



Looking forward to 2025

A FIVE YEAR PLAN



NIAB is an internationally recognised Centre for Crop Innovation, providing an integrated research and knowledge transfer hub addressing the global challenges of food production, climate change and environmental protection.

Privatised in 1996, NIAB is a not-for-profit organisation with independent charitable status. We receive no core funding from government. We re-invest any profits into future research.

Our ambition is to provide world-class research, information and advice to support crop production through innovation in crop genetics, precision agronomy and knowledge-based decision support tools. We offer exceptional research and service provision, and look to attract co-investment from commercial partners to accelerate the creation of new technologies, products, IP and start-up companies.

Via the development of the Crop Science Centre, our target is to facilitate a step-change in translational research on food security, climate change mitigation and crop science.

By 2025 we aim to grow our operation through mergers, acquisitions, and organic growth. We will continue to diversify our customer base, and work with an expanding range of partners to deliver improvements across all aspects of crop production.

Our values

NIAB will be guided by its values in everything it does:

- We are proud of our independence and integrity
- We are science-based and impartial
- We are agile and responsive to our customers' needs
- We are innovative in our approaches
- We strive to have impact from our research
- We are sensitive to the environmental impact of food production
- We respect and value our staff.



NIAB in 2020

The unremitting focus of NIAB's research is to deliver integrated, industry-facing solutions to improve the productivity, efficiency and sustainability of crop production.

NIAB is the UK's fastest growing crop science organisation. We continue to grow through a strategic programme of investment, merger and acquisition.

We aim to develop higher yielding, more climate resilient crops through applied research, the outcomes of which we can transfer effectively onto farm through our extensive industry partnerships and NIAB membership schemes.

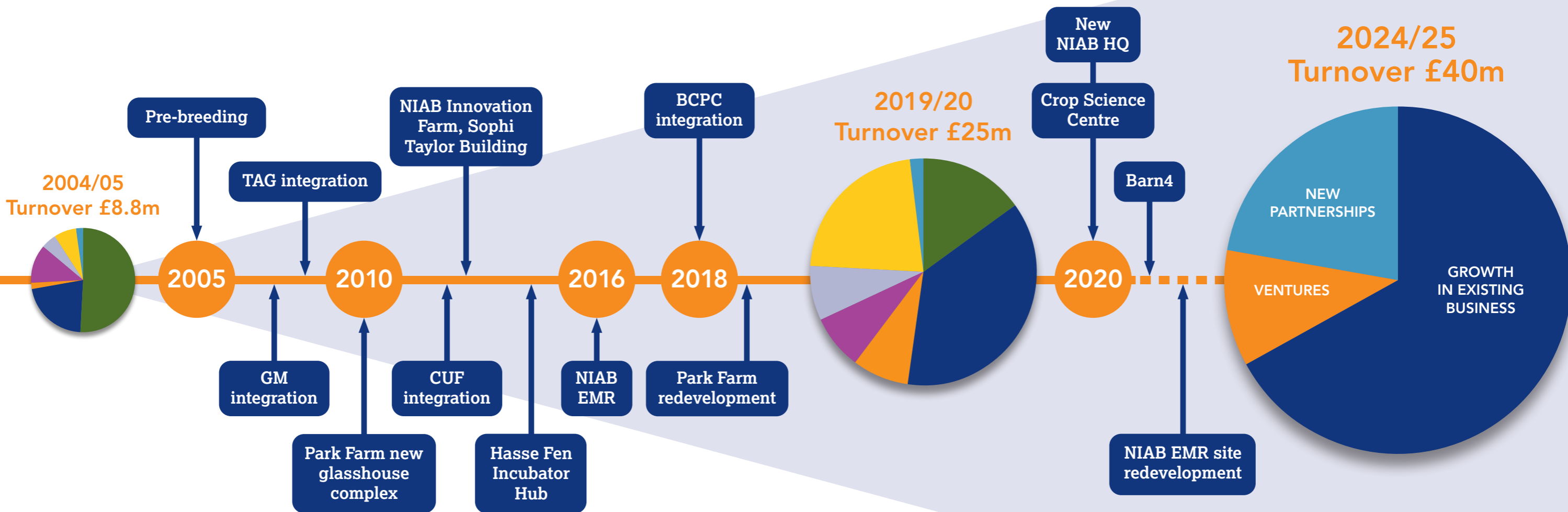
The diversity of our funding sources means that we can be truly independent from government, industry and lobbying organisations. We will continue to adapt, putting our charitable objectives and our independence at the forefront of growing a strong, research-based enterprise.

Climate change is at the forefront of our research priorities. We use the knowledge of how genetics, environment and management interact to increase quality production and cope with a more variable and changing climate.

Biodiversity protection and enhancement are also key goals, alongside increasing the efficiency of resources, resulting in less waste across the food system, as well as minimising greenhouse gas emissions. We work on a wide range of crops from cereals and oilseeds to potatoes, ornamentals, non-food crops, top and soft fruit and vines. We generate new genetic diversity in pre-breeding material for arable crops, as well as plant breeding services for the fruit sector.



Evolving, expanding



■ Other Government
 ■ Commercial/contract
 ■ Charity
 ■ Levy
 ■ Membership/training
 ■ UKRI
 ■ EU

Agricultural crop research

NIAB's group of internationally recognised research scientists carry out world-leading strategic agricultural crop research addressing pressing global challenges around food production, with an emphasis on the mitigation of, and adaptation to, climate change. Our mission is to conduct high-quality strategic and applied research, delivering knowledge, products and services that benefit both public and private customers.

Broad aims

- Build on our established programmes in cereal and protein crop pre-breeding and genetics, ensuring NIAB leads in the development of crops of global importance
- Expand pathology and entomology research to address the needs of industry through growing our programmes in sustainable control, improved diagnostics and novel IPM approaches
- Expand our three major capabilities into research departments: biotechnology, data sciences and market-led breeding, to deliver high-quality research and commercial services to key stakeholders.

SPECIFIC AREAS OF RESEARCH

- Develop integrated and multiscale models as a path towards the rational design of both crops and cropping systems. We will develop future farming systems with lowered emissions profiles and the optimisation of the wider environmental and ecosystem services.
- Improve crop resilience to abiotic and biotic stresses, utilising NIAB's unique genetic resources, phenotyping and deep-learning techniques to identify novel variation in key resilience traits in cereal and protein crops.
- Expand methods for rapid cycling in crops, e.g. speed breeding and cellular phenotyping.
- Optimise productivity focused at reducing nitrogen fertiliser use. Understanding and improving nutrient response in farming systems. Incentivising the development and uptake of varieties optimised for sustainable farming systems.
- Engage in national and international development of new techniques for establishing variety testing, providing independent testing for DUS and VCU of agricultural varieties as a qualification for National List status.
- Explore, through national and international seed certification activity, innovation in our processes that ensure seed provided to growers has the quality characteristics to deliver the full variety potential.
- We will utilise our skills and capabilities in legume research to provide solutions to the increased demand for plant-based protein for food and animal feed production.
- NIAB will continue to monitor and predict new and existing pest and disease threats to build resilience in UK crop production.
- Pioneer the use of new plant breeding technologies to engineer crop plants delivering new sources of genetic innovation. Our aim is to increase crop production and improve resilience across the major arable crops.
- We will follow up on our strong flagship wheat pre-breeding programmes, applying extensive phenotyping expertise to maximise output from experimental wheat lines developed at NIAB. These include lines derived from resynthesised hexaploid and tetraploid wheats for a range of important traits including environmental adaptation, drought tolerance and hybrid breeding potential as well as processing characteristics and digestibility.
- We will remain at the forefront of crop engineering and will broaden our portfolio of crops.

Crop agronomy and farming systems

NIAB continues to lead the UK in providing independent crop management R&D, information and services and to be at the heart of productive, profitable, innovative and resilient field crop management practice, fuelled by world-class, science-led agronomy. This is achieved by:

- Practical crop and agronomy R&D, knowledge exchange and demonstration
- Impartial, research-based crop management information and independent agronomy advice, membership and consultancy services
- Unrivalled UK trialling and evaluation capabilities for agriculture and horticulture
- Specialist crop analytical services.

Broad aims

- Work with growers and R&D businesses to test and demonstrate new technologies for resource efficiency and waste valorisation
- Grow NIAB's commercial field and glasshouse trials business, through service innovation, added value and improved cost-efficiency
- Establish and deliver new analytical tests, services and packages
- Reinforce NIAB CUF's position as a global leader in potato agronomy
- Through agritech R&D, enable innovation in arable and forage crop evaluation/management aimed at raising productivity and protecting the environment
- Expand NIAB's consultancy services, with a focus on strategic agronomy support for larger farming businesses
- Strengthen partnerships, develop new communities and grow Membership, prioritising relationships with farmers, to increase NIAB's impact and influence.

Agronomy, soil management and rotations remain central to our Farming Systems research. We will continue to lead in measurement and maintenance of soil health, monitoring the effects of cropping systems and management practices, and giving practical guidelines on how to enhance soil health.

Greater innovation in arable and forage crop evaluation through agritech R&D and data-driven approaches will focus on the agronomic understanding and validation needed to exploit new measurement techniques.

In addition to extending our work in variety/seed improvement, seed health and agronomy, we will broaden our potato R&D to encompass opportunities in diploid breeding, hybrids and true seed utilisation, as well new developments in crop storage, dormancy and taste/texture.

Through our Eastern AgriTech Innovation Hub, we will continue to work with growers, SMEs and R&D businesses to test/demonstrate new technologies with potential to reduce waste and enhance the regional circular bioeconomy. This includes resource-efficient indoor growing systems, and integrated renewable energy.

NIAB continues to be the largest provider of small plot trials in the UK. The operation spans 12 regional centres with more than 100 field sites, incorporating over 150,000 plots. We will grow our business further, delivering innovation and adding value for existing and new customers.

As part of our commercial trials business, our glasshouse-based R&D services include ornamental variety evaluation, specialist plant collections as well as growing media, nutrition, irrigation and lighting trials.

We will increase the marketing of our analytical services and are establishing new services related to soil health measurement, soil-borne diseases and pre-symptomatic disease detection in plant tissues. We will also assess new approaches to examining seed health and purity.

We are exploring new ways of working with farmers. NIAB's membership schemes are an important mechanism for two-way dialogue with industry, ensuring that our services provide maximum benefit and that our research is focused, solution-orientated and impacts on practice.

Extending NIAB's on-farm presence, our strategic agronomy services that bridge research, trials and consultancy will support data-driven decisions to achieve year-on-year improvement in crop and growing system performance.

Horticultural crop research

NIAB EMR is a world-class centre of excellence for applied research and innovation in commercial horticulture. As the UK's largest horticultural research and development organisation, NIAB EMR undertakes work primarily in perennial and clonally propagated crops. We provide scientific research, technical services and practical advice to improve the yield, efficiency and resilience of crop production across the sector.

NIAB EMR tackles the challenges associated with climate change, food security, food chain quality and resource use efficiency, to optimise economic and environmental sustainability in crops. We specialise in the ecology of pests and pathogens and the environmental and biotic factors which affect them.

NIAB EMR's research programme is based on genetics, genomics and breeding, pest and pathogen ecology and crop science and production systems. A new department has recently been established, concentrating on the transformation of crop production utilising machine learning (AI), data and clean growth. This will encompass pre-harvest interventions for shelf-life and quality, the development of nutritious and healthy food and helping industry to achieve net-zero emissions.

Broad aims

- Increase production efficiency and profit potential
- Mitigate impacts of biotic and abiotic stresses
- Safeguard the environment and increase sustainability
- Drive the transformation of crop production.

We offer knowledge and bespoke services across a wide range of activities, including growing media, crop protection and genetic provenance, as well as expert technical support and development activity in crop irrigation, fruit breeding and integrated crop management.

Recent developments include large investments in facilities, via the 'Strength in Places Fund' which will allow the upgrading of facilities at NIAB EMR.



SPECIFIC AREAS OF RESEARCH

Soft fruit

NIAB EMR began breeding strawberries in 1983 for commercial and amateur markets and has since launched 45 varieties with sales exceeding 400 million plants.

Today we work with industry consortia across the world to breed, develop and commercialise a range of soft fruit varieties, including the phenomenally successful strawberry Malling™ Centenary and the recently launched raspberries Malling™ Bella and Malling™ Charm. Using a combination of traditional techniques and genomics-assisted breeding NIAB EMR supports the efficient development of disease resistant, high quality varieties ensuring improved yield, fruit size and quality, lower fruit wastage, easier picking and season extension.

Improving UK wine production

The UK is increasingly recognised for its good quality wines. However, consistency and finest quality remain a challenge in our cool climate. The NIAB EMR research vineyard, the first of its kind in the UK and supported by the East Malling Viticulture Research Consortium, aims to ensure the best yield of the best quality grapes from UK vineyards and to increase sustainability through scientific research.

Reducing water consumption

The NIAB EMR Water Efficient Technologies (WET) Centre showcases the latest developments in irrigation management and moisture sensing technologies in fruit crops on a commercial scale. It brings together applied research with new technologies in IT and data management with resulting reductions in water, fertiliser, pesticide and energy use and increases in yield.

Breeding clubs

The breeding programmes at NIAB EMR concentrate on strawberries, raspberries, apples, cherries and rootstocks. NIAB EMR leads an international consortium to breed raspberries and blackberries for global production.

NIAB EMR's strawberry breeding programme continues to develop new varieties – the variety Malling™ Centenary exceeded 70 million plant sales in 2020.

NIAB EMR's Viticulture Club runs the only UK research vineyard. The Club members represent 70% of the English wine growers.



The next five years

- Implement the new department for the transformation of crop production
- Modernise the East Malling site
- Actively expand the commercialisation of NIAB EMR varieties
- Enrich the research and innovation pipeline to enhance proposal success rate
- Deliver the 'Growing Kent & Medway' project.

Sites and facilities

NIAB is at the heart of an active science and technology-based community in Cambridge, with regional centres across the UK. We have a programme of reinvestment in new facilities, notably at our two sites in Cambridge, but also at NIAB EMR in Kent, demonstrating NIAB's commitment to the agritech sector in the UK.

CAMBRIDGE

Our headquarters is an innovative new campus that opened in February 2020. The development incorporates the Crop Science Centre, NIAB's collaboration with the University of Cambridge, and reflects our ambitions and aspirations across the regional, national and international agri-science business communities.

The new campus, with its offices, state-of-the-art laboratories, growth room facilities and meeting

rooms, supports first-class research and service provision and will attract co-investment from commercial partners to accelerate the creation of new technologies, products, IP and start-up companies.

NIAB Park Farm, our site on the northern outskirts of Cambridge, includes The MacLeod Complex – modern, climate-controlled glasshouses, outdoor ornamental growing facilities and variety and agronomy demonstration area – alongside The Sophi Taylor Building, our BREEAM award-winning conference centre opened in 2013.

Park Farm is undergoing further redevelopment. Opened in 2019 Barns 1 and 2 are home to extensive new research laboratories and offices, crop and seed cold storage facilities and our analytical services laboratories. 2021 will see the opening of Barn4, a purpose-built incubator hub for start-up agritech SMEs.



The Cambridge farm and trials team also manages 250 ha of commercial cropping and field trials both on-site and locally, including satellite sites at nearby Hinxton and Duxford.

REGIONAL CENTRES

In addition to the headquarters in Cambridge there are twelve regional arable field trial centres across the UK, numerous satellite trials sites and the Eastern AgriTech Innovation Hub, near Soham, in Cambridgeshire.

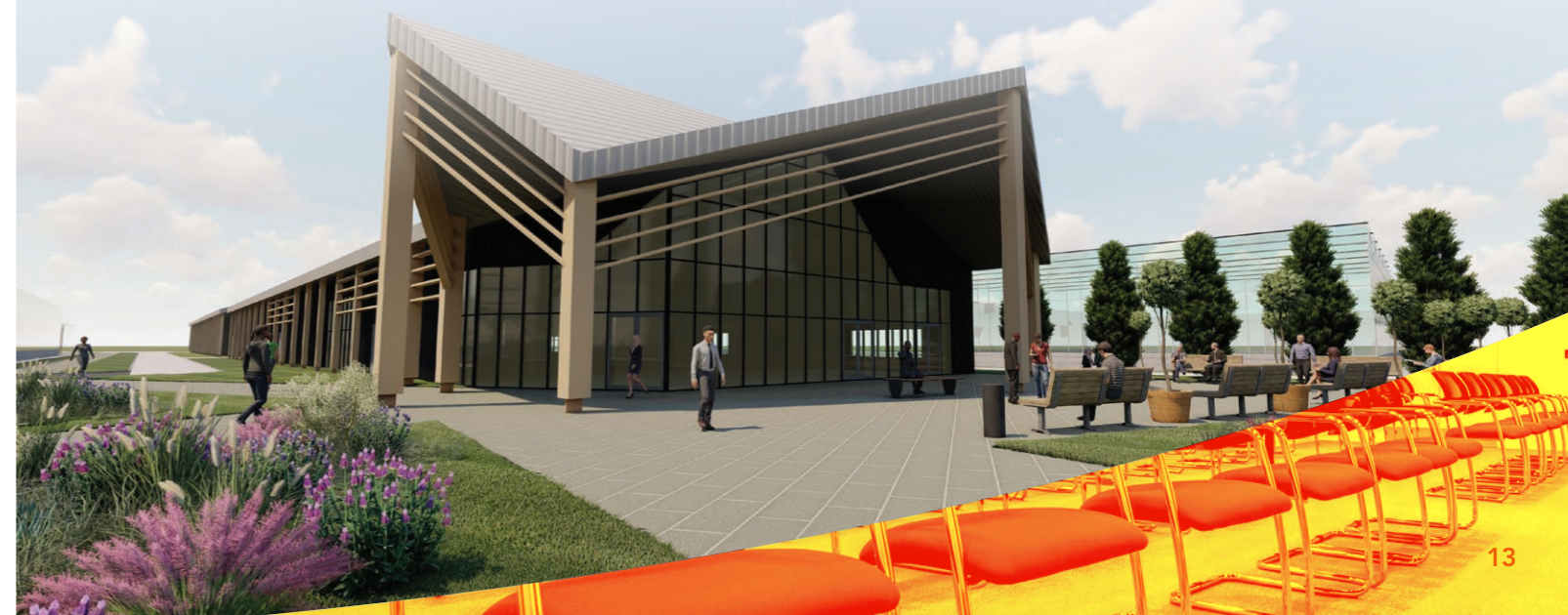
EAST MALLING

Home to NIAB EMR, the UK's largest horticultural research and development organisation. It is an international leader in top fruit and soft fruit research and development. NIAB EMR includes



offices, laboratories, conference, field and glasshouse facilities, alongside research, trials and commercial horticultural and arable land.

New infrastructure, services and high-tech plant growing facilities will be developed at NIAB EMR. Future plans include an Advanced Technology Horticultural Zone – state-of-the-art glasshouses, with high-tech imaging, robotics, precision irrigation rigs, LED lighting and CO₂ systems, as well as a green energy facility to meet the needs of the new horticultural facilities.





The UK's agritech market is valued at **£2.9 billion** and forecast to grow over the next ten years.



Ventures

NIAB Ventures exists to support, create and develop commercial activity at NIAB. A small team directly manages development projects and supports colleagues across the organisation to help build solutions and collaborations for the agrifood sector based on NIAB's unique intellectual property portfolio, which includes our specialist know-how. Delivery is through licenses, consultancy and agritech products, services and collaborations built on NIAB's global industry networks, facilities, science and talent pool.

Encouraging mutually beneficial relationships between NIAB and the agritech sector including start-ups and small and medium-sized enterprises (SMEs) and their investors is a particular focus to support delivery of NIAB innovation into the wider industry.

This includes Barn4, a business incubator at our Park Farm site, opening to tenants from spring 2021, offering start-ups and SMEs laboratory, workshop and office space alongside specialist technology and facilities.

The UK's agritech market is valued at £2.9 billion and forecast to grow over the next ten years. Current enabling technologies include genomics and biotechnology, growing systems, precision farming, sensors and robotics, decision support systems, AI and data-driven solutions.



Our values
Sustainability
Equitability

Themes
Crop nutrition
Improving photosynthesis
Pests and diseases



The Crop Science Centre is an alliance between NIAB and the University of Cambridge Department of Plant Sciences.

It is focused on translational research in crops with real-world impact, based around three key pillars of research activity: nutrition, pests and diseases, and photosynthesis.

The Centre combines the diverse skills and expertise of the University and NIAB, providing an environment for research excellence, with the capability to apply discoveries to crop improvement in the field.

It strives to improve staple crops such as maize, wheat and rice, but also specific crops of relevance to smallholder farmers, particularly those in sub-Saharan Africa.

The Centre provides leadership in crop sciences, with a creative and dynamic research culture, motivated by improvement of agriculture for the betterment of society. By bringing crop science researchers together under a single roof the aim is to generate increased translational activities and impact from research.





93 Lawrence Weaver Road, Cambridge CB3 0LE • Tel: +44(0)1223 342200 • Email: info@niab.com • niab.com