
**EVALUATING THE SOCIO-ECONOMIC IMPACTS OF
WESTERN SEED'S HYBRID MAIZE PROGRAM**

Principal Investigators

Michael R. Carter
Department of Agricultural &
Resource Economics
University of California, Davis
mrcarter@ucdavis.edu

Mary Mathenge
Tegemeo Institute of
Agricultural Policy &
Development
Egerton University
mathengemk@gmail.com

Travis Lybbert
Department of Agricultural &
Resource Economics
University of California, Davis
travis@primal.ucdavis.edu

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Tom Adams, Director, Monitoring & Evaluation
tadams@acumenfund.org*

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Abstract

We propose to evaluate the impact of Western Seed Company's (WSC) hybrid maize program on the welfare of smallholder farmers in Kenya's mid-altitude regions. This locally-based and locally-focused seed company is currently expanding into new areas, powered by recent infusions of venture capital. By collaborating closely with WSC, we are exploiting this geographic expansion with a two-year randomization design in parts of western and central Kenya, creating well-defined treatment and control groups. Because of differences between western and central Kenya, we expect the constraints, and ultimately the impacts in these two regions to be different. In particular, the western region is poorer, and farmers there are unlikely to reap the full benefits of WSC technologies in this liquidity-constrained environment. We therefore propose to relax these liquidity constraints for some farmers in western by providing fertilizer vouchers, randomized at the household level. In summary, we hope to learn about two key issues: the effectiveness of a local seed company in developing technologies fine-tuned to the local agro-ecological environment, and the impact of relaxing liquidity-constraints on the poverty-reduction potential of new agricultural technologies.

Evaluating the Impact of a New Seed Market Actor

In the mid-1990s, the government of Kenya began to slowly liberalize the domestic seed market. Western Seed Company (WSC), an early entrant in the newly opened market, released its first commercial maize varieties in 1999. Its varieties quickly garnered attention by out-yielding existing Kenya Seed (the parastatal) varieties by some 30%, especially in the mid-altitude regions that are home to many small-scale Kenyan farmers. WSC subsequently attracted venture capital funding from AGRA and social impact investors (including the New York-based Acumen Fund) who were keen to underwrite WSC's capacity expansion.

These investors were motivated by the hypothesis that an agile, well-funded, locally-based and locally-focused seed company like WSC, could create and market the technical innovations needed to boost the productivity of Kenya's small-scale maize producers and significantly improve their living standards. The work proposed here builds on research funding already received from the Acumen Fund (via a grant from Gates) to rigorously test this hypothesis by measuring the impact of WSC's maize program on household maize production, total household income as well as indicators of food security and educational investment.¹ As detailed below, the additional funding requested here will enable the study of additional regions and treatment arms that are fundamental to understanding WSC's full impact.

Unlike many parts of sub-Saharan Africa, hybrid seed adoption rates amongst Kenyan maize farmers are relatively high, reflecting decades of efforts by the Kenyan government

¹ While space constraints do not allow an extensive literature review, both the agronomy and economics literatures tend to focus on hybrid adoption rates, and at best often extrapolate economic impacts based on largely untested assumptions about substitution and other complicating effects.

and Kenya Seed Company. Even in the mid-altitude areas that are the focus of this study, hybrid adoption rates hover around 40%, with a strong majority of those not adopting hybrids citing liquidity constraints as the primary reason for non-adoption.² However, in these same areas, the median age of the adopted hybrids is 20 years, reflecting the modest rate of innovation and hybrid maintenance investment by the parastatal seed company.³ Along with the absence of hybrids fine-tuned to the mid-altitude agro-ecology, it is this low rate of innovation that creates the space for a novel market actor like WSC to impact small farm living standards with its new generation hybrids.

None of these observations of course means that WSC hybrid maize program necessarily has the impacts anticipated by its investors. In addition to the usual observation that farmers' returns to new technologies are lower than those implied by field trials, we also have accumulating evidence that the returns to improved seed varieties are highly heterogeneous amongst farmers, as are returns to more general small farm development strategies.⁴ Given that one of our key impact metrics will be the alleviation of poverty amongst food insecure households, this kind of heterogeneity is extremely important as the same average treatment effect but with different impact distributions will imply different things about the alleviation of poverty.

² Risk constraints may also be important, as suggested by the work by Karlan et al. (2012) on the impacts of relaxing risk and liquidity constraints on both the intensive and extensive margins of agricultural production. The voucher scheme described below will serve to relax both constraints.

³ Adoption rate and hybrid age figures come from Tegemeo's TAPRA panel study. Figures on reasons for non-adoption come from a random sample of farmers interviewed by Western Seed Direct Access System (DAS) program baseline (2010).

⁴ For example, see the Suri (2011) study of hybrid maize in Kenya, the Carter, Laajaj and Yang (2012) on maize in Mozambique, and the Carter, Toledo and Tjernstrom 2012 evaluation of the MCC small farmer program in Nicaragua.

As we detail below, the proposed impact evaluation is technically feasible for a number of reasons, most importantly because we already know a lot about adoption of Western Seed hybrids and because the recent venture capital-powered expansion of WSC supply allows us to get out in front of their geographic expansion. WSC itself is interested in this study and have committed to the two-year randomization design we put together using funding from Acumen. In narrow agronomic terms, our study will identify a mix of second-generation hybrid adoption effects (as adopters of Kenya Seed and other hybrids shift to Western Seeds improved lines) and first generation effects (as farmers who never had access to appropriate hybrid planting material adopt improved varieties for the first time).

But ultimately, what makes our study innovative and we think important is that we are looking at the welfare gains that accrue from introducing a new kind of market actor that has the incentives, capacities and focus to innovate in ways that are different from both traditional parastatals and international seed multinationals, such as Pioneer, Syngenta and Monsanto (all of whom have also entered the Kenyan market, but at a much higher price point and with products reported to be less well-adapted to Kenya's mid-altitude environments).⁵ If we find that it does, then the strategy of AGRA, Acumen and others will find important support. If we do not, then perhaps these organizations will need to rethink their current strategies of investing in local seed companies.

⁵ A potentially complicating feature of this study is that Western Seed's market presence may induce changes in the behavior of other seed suppliers, creating the equivalent of a general equilibrium effect that contaminates the control group. While there is some likelihood that Kenya Seed is trying to improve its performance in response to Western Seed, Western is itself on a rapid treadmill of innovation, frequently releasing new varieties. Their latest innovations are reported to outperform the seeds they currently have in the market by another 30%.

Support of USAID Objectives and Initiatives

USAID's Feed the Future Strategy aims to generate technologies, knowledge and markets that boost agricultural productivity growth across the broad array of farmers (including the small-scale and resource-poor) in order to reduce hunger and poverty. Kenya is one of 20 strategic partners under this initiative, and the USAID Mission in Nairobi has launched a series of Feed the Future programs designed to help a half million Kenyans escape poverty and hunger.

Maize is one of the key focal activities of the Kenyan mission, which has already invested heavily in smallholder maize cultivation—from seeds to markets—through its Kenya Maize Development Program. The research proposed here strongly complements these on-going mission efforts. As sketched above, Western Seed is a novel, market-based mechanism to deliver well-adapted technology to the small-scale maize farmer. Evidence that this mechanism works and is cost-effective—or becomes cost-effective when liquidity constraints are relaxed for resource poor farmers—would be a valuable lesson for Feed the Future programming, both in Kenya and globally.

Evaluation Plan

Powered by infusions of new capital, WSC has been able to rapidly expand its seed production capacity and is poised to move into regions that it was heretofore unable to supply. Operating in collaboration with WSC, the proposed research will exploit the rollout of WSC hybrids in parts of western Kenya (specifically Western and Nyanza provinces) and Central Kenya. Because of differences between them, expected impacts, constraints and evaluation strategies will be somewhat different between these two regions.

In both the Western and Central expansion areas, farmers lack access, information, experience and perhaps trust in WSC seeds. In addition, the Western area is substantially poorer and preliminary work indicates that the extent to which farmers adopt improved seeds also depends on their ability to purchase the fertilizers needed to really make the seed purchase pay off. The full socio-economic impacts of WSC technologies are unlikely to occur in this liquidity-constrained environment. As part of our evaluation, we will therefore relax these liquidity constraints for some farmers in the Western expansion area by providing fertilizer vouchers, randomized at the household level.

In addition, in contrast to the Western area, Central Kenya is characterized by higher household incomes (although there are still high absolute levels of poverty), higher asset values, and smaller land sizes. Maize in Central is mostly grown for home consumption, while coffee, tea, and dairy enterprises play major roles in income generation. These differences shape the expected impacts of high-yielding maize hybrids. We have therefore designed the evaluation to enable identification of impacts separately in the two regions. We anticipate that households in Central Kenya may respond to higher yields by substituting land out of maize and into cash crop production, compared to Western Kenya, where we anticipate more direct impacts of increased maize productivity.

Table 1 displays the design of the study. For our primary questions, we want to compare the combined groups, **A** and **B**. For other, secondary questions, we want to compare sub-groups (e.g., b'' with b' and b'' with a'). The primary treatment impact (**B** – **A**) measures the impact of making WSC seeds available and relaxing informational constraints that likely slow down diffusion of newer improved maize varieties in this context. The intervention

will both provide information about potential yields, and enable households to carry out their own experiments to learn about the returns of the technology on their own plot. We do this by building on WSC's existing marketing strategy.

Table 1: Experimental Design			
		WSC Hybrid Intervention	
		<i>NO</i>	<i>YES</i>
Liquidity Intervention	<i>NO</i>	Central region <i>a</i> , 300 farms* Western region <i>a'</i> , 300 farms*	Central region <i>b</i> , 300 farms* Western region <i>b'</i> , 300 farms*
	<i>YES</i>	Western region <i>a''</i> , 300 farms*	Western region <i>b''</i> , 300 farms*
Combined Groups		A, 900 farms [18 learning zones, 54 villages]	B, 900 farms [18 learning zones, 54 villages]

* For each treatment group, the 300 farms are drawn from 6 learning zones, with 3 villages per-zone and 17 farm households per-village.

Intervention Details and WSC commitments

When WSC enters new districts, the marketing team establishes demonstration plots on local farmers' land, around which they define spatially explicit learning zones. At the beginning and end of the rainy season, WSC holds field days and distributes free trial seed packets to attending farmers. WSC does not expect farmers to adopt new varieties until they have witnessed successful demonstration plots, and have experimented with the seed on their own land. This business model keeps a learning window open long enough to permit rigorous evaluation. Our evaluation model builds on and extends these insights in an effort to assure high uptake.

For the upcoming long rains (March-May, 2013), WSC, in collaboration with the research team identified and GPS-marked excess potential 5 km-radius learning zones. The research

team then selected 18 pairs of matched learning zones, in 16 districts in Western and Central Kenya, and randomly allocated one learning zone in each pair to treatment and one to control. The pairs were matched by altitude, rainfall, and agro-ecological zone to help ensure balance on important covariates. This has not been accounted for in the power calculations below, and thus the power calculations are overly conservative.

WSC have agreed to refrain from placing demonstration plots or performing other promotional activities within the control zones for the next two years. WSC will carry out their standard awareness activities (demonstration plots, seed distribution, and field days) in the treatment zones. WSC also provided 250g sample packs of seed that were distributed to all sampled households in the treatment areas in February 2013, at the end of a brief information session. This last activity ensures that all households in the treatment areas have the opportunity to plant a small experimental plot with Western Seed hybrids during the 2013 long rains. Finally, WSC has agreed to engineer a direct-order system for farmers in the treatment areas, which should alleviate the types of distance and infrastructure constraints to adoption identified by Suri (2011).

In addition, with the support of WSC, the research team will distribute voucher coupons that will enable households allocated to groups *a*'' and *b*'' to purchase—with a modest co-pay—hybrid seeds and fertilizer (sufficient for a one acre plot). A recent RCT in Mozambique (Carter, Laajaj and Yang, 2012) indicates that these coupons can substantially boost uptake of fertilizer and hybrid maize seeds. Importantly, the Mozambique estimates are likely an underestimate of the impact vouchers will have in Kenya, as farmers there have substantially higher familiarity and adoption of improved technologies than do the

studied farmers in Mozambique. It is important to recognize (in light of work such as Karlan et al., 2012), that voucher coupons not only provide liquidity, but also shift substantial risk away from the farmer. The fertilizer vouchers will be randomized at the household level, and explained to village elders as a lottery.⁶ For political reasons, in addition to the 'lottery' that will determine whether our sample households receive vouchers or not, we will randomly draw non-sample households from the village census who will have a (small) chance of receiving a fertilizer voucher of the same magnitude as that provided to sample households.

Outcome Variables and MDE Analysis

Within this cluster-randomized trial, we have randomly sampled three villages in each cluster/learning-zone, and the units of analysis will be households within those villages.⁷ Table 2 provides results from our calculations based on the Tegemeo longitudinal survey and from reports by WSC on the expected yield increases that we can anticipate will be achieved for first- and second-generation hybrid adopters. For example, the Tegemeo data show that the average farmer in the Western region is currently getting roughly 5 bags of maize per-acre. These yields reflect the relatively low rates of adoption of hybrids in this region. WSC's field tests indicate that farmers in this region should be able to get 25-40 bags per-acre. We conservatively assume that a successful yield impact will entail 100% increases in the Western region (per-acre planted to Western Seed hybrids relative to the pure control group a). In the Central region, current hybrid use is much higher and we therefore assume that WSC adopters (a) will experience only a 20% yield increase.

⁶ When the seed distribution took place, the sample selection was explained to village elders as a lottery.

⁷ Within each learning zone, 50 households are sampled. The distribution across the three villages per cluster is proportional to the relative sizes of the villages.

Table 2: Assumptions Impact & MDE Analysis				
	% Adoption ⁸	Adoption Intensity*	Yield Impact if Successful	Income Impact if Successful
Central Region, sub-groups, <i>b - a</i>	100%	100%	≥20%	≥15%
Western Region, sub-groups, <i>b' - a'</i>	100%	25%	≥25%	≥9%
Western Region, sub-groups, <i>b'' - a''</i>	100%	100%	≥60%	≥25%
Weighted Average, Combined Groups B - A	100%	75%	≥35%	≥17%

* Adoption Intensity is the fraction of the farmer's maize area planted to WSC hybrids.

Based on field visits in the Western region, we anticipate that liquidity constrained farmers will plant hybrids on only 25% of their maize areas, as they will lack liquidity needed to finance both seeds and complementary fertilizers (that make the hybrids pay off) on their full farm area. We thus assume that these farmers (*b*) will experience an average yield gain of 25% relative to the pure control group farmers, *a*'.

Farmers in sub-group *a''* will receive a liquidity increment in the form of a voucher. Based on recent work in Mozambique and elsewhere, we assume that these vouchers will have a modest average effect on farmer yields, boosting their average yields by 25% relative to the pure control group *a*'. We assume that sub-group *b''* will achieve a 100% yield increase relative to sub-group *a*', and 60% relative to group *a''*. We assume that liquidity restrictions do not apply to Central Region farmers.

The income impact figures in Table 2 are based on our understanding of the cropping systems of Central and Western region farmers, as informed by the Tegemeo data. In the

⁸ These numbers on adoption may appear optimistic, but our current budget allows us to include further inducements for adoption in the form of Western Seed hybrid coupons. Currently, we anticipate providing coupons discounting 15% of the seed costs for an acre of maize.

Western region, maize occupies most of the planted area and is sold by farmers at the margin. The 25% income impact number for sub-group b'' (relative to a'') is calculated based on replacement of low-productivity maize by higher-productivity maize on a constant maize area.⁹ For liquidity constrained sub-group b' , we anticipate success will result in a much smaller income impact because of these farm's lower adoption intensity.

Central region farmers farm smaller areas, but also grow valuable commercial crops. We assume that if successful, WSC hybrids will allow them to reduce their maize area and increase their area in commercial crops, creating the 15% income impact number.

Based on these numbers, we feel confident that our proposed design will allow us to detect impacts of these magnitudes, as well as the additional sub-group impacts of relaxing liquidity constraints in the Western region. Power calculations conducted for the mean difference between groups **A** and **B** result in MDEs of 18-20% of the mean (for both yields and income). These MDE's are below or at the expected impacts if the program is a success (see Table 2). For yields it is quite a bit below the expected impacts, whereas for income it is right at the minimum detectable effect. We should also have adequate power to detect successful impacts for most of the sub-group comparisons of interest (especially $b'' - a'$).¹⁰

It would of course be nice to increase sample size, but we have fully exploited WSC's expansion capacity in terms of number of new learning zones. While we could add

⁹ The exact budget share of maize is hard to calculate, since many households are both buyers and sellers of maize, but the Tegemeo data suggests that maize constitutes more than a third of rural incomes in the Western region. We assume that 20% of any increase in yield is used to pay for fertilizer and other costs.

¹⁰ The MDEs for the smaller sub-group analyses are as follows: In Western/ Nyanza, our power calculations suggest Minimum Detectable Effects (MDEs) of $\delta_{yield} \in (0.5, 0.3)$ and $\delta_{income} \in (0.4, 0.3)$, where δ denotes the standardized effect size.¹⁰ Given the means and standard deviations of yield and income respectively, this translates into MDEs for yields of 15-26% of the average 2010 yield, and 25-35% of the average 2010 household income, depending on the amount of variation in the outcome variables that can be explained by baseline values of covariates. In Central/Eastern, $\delta_{yield} \in (0.6, 0.45)$ and $\delta_{income} \in (0.6, 0.45)$, implying MDEs corresponding to 30-35% increases in yields and incomes.

additional villages within existing zones (or households within existing villages), our analysis shows that we gain little from this expansion under the statistically conservative simplifications used in our calculations.

We judge our MDE's to be upper bound estimates for three reasons. First, our pairs of 'learning zones' have been matched on a number of variables that are correlated with yields, and this has not been accounted for in the power calculations. The matching should decrease the ex ante between-site variability in yields (and since maize contributes a large share of household income, this will also lead to some reduction in the variability of income), reducing the baseline differences between 'learning zones', and therefore boosting our power relative to the MDEs reported above. Second, our power calculations were conducted as though the entire treatment were randomized at the cluster-level. In reality, the liquidity/fertilizer-treatment will be randomized within villages, which will provide greater power than the current MDEs suggest. Third, we were fairly conservative in our assumptions about the explanatory power of covariates: based on the Tegemeo data, we used the explanatory power of the previous year's site-level aggregate of the outcome variable, which explained on average 15% of the variation in the outcome variable. A full household survey is likely to provide baseline variables that can help increase the precision of the treatment effect estimate.

Timeline

The first survey will take place after the end of the long rains (the main maize growing season), and before the onset of the second rainy season (August/September of 2013). The survey instrument will include a complete production and income module designed for

agricultural households (modeled on that used in Tegemeo's TARPA panel survey). The income module will enable us to identify substitution effects between crops and alternative economic activities. It will allow a more fine-tuned cost-benefit analysis, as it will capture direct and indirect costs to households. While we don't have an ex ante hypothesis regarding the gender impacts of improved seed-adoption, we believe that a careful accounting of male and female labor will help shed light on some of these dynamics. On the one hand, women undertake much of the work around maize growing, and as such could find themselves substituting out of other off-farm activities if the required work increases. On the other hand, if women control much of the household food budget and/or can sell any surplus maize, we may find that women's bargaining power in the household increases. We will also measure educational completion ratio and enrollment data, as well as food security measures. Finally, one year from the initial survey, a mobile phone yield survey will be conducted to limit recall bias in the intermediate outcomes (yields and input use). The endline survey will take place before the long rains of 2015.

Adoption Rates and Profitability

More than 90% (50%) of the 2010 TARPA sample in Western/Nyanza (Central) province report maize yields that are less than 10 (20) bags of maize/acre, with a mean of about 5 (13) bags/acre. Field trials of WSC hybrids suggest that the possible yields are in the 30-40 bags/acre range (depending on the variety). Combining these kinds of field trial yield estimates with 2011 maize prices, estimates suggest that the average smallholder farmer in WSC's expansion zones can reap net returns of \$94/acre compared to growing local varieties, and up to \$340/acre with correct planting methods and appropriate fertilizer

use¹¹. These figures, while based on projections of a certain yield increase per acre, give us confidence that the real-world returns to the technology will be large enough that our MDEs are within a plausible impact range.

As for adoption rates, in certain districts where WSC has been established for longer, a household survey found that over 40% of improved-seed adopters planted WSC varieties.¹² Other figures, based purely on total sales, establish WSC's overall market share in their core districts to be 30% of the seed market. Importantly, WSC to date has completely sold out its entire stock of hybrids every year, with farmers in WSC's established marketing area complaining of their inability to obtain WSC product. In short, we are confident that WSC has a good product and a good marketing model and that the adoption rates and yield benefits suggest that even though the real-world effects of this technology may only be a fraction of those found in field trials, the impact on poor farming households has the potential to be important.

Logistical Viability and Training

This project began when Acumen Fund approached the UC-Davis team through CEGA seeking an impact evaluation of Western Seed's maize program. Acumen, like AGRA, is intensely interested in learning the effectiveness of investments in Western Seed. Tegemeo Institute, with whom the UCD team had working relationships, was the obvious partner for this study given Tegemeo's extensive experience and its ongoing longitudinal survey of Kenyan farmers. In addition to their broad research experience on the maize value chain,

¹¹ Source: "Impact investment: Understanding financial and social impact of investments in East African agricultural businesses", Gatsby Charitable Trust and Pearl Capital Partners (no date).

¹² Source: DAS baseline (2010). These figures come from Teso and Busia districts, and among the surveyed households who planted hybrid maize seed, 40% and 46%, respectively, planted WSC varieties.

Tegemeo routinely participates in the preparation and formulation of Government agricultural strategy, and collaborates with numerous national and international entities, such as the World Bank, the Rockefeller Foundation, Kenya Agricultural Research Institute (KARI), the Food and Agriculture Organization (FAO), and Department for International Development (DFID).

Field visits in November and December by the Tegemeo-UCD team cemented a working relationship with WSC and designed and established the viability of the impact evaluation strategy outlined above. In cooperation with WSC, the research team in January-February implemented the randomization protocol and identified the full sample of 1800 farm households needed for all treatment arms for the complete study in western and central Kenya. To date, researchers from the two institutions have collaborated on both development and implementation of the research design, and Tegemeo's local knowledge proved invaluable in carrying out the sampling and seed distribution in a timely manner. While Tegemeo has ample experience conducting research on the welfare of rural agricultural households in general, and on the impacts of hybrid maize in particular (see for example Mathenge et al. 2012), this will be their first field experience with a randomized control trial.

Following Tegemeo's field work model, enumerators and field work supervisors will be recruited from local university students. They, together with Tegemeo's permanent staff will be extensively involved in the ongoing implementation of the randomized design, as well as the analysis of the impact data that emerges from it. By involving students and

exposing them to the research process, we hope to provide a rewarding complement to their graduate studies.

Anticipated Outputs and Impacts

The research proposed here will speak to two issues:

1. The effectiveness of local seed companies for developing and disseminating seed technologies fine-tuned to the agro-ecological environments where small-scale farmers predominate; and,
2. The impact of relaxing liquidity constraints on the direct poverty reduction impacts of new agricultural technologies.

While both issues are tightly related to the overall goals of USAID's Feed the Future Initiative, dissemination of findings on each are probably best pursued through somewhat different strategies. On the first issue, we would look to collaborate with the Acumen Fund. Acumen is not only co-financing this research, but together with AGRA has raised significant capital to help Western Seed expand their business. Acumen and AGRA will be natural partners for co-organizing dissemination events and making sure that the results are communicated to investors and other decision-makers positioned to use the results of our work.

On the second issue, we will need to target decision-makers in more conventional development circles, including the government of Kenya, as well bilateral and multi-lateral donors active in the East Africa region. For this purpose, there is probably no better-placed institution than Tegemeo, which has not only enjoyed prior support from USAID, but has

built with its research a reputation as the go-to group on agricultural production and policy.

As a key stakeholder in this research, Acumen's monitoring director already communicates frequently with the research team. The team has also opened communication with the relevant unit in AGRA and will invite them to join the project stakeholder group. Building on Tegemeo's existing relationship with the mission, we will also invite relevant personnel from USAID-Nairobi to join the stakeholder team.

Against this backdrop, the project team will deliver the following outputs over the course of the project:

- An initial BASIS brief that outlines the study logic and its potential impacts.
- Results from the willingness to pay study (to be completed in mid-2013) will be reported in a second BASIS Brief and submitted for publication to an academic journal.
- Results on development impacts will become available following the midline and endline surveys. The team will publish at least 2 more BASIS Briefs on the results and submit at least 2 additional papers to academic journals.
- The team will organize 2 dissemination conferences in East Africa, targeting the two issues outlined above. We anticipate including other work on maize productivity and adoption constraints into these events. Funding is requested here for these two events. If the results warrant further dissemination, we will be prepared to

organize an event in Washington, but will need to request additional support for that event.

- At the end of the project, the household and yield survey will be made available to other researchers. As mentioned above, the project will be organized as a learning-by-doing exercise for Egerton University students. It is expected that the data will result in 5 theses prepared by these students.

Budget Notes and Coordination with Partners

As mentioned above and as shown in the matching funds portion of the budget, the Acumen has generously made grants of \$286,000 and \$105,000 to Tegemeo and UC-Davis, respectively. These funds will not only cover a portion of the survey and other research costs, they also help pay for core personnel costs (senior researchers at Tegemeo and Ph.D. student Emilia Tjernstrom at UCD). When combined with the time that will be cost-shared by the UC-Davis PIs, the project will have ample personnel time to implement the complex design.

It is also worth mentioning that the intense interest of both the Acumen Fund and the Western Seed Company in this research have been key to the successful launch of the research design earlier this year. Western Seed in particular has been a most helpful partner and is fully committed to the project. We have attached letters of support from both Acumen and Western Seed (prepared for another current grant competition) following the bibliographic references below.

Conclusion: Policy Implications and Scalability

AGRA and others have invested heavily in seed systems throughout sub-Saharan Africa with the expectation that new market players like Kenya's Western Seed Company can create new prospects for growth throughout the region, especially for the small-scale farm sector. The model is clearly replicable, but the key question is whether it really works and adds value to what can be achieved by multi-national and other traditional market participants. The proposed research exploits the opportunity created by the rapid expansion of WSC's capacity to create well-defined treatment and control groups. The project also complements the work being done by the Kenya USAID mission, such as the Kenya Maize Development Program. The on-the-ground players, which include WSC itself as well as its impact investors, are keen to understand the impacts of WSC's hybrid maize program. In addition, Tegemeo Institute is engaged in the local policy-making process. Whatever this research finds, we are confident that its results will not be ignored.

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76 Ninth Ave, Suite 315 | New York, NY 10011

Tom Adams
Head of Impact
Acumen Fund
76 Ninth Avenue
Suite 315
New York, NY 10011
USA

J-PAL Global Office:
30 Wadsworth St., E53-320
Cambridge, MA 02142
USA

12th March 2013

Dear Madam/Sir

Re: Support for further funding for joint evaluation of the socio-economic Impacts of Western Seed's hybrid maize program

I write in support of the above application made by UC Davies to further expand its joint UC Davies, Tegemeo and Acumen Fund randomized control trial. This proposal represents a significant opportunity to build upon underway research, to broaden the scope of analysis and extend it for a further year to increase the knowledge derived by this study.

Acumen Fund is excited about the potential of this research. We have committed \$400k to the core component of this study – a two-year RCT augmented by a willingness to pay experiment – and have garnered strong buy-in by our investee company Western Seed. We would be delighted to work with additional funders to increase and widen the scope of this work. We see real benefit to partnership with the ATAI programme.

The proposal submitted will generate especially useful analysis, broadening the generality of the research's findings by assessing the degree to which credit constraints affect uptake and corresponding impact of hybrid seed. This is a lesson we envisage will be of significant relevance to the wider development community, increasing our understanding of the importance of credit as a binding constraint to smallholder farmers' access to agricultural inputs (especially improved seed varieties).

By increasing the length of the study, the funding will also deepen the assessment of impact; improving reliability and providing greater confidence that the affects we may see are realized and/or sustained.



I therefore strongly urge you to approve this funding request, and hope to work closely with you on this exciting study going forward.

Yours faithfully,

A handwritten signature in black ink, appearing to read "Tom Adams". The signature is stylized with a large loop at the beginning and a long horizontal stroke extending to the right.

Tom Adams
Head of Impact, Acumen Fund.



Wednesday, March 13, 2013

To: ATAI Grant Committee members

On behalf of Western Seed Company, I whole-heartedly endorse the grant application "Evaluating the Socio-economic Impacts of Western Seed's Hybrid Maize Program" submitted in March, 2013 by the joint research team from UC Davis and Tegemeo Institute.

I am convinced that the research team and Western Seed have developed a sound working relationship over the course of the project planning, and we are looking forward to collaborating with the research team, and to the learning opportunities made possible by this evaluation. To ensure the success of the evaluation, our company has committed to abstaining from all marketing activities in the 18 control zones selected by the research team for the next two years. In the 18 treatment zones, we will carry out our standard awareness activities. In addition, we are working with the research team to realize an order- and delivery system to the farmers in the treatment areas, to minimize any potential obstacles to farmer adoption.

Western Seed Company is committed to bringing welfare-improving technology to smallholder farmers, and we welcome this evaluation as a chance to learn more about our impacts on our customers.

Yours faithfully,

Syed Osman Bokhari

Commercial Director.

SUMMARY OF PI QUALIFICATIONS

MICHAEL R CARTER is professor of agricultural and resource economics at the University of California, Davis and directs the BASIS Collaborative Research Support Program which studies rural poverty alleviation strategies in Africa, Asia and Latin American. Carter's research focuses on small farm development strategies, including asset transfer and financial market deepening programs. He has published over 100 scientific papers and 3 books, and has mentored more than 40 Ph.D. students who now hold academic, research and government positions around the globe. He has managed in excess of \$50 million in grant funds.

Carter's current research projects include analysis of poverty dynamics and productive social safety nets, and feature a suite of projects that design, pilot and evaluate index insurance contracts as mechanisms to alleviate chronic poverty and deepen agricultural and rural financial markets. This latter work is being carried out under the I4 Index Insurance Innovation Initiative, a joint venture of BASIS, USAID, Oxfam, the UN FAO and the Microinsurance Innovation Facility of the UN ILO.

An elected fellow of both BREAD and the American Agricultural Economics Association, Carter is a co-editor of the leading development journal *World Development*, and serves on the editorial board of several other journals devoted to economic development and food security. A member of the Board of Directors of Oxfam America for many years, he currently serves on the board of Freedom from Hunger as well as on multiple scientific advisory boards.

Michael R Carter

Department of Agricultural & Resource Economics

University of California, Davis

I. Contact Information

<i>University Address</i>	<i>Home Address</i>
One Shields Avenue Davis, CA 95616	44785 Garden Court El Macero, CA 95618
Telephone: +1.530.752.4672	
Fax: +1.530.752.5614	
Email: mrcarter@ucdavis.edu	
http://mrcarter.ucdavis.edu	

II. Education

Ph.D., Economics, University of Wisconsin-Madison, 1982

Dissertation: Property Relations and the Generation of Inequality

Major Field: Development Economics

Minor Field: Econometrics and Labor Economics

Third Field: Political Economy

M.A., Economics, University of Wisconsin-Madison, 1979

B.S.F.S., Georgetown University, 1977

III. Professional Experience

2009-present, Professor of Ag & Resource Economics, University of California–Davis

1998 Visiting Professor, School of Development Studies, University of KwaZulu-Nata,
South Africa

1991 Visiting Professor, CIEPLAN, Santiago, Chile

1984-present Assistant, Associate and Full Professor of Ag & Applied Economics,
University of Wisconsin-Madison

1982-1984 Instructor and Assistant Professor of Economics, Georgetown University

1981 Visiting Researcher, Centro de Investigaciones, Universidad del Pacifico, Lima, Peru

IV. Publications

A. Journal Articles

- Barrett**, C.B. and M.R. Carter (forthcoming). “The Economics of Persistent Poverty and Poverty Traps: Empirical and Policy Implications,” *Journal of Development Studies*.
- Tjernström**, E., M.R. Carter and P. Toledo (forthcoming). “Identifying the Impact Dynamics of a Small Farmer Development Scheme in Nicaragua,” *American Journal of Agricultural Economics*.
- Carter**, M.R., R. Laajaj and D. Yang (forthcoming). “The Impact of Voucher Coupons on the Uptake of Fertilizer and Improved Seeds: Evidence from a Randomized Trial in Mozambique,” *American Journal of Agricultural Economics*.
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- Fletschner**, Diana and Michael Carter (2008). "Constructing and Reconstructing Gender: Credit Supply and Women's Demand for Entrepreneurial Capital," *Journal of Socio-Economics* 37(2): 672-693, reprinted as "Construyendo y reconstruyendo género: El efecto de los grupos de referencia en la demanda de capital empresarial de las mujeres," *Revista Paraguaya de Sociología* (forthcoming).
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B. Books

- Barrett**, C., M.R. Carter and P.D. Little (editors), *Understanding and Reducing Persistent Poverty in Africa* (Routledge), 2008.
- Carter**, Michael, Fred Zimmerman and Jeffery Cason (editors) *Development at a Crossroads: Uncertain Paths to Sustainability after the Neo-Liberal Revolution* (Madison, WI: Global Studies Research Program), 1998.
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C. Chapters in Books

- Carter**, Michael R. (2012). "Designed for Development Impact: Next Generation Approaches to Index Insurance for Small Farmers," in *Microinsurance Compendium*, volume 2.
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- Carter**, Michael R. and Eduardo Zegarra, “Land Markets and the Persistence of Rural Poverty in Latin America: Post-Liberalization Policy Options,” Chapter 4 in A. Valdes and R. Lopez (eds.) *Rural Poverty in Latin America: Analytics, New Empirical Evidence and Policy* (MacMillan Press, 2000).

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- Carter**, Michael R. and Frederic Zimmerman. “Will Time and Markets Resolve the Agrarian Question? Microeconomic Insights on the Persistence and Costs of Land Ownership Inequality in Latin America,” forthcoming in volume to be published by the Ministério da Política Fundiária e do Desenvolvimento Agrário (Brasília).
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- Barrett**, Christopher and Michael Carter. “Microeconomically Coherent Agricultural Policy Reform in Africa,” Chapter 13 in J. Paulson (ed) *African Economies in Transition*, Volume 2: The Reform Experience (MacMillan Press, 1999).
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- Carter**, Michael. “Intellectual Openings and Policy Closures: Disequilibria in Contemporary Development Economics,” in F. Cooper and R. Packard (eds.) *The Dynamics of the Production and Transmission of Development Ideas* (University of California Press, 1997).
- Carter**, Michael, and Fred Zimmerman. “Market Coordination and Coordination Failures on the Path to Sustainable Development,” in Michael Carter, Fred Zimmerman and Jefferey Cason (eds) *Development at a Crossroads: Uncertain Paths to Sustainability* (University of Wisconsin Global Studies Program, 1998).
- Carter**, Michael, and Christopher Barrett. “Does It Take More than Market Liberalization? The Economics of Sustainable Agrarian Growth and Transformation,” in Michael Carter, Fred Zimmerman and Jefferey Cason (eds) *Development at a Crossroads: Uncertain Paths to Sustainability* (University of Wisconsin Global Studies Program, 1998).
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D. Book Reviews

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E. Miscellaneous Publications and Policy Briefs

Carter, M.R., E. Tjernström and P. Toledo (2012). "Investing in Small-Farm Productivity – The Nicaragua MCC Compact," *BASIS Brief* 2012-6.

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- Boucher, Steven, Brad Barham and Michael Carter,** “The Unfinished Business of Liberalization: Making Markets Work for All,” *BASIS Brief* No. 15, 2003.
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- Carter, Michael, Julian May and Vishnu Padayachee,** “Sweetening the Bitter Fruit of Liberty: Markets and Poverty Reduction in Post-Apartheid South Africa,” *South African National Human Development Report*, 2002.
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V. Working Papers

A. Manuscripts Submitted for Publication

Morrow, J. and M.R. Carter (2012). "Left, Right, Left: Income Dynamics, Learning and the Evolution of Political Preferences by Bayesian Voters," 32 pages.

Keswell, M. and M.R. Carter (2012). "Poverty and Land Redistribution: Evidence from a Natural Experiment," 30 pages.

Castillo, Marco and Michael R. Carter (2011). "Behavioral Responses to Natural Disasters," 28 pages.

Agüero, J.M., M. R. Carter and I. Woolard (2011). "The Impact of Unconditional Cash Transfers on Nutrition: The South African Child Support Grant," 33 pages.

Barrett, C.B., M.R. Carter and M. Ikegami (2011). "Poverty Traps and Social Protection" World Bank Working Paper, 31 pages.

Castillo, M. and M.R. Carter (2007). "What Field Experiments Tell Us about the Real World," 25 pages.

Castillo Marco and Michael Carter (2006). "Using Field Experiments to Identify Social Effects," 21 pages.

Carter, Michael R. "Using Household Data to Analyze Heterogeneous Policy Preferences and Responses in Endowment-Sensitive Economies," paper prepared for AAEA Conference, *Rural Policy: Issues, Data Needs and Data Access*, revised June 2000.

Carter, Michael and Yao, Yang. "Specialization without Regret: Land Transfer Rights and Agricultural Investment in an Industrializing Economy" (revised version of *World Bank Policy Research Paper 2204*), May 2004.

B. Completed Manuscripts and Working Papers Series

Janzen, S. and M.R. Carter (2012). "The Impact of Microinsurance on Asset Accumulation and Human Capital Investments: Evidence from a Drought in Kenya," working paper.

Carter, M.R. and P. Toledo and E. Tjernström (2012). "Investing in Small-Farm Productivity: Impact Dynamics and Heterogeneity in Nicaragua," working paper.

Carter, Michael R., Patricia Toledo and Emilia Tjernstrom (2012). "The Impact of Rural Business Services on the Economic Well-being of Small Farmers in Nicaragua," 52 pages.

Carter, Michael R, Sarah Janzen and Nobu Ikegami (2012). "Valuing Asset Insurance in the Presence of Poverty Traps: A Dynamic Approach," 35 pages.

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- Carter**, Michael R., Lan Cheng and Alexander Sarris (2011). "The Impact of Interlinked Insurance and Credit Contracts on Financial Market Deepening and Small Farm Productivity."
- Carter**, Michael R. (2008). "Inducing Innovation: Risk Instruments For Solving The Conundrum Of Rural Finance, keynote paper presented to the 6th Annual Conference of the Agence Française de Développement and The European Development Network," 24 pages.
- Boucher**, S. B. Barham and M.R. Carter (2008). "Are Land Titles the Constraint to Enhanced Agricultural Performance? Complementary Financial Policies to Crowd-In Credit Supply And Demand in Risk-Constrained Rural Markets," 33 pages.
- Barrett**, C.B. and M.R. Carter (2005). "Risk and Asset Management in the Presence of Poverty Traps: Implications for Growth and Social Protection," paper prepared for the conference "Linking Social Protection and Growth: Concepts, Assessing Empirical Evidence, Developing the Future Agenda," Leuven, 22 pages.
- Carter**, Michael and Juan S. Chamorro. "The Economics of Liberalizing Segmented Land Markets: Theory and Evidence from Nicaragua," 34 ppgs, September 2001.
- Carter**, Michael R. "Land Access and Class Mobility through Three Decades of Agrarian Reform and Liberalization," 26 ppgs, September 2001.
- Carter**, Michael R., Yang Yao and Klaus Deininger, "A Theory of Property Rights Reform with Embedded Safety Nets and Incomplete Markets," 41 ppgs, July 2001.
- Mogues**, Tewodaj and Michael Carter, "Social Capital and Incentive Compatibility: Modeling the Accumulation and Use of Social Capital," *Staff Paper 460, UW Ag & Applied Economics Staff Papers* 36 ppgs, September 2003.
- Carter**, Michael, "Acertando los Precios y las Instituciones: Perspectivas Pos-Liberalización desde la Microeconomía Nueva del Desarrollo," paper presented to the seminar La Economía Agraria Peruana en la Epoca Pos-Liberalizacion, Lima, September 1999.
- Carter**, Michael R., Pedro Olinto and Diana Fletschner. "Do the 'Poor but Efficient' Survive in the Land Market: Capital Access and Land Accumulation in Paraguay" 25 ppgs, 1998.
- Carter**, Michael R. and Pedro Olinto "Wealth, Property Rights and Credit Rationing: Simulated Maximum Likelihood Estimates of a Disequilibrium Credit Market" 32 ppgs, 1997.
- Carter**, Michael R. and Pedro Olinto. "Impact of Land Titling on Agricultural Productivity in Paraguay," *World Bank Working Paper*, 65 ppgs, 1996.
- Carter**, Michael R. and Cesar Herrera "Neither Wallerstein nor Solow: A Random Coefficients Model of Stasis and Mobility in the Economic World System," *Global Studies Research Program Working Paper 13*, 1995.

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- Carter**, Michael R. and Steve Boucher “Consumption Smoothing at What Cost? A Household Portfolio Model of the Financial Efficiency Gap and the Economic Space for Financial Market Innovation,” 35 ppgs, 1995.
- Carter**, Michael, B. Barham, S. Boucher and E. Zegarra “Closing the Financial Efficiency Gap: The Role and Design of Cooperative Financial Intermediaries in Low Income Countries,” 65 ppgs, 1995.
- Carter**, Michael R. and Eduardo Zegarra (1995). “Reshaping Class Competitiveness and the Structure of Agrarian Growth with Well-Sequenced Policy Reform,” *U.W. Agricultural Economics Staff Paper 379* (revised).
- Carter**, Michael, and Chris Walker. “The Evolution of Agrarian Structure in Latin American: An Econometric Analysis of Brazil,” 1994, 34 ppgs.
- Carter**, Michael, and Fred Zimmerman. “Mediating Risk through Markets, Rational Cooperation and Public Policy: Institutional Alternatives and the Trajectories of Agrarian Development in the West African Sahel,” *IRIS Research Paper* (University of Maryland) 1993, 42 ppgs.
- Carter**, Michael, and Luis Galeano and Karen Luz “Land Markets and Campesino Agriculture in Paraguay: Changing Patterns of Land Access and Ownership in A Period of Rapid Growth.” 1992, 45 ppgs.
- Carter**, Michael. “Experiments in Agrarian Class Formation and Structural Evolution: Agricultural Decollectivization in Peru and Chile,” 1991.
- Carter**, Michael, and Dina Mesbah “Economic Theory of Land Markets and Its Implications for the Rural Poor,” *Land Tenure Center Research Paper*, 1990.
- Blarel**, Benoit L., Michael Carter, Chris Onyango, and Keith Wiebe. “Economic Constraints to Agricultural Productivity in Njoro Division, Kenya”. *U.W. Agricultural Economics Staff Paper 297*. revised 1989.
- Carter**, Michael, and John Kalfayan. “A General Equilibrium Exploration of Agrarian Class Structure and Production Relations,” *U.W. Agricultural Economics Staff Paper 279*, revised, 1989.
- Carter**, Michael. “Colectivas, Cooperativas, y Parcelas: Un Analisis Economico de Alternativas Institucionales en la Agricultura Reformada,” 1987.
- Jonakin**, Jon, and Michael Carter. “The Economic Case for Land Reform: An Assessment of the Farm Size/Productivity Relation and Its Impact on Policy,” 1987.
- Carter**, Michael, and Don Kanel. “Collective Rice Production in Finca Bermudez: Institutional Performance and Evolution in the Dominican Agrarian Reform,” *Research Paper 83*, Land Tenure Center University of Wisconsin, 1985. (Also in Spanish).
- Kanel**, Don, Edward P. Reed, and Michael Carter. “Collective Farming: Lessons from Experience,” Draft report, Land Tenure Center, University of Wisconsin, 1985.
- Carter**, Michael. “A Note on the Definition and Estimation of Technical Efficiency Using Frontier and Other Omitted Variable Estimators,” 1983.

VI. Invited Papers and Seminars (since 2003)

- School of Oriental and African Studies, London, February 2013
- Allied Social Sciences Association annual meeting, San Diego, January 2013
- Paris School of Economics, Paris, December 2012
- World Development Report 2012 Workshop, Berlin, December 2012
- Ministry of Social Inclusion and Development, Lima, Peru, October 2012
- Millennium Challenge Corporation Impact Evaluation Conference, Washington, D.C., October 2012
- Consultative Group for International Agricultural Research (CGIAR) Science Seminar Series, Live Video Stream, September 2012
- Summer School in History of Economic Thought, Economic Philosophy and Economic History, Lille, France, August 2012
- International Association of Agricultural Economists, Foz de Iguasu, Brazil, August 2012
- Agriculture Evaluations Peer Review Workshop, Millennium Challenge Corporation, July 2012
- Workshop on Poverty Reduction: Building the Agenda for Impact Assessment Stellenbosch, South Africa June 2012
- International Fund for Agricultural Development Latin America Meeting, Guatemala, May 2012
- Ultra-poverty Conference, George Washington University, March 2012
- School of Oriental and African Studies, University of London, Conference on Institutional Foundations for Inclusive Development, March 2012
- Department of Economics, Yale University, February 2012
- Department of Economics, University of San Francisco, February 2012
- Department of Agricultural & Applied Economics, University of Wisconsin, February 2012
- Resource Economics and Environmental Sociology Annual Conference, University of Alberta, January 2012
- Impact Evaluation of the MCC Small Farm Development Program Washington, DC and Managua, January 2012

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- Association of Public and Land-grant Universities, Annual Meeting, San Francisco, November 2011
 - 36th National Agrarian Congress, Bogota, November 2012
 - CCFAS Workshop on Managing Climate-related Risk, Washington, DC, October 2011
 - New Evidence on Poverty Traps, University of Paris 1, October 2011
 - Building Resilience & Assets for Food Security, Washington, September 2011
 - Public-Private Partnerships for Ag Insurance, Lima, July 2011
 - Feed the Future Learning Agenda Technical Meeting, Washington, DC, June 2011
 - Forum for Agricultural Risk Management and Development (FARMD) Annual Conference, Zurich, June 2011
 - University of Clermont-Ferand & FERDI, June 2011
 - USAID-ATAI Evidence Summit on Agricultural Technological Change, June 2011
 - Congressional Research Service Briefing on Food Aid, May, 2011
 - Ag Sector Council Seminar, USAID, May 2011
 - WIDER Conference on Land Ownership, Hanoi, January 2011
 - University of Sydney, December 2010
 - Evidence Summit on Broadly Based Growth, USAID, December 2010
 - University of the Andes, Bogota, September 2010
 - UN FAO Conference on Smallholders and Value Chains, Rome, May 2010
 - IFPRI Conference on Lessons from Asia and Latin America, Lima, March, 2010
 - Pacific Development Economics Conference, March, 2010
 - University of Southern California, February, 2010
 - University of California, Riverside, February, 2010.
 - Global Index Insurance Facility Workshop, IFC, Nairobi, December 2009
 - Agricultural Impact Evaluation Conference, Inter-American Development Bank, October 2009
 - Institute for the Study of Social Sciences, Cornell University, October 2009
 - Microinsurance Workshop, IFPRI, October 2009.

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- Graduate Institute in Policy Studies (GRIPS/FASID), Tokyo, August 2009
 - Agricultural and Applied Economics Association Annual Meeting, July 2009
 - Keynote speaker, Nordic Development Economics Conference, Oslo, June 2009.
 - UC-San Diego Conference on Innovations in Microfinance, April 2009.
 - World Food Program/IFAD Conference on Index Insurance, Rome, March 2009.
 - World Bank Land Conference, March 2009
 - 6th Annual Conference of the Agence Française de Développement and The European Development Network, November 2008
 - FAO, Rome, November 2008
 - Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO), November 2008
 - Millennium Challenge Corporation, May 2008
 - La Trobe University, Melbourne, April 2008
 - Monash University, Melbourne, April 2008
 - USAID Microenterprise Development Program, February 2008
 - University of California, Davis, February 2008.
 - Facultés Universitaires Notre-Dame de la Paix, Namur, November 2007
 - Wageningen University, November 2007
 - Princeton University, September 2007
 - World Bank, Washington, D.C., September 2007
 - Millennium Challenge Corporation, Washington, D.C., June 2007
 - IFPRI 2020 Vision Seminar, Washington, D.C., May 2007
 - Rural Poverty and Public Policy in Brazil, Brasilia, April 2007
 - Keynote Address, Pacific Development Conference, Davis, CA, March 2007
 - FAO Research Conference on Rural Finance, Rome, March 2007
 - Unconditional Cash Transfers, Johns Hopkins SAIS and The Center for Global Development, November 2006
 - Poverty Reduction in Fragile and Conflict States Conference, Washington, D.C., November 2006.
 - Chronic Poverty Measurement Workshop, University of Manchester, October 2006.

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- Polarization and Mobility in Contemporary Latin America, American Agricultural Economics Association Annual Meetings, July 2006.
 - Asset-based Approaches to Poverty Reduction in a Globalized Context, Brookings Institution, June 2006
 - Innovations in Rural Finance Conference, Washington, D.C., June 2006.
 - International Conference on Agrarian Reform and Development, Porto Alegre, March 2006
 - Land, Poverty, Social Justice and Development Conference, Institute for Social Studies, the Hague, January 2006
 - National Treasury of South Africa, November 2005
 - University of Colorado, Denver, November 2005
 - GRADE Workshop on Agricultural Risk and Insurance, Lima, August 2005
 - American Agricultural Economics Association Annual Meetings, July 2005
 - University of Cape Town, Department of Economics, July 2005
 - Institute for Development Studies, Sussex, May 2005
 - Overseas Development Institute, London, May 2005
 - Cornell University Development Economics Workshop, April 2005
 - Chronic Poverty Research Centre, Social Protection Conference, University of Manchester, February 2005
 - American Economic Association Annual Meetings, January 2005.
 - Social Science Research Council, Program on Applied Economics, Santa Cruz, December 2004.
 - BASIS Conference on Persistent Poverty in Africa, Washington, D.C., November 2004.
 - University of KwaZulu-Natal School of Development Studies, 50th Anniversary Conference, October 2004.
 - Improving Land Access Conference, Managua, August 2004.
 - OECD Working Group on Poverty, Helsinki, June 2004.
 - China Centre for Economic Research, Peking University, May 2004
 - Department of Economics, University of KwaZulu-Natal, April 2004
 - National Treasury, Republic of South Africa, April 2004

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- Conference on Theoretical Perspectives on Identity, Community and Economic Policy, Barcelona, February 2004
 - Asset-Based Development Conference, USAID, Washington, D.C., January 2004
 - American Economic Association Annual Meetings, San Diego, January 2004
 - MacArthur Project Workshop on Social Capital, Washington, D.C., December 2003.
 - International Association of Agricultural Economics, International Congress, Durban, August 2003
 - American Agricultural Economics Association, Annual Meeting, Montreal, July 2003
 - Committee on Food Security, UN Food and Agricultural Organization, Rome, May 2003
 - Chronic Poverty Research Conference, University of Manchester, April, 2003.
 - University of California, Berkeley, Department of Economics, February, 2003.
 - University of California, Davis, Department of Agricultural Economics, February, 2003.

VII. Courses Taught

Graduate Level:

Microeconomics of Agricultural Development
 Macroeconomics of Agricultural Development
 The Global Economy and National Development Strategy

Undergraduate Level:

Growth and Development in the Global Economy
 Economics of Agrarian Growth and Class Formation
 Economic Development of Less Developed Countries
 Intermediate Macroeconomic Theory
 Introduction to Econometrics
 Economics of Socialism

VIII. Grants

- The Impact of SRI Rice on Rural Livelihoods in Haiti, \$150,000 (co-PI), Oxfam America, 2013-2014
- Evaluating the Socio-economic Impacts of Western Seed's Hybrid Maize Program, \$400,000 (\$105,000 to UCD) (co-PI), Accumen Fund, 2013-2015
- BASIS Assets and Market Access Research Consortium, \$18 million, USAID, 2012-2017

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- Measuring the Impact of Walmart's Direct Farm Program on Farmer Income and Agricultural Practices, \$625,000 (co-PI), Walmart Foundation, 2012-2015
 - Index Insurance: Innovative Financial Technology to Break the Cycle of Risk and Rural Poverty in Ecuador, \$265,000, Ford Foundation
 - I4 Index Insurance Innovation Initiative, \$3.5 million, USAID, UC-Davis, Blum Center for Developing Economies
 - Index Based Livestock Insurance, 2008-2011, \$1 million, DfID, World Bank and US-AID Food for Peace Office
 - Assets and Market Access Research Consortium, \$14 million, USAID, 2006-2011.
 - Impact Evaluation of Nicaragua's MCA Program, \$388,000, Millennium Challenge Corporation, 2006-2012.
 - Social Protection Policy to overcome Poverty and Aid Traps, \$45,000, World Bank, 2006-2007.
 - Using Asset Dynamics to Measure Persistent Poverty, \$30,000 (co-PI), Chronic Poverty Research Centre, University of Manchester, 2005-2006.
 - The Microempirics of Poverty Traps, \$100,000, USAID (co-PI), 2006-2006.
 - KwaZulu-Natal Income Dynamics Study, \$70,000, USAID (PI), 2004-2005.
 - Pathways from Poverty, \$40,000, BASIS Research Program (Co-investigator), 2004-2006.
 - Enhancing Land Access to Broaden the Base of Growth, \$50,000 USAID (PI), 2004.
 - Identifying the Pathways Into and Out of Poverty, \$23,000, International Food Policy Research Institute (PI), 2004-2005..
 - BASIS Collaborative Research Support Program, ~\$2 million/year, USAID (PI), 2001-2006.
 - Coping with Covariant Shocks: The Socio-economic Width of Informal Insurance Mechanisms, \$12,000, International Food Policy Research Institute, 2001 (PI).
 - Entitling Women: Gender, Land Rights and the Household Economy in Honduras and Nicaragua, \$35,000, USAID/BASIS, 2001-2002 (PI).
 - Efficiency and Equity Consequences of Property Rights Reform: The Case of Increased Tenure Security in China, \$50,000, World Bank Research Committee, 2001-2002 (Co-PI).
 - The Social Limits to Reciprocity, \$ 24,000, Pew Charitable Trust Initiative on the Nature of the Human Person, 2001-2002, (Co-Investigator).

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- Legacies of Inequality: Social Capital, Social Exclusion and the Dynamics of Income Distribution and Poverty, \$ 600,000, John D. and Catherine T. MacArthur Foundation, 2000-2002 (PI).
 - Land Market Access and the Welfare of the Rural Poor: Lessons from the Reforms in Central America and Mexico, \$ 450,000, European Community, World Bank and USAID 1999-2001 (PI).
 - Rural Economic Growth and the Improvement of the Peasant Economy in Colombia, \$ 21,000 IICA and the Inter-American Development Bank, 1998 (PI).
 - Dynamics of Persistent Poverty in South Africa, \$ 170,000 Ford Foundation, International Food Policy Research Institute, and the BASIS Project 1997-1998 (Co-PI).
 - Land Tenure, Land Markets and Land Productivity in Rural China, \$ 30,000, World Bank, 1997 (Co-Investigator).
 - International Institute Graduate Training Program, \$ 75,000, Ford Foundation, 1996-1999 (Co-Investigator).
 - Poverty in South Africa: Breaking the Cycle of Reproduction, \$ 18,800, Ford Foundation, 1995-96 (Co-P.I.).
 - Rural Poverty in South Africa, \$ 21,890, World Bank, 1994-1995 (P.I.).
 - Land Tenure Insecurity and Small Farm Productivity in Paraguay, \$ 62,000, World Bank, 1994-1996 (P.I.).
 - Non-Traditional Exports and Non-Traditional Capital Access, \$ 29,578, World Council of Credit Unions, \$ 20,000 USAID Latin America Bureau, 1993-1994 (P.I.).
 - Explaining the Heterogeneity of African Experiences with Agricultural Liberalization, \$ 10,000, World Bank, 1993-1994 (P.I.).
 - Land Tenure and Agricultural Performance in China, \$ 48,480 Ford Foundation, 1993-1994 (Co-Investigator)
 - Conference on Sustainable Development with Equity for the 1990's, \$ 75,000, Ford Foundation, 1992-92 (Co-P.I.).
 - Paths of Growth and Transformation in African Agriculture: Solving the Food Crisis? \$ 30,000, IRIS Research Program (University of Maryland), 1992-1993, \$ 13,500 U.W. Graduate School, 1991-92 (P.I.).
 - Agro-Export Growth and the Rural Resource Poor in Latin America: Policy Initiatives to Alleviate Exclusion, \$ 56,000, USAID, 1992 (P.I.).
 - Enlisting the Land Market to Solve the "Land Hunger" Problem in Paraguay—Will it Work? AID/Paraguay \$ 45,000, 1991/92 (P.I.).
 - Does It Take More Than Free Markets? The Microeconomics of Agricultural Growth and Its Impact on Agrarian Structure and Social Stability in Latin America, \$ 60,000, MacArthur Foundation, 1990-1991 (P.I.).

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- The Impact of Non-Traditional Export Strategies on Agrarian Structure and Distribution in Guatemala, \$ 25,000, Tinker Foundation, 1989-91 (Co-P.I.).
 - Evolution of Agrarian Structure in Kenya, \$ 20,154, U.W. Graduate School, 1989-90 (P.I.).
 - Viability of Agricultural Production Cooperatives in Nicaragua, \$ 85,000, Ford Foundation, 1988-89 (P.I.).
 - Land Tenure Security and Land Markets in Kenya, \$ 10,000, USAID, 1988 (Add on to Land Tenure Center grant).
 - Agrarian Structure in Latin America, \$ 79,000, USAID, 1986-89 (Co-P.I.).
 - Constraints to Small Farm Efficiency in Kenya, \$ 120,000, USAID, 1985-87 (Co-P.I. with Virginia State University).
 - Risk in Sahelian Agriculture, \$ 41,400, World Bank, 1985-87 (Co-Investigator).
 - Decollectiviation of Peruvian Agrarian Reform Agriculture, \$9823, UW Graduate School and USAID-Lima, 1985-86 (P.I.)

IX. Major University Service

- Search and Screen Committee for Dean, College of Agricultural and Life Sciences, 2005
- Graduate School Research Committee, 2004-2007
- Institutional Review Board for Social and Behavioral Sciences (Human Subjects), 2002.
- BASIS and AMA Collaborative Research Support Programs, Director 2001-.
- Social Studies Divisional Committee, 1999-2002.
- African Studies Program, Program Planning Committee, 2000-
- International Studies Program, Executive Committee, 1999-
- Latin American Studies Program, Executive and Nave Committees, 1990-
- Global Research Program Leader, BASIS Research Consortium, 1996-1998.
- Search and Screen Committee for Dean, College of Agricultural and Life Sciences, 1997.
- Review Committee, Department of Political Science, 1997.
- Director of Graduate Programs, Department of Agricultural and Applied Economics, 1995-1997 & 2006-2008.

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- Chair and Member, University Fellowships Committee, Social Studies Division, 1990, 1992-1994.
 - Co-Director, Global Studies Research Program, 1993-1996.

X. Other Professional Activities

- Scientific Committee, Breaking Poverty Persistence in Latin America: An Unfinished Agenda, World Bank
- Scientific Committee, Conditional Cash Transfers and Rural Development in Latin America Initiative – Universidad de los Andes & the International Fund for Agricultural Development, 2012-2015
- External Advisor, Comisión Quipu, Lima, Peru, 2012
- Editorial Board, Studies in Comparative International Development, 2007-
- President, International Section, American Agricultural Economics Association
- Advisory Board, National Longitudinal Study of Colombia
- Advisory Board, National Income Dynamics Study of South Africa (NIDS)
- World Development Report, 2008, Contributing Author
- World Development, Associate Editor (microeconomics), 2003-
- World Bank, Land Policy Research Review, Steering Committee, 2001-2003.
- Oxfam America, Board of Directors, 2001-2008
- American Journal of Agricultural Economics, Associate Editor, 1998-2002.
- Institut de Reserche pour la Développement, Land Policy Project Scientific Advisory Committee, 2000-
- Referee: *Journal of Development Economics*, *World Development*, *Economic Development and Cultural Change*, *American Economic Review*, *Review of Economic Studies*, *Economic Journal*, *Oxford Economic Papers*, *American Journal of Agricultural Economics*, *Land Economics*, *Ford Foundation*, *Inter-American Foundation*, and *MacArthur Foundation*.
- Memberships: American Economic Association, Royal Economic Society, American Agricultural Economics Association

XI. Foreign Language

- Fluent in Spanish

XII. Honors and Awards

- Fellow, BREAD (Bureau for Research and Economic Analysis of Development), 2012
- Fellow, Agricultural and Applied Economics Association, 2009
- International Dinner Speaker, American Agricultural Economics Association Annual Meeting, 2006
- Outstanding Article in the *American Journal of Agricultural Economics*, 2003 (with Pedro Olinto)
- Outstanding Contribution to the Graduate Program, Department of Ag and Applied Economics, 1996
- Graduate Teaching Award, Department of Agricultural Economics, 1994, 1999
- Vilas Associate Professor, University of Wisconsin-Madison, 1990
- Foreign Travel Fellowship, University of Wisconsin-Madison, 1981
- University Fellowship, University of Wisconsin-Madison, 1980-81
- Department of Economics Fellowship, University of Wisconsin-Madison, 1978
- Magna cum laude, Georgetown University, 1977
- Notz Medal in Economics, Georgetown University, 1977
- Phi Beta Kappa, 1976

.XIII. Ph.D. Advisees

- Aldana, Ursula (Ag & Applied Economics), 2010 GRADE.
- Agüero, Jorge (Ag & Applied Economics), 2006, University of California-Riverside
- Barrett, Christopher (Economics and Ag & Applied Economics), 1994, Utah State University; Cornell University
- Boucher, Stephen (Ag & Applied Economics), 2000, University of California-Davis
- Castillo, Marco (Ag & Applied Economics), 2001, University of Newcastle on Tyne; Georgia Tech; George Mason
- Chen, Weiping (Ag & Applied Economics), 2003, Freddie Mac
- Chamorro, Juan (Ag & Applied Economics), 2002, Government of Nicaragua
- Fletschner, Diana (Ag & Applied Economics), 2002, University of Washington-Seattle
- Galarza, Francisco (Ag & Applied Economics), 2009.
- Hauge, Soren (Economics), 1998, Ripon College
- Heber, Mary (Economics), 1990.
- Ikegami, Menoubu (Ag & Applied Economics), 2008, International Livestock Research Institute
- Kaimowitz, David (Ag & Applied Economics), 1986, ISNAR; International Center for Agro-forestry (co-advisor)
- Katz, Elizabeth (Ag & Applied Economics) 1992, World Bank, Barnard College; St Mary's College; Univ. of San Francisco
- Laajaj, Rachid (Ag & Applied Economics) 2012, Paris School of Economics
- Linkow, Benjamin (Ag & Applied Economics) 2008, Miami University of Ohio
- Melmed-Sanjak, Jolyne (Ag & Applied Economics) 1987, SUNY-Albany; USAID/Latin America Bureau; Millennium Challenge Corporation
- Morrow, John (Ag & Applied Economics) 2010, Kent State; LSE
- Mogue, Tewodaj (Ag & Applied Economics) 2005, IFPRI
- Mushinski, Dave (Economics), 1996, Colorado State University (co-advisor)
- Olinto, Pedro (Ag & Applied Economics) 1997, World Bank; IFPRI; World Bank
- Ricardo Sabates (Development Studies), 2002, University of London
- Shimamura, Yasuhara (Ag & Applied Economics), 2009, FASID GRIPS Graduate Program, Tokyo

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- Sial, Maqbool (Ag & Applied Economics), 1989, Pakistan Agricultural Research Council; University of Faisalabad
 - Stanley, Denise (Ag & Applied Economics), 1997, University of Tennessee; Cal State-Fullerton
 - Uriarte, Alex (Development Studies), 2000, Brazilian Education NGO; USAID
 - Walker, Christopher (Economics and Ag & Applied Economics), 1999, Asian Development Bank
 - Weibe, Keith (Ag & Applied Economics), 1992, USDA
 - Wenner, Mark (Ag & Applied Economics), 1989, USDA; Inter-American Development Bank
 - Wheeler, Rachel (Development Studies), 2001, Institute for Development Studies, Sussex (co-advisor)
 - Yao, Yang (Ag & Applied Economics) 1996, Peking University
 - Zegarra, Eduardo (Ag & Applied Economics), 2002, Ministry of Agriculture, Lima, Peru; GRADE
 - Zimmerman, Frederick (Economics), 1994, Stanford University; University of Washington

TRAVIS J. LYBBERT

Ag & Res Econ, One Shields Ave, Davis CA 95616 • Tel:(530) 554-1393 • Fax:(530) 752-5614
tlybbert@ucdavis.edu • http://tlybbert.ucdavis.edu

APPOINTMENTS & EXPERIENCE

2011+	ASSOCIATE PROFESSOR	Dept. of Ag. & Resource Econ., Univ. of California, Davis, CA
2011	VISITING RESEARCHER	World Intellectual Property Organization, Geneva, Switzerland
2006-11	ASSISTANT PROFESSOR	Dept. of Ag. & Resource Econ., Univ. of California, Davis, CA
2004-06	ASSISTANT PROFESSOR	Wilkes Honors College, Florida Atlantic Univ., Jupiter, FL
2002-03	INSTRUCTOR	Operation Research Department, Cornell University, Ithaca, NY
2002	INTERN	WTO-Intellectual Property Division, Geneva, Switzerland
2000-02	LICENSING CONSULTANT	Cornell Research Foundation, Ithaca, NY
1997-98	FULBRIGHT SCHOLAR	Rabat, Morocco

EDUCATION

CORNELL UNIVERSITY, Ph.D. Applied Economics, 2004
CORNELL UNIVERSITY, M.S. Agricultural Economics, 2000
UTAH STATE UNIVERSITY, B.A. Economics, 1997 *summa cum laude*

TEACHING

Microeconomics of Development (Ph.D)	International Economic Development
Applied Microeconomics (M.S.)	Honors Controversies in the Global Economy
Honors Principles of Microeconomics	Honors Principles of Macroeconomics
Honors Environmental Economics	Honors GIS & Economics
Honors Introduction to Econometrics	Economics of Engineering Systems
Business & Poverty (Lifelong Learning course)	

PUBLICATIONS

36. Travis J. Lybbert, Nicholas Magnan, David Spielman, Kajal Gulati, Anil Bhargava, "Farmers' Demand for Laser Land Leveling in Eastern Uttar Pradesh, India: An experimental auction to inform market segmentation and targeting strategies" forthcoming *American Journal of Agricultural Economics*.
35. Travis J. Lybbert and Ghada Elabed, "Olive Oil as an Economic Development Elixir: Olive oil policies and rural poverty alleviation in the Middle East & North Africa" forthcoming *Development Policy Review*.
34. Travis J. Lybbert, David R. Just, and Christopher B. Barrett, "Estimating risk preferences in the presence of bifurcated wealth dynamics: Do we misattribute dynamic risk responses to static risk aversion?" forthcoming *European Review of Agricultural Economics*.
33. Jenny C. Aker, Christopher Ksoll and Travis J. Lybbert "Can Mobile Phones Improve Learning? Evidence from a Field Experiment in Niger" forthcoming *American Economic Journal: Applied Economics*.
32. David R. Just and Travis J. Lybbert, "A Generalized Measure of Marginal Risk Aversion: Experimental

- Evidence from India and Morocco” forthcoming *American Journal of Agricultural Economics*.
31. Michael Carter and Travis J. Lybbert. 2012. “Consumption versus Asset Smoothing: Testing the Implications of Poverty Trap Theory in Burkina Faso” *Journal of Development Economics* 99: 255-264 .
 30. Travis J. Lybbert. 2012. “Hybrid Public-Private Delivery of Preventative Lipid-Based Nutrient Supplement Products: Key Challenges, Opportunities and Players in an Emerging Product Space” *SCN News* (UN Standing Committee on Nutrition) 39: 32-39.
 29. Travis J. Lybbert and Daniel Sumner. 2012. “Agricultural Technologies for Climate Change Mitigation and Adaptation in Developing Countries: Policy Options for Innovation and Technology Diffusion” *Food Policy* 37: 114-123.
 28. Travis J. Lybbert, Abdellah Aboudrare, Deborah Chaloud, Nicholas Magnan, and Maliha S. Nash. 2011. “Booming markets for Moroccan argan oil appear to benefit some rural households while threatening the endemic argan forest” *Proceedings of the National Academy of Sciences* 108(34): 13963-13968.
 27. Travis J. Lybbert and John McPeak. 2012. “Risk & Intertemporal Substitution: Livestock Portfolios & Off-take Among Kenyan Pastoralists” *Journal of Development Economics* 97: 415-426.
 26. Travis J. Lybbert, Troy C. Lybbert, Aaron Smith, and Scott Warren, “Does the Red Flag Rule Induce Risk Taking in Spring Finishes? Moral Hazard Crashes in Cycling’s Grand Tours” *Journal of Sports Economics* forthcoming.
 25. Nicholas Magnan, Rachid Mrabet, Travis J. Lybbert, and Aziz Fadlaoui. 2011. “The Option Value of Delayed Input Use Under Catastrophic Drought Risk: The case of no-till in Morocco” *American Journal of Agricultural Economics* 93(2): 498-504.
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 7. Travis J. Lybbert, Christopher B. Barrett, and Hamid Narjisse. 2004. "Does Resource Commercialization Induce Local Conservation? A Cautionary Tale from Southwestern Morocco." *Society & Natural Resources* 17: 413-430.
 6. William H. Lesser and Travis J. Lybbert. 2004. "Do Patents Come Too Easy?" *IDEA: The Journal of Law and Technology* 44(3): 381-407.
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WORKING PAPERS

- a. Travis J. Lybbert, Nicholas Magnan and W. Douglas Gubler, "Powdery Mildew Risk & Forecasting in Winegrapes: Do growers change risk management strategies in response to disease forecasts?"
- b. Christopher R. Gustafson, Travis J. Lybbert, Daniel A. Sumner, "Consumer Characteristics, Identification, and Hedonic Valuation of Wine Attributes: Exploiting Data from a Field Experiment"
- d. Katherine P. Adams, Stephen A. Vosti, Travis J. Lybbert, and Emmanuel Ayifah, "Using Experimental Auctions to Estimate Willingness-to-Pay for a New Maternal Nutrient Supplement in Ghana"
- e. Travis J. Lybbert, Nicholas Magnan, David J. Spielman, Anil Bhargava, and Kajal Gulati, "Targeting Technology to Reduce Poverty & Conserve Resources: Experimental Delivery of Laser Land Leveling to

- Farmers in Uttar Pradesh, India”
- g. Travis J. Lybbert and Nikolas J. Zolas, “Getting Patents & Economic Data to Speak to Each Other: An ‘Algorithmic Links with Probabilities’ Approach for Joint Analyses of Patenting & Economic Activity”
 - h. Travis J. Lybbert and Heather Morgan, “Food Security & Sociopolitical Instability in the Middle East & North Africa: Lessons from the Arab Spring & Prospects for the Coming Decade”
 - i. Nicholas Magnan, David J. Spielman, Kajal Gulati, and Travis J. Lybbert, “Leveling with Friends: Network Effects on Demand for an Agricultural Technology in Eastern Uttar Pradesh, India”

OTHER PUBLICATIONS & REPORTS

10. Travis J. Lybbert, “Drought-tolerance: a learning challenge for poor farmers” *Science and Development Network*, Opinions, 14 July 2010. <http://www.scidev.net/en/opinions/drought-tolerance-a-learning-challenge-for-poor-farmers.html>
9. Travis J. Lybbert and Daniel Sumner, “Agricultural Technologies for Climate Change Mitigation and Adaptation in Developing Countries: Policy Options for Innovation and Technology Diffusion” *ICTSD-IPC Platform on Climate Change, Agriculture and Trade*, Issue Brief No.6, May 2010, International Centre for Trade and Sustainable Development (Geneva, Switzerland) and International Food & Agriculture Trade Policy Council (Washington DC).
8. Travis J. Lybbert and Michael R. Carter, “Evaluation of CIRM Research Plan for WRMS Project: *Comprehensive Agriculture Risk Management Services*” September 2009, Prepared for ILO and CIRM.
7. Abdellah Aboudrare, Travis J. Lybbert, and Nicholas Magnan “Le Marché de l’Huile d’Argan et Son Impact Sur Les Ménages et La Forêt dans La Region d’Essaouira” *Transfert de Technologie en Agriculture* Avril 2009 (Published by the Ministry of Agriculture and Fisheries, Kingdom of Morocco).
6. Travis J. Lybbert, Nicholas Magnan, and Alex McCalla “Assessing the Tradeoffs between Cereal and High Value Crop Production in Morocco” October 2008, Prepared for the World Bank.
5. Travis J. Lybbert, “Empirical Approaches to Assessing Tenure Constraints on Emerging Value Chains in Morocco” July 2007, Prepared for USAID project Integrating Agriculture and Agribusiness.
4. Travis J. Lybbert, “Costly Measures vs. ‘Unconscionable’ Profits” *Palm Beach Post* OP-ED, 10 November 2005.
3. Travis J. Lybbert, “Indian Farmers’ Valuation of Crop Yield Distributions: Implications for Bt Brinjal” Policy brief prepared for the Agricultural Biotechnology Support Project II (<http://www.absp2.cornell.edu/>), July 2004.
2. Travis J. Lybbert, Christopher B. Barrett, and Hamid Narjisse, “Market Solutions, the Environment, and Morocco” *Project Syndicate* Into Africa series, January 2003.
1. Travis J. Lybbert and Richard Cahoon, *Licensing the Ring-Spot Virus Resistant Papaya in the Caribbean Region*, Report prepared for Jamaican Agricultural Development Foundation, May 2001.

PRESENTATIONS

35. “Farmers’ Heterogeneous Valuation of Laser Land Leveling in Eastern UP: An Experimental Auction Approach to Informing Segmentation & Subsidy Strategies” Presented at ASSA January 2012, The Ohio State University April 2012, Purdue University April 2012, Bay Area Workshop in Behavioral and

- Experimental Economics May 2012.
34. “Comment les marchés d’argan ont eu un impact sur les ménages et la forêt ?” Presented at the Congrès International de l’Arganier, Agadir, Morocco, December 2011.
 33. “Data Mining & Probabilistic Matching Methods for Linking Patents to Trade: A Platform for Empirical Analysis of International Patenting Strategies” Presented at World Intellectual Property Organization July 2011.
 32. “Powdery Mildew Risk & Forecasting in Wine Grapes: Do growers change risk management strategies in response to disease forecasts?” Presented at SCC-76 Economics & Management of Risk in Agriculture & Natural Resources Annual Meeting March 2010, AAEA July 2010, and Colorado State University May 2011.
 31. “Agricultural Technologies for Climate Change Mitigation and Adaptation in Developing Countries: Policy Options for Innovation and Technology Diffusion” Presented at Tamil Nadu Agricultural University, September 2009; Roundtable on Climate Change and Food Security: Taking Stock after the COP15, OECD Paris, February 2010.
 30. “Goats, Trees & Rural Poverty: Ten years of booming markets for Moroccan argan oil” Presented at ‘Biodiversity Conservation & Poverty Traps’ Workshop, Cornell University, February 2010, University of Provence-Marseille, Laboratoire Population Environnement Développement, February 2010, Environmental Protection Agency, Landscape Ecology Branch, May 2010, and International Union for the Conservation of Nature-Geneva July 2011.
 29. “Dynamic Field Experiments in Development Economics: Risk valuation in Morocco, Kenya & Peru” Presented at Northeast Agricultural & Resource Economics Association Workshop in Experimental Economics, June 2009 and Tamil Nadu Agricultural University, September 2009; FAO Rome, January 2010.
 28. “Do Powdery Mildew Forecasts Shape How Winegrape Growers Manage Disease Risk?” Presented at SCC-76 Economics & Management of Risk in Agriculture & Natural Resources Annual Meeting, Galveston, March 2009 and at California Department of Pesticide Regulation, December 2009.
 27. “Do We Misattribute Dynamic Risk Responses to Static Risk Aversion?” Presented at Pacific Development Conference, March 2009.
 26. “Will the Poor Value Seed Traits that Reduce Risk? Bt in India and Drought Tolerance in Morocco” Presented at Biotechnology in Developing Countries, UC Berkeley, January 2009.
 25. “Seeing Shadows of Asset Dynamics in Variability Preferences: Risk Aversion & Intertemporal Substitution Among Kenyan Pastoralists” Presented as ARE Department Seminar, UC Berkeley, November 2008 and at AAEA, July 2009.
 24. “Drought Risk, Vulnerability & Rural Livelihoods in Morocco” Presented at Global Climate Change and Poverty in Dry Areas: Poverty Research for Improved Livelihoods in Dry Areas Workshop, Alexandria, Egypt, November 2008.
 23. “The Impact of the Argan Market Boom on Households and on the Forest” Presented at the Direction Provinciale d’Agriculture, Essouira, Morocco, July 2008.
 22. “What to Smooth? Asset v Consumption Smoothing in Burkina Faso” Presented at the Pacific Development Conference, San Diego March 2008; Brigham Young University October 2009; Utah State University October 2009; UC Davis January 2010; and University of Ouagadougou, Burkina Faso November 2011.
 21. “Drought Risk & Tolerant Technologies in Meknes, Morocco” Presented at the International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria, February 2008.

20. “PCT Applicants’ Spatial Strategies: Trade & Technology Attraction” Presented at the World Intellectual Property Organization, Geneva, Switzerland, February 2008.
19. “Risk Averters that Love Risk? Average v Marginal Risk Aversion” Presented at AAEA, July 2007 and Economic Science Association, October 2007.
18. “Farmers’ Valuation of Crop Yield Distributions & Field Experiments” Presented at University of San Francisco, April 2007.
17. “Risk Aversion & Intertemporal Substitution Among Kenyan Pastoralists: Two sides of the same coin?” Presented at the Duke Development Economics Workshop April 2007 and Northeast University Development Consortium 2007.
16. “Risk Responses to Dynamic Asset Thresholds” Presented at Allied Social Science Associations 2007.
15. “Desperation and dynamic risk aversion: Activity and investment choice when there’s nothing left to lose” Presented at Northeast University Development Consortium 2006 and Pacific Development Conference 2007.
14. “Is Risk Aversion Really Correlated with Wealth? Spurious correlation from estimated probabilities” Presented at AAEA, July 2006 and UC Davis 2006.
13. “Biodiversity Access, Benefit Sharing, and Patent Disclosure: A counterfactual case of Morocco’s Argan Oil” Presented at the WIPO-WTO Intellectual Property Colloquium 2006, Geneva, Switzerland.
12. “Tendances de l’Intégration de l’Agriculture et l’Agrobusiness” (Trends in the Integration of Agriculture and Agribusiness) Presented at the International Agriculture Fair 2006 Meknés Morocco, Meknés Regional Center of the *Institut National de Recherche Agricole* Morocco 2007, and Tamil Nadu Agricultural University 2007.
11. “Governing Entrepreneurs: The dynamic nexus of government, business, society, and technology” Presented at Wilkes Honors College Outreach Breakfast 2006 for local government and business leaders.
10. “How the World Got Rich Quick” Presented at Wilkes Honors College Forum 2006.
9. “La Sécheresse, La Vulnérabilité, et La Valorization des Semences” (Drought, Vulnerability, and the Valuation of Seeds) Presented at Rabat and Meknés Regional Centers of the *Institut National de Recherche Agricole* – Morocco 2006.
8. “Wealth, Farmer Characteristics and Risk Aversion” Presented at SCC-76 Economics and Management of Risk in Agriculture and Natural Resources, March 2005.
7. “Indian Farmers’ Valuation of Yield Risk: Will poor farmers value ‘pro-poor’ seeds?” Presented at Florida Atlantic University 2004, UW-Madison 2005, AAEA, July 2005.
6. “Diseases, Drugs, People, & Profit” Presented at Wilkes Honors College Forum 2004 and Rotary International Club-Jupiter 2004.
5. “Bayesian Herders: Asymmetric Updating of Rainfall Beliefs In Response To External Forecasts” (with Christopher B. Barrett) Presented at University of Arizona 2004, Montana State University 2004, UC-Berkeley 2004, Florida Atlantic University 2004, NEUDC 2002 and at the World Meteorological Organization 2002 (Geneva, Switzerland).
4. “Assessing the Impact of Plant Variety Protection Using Variety Trials” Presented at NC1003 Conference 2003, New Brunswick, NJ.
3. “Does Resource Commercialization Induce Local Conservation? A Cautionary Tale from Southwestern Morocco.” Presented at Western Ag. Econ. Assoc. meetings 2001.
2. “Pastoral Risk and Wealth-Differentiated Herd Accumulation Patterns in Southern Ethiopia” (with

Christopher B. Barrett) Presented at Cornell University, SUNY-Binghamton, and AAEA, July 2000.

1. “Migration Rates and Olympic Amenities: a model of previous Olympic host regions.” (with Dawn Thilmany) Presented at the Utah Governor’s Office of Planning and Budget 1997 and the Western Regional Science Association meetings 1998.

G R A N T S & F E L L O W S H I P S

UNDERSTANDING PATENTING STRATEGIES IN THE PATENT PERIPHERY

National Science Foundation, Science of Science and Innovation Policy Program, 2011-2013

PEST RISK FORECAST MAPS FOR PRODUCTION & BIOSECURITY THREATS

USDA Agriculture & Food Research Initiative, 2010-12

SUSTAINABLE GRAPE PEST MANAGEMENT IN CALIFORNIA

California Department of Food & Agriculture, 2010-12

LINKING MOROCCAN SAFFRON PRODUCERS TO HIGH VALUE SAFFRON MARKETS

International Center for Agricultural Research in the Dry Areas (ICARDA), 2009-10

LIPID NUTRIENT SUPPLEMENT FOR INFANTS & PREGNANT / LACTATING MOTHERS

Bill & Melinda Gates Foundation (with UC Davis Nutrition), 2008-2013

CELL PHONES AS A PLATFORM FOR ADULT LITERACY TRAINING

Center for Information Technology In Society (CITRIS), UC, 2008-09

Blum Center for Developing Economies, UC Berkeley, 2008-10

Fell Fund, Oxford University, 2008-10

ALO/INDIA PROJECT – EXPERIMENTAL ECONOMICS WORKSHOP

International Programs & Outreach, College of Agriculture & Environmental Sciences, UC Davis, 2007

GRAPE GROWERS & DISEASE FORECAST INFORMATION RESEARCH GRANT

Giannini Foundation of Agricultural Economics, 2008 & 2007

SEED GRANT FOR NEW INITIATIVES – INDIA

International Programs, UC Davis, 2007

DROUGHT RISK, VULNERABILITY & THE VALUATION OF TECHNOLOGY, MOROCCO

International Center for Agricultural Research in the Dry Areas (ICARDA), 2006-07

WIPO-WTO ACADEMY GRANT

Lifelong Learning Society, Florida Atlantic University, 2006

DISSERTATION RESEARCH GRANT

Agricultural Biotechnology Support Project II (USAID), 2003

A W A R D S & A C T I V I T I E S

QUALITY OF RESEARCH DISCOVERY AWARD

“Risk Averters that Love Risk? Marginal Risk Aversion in Comparison to a Reference Gamble” (with David R. Just), American Journal of Agricultural Economics Vol.91: 3 (2009), European Association of Agricultural Economists 2011

OUTSTANDING *AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS* ARTICLE

“Risk Averters that Love Risk? Marginal Risk Aversion in Comparison to a Reference Gamble” (with David R. Just), Agricultural & Applied Economics Association, 2010

EXCELLENCE IN EDUCATION AWARD FINALIST

Associated Students of UC Davis in College of Agriculture and Environmental Sciences 2008-09

WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO) ACADEMY INVITEE

Two week training at WIPO and WTO for teachers of intellectual property, Summer 2006

DISTINGUISHED TEACHER OF THE YEAR NOMINEE

Students of Wilkes Honors College, Florida Atlantic University, 2004-05 and 2005-06

INSTRUCTOR OF THE YEAR

Dept of Operations Research, Cornell University, 2003

BEST GRADUATE STUDENT PAPER

Dept of Applied Economics & Management, Cornell University, 2000

OUTSTANDING TEACHING ASSISTANT OF THE YEAR

College of Agriculture & Life Sciences, Cornell University, 1999

FULBRIGHT SCHOLAR, Morocco, 1997-98

HARRY S. TRUMAN SCHOLARSHIP FINALIST, 1996

O T H E R

REFEREE: American Journal of Agricultural Economics
Economic Development & Cultural Change
Environment & Development Economics
World Development
Current Anthropology
Journal of Agricultural & Applied Economics
Food Policy
National Science Foundation
Journal of Agricultural Economics
Journal of Sports Economics
Proceeding of the National Academy of Sciences
Ecology & Society

AFFILIATION: Agricultural & Applied Economics Association, Western Economic
Association, American Economics Association

LANGUAGES: English (native)
French (fluent)
Moroccan Arabic (conversational)