

Public-Private Partnership to Develop and Deliver Drought Tolerant Crops to Food-Insecure Farmers

Summary and Interpretation of the May 3-4, 2005 Strategy and Planning Meeting

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The Drought Tolerant Crop Initiative

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The opinions expressed in this document are those of Don S. Doering and do not represent the views of the officers, board, or staff of the funding institutions listed above. Views summarized from the May 3-4 meeting are presented without attribution and do not reflect the opinions of all participants; the meeting was not intended to seek consensus.

May 31, 2005

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FOREWORD

Dear Colleagues,

Thirty people from different disciplines, countries, institutions and sectors met for two days on May 3rd and 4th to explore how drought tolerant crops might become available at large scale to drought-prone, food-insecure farmers. We asked: Is the trait of drought tolerance a platform for a new agricultural partnership that is focused on product development and delivery?

The general facts were broadly agreed upon: (1) Transgenic drought tolerant crops may be a powerful tool to reduce drought-induced food insecurity and the trait can help drive the adoption of improved seed. (2) Developing a single transgenic crop takes focus, significant time, investment, and technical capacity that principally resides today in the private sector. (3) Delivering improved seed at large scale to food-insecure farmers will take a partnership of the for-profit, public, and non-profit sectors.

A public-private partnership for crop improvement and delivery will occur in the future, propelled by necessity and the example set by the public health arena. A well-resourced and independent partnership will be able to focus on one or two crops, raise the money, set the targets, and build the relationships to get the job done for the benefit of poor farmers. The time for that idea is still in the future.

The strategy and planning meeting on May 3-4, 2005 ended with too many institutional and strategic questions among the technology and financial donors to explore partnership as a collaborative inquiry along with implementation partners. The meeting did succeed to motivate almost all of the institutions at the meeting to individually and bilaterally explore the unanswered questions and the possibilities of partnership.

At the meeting I shared the quotation “when you want what you’ve never had, you must learn to do what you’ve never done.” What we don’t have are improved seeds reaching poor farmers at scale or genetically engineered traits in public development reaching the market. To achieve those aims, the private sector, public sector, and non-profit sector must learn to accept the uncertainty and loss of control of new - yet necessary - ways of working together.

This document reports on key discussion points at the meeting and the solicited feedback and conversations with participants afterwards. The report highlights the key issues, next steps, and roles to reach the poorest farmers with improved seeds that help safeguard and improve their lives and livelihoods. The “Bottom Line” conclusions and Recommendations in this report are my own and also reflect the views expressed by some or many of the meeting participants.

Thank you for your interest and contributions and for the opportunity to support this effort.



Don S. Doering

May 31, 2005

Arlington, Virginia

1. OVERVIEW

CONTEXT

Drought tolerant crops may provide significant benefits to poor farmers by protecting yield loss in drought years and the drought tolerant trait may accelerate the distribution and adoption of improved crop seed. The development and delivery of drought tolerant crops at large scale will require the partnership of the for-profit, public, and non-profit sectors. On May 3-4, 2005, thirty individuals from four private companies, two government agencies, four CGIAR centers, three universities, one philanthropy, and four NGOs met to consider how private sector discoveries in drought tolerance genetics could be translated into improved crops to benefit food-secure farmers and their dependents. The meeting was a follow-on meeting to a smaller, *ad hoc* consultation on November 17, 2004 and to explicit interest in the private sector to share drought tolerance technology for humanitarian benefit.

STRUCTURE OF DISCUSSIONS

Discussions were organized according to the commercial market potential of different crops and according to development or delivery activities. The development phase was described as the activities and essential capacity from gene discovery through field testing and regulatory approval. The delivery phase was described as the activities and essential capacity from regulatory approval through seed multiplication, seed distribution, and the access mechanisms to ensure social, legal, and economic access to that seed. The high-market potential crop discussed was maize, rice and wheat were considered as medium-market potential crops, and sweet potato and beans were examples of low-market potential crops. Different models of partnership were discussed in comparison to those created in the public health arena to develop therapeutics and vaccines for diseases such as AIDS, tuberculosis, and malaria.

OUTCOMES

- The meeting succeeded to convene parties to strengthen the private and public sector commitments to future technology sharing and partnering in drought tolerant crop development and delivery. The meeting did not foster interest in immediate further collaborative dialogue and multilateral planning of public-private partnership.
- Enthusiasm for continued exploration of drought tolerant crop development and delivery is high and key stakeholders plan to individually pursue projects and project planning.
- An initial focus on Africa and on maize and rice was chosen to narrow near-term efforts to be pursued by project partners.
- Existing varieties of drought tolerant maize offer the prospect of developing seed delivery systems, access mechanisms, and crop evaluation capacity while further-improved crops are in development.
- There was support for an analytic project to estimate the potential benefits of the drought tolerance trait in major staple crops and in low-commercial potential crops.
- All of the attendees expressed interest in personal involvement or the involvement of their institutions in the development of plans and projects for drought tolerant crop development and delivery.

####

2. MAIZE FOR AFRICA

PRIVATE SECTOR PROGRESS IN MAIZE

- Maize will be the first drought tolerant crop introduced into markets by the private sector.
- Pioneer and Monsanto have shown results of field trials of transgenic, drought tolerant, hybrid yellow corn in presentations that are available at the investor sections of the company websites.¹
- The genes, conditions, and quantitative results of these trials remain confidential. It is a reasonable guess that trials were under early drought stress that would result in about 30-50% yield reduction in conditions that resembled average U.S. yield of about 140 bushels per acre (about 11 tonnes/hectare).

“Drought tolerance will simply increase the likelihood that actual performance comes closer to potential performance at any given level of water availability.”
- It is likely that the tested genes are maize homologues of transcription factors discovered in arabidopsis whose over-expression confers drought stress tolerance via general stress tolerance or water use efficiency mechanisms.
- Publicly available photos and graphs suggest that the best performing varieties show almost 40% higher yields than stressed controls and only about 15% yield reduction compared to non-stressed varieties. Given the very early stage of development, it is likely that either these results will be further improved, or the final products will most likely resemble today’s best performing test varieties.
- Drought tolerance as a trait is qualitatively different from traits such as herbicide tolerance and insect resistance (from Bt) for its complicated genotype by environment (G x E) interaction and interaction with the genetic background (G x G).

“A ‘lead’ event is only a ‘lead’ event for now and may be surpassed later by other higher performing constructs or events.”
- Monsanto’s results show large differences between different genes, among events of the same genes, and between the same events in different genetic backgrounds.
- Transgenes are additive to continued improvement by breeding and any drought tolerant gene would be crossed into the best available germplasm. A drought tolerant crop may function more like ‘elite germplasm’ for its requirements for stewardship and appropriate application.
- Stewardship is a multi-layered term and understanding its meaning will be needed to bridge sectoral divides. Stewardship means complying with governmental standards for laboratories, production, and regulations for safety and efficacy. It also means the management of products to ensure their continued performance and management of any post-market regulatory issues.
- The private sector may backcross lead drought tolerance events into tropical maize in Africa if doing so supports project goals, does not create unrealistic public expectations, and yields important data.

¹ E.g., <http://www.monsanto.com/monsanto/content/investor/financial/presentations/2005/02-15-05.pdf> and http://media.corporate-ir.net/media_files/NYS/DD/presentations/Goldman_022505.pdf.

MAIZE DEVELOPMENT FOR FOOD-INSECURE FARMERS

- Private sector plans for maize development and introduction to profitable commercial markets in Africa may be accelerated by the potential to apply drought tolerance discoveries for humanitarian benefit.
- Commercial introduction of drought tolerant maize in Africa may enable the distribution of seed through publicly supported market channels to the low-profitability markets of food-insecure farmers.
- Private sector development of drought tolerant tropical maize may result in (A) varieties that are suited for conditions of poor farmers, (B) approved events that can be crossed into germplasm that is better adapted for conditions of poor farmers, or (C) genes/events that are best for low-input systems of poor farmers and are different from the commercially developed genes/events.
- Public sector contributions to developing varieties for food insecure farmers in the above scenarios, from least to most costly, may be (A) participatory evaluation of commercial varieties in low-input systems, (B) contribution of well-adapted germplasm for breeding and on-farm evaluation, or (C) gene transformation or event evaluation in well-adapted germplasm, breeding into appropriate germplasm, and on-farm evaluation.
- There is not a clear precedent for drought tolerance as a trait since it is a “risk-reduction” trait. Its adoption by farmers may have to do with attitudes about risk and alternative strategies. Farmers may not be willing to pay as much for drought tolerance as a yield-increasing trait.

“[Private sector data] is not nothing – these are big results!”

THE BOTTOM LINE

- Maize is on a fast track in the private sector. The maize community, perhaps led by CIMMYT-Africa, must move promptly to maintain the current interest within the private sector in maize for food-insecure farmers.
- In the course of drought tolerant maize development, the public/non-profit sector may assist in breeding, germplasm selection, gene evaluation, field testing, and performance assessment.
- Where the public sector makes investments that assist technology developers in their commercial interests, there will need to be commensurate investments or guarantees by the private sector to create access by poor farmers to improved seed.
- Companies engaged in intense competition in maize markets, will not collaborate with each other in any way. However, multiple companies may engage in bilateral partnerships with a maize alliance that can assemble significant enough resources to get results.
- The private sector is likely to conclude that stewardship demands a hybrid maize system with year-to-year seed purchasing for quality stewardship. Small seed producers and the public sector do not have the capacity for production and stewardship of transgenic traits in high quality hybrid systems and will have to build this capacity to deliver drought tolerant varieties to the poorest farmers.

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3. MAIZE DELIVERY AND ACCESS

KEY DISCUSSION POINTS

- In Africa, less than 10% of seed is sold by multi-national companies, about 10-20% by small and regional companies, and the remainder of seed is from traditional seed exchange and saving. Helping the development of seed markets in poor rural areas would have negligible impacts on the markets of multi-national companies.

“What public investments can make it profitable for the private seed industry to improve the livelihoods of the poor?”

- The high interest in improving seed systems in Africa expanded the scope of the discussion beyond drought tolerant crops and to much broader issues that confounded a more focused discussion on access mechanisms for privately or publicly developed drought tolerant crops.
- There is a relatively low level of knowledge of the drivers of adoption of improved seed and how to create a sustainable seed system.
- The seed market is highly fragmented and diverse. There are those who believe that there will soon be harmonization of seed policy in regions in Africa and those who believe that harmonization is very unlikely in the foreseeable future.
- Small scale companies have local ownership, value is created locally, they are more likely to serve small farmers in remote rural areas, and they create jobs in rural areas.
- The impact of drought in drought-prone areas creates a vicious cycle of degraded land, degraded agricultural and seed system capacity, and degraded capacity to cope. Farmers live and work in complex livestock and cropping systems and are dependent upon institutions that must be strengthened.
- The seed delivery system needs to be one that opens up additional options, increases farmer choice, and not one that just delivers a particular drought tolerant variety.
- The concept of “access” was introduced into the strategy for drought tolerant crop partnerships to address issues of physical access (distribution and delivery channels), economic access (cost of improved seed), and social access (legal rights).
- For poor farmers with little or no access to commercial markets, the private sector may sell seed to NGOs or government, donate drought tolerance traits for public germplasm development without further private investment, or may donate limited volumes of seed at cost to public programs with royalty-free technology.
- For poor farmers with limited or occasional access to commercial markets, the private sector may offer competitive pricing for quality seed with drought tolerance traits and rebates or other discount mechanisms targeted via vouchers or ‘smart card’ technologies.

“It is important to do genuine training and capacity building with decision-makers, rather than low sophistication public relations work.”

“There are a lot of grey areas in this dynamic sector. Everybody seems to be developing static strategies based on outdated assumptions in a fast changing [seed] industry.”

“My biggest concern is what will farmers do with the genetically modified seed once she/he gets them.”

- There is a dual challenge of reaching the lowest access group of farmers and fostering the upward movement of farmers to greater access and participation in markets where seed suppliers have a business incentive.

THE BOTTOM LINE

- There are explicit and underlying tensions between investors in small scale seed companies and rural seed systems and those who believe the large companies can, and will, directly serve the farmers in greatest need.
- High public investment in crop development will only be returned if there are channels for large-scale access.
- Public investment in seed access mechanisms that advance the commercial goals of a few companies in the interest of poor farmers must protect that interest and be accountable to that interest.
- The key value of the public sector is to serve the markets that extend to the poorest of the resource-poor farmers who will not be served by large commercial seed companies in any foreseeable future.
- Public investments in general seed market development must be structured to favor the growth of the large seed companies as well as the small seed companies.
- A focused scenario development exercise among public and private interests in maize within a single country would help to clearly define the beneficiary populations and the features of poverty, physical access, profit margins, farm size, and food security that may distinguish where self-sustaining private markets end from where the public and non-profit sector must support seed adoption and market development.
- Questions and uncertainties about access to drought tolerant crops must be addressed through intensive, direct, and clear discussions among project partners. Mutual understanding of how the poor will have access to improved seed may have to proceed progress on crop development partnerships or partnerships to improve essential capacity such as scientific capacity and regulatory capacity.

“There is a lot already going on [in seed systems]...the gap is with respect to the level of coordination among initiatives; it’s the public sector disease.”

“My concerns are that [the private sector] is not interested in working with small and medium sized seed companies in Africa who they identified as competitors. Without engaging these local companies, I do not see any clear strategy to deliver seed to the targeted beneficiaries.”

“How much the private sector focuses on needs in Africa depends in part on the robustness of an access public-private partnership...the drought tolerance trait may just represent a catalytic example or opportunity.”

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4. RICE & WHEAT

KEY DISCUSSION POINTS

- Wheat is a potential crop for drought tolerance improvement in public-private partnership. The private sector experience with transgenic wheat and the lack of representatives from the wheat community made rice the principal subject of discussion.
- Wheat may find attractive partners in India and China where there is increasing interest in wheat cultivation in water-limited environments, this is also a need in Russia and central Asia.
- Capacity in Asia for drought tolerant rice testing and development makes rice a very attractive target crop. There is advanced genome mapping and there are QTL's for drought tolerance in rice.
- China is the likely place for drought tolerant rice improvement given their permissive regulations, interest in transgenics, pending approvals of transgenic rice, efforts on hybrid rice, entry into the World Trade Organization, and government investment in rice improvement.
- The projected water shortage in Asia and elsewhere makes environmental sustainability one of the key issues for rice cultivation for which water use efficiency, drought stress tolerance, and weed control must all contribute.
- Rice is growing rapidly in Africa and is an increasingly attractive crop for food security. The lack of cultural associations with paddy rice, make Africa a valuable proving ground to advance other cultivation methods and means for weed control that may then be transferred to Asia.
- Any transgenic improvements in rice will face the issue of crossing into the weedy 'red rice.'
- Seed access, delivery, and stewardship is not the challenge in rice as it is in maize. Seed savings and distribution in informal channels will spread varieties. The use of hybrids and advanced genetics may require new delivery channels in rice.

"The challenge will be to develop a rice plant with significantly different architecture to function under aerobic management practices – weed control technology will be essential."

"We need a mechanism to get a more granular understanding of what is needed around the development and delivery of [drought tolerant] rice."

THE BOTTOM LINE

- Public-private partnership on drought tolerant rice development is an open possibility. Such a partnership would be in new territory to structure public and private co-investment and to ensure the creation of private goods as well as products for humanitarian benefit. There are helpful precedents of licensing terms for automatic grant back to the private sector of public discoveries or where donors have automatic options to technology.
- With the private sector's focus on maize, the public and non-profit sector will have to initiate the next steps toward partnership. IRRI is the likely leader of any such initiative and national partners in China, Japan, or India may be key for long-term political and financial support. Though Rockefeller Foundation in sun-setting much of its rice biotechnology work, it still can play a powerful catalyst role. IRRI's interest in development of an Africa strategy, the growing interest in rice Africa, and donor focus on Africa are trends that make drought tolerant rice for Africa of particular interest.

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5. LOW MARKET POTENTIAL CROPS

KEY DISCUSSION POINTS

- Drought tolerance may be a very important trait for non-staple crops and may accelerate the adoption of non-staple crops with other improved agronomic and nutritional traits.
- Beans and potato are the most likely candidates for development and each have relative advantages from technical, strategic, and political perspectives.
- Beans (*Phaseolus*) may be the most attractive candidate for its role in diet diversification, food security role, and relationship to soybean (*Glycine*), one of the major targets of the private sector.
- There is a tough public policy question of whether public investment should assist the private sector to adapt drought tolerant maize and rice for poor farmers or should invest in advancing a crop that will not receive any private investment.
- Competition for resources among different crop communities may make it difficult to advance the case of one crop and may threaten to dilute scarce resources.
- The technical resources for large-scale transformation, event characterization, and screening are presently inadequate in the public sector to tackle the complexity of drought tolerance in any of the minor crops.
- Access and seed distribution will have to be driven by the public sector and may rely on informal channels such as seed saving and sharing and small-scale markets.
- The technical issues are likely to be solvable (given experience with potato, soybean, and arabidopsis), the key question is where is a drought tolerant crop most economically and socially valuable?

“Drought tolerance could be a very useful trait to dovetail with improved nutritional quality.”

“The cost of working with these crops is significantly higher than for other crops, augmented by lack of research infrastructure and human resource capacity to do the research.”

THE BOTTOM LINE

- The development of drought tolerant crops such as potato, sweetpotato, beans, or peas will rely entirely on investment and advocacy within the public and non-profit sectors and not all crops can be advanced equally.
- The private sector will assist with technical development through licensing and transfer of know-how if there appears to be a serious public effort that is likely to succeed.
- A key first step to mobilizing investment and technology sharing is an independent cost-benefit analysis that compares the likely development costs of different crops to the benefits from their improved drought tolerance and that also outlines a strategic development plan.

“There is no question that the group thinks this is desirable, but what we need is to build a case for taking on one crop vs. another.”

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6. PUBLIC-PRIVATE PARTNERSHIPS

KEY DISCUSSION POINTS

- There are many types of public-private partnerships active in the public health arena including those which focus on product development, product access, and both development and access. Experience has shown that access must be addressed from the earliest partnership stages or products targeted to the poor will fail to reach beneficiaries.
- Partnerships in public health may include one or more companies, may be legally independent entities, or may be hosted within a civil society NGO. Partnerships may be among any combination of private sector civil society NGOs, private sector for-profit institutions, and public sector governmental and multi-lateral agencies.
- Partnerships in public health may aim at any combination of: one or multiple product types with one or multiple disease targets. Product liability issues are generally negotiated up front.
- Most of the variation in product development partnerships in public health depends on the choice of product type, the disease focus, and the delivery context.
- Important tools in establishing a public-private partnership in health include: scientific assessments, economic and market assessments, a plan for access, the social or policy investment case, and a business plan.
- Most of the major product development partnerships took extensive consultations and meetings, two to three years of work, and direct investment in the range of \$500,000 – \$2,000,000.
- There are small to medium-sized agricultural biotechnology companies with capacity for gene discovery and evaluation that may be possible partners in future efforts. The large agricultural biotechnology companies also contract important elements of regulatory science and field testing to contract research companies that are possible future partners and often unknown to the public and non-profit sectors.

“A bit of subsidy to for-profit companies to engage in low financial return activities actually is an effective way to mobilize a highly skilled human resource base at below-cost rates.”

“One important lesson is that when the planning has been rushed, they’ve gotten it wrong; the resulting ill feelings have had a very damaging impact on necessary partnerships.”

“What are the parallels between public sector role to create a viable health care system vs. public sector role to create agricultural technology delivery systems and markets?”

THE BOTTOM LINE

- The agricultural community has much to learn from the example of public health partnerships both for their similarities and differences. Efforts to create public-private partnerships in agriculture would greatly benefit from involving individuals directly involved in the creation and leadership of partnerships for public health products.
- Even with the recognition of the necessity of, or potential benefits of, partnership for crop development and delivery, there must be patient investment of time, money, and good will to design a partnership and its strategy.

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7. ANALYSIS: DIFFERENCES AND CONVERGENCE

MISUNDERSTANDINGS AND SECTORAL DIVIDES

- Some participants misunderstood that the only proposed option forward was a single “umbrella” partnership that coordinated all efforts in all crops through all the stages of development and access. *The intention was to explore which of approximately twelve partnership concepts was most technically, strategically, financially, and politically feasible. Six partnerships possibilities are created by either a development or an access partnership in one of the three crop categories. Three partnership possibilities are created by a development and access partnership in one of the three crop categories. Two concepts were partnerships in crop development stages common to one or more crops (e.g., regulatory science or gene evaluation) or partnerships in crop access stages common to one or more crops (e.g., quality seed production or marketing to the very poor). One concept was an access and development partnership that began as an “umbrella” planning partnership in several crops and then evolved into a focused effort on one or two crops.*
- Some non-profit and public participants did not understand the private sector’s strategies for reaching the poorest farmers, their desired role in reaching poor farmers, and how those strategies included small scale seed companies. *This issue remains to be clarified in future discussions among partners.*
- Some private sector participants did not appreciate the private sector’s opportunity to catalyze and support both non-profit and public sector partnerships and to influence and advocate for public financing and political support of those partnerships. *This issue remains to be clarified in future discussions among partners.*

“Do not underestimate the need for hard work and for exploration to surface the many below-water issues that people are sitting with.”

PUBLIC AND PRIVATE DONOR CONCERNS

- Financing of partnerships with multi-national seed companies creates competition to the small scale seed industry that is a current investment interest of donors and is believed to be a critical player to reach poor farmers.
- Financing of activities that promote private sector interests without clear mechanisms for public benefit may be viewed as providing unnecessary and unfair advantages to large seed companies.
- Donors need specific guarantees that the private sector aims to benefit poor farmers.
- Financing of potentially large projects in their early stages creates a pressure upon the donor to continue to finance the project.
- Financing of independent partnership initiatives before the donors have defined their own internal strategies may reduce the donor’s ability to set strategy and priorities.

“Does this topic hold sufficient interest for an independent initiative?”

PRIVATE SECTOR CONCERNS

- The private sector is motivated to (1) deliver benefits to food-insecure farmers, (2) promote acceptance of biotechnology, (3) stimulate investment in public services such as scientific capacity, regulatory capacity and rural infrastructure, and (4) expand existing markets and develop new markets.

- The complexity of the drought tolerance trait and its G x E and G x G interactions demand technical excellence and appropriate resources and capacity to ensure appropriate performance. In country-testing and fieldwork is essential for this trait but there is a lack of capacity in target markets of certified labs, regulatory science, and field test partners.
- Drought tolerance is at a very early stage of development. “Over-selling” or being perceived as “over-promising” performance could disappoint farmers, customers and partners and also serve to harm corporate reputation.
- Testing of unproven genes and events with public partners may result in publicized failures that could harm the reputation of project partners and the support for the resulting technology.
- In order to bear business risks of sharing technology and products, the public investment and effort must be of sufficient focus, scale, and quality to produce real and measurable results.
- The lack of working regulatory systems in target markets creates uncertainty and increases the time to market for commercial products and humanitarian products.
- Demands for trait performance and stewardship make hybrid maize the preferred crop strategy but hybrids have little penetration to the farmers beyond the boundaries of today’s commercial markets.
- A public sector project in drought tolerant crop development or delivery will require sustained financing driven by both a sense of urgency and accurate knowledge of time and costs.
- Intellectual property and trade secrets are concerns that are likely to be manageable and are more easily addressed than many of the concerns listed above.

“I still have some qualms – not about starting and stopping – but about starting too soon and starting off on the wrong track.”

“The only reason to have more than a number of ad hoc, parallel initiatives in drought stress tolerance is if genuine value-added is created.”

NON-PROFIT IMPLEMENTATION PARTNER CONCERNS

- Existing crop improvement programs have long-term strategies and plans in place, arrived at through long negotiation, that will not be easily changed to accommodate a drought tolerance initiative.
- A focused partnership on one crop may compete for scarce resources from other crop research and development efforts.
- The private sector controls the enabling and proprietary intellectual property. Guarantees are needed to ensure access to the resource poor farmers that are the mandated mission of non-profit institutions.

“We can not deal in such a way to promote some kind of monopoly, but we will [deal] to ensure different options for the resource poor.”

“I am concerned about transgenic vs. conventional breeding approaches and about equity in delivery and access.”

WHAT CAN BRING PUBLIC AND PRIVATE PARTIES TOWARD PARTNERSHIP?

- Money and vision.
- A convening party that has funds to finance the partnership formation activities themselves and has the independence to lead the formation of an alliance as well as to restrict the breadth of the alliance should strategy and effectiveness mandate a narrowed focus.
- A funder who will finance research, analysis, and communications on outstanding questions regarding partnership and partnership activities in order to lower the uncertainties for all parties.

“At the next meeting it would be helpful to be more specific about what are the interests and fears of each of the stakeholders.”

(CONTINUED) WHAT CAN BRING PUBLIC AND PRIVATE PARTIES TOWARD PARTNERSHIP?

- A convening institution that is also an implementation organization of crop improvement or of seed delivery that can incubate the ‘partnership concept’ while acting as a funding recipient and a partner for collaborative activities.
- A longer term convening and consultation process (at least 12 months) that can make the technical, economic, and strategic case for partnership, increase trust and confidence among partners, clarify the incentives of each party, and define the incentives for collaboration.
- A strengthened argument for why partnership is necessary, what partnership achieves that individual action can not achieve, and the benefits of partnership to each individual partner.
- A more clearly defined distinction between access issues that must be specifically addressed for adoption of drought tolerant seeds from broad seed system issues beyond the scope of a single crop improvement project.
- A background analysis of the potential benefits of drought tolerance in specific crops to specific farmer types coupled with a clear description of the target beneficiaries of different market support mechanisms.
- A well-defined case that is tailored to the major sectors that describes the intersection of the technology opportunity, the partnership opportunity, and the societal opportunity.

“Heads up! Carrying out many of the initial stage functions [of partnerships] requires real people, real time, and real money – this is not a “nights and weekends” activity.”

THE BOTTOM LINE

- Despite much talk, public-private partnerships in which both sectors make contributions and have a stake in the outcomes are rare in crop development for developing countries. Justifying significant public investment in crop development and delivery will require a cost-benefit analysis based on project plans. Project structure must guarantee the benefits to the poorest farmers and guarantee that benefits to the private sector also create public goods such as rural development, improved agricultural productivity, and seed markets.
- Bridging the divide across institutions and sectors is possible with sustained effort and work to align incentives and to define common interests. All parties will have to relinquish a little institutional control in the interest of access to greater future technical, financial, and human resources and greater societal benefits.
- Exploring partnership for drought tolerant crop development and delivery should progress along crop lines with continued cross-fertilization of ideas through the participation of individuals and institutions who do not have large stakes in particular crops, who can bridge sectoral divides, who can mobilize resources and political support, and who can identify synergies among independent projects and efforts.
- We are not succeeding at delivering improved crops at large scale to food-insecure farmers or at developing genetically modified crops adapted for the needs of poor farmers at a pace that comes close to matching the global need. Institutional and individual leadership within any sector has the opportunity to mobilize the resources to drive change.

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APPENDIX: MEETING ATTENDEES

Anne Acosta	CGIAR ILAC Initiative/CIMMYT
Marc Albertsen	Pioneer Hi-Bred International
Gerard Barry	Golden Rice Network/HarvestPlus/IRRI
Marianne Bänziger	African Livelihoods, CIMMYT
Mpoko Bokanga	African Agricultural Technology Foundation
Carmen De Vicente	Generation Challenge Programme/CIMMYT
Debby Delmer	Rockefeller Foundation
Don Doering	Winrock International
Natalie DiNicola	Monsanto Company
Sam Dryden	Emergent Genetics Inc.
Neal Gutterson	Mendel Biotechnology Inc.
Huntington Hobbs	Winrock International
Julie Howard	Partnership to Cut Hunger and Poverty in Africa
Rob Horsch	Monsanto Company
Dave Johnston	Canadian International Development Agency
Julian Kinderlerer	University of Sheffield
Larry Beach	U.S. Agency for International Development
Ed Mabaya	Cornell University, Seeds of Development
Susan McCouch	Cornell University
Peter McPherson	Partnership to Cut Hunger and Poverty in Africa
Anne Shusterman	Emergent Genetics Inc.
Chris Somerville	Stanford University
Joe Tohme	HarvestPlus Challenge Programme/CIAT
Frank Tugwell	Winrock International
Tom West	Pioneer Hi-Bred International
Stan Wood	International Food Policy Research Institute (IFPRI)
Roy Widdus	Initiative on Public-Private Partnerships for Health

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