

**Judith Rodin, President of the Rockefeller Foundation**  
**“Mobilizing the Next Green Revolution: Alleviating Poverty in the Age of Climate Change”**  
**2008 World Food Prize – Norman Borlaug International Symposium’s Laureate Luncheon**  
**Friday, October 17, 2008**

Thank you for the welcome, the privilege of honoring Senators Bob Dole and George McGovern, and the opportunity to speak here in Iowa. Iowa certainly finds itself at the center of everything – as I imagine Senators Dole and McGovern, not to mention Senators McCain and Obama would affirm. This beautiful sweep of heartland also became an adopted homeland of sorts for the Rockefeller Foundation. Our own Norman Borlaug carried the seeds of a Green Revolution from Cresco, about 190 miles from here by car, to Latin America, Asia, and now Africa. Norman’s work mobilized a miracle that saved a billion lives. You could say, then, that our tradition of agricultural innovation has roots planted deeply in Iowa soil.

Just two years ago, I had the pleasure of working with Norman, when the Rockefeller Foundation sponsored the Africa Fertilizer Summit in Abuja, Nigeria. He spoke with unrivaled authority, admonishing that the Green Revolution had three key ingredients: seeds, fertilizer, and leadership. He challenged donors, ministers, and presidents to devote the same intellectual, institutional, and financial resources to the African Green Revolution as their predecessors in Latin America and Asia did a generation ago. I can’t help but think that the world would be suffering less severe food shortages and price spikes if more development agencies and elected officials had answered Norman’s call for leadership in 2006, rather than waiting for a food crisis in 2008.

As I look out at the audience and flip through the program, I’m also delighted to recognize the more than two dozen symposium speakers who were or are Rockefeller Foundation grantees – and the many more here who trained for their careers as Rockefeller Foundation fellows or Rocky Doc’s. We thank you for serving as ambassadors of the foundation’s goodwill and good-works around the globe.

You’ve heard a lot, this week, about the Rockefeller and Bill & Melinda Gates foundations’ joint aspirations to seed transformational agricultural productivity in sub-Saharan Africa, with many of you as partners. Since launching AGRA two years ago, the Rockefeller Foundation has contributed about \$75 million and secured some of our best and brightest to the alliance. We’re pleased that AGRA has generated early success, attracting unexpected supporters and new collaborators. And while our commitment continues, we also seek and support other innovations across the field of agricultural development.

Let me mention just two. As many of you know, Rockefeller grantees were first to harness biotechnology to fortify food’s nutritional value – and not without controversy. Take Golden Rice, for example. In the sixty-five years since they began, we’ve funded the work of Golden Rice’s engineers, Dr. Peter Beyer, Dr. Ingo Potrykus, and others for more than fifteen of them. Golden rice promises to alleviate the suffering of malnourished children and the debilitating effects of beta-carotene and vitamin A deficiencies – blindness and measles – in particular. Its widespread distribution could save almost 3 million children’s lives, while nourishing as many as 300 million more – 40 percent of children under age five, in the developing world, according to the World Health Organization.

I'm delighted to announce, today, that we will be providing funding to the International Rice Research Institute – which we helped establish almost fifty years ago – to shepherd Golden Rice through national, regulatory approval processes in Bangladesh, India, Indonesia, and the Philippines. And we hope this is just the beginning. This continues our historic relationship with IRRI, an institution that has directly benefited billions of the world's poorest people. It also reflects our enduring commitments to connect families with technologies that can help them lead healthier, better, more productive lives, to see innovation through to action and impact, and to give great ideas, 90 percent down the road, that extra 10 percent they need to reach their destination.

I'm pleased to announce another grant this afternoon too. We know that even if farmers breed better seeds and harvest more bountiful yields, communities around the world will still suffer food emergencies. As the food crisis worsened during these last nine months, the United Nations World Food Program labored tirelessly to help when and where the suffering was greatest. A recent grant from the Gates and Howard Buffet foundations will enable the WFP to purchase local produce. It will increase emergency food supplies, tie the smallholder farmers who produce them with reliable markets, and spread new economic opportunities throughout Africa. We commend our partners for their leadership on this front.

Still, the rush on WFP finances during this and other times of challenge may lead to delays and disruptions in service for people and for communities in dire need. In response, we're working with the WFP to develop innovative financing strategies and new types of funding instruments for disaster relief and food distribution. If successful, they can be replicated and expanded in other development programs around the world.

Since this week's theme is "confronting crisis," I want to talk for the next few minutes about how we confront another grave and growing crisis on the horizon: climate change. Weather and climate remain among farmers' greatest vulnerabilities, as they have throughout history. But, today – as we sense, as we know – is different. Decades of continued climate change are on the way, regardless of when we get emissions under control – regardless how many westerners trade in Hummers for Priuses. You heard yesterday from India's Dr. Rita Sharma about the impacts of climate change on agriculture. Subsistence slips further from reach as climate sensitive, natural ecosystems deteriorate – as vulnerable people in vulnerable places lose clean water for drinking and fishing, protected habitat for hunting and grazing, and fertile soil for farming.

In Africa, especially, global climate disruption jeopardizes local agricultural yields. The people of sub-Saharan Africa have contributed only 2 percent of global carbon emissions. Yet, they will pay some of climate change's highest tolls. Livelihoods – lives – are at stake. The Nobel Peace Prize-winning Intergovernmental Panel on Climate Change projects, with high confidence, that the countries of sub-Saharan Africa will be among the most severely affected by increased climate variability. Researchers at the International Livestock Research Institute suggest that, in the next decade, climate change could shorten sub-Saharan Africa's growing season by several weeks and decrease yields from rain fed agriculture by as much as half. Yale's Robert Mendelsohn estimates that small scale African farmers, who rely so much on rain fed land, stand to lose \$28 per hectare per year for each one degree, Celsius, rise in global temperature. If you earn less than two dollars a day, that's a devastating blow to your family's wellbeing.

The risks will be especially severe for African women – who we’ve talked about so much this morning – who harvest 80 percent of the continent’s food. Women already disproportionately bear the burdens of malnourishment. They grow, buy, and cook, but usually eat only after their husbands and children. As food becomes scarcer and costlier, less is left over, and it’s women – not men – who starve. Climate change only intensifies women’s hazards. Men may migrate to cities for their work, but, because of climate change, the women who remain will spend more time in the fields, harvesting less productive crops, and walk further distances to gather fuel and collect water. Because of gendered land tenure policies, men and women have access to different kinds of resources. When extreme weather events occur, men will still own their land. Women’s wealth, however, is what they harvest. And girls – not boys – are removed from school when families can no longer afford uniforms, books, and enrollment fees, or when they need extra help in the fields.

So what can be done? First, we must implement resilient farming methods and food supply systems. Second, we must implement pro-poor adaptation and mitigation strategies. The good news: there is substantial progress on the first front, especially in breeding stress-tolerant, climate-resilient seeds, improving irrigation and increasing water-use efficiency – getting the most crop from every drop – strengthening soil management practices, and helping to build infrastructure and output markets. These efforts must be better integrated and coordinated within country and across climactic regions.

On the second front, we must do more to empower African farmers and African institutions to mobilize the next Green Revolution in a world that will continue warming. Let me touch briefly on three new examples of Rockefeller Foundation work, all of which fall under our \$70 million initiative to strengthen local resilience to the impacts of climate change.

First, farmers need better and timelier seasonal climate forecasts to prepare for adverse events like drought, and to seize the new opportunities that climactically favorable seasons may present. The science that enables this kind of forecasting is improving by leaps and bounds. Forecasting tools are growing more reliable. And several African institutions are now working with the World Meteorological Organization to construct these seasonal climate projections.

The Nairobi-based, Intergovernmental Climate Prediction and Applications Center – ICPAC – is one such organization. It engages some of the world’s best climate scientists in developing seasonal forecasts, and then sharing regional climate outlooks with ministries of agriculture, extension agencies, and others who can spread the word among smallholder farmers. In August, ICPAC hosted a training workshop that brought together, from more than 15 African nations, the meteorologists who make forecasts, the agriculturalists who need them, and leading scientists from the United States, Europe, and South Africa. Stunningly, for many, it was the first time they met their counterparts within their own country, let alone those from across the continent or around the world. Now they’re being wired into African science and research networks, with new capacity to make excellent forecasts, and inform local adaptation methods.

These forecasts, however, will always be based on probabilities, and a forecast that’s 70 to 80 percent reliable still leaves farmers 20 to 30 percent uncertain. I don’t need to tell anyone here that farming – and rain fed agriculture specifically – is a risky business. To help reduce the risk, the Rockefeller Foundation is scaling pilots on weather indexed crop and livestock insurance for smallholder farmers.

For example, we're partnering with the World Bank, ILRI, global insurers like Swiss Re, and local insurers like FSD-Kenya. FSD-Kenya is creating an insurance package that reimburses input costs should farmers lose their crops to an independently and objectively documented weather event. FSD-Kenya aggregates large pools of farmers by region, thus considerably lowering the price of insurance per farmer. While the insurance is provided by private companies, it takes added subsidies from civil society and the public sector to make these policies more accessible and affordable for smallholder farmers. Because the insurance is weather-indexed, the payout thresholds are simple and clear. And the benefits will flow through the entire agricultural value chain.

Take the case of Josephine Okot, the founder and managing director of Victoria Seeds, in Uganda, a full line seed company that provides smallholder farmers with high quality seeds for vegetable, cereal, legume, and oil crops. We invested in Victoria Seeds through African Agricultural Capital, a Kampala-based investment fund that serves small scale farmers. Josephine obtains licenses for new crop varieties, contracts with cooperatives of women farmers who multiply the seed, prepares the seed in affordable packages, and markets these packages throughout Uganda – including in the country's strife-torn northern region, where many of her family members still live. When our Board and I visited with Josephine in March, she told us that climate challenges pose the greatest risk to her business' profitability. If the rains don't come early in the growing season, farmers don't buy seeds. If the rains don't come late in the growing season, then farmers can't afford to pay for the seeds they already purchased on credit. Either way, Victoria Seeds, loses. Whether-indexed crop insurance will be a huge help.

But another variable in the risk-reduction equation are climate projections that provide sufficient, geography specific detail. You heard from Rockefeller Foundation grantee Roz Naylor, who, along with David Lobell, developed overlapping global circulation, crop production, and ecosystem function models. These are critical. They provide a comprehensive view of how, by 2030, climate change will affect five staple crops in a dozen extremely poor regions of the developing world. One alarming finding? Maize production in southern Africa could diminish by as much as one-third. Think about what this would mean: a third less of southern Africa's staple food. Professors Naylor and Lobell are collecting additional data and refining their modeling so they can calibrate their projections to other agro-ecosystems.

Now, all these strategies – linking up seasonal forecasting networks, developing new crop insurance products, and projecting climate change's repercussions for specific crops in specific places – must be intentionally tilted to reach smallholder farmers in the most vulnerable communities. These tools and technological advances must not only be accessible to the elite – including large scale farms, though they need these solutions too. We must assure that resilient, entrepreneurial people – despite conditions of poverty – can mitigate risk and seize new economic opportunities that climate change may create.

We know this is possible because we watched it happen in our previous work, which opened doors to credit for a new type of entrepreneur: agro dealers, typically women, selling seeds and fertilizer to smallholder farmers. Take Janet Matemba, from the village of Lumbadzi in rural Malawi. Janet owned a small, remote roadside stand that sold sodas, soap, biscuits, and cooking oil to area farmers. Six years ago, a representative of the Rural Market Development Trust, one of our grantees, approached her about selling agricultural products. She hesitated. What did she

know about agriculture? It would mean learning new skills and – more intimidating still – making a relatively substantial upfront investment. But Janet eventually decided to take the chance. She studied business management and earned her certificate in agro dealing. With the help of a guaranteed credit facility, she purchased fertilizer and seeds from wholesale suppliers. She broke those packages down into smaller sizes and sold them to local farmers. Now, she turns significant profit, reinvests most of what she earns into growing her business, and hires many of her neighbors. Janet Matemba and so many like her embody the potential for retail entrepreneurs to replenish depleted soils, create viable agricultural marketplaces, and strengthen Africa's self-sufficiency. Janet Matemba, Josephine Okot, and countless other women have demonstrated considerable courage. They are able, active partners. They nourish and build communities with their bare hands.

Today, the challenge of climate change may afford new economic opportunities to industrious, resourceful women, like Janet and Josephine, if we maintain focused attention on assuring economic growth with equity. For instance, during the last few years, the international carbon trading systems have expanded prolifically. These institutions allow emitters in developing countries to sell emission credits to companies in and governments of industrialized ones. Last year, the market facilitated over \$63 billion in exchanges. But in Africa, as in emerging economies around the world, the carbon markets are yet to work for the women and families laboring in the fields and tending the forests.

Kyoto Protocol rules do not formally recognize that sustainable agricultural practices could mitigate carbon emissions and climate change. So, it will be critical to reform Kyoto's Clean Development Mechanism at the United Nations Framework Convention in Copenhagen next year. This is among the easiest, but most important modifications that delegates can and must make. With this single reform, governments and donors could direct funds from the carbon markets to reward local, terrestrial carbon sequestration. With this single reform, women like Josephine Okot and Janet Matemba could tap into a torrent of economic possibility. We have partnered with COMESA, the Common Market for Eastern and Southern Africa, to enable their advocacy in Copenhagen for this pro-African policy. And we're one voice in a rising choir, elevating the connection between carbon sequestration and poverty alleviation. Strengthening resilience to climate change *is* a poverty reduction strategy.

With the Clinton Foundation and World Wildlife Fund, we're laying the groundwork for more exact carbon measuring and monitoring systems, building more effective institutions, and promoting new financial incentives. These incentives could reduce deforestation, which leaves roughly the same carbon footprint as all the cars, trucks, and planes in the world. These incentives could also encourage reforestation, ecosystem restoration, conservation tillage, and other practices that boost soil's organic content. Agro forestry, integrating nitrogen-fixing trees in crop production practices, is another important ingredient in the recipe.

If the global community joins together to include these practices in the carbon credit system, we will generate multiple, mutually reinforcing opportunities to generate greater wealth across sub-Saharan Africa and throughout the developing world. The benefits must not go exclusively to governments. They must go to smallholder farmers, to women, who, the data affirm, are much more likely than men to reinvest their income in nutrition, health, education, and family farms or small businesses – a finding seen in studies of countries diverse as Bangladesh, Brazil, Cote d'Ivoire, Ghana, Indonesia, and South Africa to name just a few.

Progress always springs from the seeds of daring ideas. In the 20th century, our forbearers joined together, marshaled the energy and ingenuity of scientists and donors, and ignited a Green Revolution. More than half the people on earth today eat rice and wheat varieties containing genes introduced by Rockefeller Foundation scientists in the 1960s.

When they began, however, the skeptics said such an achievement was far from reach. Take India, for example. In the 1960s, the US Food for Aid Program shipped 5 million tons of wheat to India every year. One 1967 bestseller called India's food situation "hopeless." Another leading scholar characterized the notion of Indian self-sufficiency as "fantasy."

We know – now – that, thanks to Norman Borlaug and countless others, India's wheat crop increased from 11 million tons to 60 million tons. But let's pause for a moment and imagine the world without this historic accomplishment – not just a world without Dwarf Wheat in India, but without increased food supplies in Latin America, Southeast Asia, and around the globe. This would be a world with more, not less, poverty and disease, a world with more frequent refugee crises and forced migrations, a world with more regular conflicts over scarcer resources.

A generation later, we face challenges equal in size and significance. But we cannot solve these 21st century challenges with 20th century ideas and technologies alone. We must continue to innovate, continue to invest in innovation, and the Rockefeller Foundation is committed to this crucial effort.

Imagine the possibilities if we do. Imagine family farms in Africa that look – that produce – like family farms in Iowa. Imagine more women, like Josephine Okot and Janet Matemba, sowing the seeds of their communities' renewal. Imagine a Norman Borlaug for every African country, for every country around the world. And then stop imagining – and listen to one of her stories.

Annet Namayanja grew up in Kiboga, a small farming town in Uganda's rural, impoverished, central region. As a Rockefeller fellow, she studied agriculture, earned a master's degree, and is now pursuing her Ph.D. at Makerere University. Several years ago, she began researching the common field bean, so nutrient-rich that it's called "the poor man's meat." These beans grow rapidly. Farmers can cultivate two, sometimes three crops a year. They provide essential income for women and families like Annet's.

Just two years ago, Annet identified a genetic trait in bean seeds that strengthens their resistance to root rot. Through cross pollination, she then bred that trait into two new varieties of beans that are hardier and better adapted to the central Ugandan soil and climate. Not long thereafter, we received an email from Annet. She explained that the farmers in her village had devised names, in their local dialect, for her two new bean varieties. They call the first "mulwanisa" or "endurance." They call the second "musahura," "restoration," or "replenishment. And these are precisely the qualities that communities like Kiboga, the world over, need today more than ever: the endurance to anticipate, prepare for, and recover from the terrible local impacts of the global climate crisis; the restoration of economic opportunity and self-sufficiency; and the replenishment of faith in the promise of a better tomorrow. This is a wonderful vision, and one within reach. I'm honored to thank all of you for doing your part.

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