Remarks at the World Cocoa Foundation – 21st Partnership Meeting & Roundtable Sessions

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Good morning. Thank you for that kind introduction and thank you to the World Cocoa Foundation for inviting me here to speak.

I'm happy to speak to you today in part because I have at least two connections this group. As some of you might know, before joining USDA I served as Global Director of Scientific Affairs for Mars, where I managed the company's scientific policy and research on matters of health, nutrition, and food safety.

I'm now USDA's Chief Scientist and Under Secretary for Research, Education, and Economics, where I coordinate the scientific research, education, and statistical programs across the Department.

With annual global cocoa production around 3 million tons, the livelihoods of 40-50 million people worldwide depend on this vital commodity. Research, education and technology transfer are the keys to sustaining this system, helping improve the lives of cocoa farmers and their families around the world, and providing consumers with a delightful confection.

The private sector and the public sector have distinct roles to help this system grow. For growth, agriculture relies more heavily on improvements in technology than almost any other sector of the economy. Innovation, then, is the primary agenda for the sustainable intensification of ag production in general, and for cocoa in particular.

For me, innovation includes both scientific, as well as policy, innovation. Science is the foundation, but a forward-thinking ag science policy can get us to where we need to be to sustainably intensify agriculture over the next few decades and keep pace with increased demand for food, feed, fiber and fuel from a more crowded planet.

With a major food crisis looming on the horizon, we need to make sure our policy keeps pace with our science. This can't wait – the world needs to intensify agricultural production by 70-100% by mid-century to meet the projected demand for food, and do so in the face of even greater environmental challenges.

So we need the right leadership – leadership based on science, leadership willing and able to exploit the full range of resources we have, and most of all, leadership that's not afraid of change.

The food and ag challenges we face are global in nature, and the solutions must be too. We live in a time when technology makes the prospect of a globalized "open science" a reality.

Today, only open science can get us where we need to go. Open science means collaboration. Open science means coordination. Open science means sharing resources to maximize research productivity. And it means sharing the tools to help people help themselves.

70% of the world's cocoa comes from West Africa, and most of the world's cocoa is grown within 20 degrees of the equator. Some of these areas are where agricultural development is needed the most, to sustainably increase production to produce the food they will need.

Open science means collaborating across the cocoa supply chain with governments, civil society and the cocoa farmers and chocolate industry. While cocoa production starts in these regions, cocoa research and cocoa innovation can and does happen throughout the world.

USDA's Agricultural Research Service is a partner in highly collaborative cacao research, with strong private sector, public sector, academic, and international partnerships. Our cacao research is focused around several key goals:

- Conducting fundamental genetic and biocontrol research on key cacao diseases,
- Developing disease control methods to enhance cacao yields and production efficiency and strengthen sustainable cacao production,

- Developing key genetic tools for managing cacao and other tropical tree crop genetic resources more effectively,
- and developing production systems to optimize cacao plant/soil interactions, manage soil fertility and shade, and minimize fertilizer inputs and pesticide applications.

Working to help the cacao community achieve these goals, ARS contributes to international cacao research partnerships including CacaoNet and INGENIC (International Group for Genetic Improvement of Cocoa (Bioversity)), The International Cocoa Quarantine Centre, and the International Cocoa Germplasm Database.

In terms of collaboration, our cacao research is a model we'd like to emulate in other areas of ag research. In fact, there is a lot that can and should be done to make global food and ag R&D better coordinated, more efficient and more effective. Fortunately, the world's attention is beginning to turn towards these issues. Greater direction on priorities and targets and increased transparency in global agricultural research and investment can *catalyze* growth and support the long-term sustainability of ag systems and natural resources.

So far, there are promising *pockets* of international collaboration for specific initiatives – like cacao, or wheat – or for select regions or countries. An example here is the Global Conference on Agricultural Research for Development (GCARD) for developing country needs. But we can do much more to coordinate *all* global ag research to strengthen research planning, encourage knowledge sharing, and foster necessary productivity gains. This is all the more critical given that the economic situation in the E.U. and the U.S. has led to reductions in government funding of ag research.

In 2011, both the G-20 Ag Ministers Group and the G-20 Development Working Group recognized the need for increased cooperation on international agricultural research and development as critical to achieving increased and sustainable global ag productivity.

This year they are considering additional action on these initiatives, with ag research on their agenda, as it was recently at the G-8 summit.

Through these meetings, we're working with the participants to develop what we see as **six strategic platforms** to achieve sustainable food security. These platforms, once established, will be the fundamental building blocks for fostering the research to reinvent global agriculture, as it's been reinvented over and over again in the past, this time using all the tools in our toolbox to meet the needs of a changing world.

The six platforms are:

1. Open access to scholarly publications
2. Open access to germplasm collections
3. Open access to genomic and genetic data
4. Accelerated technology transfer
5. Improved agricultural statistics – and
6. Meeting of agricultural chief scientists on ag research and development

The first platform is establishing **open access to scholarly publications**. There is a great opportunity to maximize the impact of federally-supported research by making the results of unclassified research, in the form of peer-reviewed scholarly

publications, accessible and permanently stored so they may be searched, retrieved and analyzed by the public.

USDA is currently developing a digital repository for scholarly publications. Going forward, this initiative would extend beyond USDA to all government agencies that conduct or support research. These digital resources, linked with similar archives abroad, have great potential to increase global collaboration and research productivity.

On a similar theme, the second platform is **open access to germplasm collections**. Crop diversity underpins all agriculture throughout the globe. But irreplaceable crop diversity is threatened by extinction in nature and in farmers' fields. Plant breeders turn to genebanks for this diversity, including sources of pest resistance or climatic adaptation.

Those of you here yesterday might have heard USDA's Dr. Peter Bretting discussing the conservation of cocoa genetic resources. USDA's National Plant Germplasm System, partnering with the CGIAR Center Bioversity International and the independent Global Crop Diversity Trust, recently completed and

released GRIN-Global, a powerful Internet-based information management system for the world's plant genebanks.

Sharing germplasm resources is a core principle in the United States, but not observed by every country, and so we're working to promote international cooperation. So far, USDA has trained I.T. personnel from three CGIAR Centers in GRIN-Global software, as well as staff members from the national genebank systems in Canada, Russia, Mexico, India, Ethiopia, and numerous other countries.

The third important aspect of open science involves **open access to genomic and genetic data.** The U.S., E.U., and many other countries including China have made large investments sequencing crop and animal genomes. This work has transformed and accelerated modern breeding. "Next generation" DNA sequencing technologies have enabled researchers to produce ever increasing amounts of valuable genomic and genetic data at dramatically lower cost.

But the benefits of rich datasets are increasingly going to a select minority of scientists and institutions with access to high performance computing resources and software designed to handle extremely large genetic datasets.

Open access to this data would enable scientists worldwide to fully exploit new genomic information and associated germplasm, including plant and animal breeders from developing countries, including those without sophisticated molecular laboratories. The results could be up to a 50 percent reduction in the time it takes to breed better producing animals and plants, which will help address the urgent need to increase crop and animal yields.

In order to realize the benefits of these first three platforms, we're also going to need **accelerated technology transfer** – to bring these improvements from lab to field. A key goal is to establish a culture of tech transfer and an infrastructure that can make it happen effectively.

An important part of tech transfer is global ag extension. We need to reinvent extension for the 21st century, to effectively communicate to farmers how best to use new seeds and other technology. Information communication technologies today have the potential to drive higher adoption of improved ag technology and in turn, improve agriculture globally. This year the G8 negotiated ways to

reinvent ag extension for the 21st century, to better address global extension for smallholder farmers, farmer organizations and agribusinesses.

ICT cannot replace physical extension agents or other place-based sources of information for farmers, but ICT can improve the effectiveness of these agents by providing them with improved and up-to-date information and expanding their reach through strategic use of media.

We also want to change the way research advances are brought to market. USDA established something called "ATIP," the Agricultural Technology Innovation Partnership program, to further enhance the likelihood that USDA intramural research outcomes would be adopted by U.S. private sector businesses for commercialization.

ATIP forms geographically-based partnerships with well-established economic development organizations around the country that can help facilitate getting ARS research into the market.

On a global level, other countries, leading agribusinesses, multilateral institutions and local private financial institutions might consider this and similar models to intensify private investment in agriculture.

The next platform is **improving agricultural statistics** worldwide. In order to know if we are meeting our goals, we must set an accurate baseline for measuring progress on the sustainable intensification of agriculture, and key indicators to measure improvements on top of that baseline as we go along.

Finally, we need to establish regular coordination of the world's **chief agricultural scientists on ag research and development.** There is currently no forum which addresses agricultural research and development from a global perspective. Without this, there is a risk that some partnerships may have duplicative goals or that countries may be investing in research already accomplished elsewhere. (It is important to point out that this research occurs in a precompetitive space – not in conflict with the U.S. Government's commitment to intellectual property protection in the marketplace.)

To that end, through the G20, the U.S. is proposing a biannual "Meeting of Agricultural Chief Scientists on Research and Development" to map out a plan for coordinating a set of priorities, setting targets, and aligning resources to sustainably increase productivity by 70 to 100 percent by 2050. This meeting could also allow for research institutions to report on investments in agricultural R&D to establish baselines and track progress toward our commitments and priorities.

We need this level of coordination if we want to cultivate the kind of open science to rise to the challenges we face.

Open science and open data will ultimately help decision-makers, companies, researchers and – most importantly – farmers, access and effectively use new forms of critical agricultural knowledge, information and technology. These new resources are essential for achieving the sustainable intensification needed to ensure future food security.

Between now and 2050, today's ag science students will be doing the research, producing new products, and making the policy decisions that will determine whether the world will surmount the challenge.

We need the leadership today to set the stage for this work to begin. These six platforms can be a big part of this initiative.

People are *thinking* more about food these days. This interest is a great opportunity, one we in the food and ag community can't afford to pass up.

We need to nurture this interest with a clear and focused vision of where we need to get to, and how we can get there. With a plan for open, collaborative science, we can turn this interest into the action the world desperately needs.

Thank you for the invitation to be part of your meeting and for the leadership role the World Cocoa foundation plays.