Innovate UK

Results of Competition: Agri-Tech Catalyst - Early Stage Feasibility - Round 5
Competition Code: 1506_FS_SAF_AGCATES5

Total available funding for this competition was £10,344,929 from Innovate UK (over all strands)

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Lincoln Garford Farm Machinery Ltd	3D Vision-based Crop-Weed Discrimination for Automated Weeding Operations	£180,490	£139,284
Project description - provided by applicants			
The current crop production systems have been reliant on the wide-scale application of herbicides tocontrol weeds. However, this approach is not sustainable due to unprecedented regulatory andenvironmental pressures which place new emphasis on the development of novel techniques to killweeds.This project will investigate the technical foundations for the next generation of robotic weedingmachinery, enabling selective and accurate treatment of specific weeds. The proposed technology is anovel combination of low-cost 3D sensing and learning software together with a suitable weeddestruction technique. The proposed developments will lead to more efficient cultural weedingequipment resulting in better management of weeds and reduced input use, bringing several benefits tofood producers, sellers and society.			

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SoilEssentials Ltd University of the West of England Aralia Systems Ltd	GrassVision - Automated application of herbicides to broad-leaf weeds in grass crops	£216,197	£166,514
Project description - provided by applicants			
GrassVision will use imaging and precision agriculture techniques to develop a novel spray apparatusfor precision application of herbicides to broad-leaf weeds in grass crops. The GrassVision consortiumconsists of imaging experts (Center for Machine Vision, UWE), data analysis experts (Aralia Ltd.) andprecision agriculture experts (SoilEssentials Ltd.). Sustainable production requires weed control methodsto reduce herbicide use to comply with current and future EU legislation. The primary focus will be todetect weeds using novel 3D machine vision techniques. Initially the project will use off-the-shelfmachinery to spray a targeted area around each weed, with an estimated aimed decrease in herbicideuse of around 75%.The project will then look to determine the limits of precision by refining the boomitself. Using this approach, we hope to achieve an ideal target of a 5x5cm spray area per-weed,providing potential reductions in herbicide use in excess of 90 %.			

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Wideblue Ltd Galloway & MacLeod Ltd The James Hutton Institute University of Strathclyde University of the West of Scotland	Feasibility of a Hyper Sprectral Crop Camera (HCC) for agriculture optimisation	£434,602	£323,053
Project description - provided by applicants			
Low cost Hyperspectral Crop Camera (HCC).A consortium from a broad range of disciplines have come together to develop a revolutionary low costcrop camera that could potentially allow farmers to improve crop yield, use less fertiliser, use lesspesticide and spot pests and diseases earlier.The project will be led and coordinated by Wideblue Limited - a developer and manufacturer ofspecialist cameras. The project will also call on the skills of the the James Hutton Institutes expertise incrop nutrition and monitoring, the University of Strathclyde's Hyperspectral Imaging Centre, theUniversity of the West of Scotland's Institute of Thin Films, Sensors and Imaging and Galloway &MacLeod's intelligent agriculture division.			

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Exosect Ltd Lancaster University University of Greenwich	A Novel Biopesticide Formulation Technology for Major Lepidopteran Crop Pests	£287,203	£219,697
Project description - provided by applicants			
Biopesticides are products based on the natural diseases of insects that can be used to protect crops against pests. They are environmentally-friendly because they target only a limited group of insects and are safe to humans, livestock and beneficial insects such as pollinators. However, biopesticides have a number of shortcomings which mean that they are not commonly used. This project aims to develop an innovative approach to improve the field-persistence, efficacy, shelf-life and cost-effectiveness of viral biopesticides against the moth caterpillars that eat crops. It will build on tried and tested Entostat technology to better protect the biopesticide whilst in storage or on the crop, whilst also improving its capacity to kill pest insects. The opportunity exists to replace current foliar chemical insecticides in this sector with a biopesticide of equal efficacy and substantially lower environmental impact and this project will take an important step in this direction.			

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The James Hutton Institute University of Southampton James Hutton Ltd Amcor Flexibles UK Ltd Branston Ltd Tesco PLC Waitrose Ltd	Strategies to reduce waste due to greening in potato tubers	£499,782	£362,099

Project description - provided by applicants
In the UK, tuber greening is directly linked to 116,000 tonnes of household potato waste each year withan associated estimated loss of £60m p.a. to UK retailers. In field losses due to tuber greening also costthe industry £37m p.a. Greening is a significantly negative factor in consumer purchases where a 1%increase in sales is worth £3m p.a. to producers. This project brings together partners that span the foodchain from production, through packaging, to major supermarkets who will work with academicresearchers to develop solutions to reduce tuber greening. Photobiological experiments will identify theconditions and target genes for light-induced tuber greening informing the design of prototypepackaging film to reduce greening during storage and in store. Recently developed potato geneticapproaches will be used to identify markers for genes associated with reduced greening providing thefoundation of a longer term strategy to produce new non-greening potato varieties.

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Scotland's Rural College (SRUC) Innovent Technology Ltd Agri-EPI Centre Ltd Sainsbury's Supermarkets Ltd	Early detection of tail biting in pigs using 3D video to measure tail posture	£449,429	£334,817
Project description - provided by applicants			

Tail biting in growing pigs starts without warning. Outbreaks of tail biting result in pain and sickness forbitten pigs and economic losses for farmers, particularly when infection through tail wounds results inabattoir condemnation of meat. Recent research shows that pigs' behaviour changes before a damagingtail biting outbreak starts. This project aims to develop a'smart farming' product based on the latestvideo technology and machine-vision software to automatically detect these changes and warn farmersso they can intervene to stop tail biting. The project brings together SRUC's expertise in pig behaviouranalysis, Innovent Technology Ltd's machine vision software development skills with Sainsbury's pigsupply chain perspective to ensure that end user needs are met. Experience with on-farm 3D video, andaccess to a network of Agri-tech expertise will be facilitated by the Agri-EPI Centre.

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Ace Aquatec Ltd University of Bristol	Humane Electric Stunning	£499,996	£359,806
Project description - provided by applicants			
A novel method of electically stunning farmed fish			

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Crop-Innovations Self Help Africa (UK) Bora Biotech Agsenze Ltd Secure Harvests Ltd PepsiCo International Ltd	Aflascope: Novel sample extraction procedures for improved aflatoxin management	£304,823	£225,999

Project description - provided by applicants
AflaScope is a cross-disciplinary collaboration to examine the feasibility of using an acoutic separationplatform for purification of aflatoxins from crops. Aflatoxins (toxins from storage mould) are a significantthreat to food security, particularly in developing nations. Testing & monitoring are vital but, due tocomplex sample prep, high cost, inaccessibility & lack of information, aflatoxin testing is not thoroughlyimplement & billions of people are at risk. This innovative project will develop a novel, rapid & chemical-free procedure for extracting & concentrating aflatoxins. When integrated with down-stream diagnosticadvances, the extraction platform could enable a low-cost, sensitive, portable test system for on-siteaflatoxin monitoring, increasing ease & frequency of testing, & potentially improve decontamination. Ifsuccessful, the resultant increase in crop value & safety will bring about a step-change in on-farmmanagement.

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Mars Chocolate UK Ltd WCF Ghana-CocoaAction University of the West of England	Rapid and cost effective 'on-site' detection of Cacao swollen-shoot virus (CSSV).	£296,199	£214,613
Project description - provided by applicants			
Cocoa beans are the key raw material in chocolate manufacturing. In West Africa, where 70% of thecocoa imported and consumed in the UK is produced, the chocolate industry has identified CacaoSwollen Shoot Disease (CSSV) as the major constraint to productivity. A cacao farm with CSSV will sufferdeclining yields and hence declining farmer income from what is often the only cash crop being grown.To limit the spread of this disease it is essential to develop diagnostic test that can detectpresymptomatic infection facilitating its prompt control. In this proposal we will develop a suitablemethodology and associated instrumentation to detect CSSV in crude plant extracts. Our approach willemploy paper based detection assays suitable for rapid application that can be used in formats thatenable unskilled personnel to operate them, thereby enabling their widespread deployment in the field.This will have a significant impact on the economic prospects of cacao farmers in West Africa.			

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Co2i Ltd XL Horticulture Ltd Rothamsted Research Ltd World Vision Kenya	DryGroAF (DAF)	£396,544	£303,538
Project description - provided by applicants			
The DryGro process enables the production of crops on arid land - it uses 99% less water thanconventional agriculture and has the potential to transform large areas of land which are currentlyunproductive. The focus of the DAF project is to develop the process to grow biomass to produce animalfeed.			