

United States Department of Agriculture
National Institute of Food and Agriculture

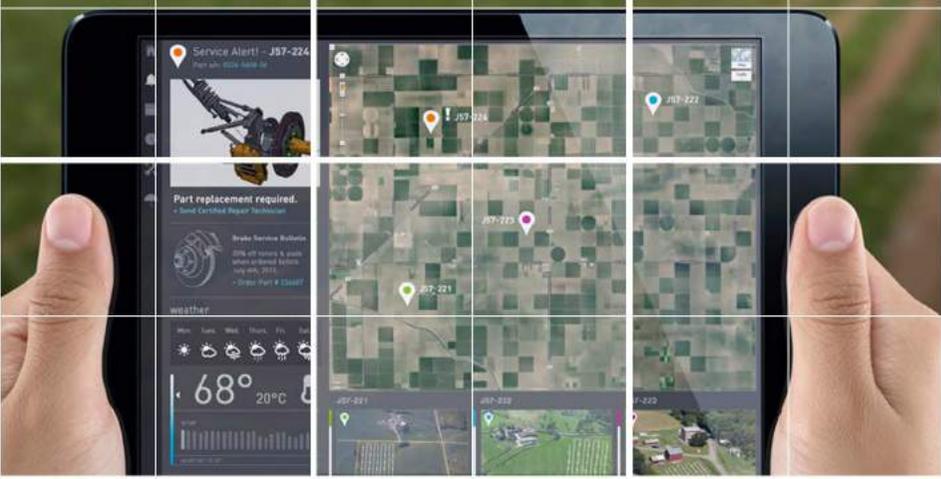
Agriculture 4.0

Connecting the dots for sustainability,
profitability and traceability.



CHALLENGE
ADVISORY

16th & 17th October 2018 San Francisco



Agriculture 4.0

Improving Agriculture

In order to achieve food security on a global scale, agribusiness must evolve. As one of the oldest industries in the world, there are a number of key issues that must be resolved before the planet can move forward with agricultural development. Profitability, efficiency, infrastructure, education and sustainability are all integral aims of agriculture stakeholders. To establish a strong agriculture market in the 21st Century, digital practices are paramount.

In association with NIFA-USDA, Challenge Advisory have built strong insights into how digitalization can be integrated into agriculture. Together, we have produced

Agriculture 4.0, which aims to improve understanding of modern agriculture practices within the market. Digital agriculture is dependent on the integration of data, precision agriculture technology and machinery, in line with a vision of traceability, visibility and interconnectivity.

Agriculture is set to undergo a disruptive transformation at the hands of technology, and agribusinesses can remain at the forefront of innovation with Agriculture 4.0. Farmers, cooperatives and distributors will connect with agribusinesses serving them in order to improve logistical output and gain access to the best software and hardware in digital agriculture at

an affordable cost. For the innovators in farm management, crop analytics and monitoring systems, there will be the opportunity to showcase the latest solutions, which allows for the improvement of brand reputation, as well as private meetings with resourceful buyers.

Finally, the entire value chain of agriculture will come together to establish a culture of interdependence, interconnectivity and traceability. Agriculture 4.0 takes the principles of Farm-to-Fork discussions and takes it a step further, not only looking at the consumer's perspective, but including the suppliers, processors and farmers themselves in the discussion in order to

reach a resolution for global agriculture that allows for bold innovation to address global food security.

By attending Agriculture 4.0, organisations will have the ability to network amongst each other for precise and profitable resolutions across the entire industry. There will also be panel discussions and workshop sessions designed for partnerships and profitable business development, as well as a greater understanding of digital agriculture practices. Join Challenge Advisory and all of our stakeholders for education, resolution and investment relating to the latest technology in digital agriculture.



NIFA provides funding to catalyze transformative discoveries, education and engagement to solve societal challenges.

NIFA Director Sonny Ramaswamy
Key Stakeholder Agriculture 4.0



Key Themes, Opportunities and Incentives

Key Themes	Opportunities	Incentivise
Farm Efficiency & Profitability	<p>Work with stakeholders to reduce the use of energy, nitrogen fertiliser, water & increase carbon sequestration with resilient agricultural systems.</p>	<p>Showcase the efficacy of your systems firsthand \$700M in mandatory funding (NIFA/AFRI) \$107M for water research (WBG)</p>
Renewable Energy	<p>Work with agencies in assuring that renewables account for 80% of US electricity by 2050 through solar, wind turbines, biopower, geothermal and hydropower.</p>	<p>Work with USDA & UN to achieve the 2050 goals \$421M in competitive funding(USDA/SBEBP) \$184M to fund on-farm solar projects (FAO)</p>
Agricultural Systems and Technology	<p>Leverage existing or create new partnerships to achieve USDA targets for the proliferation of new and secondary markets & the reduction in the ag carbon footprint.</p>	<p>Show your technology to those who need it most \$330M AFRI Funding (USDA) \$84M efficiency grants (NIFA)</p>
Food Safety	<p>Understanding legislation across the FDA Food Safety Modernisation Act in the prevention of food contamination & assess priority areas for increased efficiency.</p>	<p>Understand the legislation first hand from those who drafted the bill \$62M investment in new technologies & processes</p>
Plant Health & Breeding	<p>Potential of CRISPR-Cas & other plant breeding technology, as well as developing new business & market development opportunities globally.</p>	<p>Funding & processes for grant opportunities \$168M in discretionary research funds (USDA) \$147M through global initiatives (WBG).</p>
Food Loss & Waste 2030 Reduction	<p>Support USDA & EPA in building new food loss & waste infrastructure across the country to ensure the reduction of food loss & waste by 50 % over the next 14 years.</p>	<p>Meet with government, food manufacturers, co-ops & large farms to discuss the benefits of your systems \$600M through domestic initiatives</p>

Traceability & Transparency

Challenges in compliance with the Food Modernisation Safety Act

Since the turn of the millennium, around the world there has been a growing demand, clamour even, from consumers for transparency regarding where their food is coming from and how it is described to them due to concerns over the safety of the product after some high profile food related tragedies and product recalls.

In both Europe and the US at a government level, due to the high level of food borne pathogens and food-related illness and even fatalities the governments have issued stringent legislation to curb such events. According to the US Centers for Disease Control and Prevention about 48 million people (1 in 6 Americans) get sick, 128,000 are hospitalised, and 3,000 die each year from foodborne diseases a largely preventable strain on the public health.

The EU introduced the General Food Law and the US Government in turn introduced a consumer protection act called the Food Safety Modernisation Act 2011 (FSMA). Although this latter act originally only affected food processors it has now been extended to farmers of produce such as fruit and vegetables through a rule called the FSMA Produce Safety Rule, which was finalised in November 2015.

Evidently the high levels of scrutiny, audit and compliance that this much needed rule has warranted mean extra work for farmers and as such the opportunity for companies which can help farmers manage the safety of their operations and end product through innovative technologies are immense

In light of the Produce Safety Rule, traceability, resource management, data collection, analytics and reporting all take on extra importance and significance due to the fact that the farmers have no choice but to comply. The automation of these often time consuming operations will be key to allowing the US farmer to do what he excels at: producing wholesome food for us all in as efficient, sustainable and profitable way he can.

Agriculture 4.0 will bring insight from both regulatory and commercial viewpoints and examine the methods and technologies that can help in this area and bring to the table organisations which are at the cutting edge of those technologies helping to make the business case to those who need to invest in them in order to comply.

Challenge Advisory aims to help farms across the globe to gather and integrate huge amounts of data in order to gain a panoramic view of their farm. Once this data has been collected, our aim is to help them to use this data to the best of their advantage, to make meaningful and timely operational decisions which will help any farmer to enhance their yields and their profits.

Challenge Advisory is sourcing the technology service providers and coordinating the entire supply chain from “farm to fork” to ensure that there are no missing links forging iron-clad partnerships to bring about success for all concerned. If you are reading this the chances are that you have been identified by Challenge Advisory as being integral to this issue and as such we endeavour to open up significant business development opportunities through our network of stakeholders, partners and clients culminating in your participation at the summit.

Event Streams

Stream 1

IoAT Connecting The Chain

IoAT and the drive to standardisation.
The role of IT infrastructure.
The possibilities through connected data platforms.
Data in motion and real time analytics.

Stream 2

Data Driven Decisions

Disruptive developments in software, engineering & sciences
Agricultural devices, sensors & systems. Hyperspectral and multispectral data interpretation.
Assistance for farmers on how to use new technologies.

Stream 3

Traceability/Transparency

Food safety modernisation act compliance.
Food safety management systems.
Traceability along the supply chain.
The role of the farmer in assuring traceability.

Stream 4

Food Waste

Achieving food waste reduction of 50% by 2030.
Reducing factory farm wastage and prevention of contamination.
Increases in storage facilities to cope with higher production.
Advances in downstream storage

Stream 5

Labour Shortages

Technology to counter labour shortage & output reduction.
The role of robotics and mechanisation in automation.
Achieving dexterity of food picking. Advanced electronics and fleet management in machinery.

Stream 6

Biotechnology

Preventing crop loss caused by pests and disease.
What does the future hold for GMO? Assess the risk of biotechnology and promote best management practices
Fast & affordable editing Crisp-Cas9?

Stream 7

Cybermatics & Security

Cybersecurity to shield farm data
Integration of data security into smart farming.
Preventing the infiltration of supply chains and food irradiation.
Spotting weakness and managing threats.

Stream 8

Financing Technology

Investing responsibly in food & agriculture assets.
Growing innovations for investors.
Investment opportunities in agricultural asset classes
Investing beyond the farm.

Agriculture IIoT:

Complete Visibility of the Supply Chain

Regulatory

- Proof of Procedure
- Outbreak Investigation
- Transparency of Comm.
- Waste Management
- Trace Initiatives



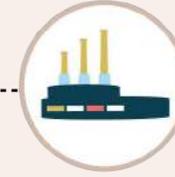
Farm

- Feeds
- Seeds
- Sensors
- Phosphorus Cycles



Production

- Packaging
- Processing
- Pasteurising
- Manufacturing



Suppliers

- Fertilisers
- Pesticides
- Water

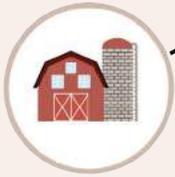


Consumer

- Traceability
- Trust
- Nutrition

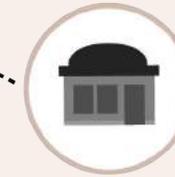
Storage

- Data
- Monitoring
- Conditions
- Quality



Retailers

- Groceries
- Restaurants
- Catering
- Markets



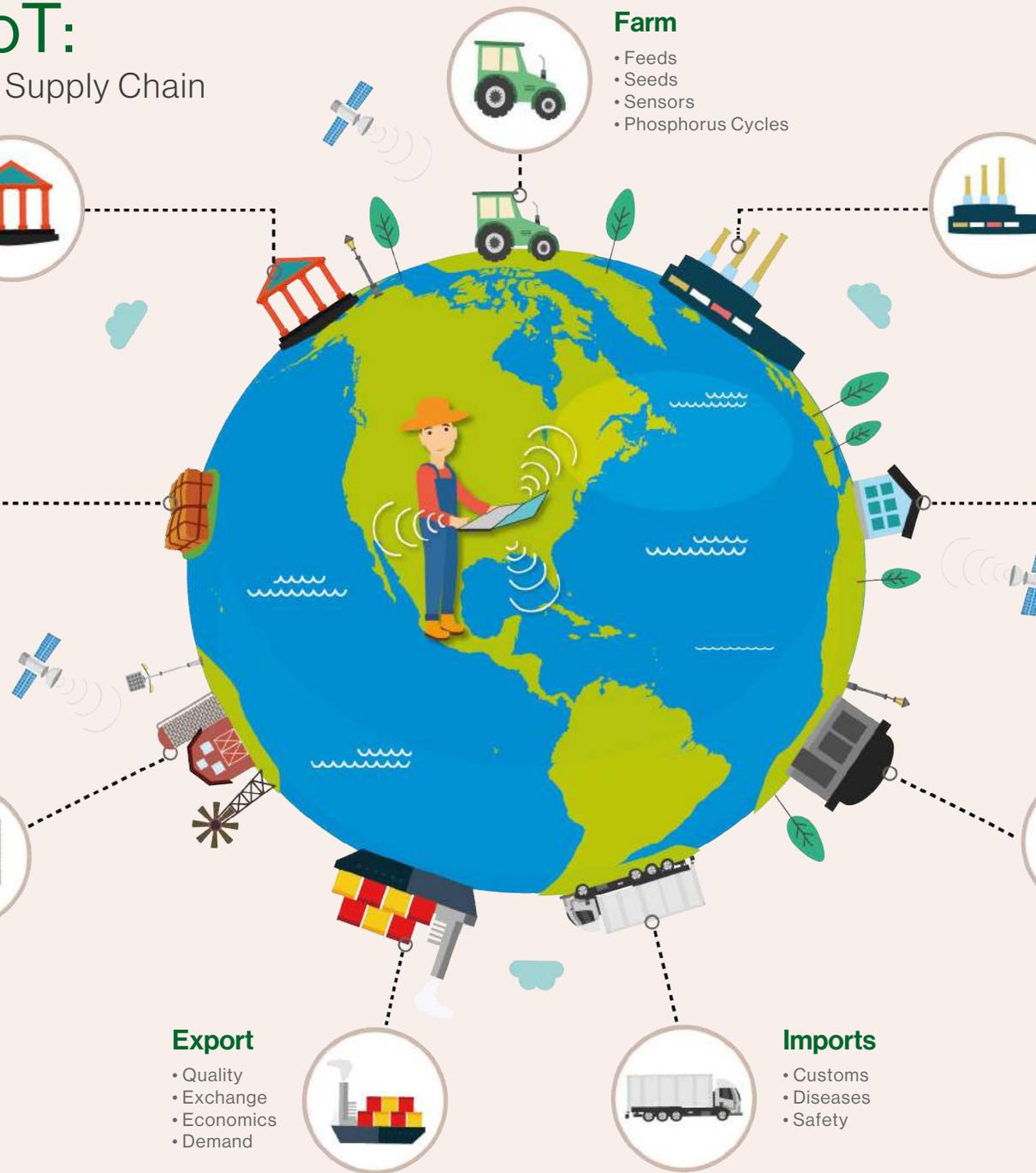
Export

- Quality
- Exchange
- Economics
- Demand



Imports

- Customs
- Diseases
- Safety



USDA-NIFA Updates Vision for Data Science in Agriculture

Identifying the future of data in agriculture

The U.S. Department of Agriculture's National Institute of Food and Agriculture (NIFA) is looking to identify the frontiers and future of data in agriculture and build on existing U.S. government-wide efforts and investments in big data.

One stream of the summit will feature distinguished leaders in the fields of data science and agriculture and engaged a diverse array of stakeholders to identify new opportunities for data science in agriculture.

At Ag 4.0, NIFA Director Sonny Ramaswamy will deliver updates on a new initiative, Food and Agriculture Cyberinformatics and Tools (FACT), designed to develop data-driven solutions for addressing complex problems facing agriculture today.

"Data, technology, and approaches that integrate individual and societal considerations are essential to meeting this challenge," said Dr. Ramaswamy "To achieve this, NIFA envisions a future for agriculture that is connected, data-driven, personalized, and sustainable."

The FACT initiative recognizes that analyses of agricultural systems to identify novel solutions require multi-scale data, machine learning, data visualization, and predictive modeling. These analyses also require transdisciplinary teams to work across scientific, economic, environmental, industrial, and political spheres. To enable this iterative process, clear strategic investments need to integrate information technology, computer science, engineering, statistics, business, economics,

and social sciences communities with traditional agricultural research, education, extension, and agricultural producers and allied food supply chain participants.

NIFA encourages its partners and stakeholders within these communities to use the Ideas Engine to identify opportunities for:

- Data-driven advances in agriculture and the food production system;
- Cross-sector advances in data applications;
- Data-driven advances to address societal well-being and consumer demands;
- Data management and application;
- Developing a data literate workforce and end-user;
- Big data in communication, property rights, and communities

NIFA encourages ideas to develop workshop proposals at the summit that address these topics in further detail to identify needs and develop strategic plans. These workshops can focus on needs for generating, managing, and integrating big data in a specific domain of the food and agricultural system.

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Challenge Advisory: We Create Change™

An Overview of Our Organisation

We advise governments and global business on the challenges and opportunities associated with having 10 billion people on our planet by 2050. Challenge Advisory collaborates with its clients to deliver profitable solutions and foster enterprise efficiency. In a constantly evolving environment, the core of our strategy is adaptability.

Challenge Advisory LLP is a global firm with offices in North America, South America, Africa, Europe and Asia. Each of our Industry and Functional Practice Heads act under a

'Partnership Agreement' and are all united under the core ideals and strengths of Challenge Advisory's values, which focus on sustainable development. Integral to our firm and client's long-term success is our 'steering committee' which oversees and advises on the focus and strategy which Challenge Advisory takes. The committee comprises of leaders from government, civil society and global business. Underpinning all of this is our understanding of your needs, challenges and the solutions required to address them, all the while recognising the importance of discretion and confidentiality.

As a result, we have a deep understanding of your core concerns and use these insights to deliver exemplary results, consolidating your organisation quietly, effectively and privately.

Implicit in our set of values is to build long-term, mutually beneficial relationships with every client. The challenge of having 10 billion people on our planet is something which is solved through long-term solutions. Our firm's success is inextricably linked to the success of our clients. Our governance will always be aligned with that of our clients under these guidelines:

- We will only take on a client if we believe we can create value.
- We will always deliver an honest opinion.
- We will not publicise the work we do for our clients.
- In the interests of every client, confidentiality is paramount. The preservation of a client's confidences is a categorical imperative.

[Click here to read more about us](#)

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Jeremy G for Challenge Advisory | CH1452341 | Sept 2016

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