolling out our Strategic Basque Plan with the Basque Government's Hizketa tool, which facilitates preparation of strategic plans based on the Standard Reference Framework of the new Bikain. NEIKER is working to obtain this official certificate, which accredits a certain level of standardisation in the presence, use, and management of Basque at an entity.

In parallel fashion, we have continued boosting the use of Basque with different internal actions: presence at corporate events, bilingualism in official internal documents, bilingual internal communications, help to learn Basque, etc.



MANAGEMENT MODEL

n 2020, we worked to reinforce some of the actions begun years prior regarding the establishment of responsible and engaged government, and consolidation of an advanced management model.

COMMITMENT TO EQUALITY

In 2020, we continued making progress so that equality becomes a cross-cutting theme in our company. We approved the "Diagnosis of Equality at NEIKER," the "2nd Equality Plan for Women and Men at NEIKER," and the "Protocol for Prevention and Action against Sexual Harassment, Gender-Based Harassment, Harassment for Sexual Orientation, and Harassment for Gender Identity and Expression at NEIKER." Another noteworthy milestone is that we created the **Confidentiality Consultation**, in charge of handling complaints, claims, and reports on sexual harassment and sexist, sexual orientation, or gender identity and expression-based harassment.

We also worked to guarantee good practises in people management. On an annual basis, we create and update a register with the average salaries, salary complements, and non-salary income for staff, broken down by gender and distributed by professional group. In the salary audit for compensation between September 2019 and October 2020, the result of the wage gap was favourable to women, at 6%.

Education is a fundamental pillar to raise visibility for the gender perspective. For this reason, in 2020, we developed specific equality training plans. On one hand, to train people directly responsible for leading the measures set forth in our second plan. On the other, to raise awareness of this issue for everyone who works at NEIKER. Moreover, we have begun including gender perspective in all our internal surveys.

We also work to increase the degree of co-responsibility between men and women at NEIKER in terms of co-responsible social organisation. To this end, we foment applicable measures

for personal and professional life balance, which are set forth in our Welcome Manual for everyone joining NEIKER, and we periodically share them by means of internal communications.

In 2020, we conducted the tasks necessary to apply this year for status as a collaborating company in Equality, and the consequent access to the Emakunde Bai-SAREA Network. This is public recognition for the work we have already done, and NEIKER'S political and technical commitment to equality policies.

In closing, we actively supported noteworthy events such as the International Day of Women and Girls in Science (11 February), International Women's Day (8 March), and the International Day for the Elimination of Violence against Women (25 November).

WE APPROVED PLANS, PROTOCOLS AND DIAGNOSIS GUARANTEE GOOD PRACTISES AWARENESS, TRAINING AND

Thus, we would like to highlight the system that we implemented to review compliance with legal requirements that a company such as NEIKER must meet, the beginning of development of a new strategic plan and approval and dissemination of the "Equality Plan" and the "Protocol Against Sexual and Gender– Based Harassment" in the organisation, which we already mentioned in the pertinent section in this report.

Moreover, we have joined management bodies of the **Basque Research and Technology Alliance (BRTA)**, forming part of its

management, scientific, and market committees. After launching NEIKER'S Code of Conduct in 2018 and starting up our Compliance Committee, in 2020, we issued a technical instruction on remunerated activities outside NEIKER, and we have continued to internally disseminate the main principles of our code of conduct. Within the scope of the Spanish Data Protection Act (LOPD, in Spanish), we have updated internal operations and appointed a data protection officer.



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In line with what we are, we encourage transferring knowledge and scientific dissemination within society, without forgetting initiatives that improve the living conditions of everyone, inside our borders and beyond them.

PROMOTING SCIENCE IN BASQUE

Since 2016, we have collaborated to encourage Basque along with the Elhuyar Foundation in primary sector research and in NEIKER's own activity. We participate in Zientzia Azoka, an initiative to promote the culture of science by presenting scientific projects designed by young people at the Zientzia Azoka Fair, with scientific workshops and prizes for the best projects. NEIKER is part of the jury that selects the winning projects, and we welcome two-day stays from participating schools whose students visit our facilities to learn about research work at a technological centre first-hand. in 2020, we have to reinvent with new formats to continue promoting scientific culture.

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FOOD BANK

We strengthened our relationship with the Federación de Euskadi de Banco de Alimentos (Basque Food Bank Federation) (FESBAL), an entity with whom we have been collaborating for six years and to whom we deliver surplus from our experimental farms' harvests every year. In 2020, we donated 10,000

kilos of potatoes to the Alava Food Bank, from research conducted at our Alimentos farm (Álava). This time, it was the Divaa, Lucinda, Monalisa, Spunta, Agria, Yona, Desiree, Kennebec, Jaerla, Baraka, and Red Ponticac varieties, collected after completing the test that occupied approximately one hectare at Arkaute. In total, since the beginning of the convention in 2015, we have donated nearly 90,000 kilos of potatoes, which the Food Bank of Alava distributes to 4,500 beneficiaries spread throughout 1,200 families.



SALUGANDA, SUSTAINABLE SCHOOLS IN UGANDA



Since its beginnings in 2010, we have supported the NGO Saluganda's work in seeking to improve people's quality of life, especially women, girls, and boys in rural zones in several communities of Uganda. It does this through education, social development, and basic health. In addition to other actions, this initiative promotes sustainable schools and provides coverage to seven educational centres, with over 2,500 students attending.

Over the years, NEIKER has collaborated on this initiative in different ways (helping to install dry latrines, rainwater collection tanks, pig breeding, hen houses, and ecological gardens), thus completing a sustainable production cycle for each school.

In addition to NEIKER'S economic aid every year, in 2020, we started up several internal actions to collect funds: the sale of ecological squash and handmade hair ties purchased in Uganda. The funds collected where allocated to the purchase of thermometers, hydroalcoholic gels, new desks to maintain social distancing, etc., which allowed 7 schools in the project (closed due to COVID-19) to reopen for last-year students, who could at least prepare for their graduation exams.

ENCOURAGING DISSEMINATION TO SOCIETY

We enjoy participating in initiatives that encourage bringing science closer to society, since we believe that, in addition to researching and transferring our knowledge to the agro-livestock and forestry sector, we have an educational duty toward society.

Although 2020 was not the best year to organise educational events, we have taken part in the events "Conocimiento en Escena (On-Scene Knowledge)," organised by Baserri Antzokia Fundazioa in Derio (Biscay). Researchers from the Parque Tecnológico de Bizkaia (Biscay Technological Park), UPV-EHU (University of the Basque Country), and other entities introduced their projects and research in a relaxed atmosphere, accompanied by food and drink.

CENTRO DE ARKAUTE

Campus Agroalimentario de Arkaute, 01080 Vitoria–Gasteiz (Araba) (+34) 945 121 313

CENTRO DE DERIO

Parque Científico y Tecnológico de Bizkaia, C/ Berreaga 1, 48160 Derio (Bizkaia) (+34) 944 034 300





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