

# Which Innovations Reach More Than 100,000 or One Million People?

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## Evidence from the Development Innovation Ventures Portfolio

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## Executive Summary

The following are key findings from a review of the 43 awards made by Development Innovation Ventures (DIV) from 2010-2012. (For more detail, see , “Key Lessons on Reach” below.)

- 1) DIV has been successful in supporting innovations which reached more than 100,000 or 1,000,000 people within 3-4.25 years.

28% of DIV awards (12/43) have already reached more than 100,000 people. These awards account for 57% of the total value of DIV awards in this time period, or \$9,959,818 in total funding.

14% of DIV awards (6/43) have so far reached more than one million people. These awards account for 37% of the total value of DIV awards in this time period, or \$6,379,388 in total funding.

24 million people—approximately one person per \$0.75 invested by DIV—have been reached by innovations supported by DIV.

- 2) Although early stage awards have lower probability of generating reach, they are much cheaper, and thus have a particularly high reach per dollar invested by DIV. They generate substantial reach by leveraging support from other entities.
- 3) The great majority of the reach of DIV-supported innovations was attained without the applicants returning to DIV for additional financial support. Six of ten innovations which reached more than 100,000 people received only a single stage one or two grant. Innovator engagement with the rich ecosystem of existing players – NGOs, firms, and governments – generated tremendous leverage for DIV.
- 4) Cost was a key determinant of which innovations scaled. The largest scale was achieved by innovations with very low costs per person.
- 5) A start-up model involving creation and scaling of a new organization designed to support the innovation was used for only three of the ten innovations reaching more than 100,000 people and one of the five innovations reaching more than one million people. Seven of the ten DIV-supported innovations which reached 100,000 people and four of the five innovations reaching more than a million people relied on influencing the practices of existing large organizations, including large firms, NGOs, and governments.

- 6) Only two of the ten Innovations reaching 100,000 people or more obtained significant financing from direct sales to the ultimate consumers. Four could be seen as using bulk sales, and four used other approaches that minimized customer acquisition costs.
- 7) Innovations tested with RCTs scale not only through adoption by governments, but also through adoption by large existing private sector firms and NGOs.
- 8) The biotech and IT industries routinely build on innovations developed by researchers using frontier techniques in those fields. The evidence from DIV awards is consistent with the idea that a similar approach may be effective in development, with innovations developed in part by researchers and/or involving randomized controlled trials reaching 100,000 or 1,000,000 users at a particularly high rate.

42% (10/24) of awards for which an RCT was used for evaluation or development economics researchers were involved in design of the innovation reached more than 100,000 people.<sup>1</sup> 25% (6/24) of these awards supported innovations that have reached more than one million people.

In contrast, among the innovations not including an RCT component, 11% (2/19) reached 100,000 people and none reached more than one million people.

- 9) Innovations that had already been tested through RCTs and found to have impact and potential for cost effectiveness prior to applying for DIV support accounted for three of the five innovations that reached over one million people. We believe that DIV only made three awards in this category<sup>2</sup> and that all of them reached over one million people.
- 10) While some DIV-supported innovations have scaled up in multiple countries, most have not. DIV may want to encourage international diffusion of successful approaches, along with appropriate monitoring and testing.

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<sup>1</sup> These ten awards supported eight innovations, since two innovations each received two awards.

<sup>2</sup> To be confirmed subject to further review of the data.

## Introduction

This note reviews the rate at which innovations supported by Development Innovation Ventures' (DIV) 2010-2012 portfolio of 43 awards reached either 100,000 or 1,000,000 people. We look both at the portfolio overall, and at different subcategories of DIV investments, and draw some tentative lessons.

This is of interest for several reasons:

- 1.) Since the social value generated by each DIV investment depends on the number of people reached times the benefit per person, a necessary condition for a project generating a high social rate of return is that it reaches a large number of people. Other factors are important, but innovations that do not reach at least 100,000 people are unlikely to account for a large fraction of the social return of the DIV portfolio. Have DIV supported innovation reach any significant scale?
- 2.) Reaching scale is a major challenge for social entrepreneurs, and impact investors are concerned about whether there is a sufficient flow of high quality deals.<sup>3</sup> We are not aware of other organizations which release data on the percentage of investments that have reached 100,000 or one million people, but our impression is that only a limited number of social enterprises reach more than 100,000 people in Africa or more than one million people in South Asia. A rule of thumb in the for-profit venture capital world is that 10% of investments yield modest success, and that 1% of investments generate a large share of overall return. There is limited evidence on the determinants of which innovations succeed in reaching large numbers of people. The DIV experience allows us to shed light on this issue.
- 3.) DIV has some design features that differ both from most impact investors and from most government programs to encourage R&D, and evidence on the track record of DIV in achieving reach may be useful in thinking about the broader applicability of these design features. Whereas many other programs have a top-down approach in which program staff identify problems in advance, choose sectors on which to focus, or set strategy within sectors, DIV follows a bottom-up approach that is deliberately open across sectors. open to supporting both innovations that will scale commercially and innovations designed to scale through the public sector, and open to both startups and organizations proposing to change behavior within existing large organizations. Although the bulk of DIV's outreach effort has been oriented towards traditional social entrepreneurs, DIV has also made an effort to be open to proposals from development economics researchers. To balance this openness, DIV employs a staged finance approach in which innovations only receive larger-scale support after they have passed rigorous tests. DIV provides large-scale support only for innovations which have rigorous

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<sup>3</sup> For example, according to the "Beyond the Pioneer" JP Morgan Survey of 50 impact investors: "In 2009-10, a team led by Mike Kubzansky conducted an ambitious 16-month study of inclusive businesses across nine countries in sub-Saharan Africa. Their aim was to gain a better understanding of when, where and how market-based approaches in Africa succeed. The team looked at 439 promising inclusive businesses and found that only 32 percent were commercially viable and only 13 percent were operating at scale."

The Monitor inclusive markets report on "Emerging markets, Emerging models" conducted a market scan of over 300 organizations with over 150 business models including those thought to be very good and found that "only a handful of enterprises in low-income markets are commercially viable and operate at scale, even in a huge potential market like India, with its more than 700 million living at or below the poverty line."

evidence of impact and cost effectiveness or which have demonstrated market viability. At the piloting and testing stage, however, DIV has historically been open to proposals that have the potential to scale based on their cost effectiveness, for example, even if they do not necessarily already have a management team in place capable of scaling internally or written commitments from scaling partners. DIV's organizational structure supports this open approach. For instance, external referees and decision panelists review proposals, enabling DIV to accept proposals across diverse sectors without building a large internal staff with expertise across all sectors. Decision panels during this period typically included members with research experience in development economics and expertise in rigorous impact evaluation and cost-effectiveness analysis, as well as members with a background in social entrepreneurship or venture capital. USAID procurement rules during the period meant that DIV staff could not "co-create" projects, so the content of proposals was driven by the innovator applicants themselves. Evidence on the extent to which this approach generated reach may be relevant for DIV, for other programs that have been inspired in part by the DIV model and have adapted some of its features (e.g. the Global Innovation Fund, and innovation funds established in Peru and Tamil Nadu), for USAID more generally, and for the impact investing movement.

Below we first review methods and data, then present key lesson on the overall record of DIV in achieving reach, and on the predictors of reach among the projects in the DIV portfolio. . . Finally, we discuss how current reach, the focus of this note, fits into a broader calculation of social value and social return. Social value depends not only on the extent to which DIV has played a role in influencing current reach, but also on future reach, benefits per person, and cost. Appendix one reviews each DIV award, and Appendix two focuses on those innovations that have reached over one hundred thousand people, providing some discussion of the benefits of each innovation per person reached in cases where there is rigorous evidence on this impact. We are in the process of fleshing out this discussion to also qualitatively discuss the other determinants of social return.

## Methods and Data

This note focuses on the number of people reached. Because DIV supports early stage work, and it takes time to pilot, iterate, test, adapt, and scale innovations, we focus on the 43 DIV awards from the program's first grants in September 2010 through the end of 2012. It is too early to get a good sense of the potential reach of innovations that received a first award during or after 2013, though it is important to note that DIV has now made over 100 investments.

Monitor's research in India suggests that inclusive businesses take more than a decade to reach reasonable scale. We thus expect that many projects will continue to scale beyond the level that has already been reached.

Our estimates of reach should be interpreted as the number of people reached by innovations supported by DIV, or adapted forms of those innovations, not as a causal statement about the impact of DIV. Some innovations received multiple sources of support, and while we hope to provide some qualitative information on this in future iterations of this document, we cannot assess the counterfactual of how many people would have been reached in the absence of DIV support. We try to focus on measures of additional reach subsequent to the DIV funding decision, or in the case of entities that already had established programs, new reach for the products and geographies enabled by the DIV award, but this does involve subjective judgments, and in some cases we do not have clear data. We hope to improve this measure over time.

We take a number of steps that may lead us to conservatively estimate reach.

- a) We list the number of people reached only for projects that reached more than 100,000 people. We thus omit the people reached by projects which reached less than 100,000 people, but by focusing on projects with high reach we will capture the bulk of the social impact realized so far, since the reach of projects tends to be highly skewed. We separately report innovations that have reached more than 100,000 and innovations that have reached more than a million people.
- b) We do not project the future reach of DIV-supported innovations. Since DIV only made its first grants four and a half years ago, and it often invests in early-stage, high-risk projects, it is likely that the full impact of DIV's investments has not yet been realized. We believe that future benefits are likely to be large, but we do not attempt to provide quantitative estimates, since these would be inherently subjective.
- c) This note does not attempt to value learning created by DIV projects (e.g. policy lessons that led to *not* scale up ineffective projects, or spillover learning for other innovations).

The note focuses on the results of the DIV portfolio in terms of reach, and does not discuss important intermediate and process indicators regarding DIV operations, such as customer service measures, stakeholder satisfaction, additional funds raised, etc. Important lessons can clearly be learned from these, but they are outside the scope of this note.

## Data

Appendix one contains data on all 43 awards made by DIV from its first award in September 2010 through the end of 2012.

The following innovations reached more than one million people in the original or adapted form:

- Voter Report Cards (~ 10 million reached)<sup>4</sup>
- Election Monitoring Technology (~3 million reached with version tested under RCT, ~5.25M reached with cheaper version not tested by RCT)
- Consumer Action and Matatu Safety (~3 million)
- Chlorine Dispensers for Safe Water (~1.2 million)
- Digital Attendance Monitoring (~ 1.8 million during RCT)

The following innovations reached more than 100,000 people but less than one million people:

- Scaling CommCare for Community Health Workers<sup>5</sup> (~562,000)
- Renewable Powered Microgrids for Rural Lighting (~100,000)
- Recruiting and Compensating Community Health Workers (~240,000)
- Improved Cookstoves in Darfur and Ethiopia (~250,000)
- VisionSpring BoPtical Care (~140,000)

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<sup>4</sup> This innovation received two DIV awards from 2010-2.

<sup>5</sup> This innovation received two DIV awards from 2010-2.

Overall, innovations supported by DIV have already reached over twenty-four million people.<sup>6</sup>

Appendix two provides more detailed information on each of the DIV-supported innovations above which reached more than one hundred thousand or more than one million people. It also provides information on the benefits per person reached in those cases where data exists.

While in some cases classification of individual awards required judgement calls, and we are still in the process of obtaining more information on additional variables, and in some cases confirming certain pieces of data, we believe that the key results reported in the next section are broadly robust to classification of individual grants.

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<sup>6</sup> This is a conservative estimate, as it includes only those DIV awards that reached more than 100,000 people.

## Key Lessons on Reach

- 1.) **DIV has been relatively successful in supporting innovations that scale. A relatively high fraction of DIV awards, and an even higher fraction of DIV total investment, went to projects which, to date, have already reached more than 100,000 or 1,000,000 people.**

28% of DIV awards (12/43) have so far reached more than 100,000 people within 3-4.25 years.<sup>7</sup> These awards account for 57% of the total value of DIV awards in this time period, or \$9.96 million in total funding.

14% of DIV awards (6/43) have so far reached more than one million people. These awards account for 37% of the total value of DIV awards in this time period, or \$6.38 million in total funding.

We would eventually like to make formal comparisons with other impact investing organizations, but are not able to do so at this point. A rule of thumb in the venture world is that 10% of investments yield modest success and 1% yield large successes. While we have not yet identified other funders that publish data that would allow for computation of comparable statistics, our reading of the literature and our examination of websites of some other organizations suggests that these rates compare well with those achieved over a much longer time frame by other impact investing organizations. These results are all the more striking because while some organizations provide funding only after a certain level of scale is reached (e.g., Acumen, Skoll Foundation), DIV often supported innovations at an early stage (and supported a test to know whether they were worth scaling up), rather than waiting until innovations had already reached a certain scale and had attracted earlier support before investing.

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<sup>7</sup> Two innovations (Voter Information Report Cards and CommCare) that reached over 100,000 people received both a Stage 1 and a Stage 2 award. Thus these 12 awards support 10 separate innovations.

- 2.) **Stage one and stage two awards have a particularly low cost per person reached and amount for more than 95% of those reached by innovations supported by DIV during this time period.**

**Table Two: Number and value of awards by stage, fraction of awards reaching 100,000 or 1,000,000 users, and expenditure per person**

Award Stage	Number of Awards	Award Value	Fraction Reaching More than 100,000 people	Fraction Reaching More than 1,000,000 people	People Reached <sup>8</sup>	Expenditure per Person Reached
<b>Stage 1 (&lt; \$100,000)</b>	24	\$2,353,136	17% (4/24)	8% (2/24)	6,723,733	\$0.35
<b>Stage 2 (&lt;\$1,000,000)</b>	18	\$9,557,926	39% (7/18)	11% (2/18)	16,106,044	\$0.59
<b>Stage 3 (&lt;\$15M)</b>	1	\$5,516,606	100% (1/1)	100% (1/1)	1,280,536	\$4.31

One of these early stage innovations (Consumer Action and Matatu Safety) recently received a stage three DIV award, but in general, stage one and two innovations attained high levels of reach because other funders/entities provided support based in part on the information generated from DIV project. This leverage implies that investments in Stage 1 and Stage 2 awards can lead to significant reach per dollar spent.

- 3.) **The great majority of the reach of DIV-supported innovations was attained without the applicants returning to DIV for additional financial support.**

It is worth recognizing that DIV operates in a rich ecosystem, where other entities (governments, NGO, private sector firms) can adopt innovations. This has helped leverage DIV funding in a large way.

From a monitoring point of view, the fact that many innovations scale after the DIV project has closed, and without requesting additional DIV funding, implies that it is important to build monitoring systems to pick up these cases. DIV could consider maintaining contacts with scaling organizations and collect data on reach over time, even after the end of its funding period.

- 4.) **Cost was a key determinant of which innovations scaled. The largest scale was achieved by innovations with very low costs per person.**

In some cases there were innovations delivered by media or phone (e.g., voter report cards, election monitoring). Of course it's important to recognize that total impact depends on the benefit per person reached times the number of people reached, and some innovations with

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<sup>8</sup> Two innovations (Voter Information Report Cards and CommCare) that reached over 100,000 people received both a Stage 1 and a Stage 2 award. In both of these cases, people reached by those innovations are counted as people reached by Stage 2 awards.

moderate cost per person (e.g. Vision Spring) and moderate reach may generate high total social benefit.

- 5.) **While some innovations reached more than 100,000, or in one case, more than 1,000,000 people through the creation and growth of a new organization designed to scale the innovation, the vast majority of reach was delivered through adoption of DIV-supported innovations by existing large organizations, including large firms, NGOs, and governments.**

<b>Start-Up Model</b>	
Chlorine dispensers for safe water	
Vision Spring	
Renewable power micro grids	
Improved Cookstoves (check)	
<b>Existing Organization</b>	
Voter report cards	
Digital attendance monitoring	
Election monitoring technology	
Consumer action and matatu safety	
CommCare (check)	
Recruiting Community Health Workers	

- a) Four of the DIV-supported innovations which reached 100,000 or more consumers involved the creation and scaling of new organizations (Mera Gao Power, Vision Spring, Dispensers for Safe Water/ Evidence Action, and Cookstoves). Six involved adoption of the innovation by existing entities that already had high levels of reach.
- b) Of the five innovations which reached more than one million people, one was scaled by an NGO which constructed and built operations around the innovation (Evidence Action with chlorine dispensers), and four did so by adoption by existing organizations (Insurance companies for stickers in matatus, Government of India for biometric monitoring, political campaigns for real-time efforts to send polling station outcomes to central locations by mobile phones, and newspapers for voter report cards). Existing organizations with large reach that adopted DIV-supported innovations or modified versions of these innovations included private-sector firms, NGOs, and governments.

Many existing funders support social entrepreneurs seeking to start and scale new organizations, (e.g. Draper Richards Kaplan Foundation; the Mulago Foundation; the World Bank’s Development Marketplace; Legatum; CIF; and the Skoll Foundation). Many universities and business schools conduct business plan competitions to identify and support social entrepreneurs. DIV’s openness to a variety of approaches to innovation and to scaling, including, but not limited to, this approach seems to be one important ingredient in reaching large numbers of people.

- 6.) **Innovations that attained high reach through commercial sales sometimes used direct sales to the ultimate consumers, but more often relied on bulk sales or other approaches that minimized customer acquisition costs.**

Direct sales	Other
Renewable power micro grids	Recruiting Community Health Workers
Vision Spring	Digital attendance monitoring
Bulk sales	Election monitoring technology
Improved cookstoves	Voter report cards
CommCare	
Chlorine dispensers	
Matatu safety	

Projects that attained high reach through the private sector sometimes used direct sales to consumers, but more often involved bulk sales or other approaches that allowed for involvement by existing large private sector players. While two social entrepreneurship efforts that reached more than 100,000 people (e.g. Vision Spring and Mera Gao) relied on direct to consumer sales, all the others, and all of those that reached more than one million people, relied primarily on other scaling strategies. These sometimes involved bulk sales to large organizations that involve much lower transaction costs per customer (E.g., DiMagi sells to NGOs, governments and Gates Foundation-supported projects; Dispensers for Safe Water has scaled through arrangements with governments and through carbon finance).

There is a growing appreciation in the social entrepreneurship world of the difficulty of achieving profitability when relying only on retail sales to bottom of the pyramid customers, in part due to high customer acquisition costs, challenges acquiring working capital, working capital constraints on their suppliers, retail distribution networks and/or customers. Some very valuable innovation may require continued subsidies to be adopted on a large scale. One reaction is to focus on serving customers with higher income and hoping that there would be some trickling down, but there may be some tradeoffs regarding USAID’s mission focusing on extreme poverty. Our data on the routes taken by DIV grantees to reach more than 100,000 or 1,000,000 people suggests that other strategies based on bulk sales may also be viable.

- 7.) **Innovations tested with RCTs scale not only through adoption by governments, but also through adoption by private sector firms and NGOs.**

Of the nine DIV awards for innovations with RCTs that have reached more than 100,000 people, there were two clear cases in which developing country governments played the lead role (scaling of an improved approach to community health worker recruitment by the government of Zambia, biometric monitoring in India.) The Kenyan government seems likely to play an important role alongside the insurance industry in scaling the Kenyan matatu safety program. Donors played a key role in provision of Potential Energy’s improved cookstoves in Darfur. NGO partners played a role in a number of projects. A major lesson of this analysis is that large private firms played a major role as well (e.g. insurance companies played a major role in the

Matatu stickers project, newspapers published the free content when an NGO provided them with voter reports cards, and banks scaled psychometric testing of entrepreneurs).

- 8.) **The biotech and IT industries routinely build on innovations developed by researchers using frontier techniques in those fields. The evidence from DIV awards is consistent with the idea that a similar approach may be effective in development, with innovations developed in part by researchers, and/or involving randomized controlled trials, reaching 100,000 or 1,000,000 users at a particularly high rate.**

42% (10/24) of awards for which an RCT was used for evaluation or development economics researchers were involved in design of the innovation supported innovations that had reached more than 100,000 people by the end of 2014.<sup>9</sup> 25% (6/24) of these awards supported innovations that had reached more than one million people in the original or adapted form by the end of 2014 (e.g. voter report cards, election monitoring, stickers in matatus, chlorine dispensers, and biometric attendance verification).

In contrast, among the innovations not including an RCT component or a strong role for in development economics researchers, 11% (2/19) reached 100,000 people (Vision Spring, Mera Gao), and none reached more than one million people.<sup>10</sup>

One could imagine multiple hypotheses for this high rate of success. Most awards where development economics researchers were involved also involved RCTs. This overlap makes it difficult to separate out a direct “RCT impact” from a “researcher impact”.

- a) As noted earlier, relatively few projects based on a strategy of direct sales to individual consumers reached large numbers of people. Bulk sales to large customers and adoption by large organizations, from insurance companies to governments, are key channels for reaching large numbers of people. Evidence may be useful in reaching some key decision makers in these organizations.
- b) Development economics researchers may be more interested in evaluating innovations that they believe have a reasonable chance of success. In future work, we hope to test the hypothesis that they may be more likely to focus on innovations with a low cost per user, which seems to be a strong predictor of success.
- c) When researchers were involved, they were typically not just evaluators: they were fully involved in the development of the innovation (e.g. voter report cards, dispensers, Afghanistan monitoring projects). They were “researcher-entrepreneurs”, rather than just evaluators. Many of the ideas developed by researchers drew on the latest ideas in the

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<sup>9</sup> Voter information report cards, election monitoring technology, digital attendance and medical information systems in primary health care centers, mobile tools for community health care workers, consumer action on Matatu safety, bringing safe water to scale, improved cookstoves, and recruiting community health workers.

<sup>10</sup> 24 awards incorporated an RCT component or were based on an RCT. This excludes two cases in which the initial proposal included an RCT but the ultimate actual project funded by DIV did not include an RCT: Psychometric Analysis for Entrepreneurs (AID-OAA-F-13-00028) and Affordable Access to Energy for All: Innovative Financing for Solar Systems (AID-OAA-F-13-00007).

field, and the data suggest that the researchers who developed these ideas were relatively successful in working with others to scale these innovations.

While it is hard to code this variable and thus to formally test the hypothesis, it is the view of DIV staff that awards that reached more than 1 million people typically involved carefully thinking from the beginning about scaling and piloting and/or formal testing of how to do so effectively. This implementation learning, coupled with the evidence of the effectiveness of the innovations, led to buy-in for follow-on support beyond DIV funding. Their focus on implementation also led them to build teams and partnerships committed to growing the innovation. While established partnerships were not required to secure DIV funding support, identifying these partners early on and working with them as the innovation grew seems to have been a key component of the growth of these particular solutions. The evidence suggests that this could be done in practice by a variety of types of awardees. There was a relatively high rate of achieving reach among awards to academic institutions and to research-oriented NGOs. For-profit firms had a high rate of reaching one hundred thousand people.

Organizational type	Project type	Share of projects by type that reached 100,000 people	Share of projects by type that reached 1 million people
NGO		24% (7/29)	14% (4/29)
<i>Breakdown of project type of the NGO projects that reached at least 100,000 people:</i>			
	<i>Operations</i>	7% (2/29)	3% (1/29)
	<i>Research</i>	14% (4/29)	10% (3/29)
	<i>Operations/Research</i>	3% (1/29)	0% (0/29)
For profit		38% (3/8)	0% (0/8)
Academic		33% (2/6)	33% (2/6)

9.) **Innovations that had already been tested through RCTs and found to have impact and potential for cost effectiveness prior to applying for DIV support accounted for three of the five innovations that reached over one million people. These innovations had a very high scaling rate.**

<b>Innovations already tested through RCTs that reached 1 million people</b>
Matatu safety
Voter report cards
Chlorine dispensers

Three of the five innovations that reached over one million people (voter report cards, stickers in matatus, chlorine dispensers) had already been subject to RCTs before applications were submitted to DIV. While we have not yet coded the data, we believe that there were very few applications in this category, so the rate at which proposals in this category reached over one million people was very high (Possibly 100%). DIV may want to proactively reach out to encourage submission of large stage two proposals and stage three proposals for innovations that have proved successful in earlier RCTs, and that are proposing to work at scale.

In the two cases in which results are available, impact at scale dropped, but was still very good (matatus, chlorine dispensers). This suggests that it will be important to build in further monitoring (chlorine dispensers) or rigorous impact evaluation (matatus) for such projects.

- 10.) **While some DIV-supported innovations have scaled up in multiple countries, most have not. DIV may want to encourage international diffusion of successful approaches, along with appropriate monitoring and testing.**

## From Reach to the Social Rate of Return

While the focus of this note is the determinants of reach, and reach is a key component of the social rate of return to DIV, it is worth explicitly discussing how reach fits into an overall calculation of social value created by DIV. Some measure of social rate of return or social value would in principle be the appropriate way to evaluate investments, rather than for example, whether innovations fulfilled the milestones set forth in their original project documents. DIV was set up to support innovation and a key principle of innovation is that this requires rapid iteration and flexibility. The eventual innovation that scales may be substantially adapted from that which DIV initially supported.

Maximizing social return is equivalent to maximizing the social rate of return on investment, (taking the budget available for investments as fixed).

The social value created is the discounted sum of the number of people reached due to DIV support, times the benefit per person reached, minus discounted costs. Discounted costs include not only the costs to DIV but also other costs such as cost to other donors, developing country governments, developing country consumers who purchase products, etc.

$$\text{Net social value} = \sum_{Project\ 1}^{Project\ 43} \sum_{t=0}^{\infty} (1-r)^t (\text{Number of people reached due to DIV}_t \times \text{Benefit per person reached}_t - \text{Social costs}_t) - \sum_{t=0}^{\infty} ((1-r)^t \text{Administrative costs}_t)$$

In practice, of course, it is not practical to collect the full set of data necessary to conduct such a calculation, but it is nonetheless instructive to go through the terms.

### Benefit per Person Reached

Appendix two presents evidence on impact per person in cases where rigorous evidence on impact is available

In cases where the innovation which achieved high reach was adapted from an innovation with a rigorous impact evaluation (for example an RCT), one cannot necessarily assume that the impact of the adapted innovation is the same as that measured in the rigorous impact evaluation. However, one should still be able to generate a better subjective assessment of the likely impact of the innovation that generated high reach if one has at least some related evidence from rigorous impact evaluations to draw on than if one does not, so we cite any rigorous evidence that is available on the impact of forms of the innovation that have been subject to rigorous impact evaluation. .

### Future Reach (Sustainability)

The total discounted reach of an innovation consists of the reach that has already been attained plus the discounted value of future reach in its original and adapted form. Obviously, it is impossible to know future reach of an innovation. It is entirely possible that some innovations which have not yet reached 100,000 or one million people will do so in the future. It is also possible that innovations that have already reached that many people will stop where they are now and not reach many additional consumers, or that they will continue to expand at the same annual rate as in the past, or at an increasing annual rate, or at a constant rate for some time. This obviously takes one rapidly into an area

of subjective judgments where different analysts could draw different conclusions. In future versions of Appendix Two, we will provide our own qualitative sense of the prospects for future reach of innovations that have reached at least 100,000 people so far.. While current reach is a very imperfect way of estimating likely future reach, it at least has the merit of being objective.

### **Costs**

The social value of a project depends on the reach times the net benefit per person reached – i.e. total benefit minus costs. Costs include costs to DIV, other donors, developing country governments, and consumers who purchase the product.

Of course in evaluating the social value generated by DIV as a whole, it would be important to subtract DIV's own administrative costs.

### **Attribution**

In the formula above the key variable is the number of people reached *due to DIV*. In practice, it is difficult to determine what would have happened had DIV not made an award. This is the question of attribution. Perhaps if DIV had not funded a project, another entity would have funded it. Perhaps even if nobody had funded a particular social enterprise, other social enterprises doing something similar would have generated the same ultimate impact.

Getting at attribution is inherently very difficult, but we make the basic effort to avoid counting reach that had already been obtained prior to the DIV grant. If the organization had an established product in the market, and the DIV grant was for an innovation on that product which did not take off, we count the sales only of the new product.

Appendix Two discusses each of the projects that reached more than 100,000 or one million people. (It will be clear from the formula above that projects which never reach more than 100,000 people are unlikely to contribute substantially to the total social value created by DIV.) The write-ups include qualitative information relevant to thinking about future reach, benefits per person, costs, and attribution. In future drafts we will attempt to go further in organizing the material along these lines and filling in more information.

## Appendix One: Data

The table below shows all 43 DIV awards through December 31, 2012 and provides information on the number of people reached by each innovation which reached over 100,000 people. As discussed in the previous section, this includes both those reached through the original innovation and those reached through adapted forms of the innovation. The unit of analysis is the award; in two cases, DIV made two awards for the same innovation.<sup>11</sup>

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<sup>11</sup> This means that the overall impact cannot be estimated by summing the reach for each award.

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
The E-Bike: Practical, Scalable, Pollution-Free Mobile Transportation	SiGNa Chemistry, Inc.	U.S.	1	10/1/2010	\$100,000	No			For profit
Cellular Monitoring: Improving Governance in Afghanistan	The Regents of the University of California, San Diego	Afghanistan; the innovation later expanded to Kenya, Uganda, South Africa	1	9/30/2010	\$99,992	Yes	6,483,633 <sup>13</sup>	Qualcomm, Inc; HTC	Academic

<sup>12</sup> This column is marked 'Yes' if development economics researchers were involved at any stage in the project development, implementation, or evaluation. In nearly all cases, development economics researchers were involved in conducting an RCT of the innovation.

<sup>13</sup> People reached includes those reached under the DIV-supported innovation, and those reached under adaptations of the innovation which were used in other countries and in Afghanistan during a later election.

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Scaling CommCare for Community Health Workers in India	Dimagi Inc.	India	1	11/1/2010	\$99,624	Yes	562,340	Gates Foundation; Government of Bihar; BBC World Service Trust; Catholic Relief Services; IntraHealth	For profit
			2	8/31/2012	\$996,424	Yes			For profit
Improving Governance and Public Service Delivery with Voter Information Campaigns	Institute for Financial Management and Research - IFMR	India	1	9/30/2010	\$98,957	Yes	20,000,000	Satark Nagrik Sanganathan (SNS); Hindustan newspaper	NGO
			2	2/7/2012	\$200,000	Yes			NGO
Rural Solar Accessibility via Consumer Cooperative Enhanced Society (ACCESS) Retails	Lighting Rural Uganda with Solar	Uganda	1	10/4/2010	\$98,360	No			NGO
Inventory Credit: Combining Storage and Savings To Increase Income	Innovations for Poverty Action	Sierra Leone	2	9/30/2010	\$230,145	Yes			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Proteinuria Self-Test For Early Detection of Pre-Eclampsia	Jhpiego Corporation	Nepal	1	1/15/2011	\$100,000	No			NGO
Examining barriers to fertilizer use in Kenya	Innovations for Poverty Action	Kenya	1	9/7/2011	\$99,828	Yes			NGO
Developing an Affordable Balloon Tamponade for Postpartum Hemorrhage Treatment and Management	Program for Appropriate Technology in Health (PATH)	Ghana	1	10/13/2011	\$99,793	No			NGO
Developing Sustainable Sanitation in Urban Slums	Sanergy	Kenya	1	11/17/2011	\$99,840	No			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Life changing and Revenue generating Electricity for Sub-Saharan Africa: EGG-energy's Franchised Solar Hubs	EGG-energy	Tanzania	1	2/21/2012	\$100,000	No			For profit
Increased Uptake and the Use of Safe Water Filters at Scale	RAND Corporation	Kenya	1	8/29/2012	\$108,735	Yes			NGO
Digital Attendance and Medical Information System in PHCS	Institute for Financial Management and Research - IFMR	India	2	9/30/2010	\$172,679	Yes	1,800,000	Government of Karnataka, National Rural Health Mission of Karnataka	NGO
Leveraging Public-Private Partnerships for the Indian and Global Environment	Institute for Financial Management and Research - IFMR	India	2	1/27/2012	\$185,553	Yes			NGO
Viability of Cyanobacterial Bio-fertilizer to Improve Soil Fertility and Crop	Thin Air Nitrogen Solutions, LLC	Ethiopia	1	3/1/2012	\$99,854	No			For profit

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Yields in Ethiopia									
Household Hand-Washing Device-Commercial Development	WaterSHED	Vietnam	1	4/24/2012	\$100,000	No			NGO
Renewable Powered Micro Grids for Rural Lighting	Mera Gao Micro Grid Power (MGP) Private Limited	India	2	9/30/2011	\$300,000	No	100,000	Mera Gao Power	For profit
Improving patient safety in Pakistan's hospitals: a mobile health solution for enabling and monitoring the 'First, do no harm' principle	Indus Hospital	Pakistan	1	7/2/2012	\$99,250	No			NGO
Smoothing the Costs of Education: Microsavings in Ugandan Primary Schools	Innovations for Poverty Action	Uganda	2	3/27/2012	\$181,537	Yes			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
InSight: Mobile Accounting and Financial Inclusion in Emerging Markets	InVenture	India	1	9/30/2012	\$100,000	No			For profit
Milele Tube Final Testing and Marketing Introduction	Baisikeli Ugunduzi	Kenya	1	10/1/2012	\$100,000	No			NGO
Testing a Digital Platform's Ability to Recreate the Success of Rural Community-Led Total Sanitation in Urban Communities	IDEO.org	Ghana	1	9/12/2012	\$100,000	No			NGO
Developing a Supply Chain for Hermetic Storage of Grain in Afghanistan	Purdue University	Afghanistan	1	9/9/2011	\$88,400	No			Academic

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
The Entrepreneurial Finance Lab Research Initiative	President and Fellows of Harvard College	Originally Egypt, Later Reallocated	2	4/24/2012	\$438,002	Yes			Academic
Consumer Action and Matatu Safety	Georgetown University	Kenya	2	8/25/2011	\$291,154	Yes	3,000,000	Insurance companies; Safaricom; Government of Kenya	Academic
Remittances for Educational Finance	University of Michigan	Philippines	1	2/17/2012	\$96,409	Yes			Academic
Mobile Phone Agriculture Extension: Using ICT to Reduce Outreach and Monitoring Costs	Innovations for Poverty Action	Kenya	1	9/15/2011	\$96,394	Yes			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Fighting Tuberculosis through Community Based Counselors in Northern Indian slums: A Randomized Evaluation of Performance Based Incentives	Institute for Financial Management and Research - IFMR	India	1	10/1/2012	\$75,104	Yes			NGO
The Role of Mobile Banking in Expanding Trade Credit & Business Development in Kenya	Innovations for Poverty Action	Kenya	2	8/24/2011	\$360,195	Yes			NGO
Recruiting and Compensating Community Health Workers: A National Field Experiment in Zambia	Innovations for Poverty Action	Zambia	1	9/5/2012	\$99,032	Yes	240,100	Zambia Ministry of Health	NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Affordable Access to Energy for All: Innovative Financing for Solar Systems	d.light design	Uganda	2	9/20/2012	\$1,020,126	Yes			For profit
Evaluating the Impact of Mobile Banking and Business Skills on Microenterprise Development	Faculdade de Economia da Universidade Nova de Lisboa	Mozambique	2	9/30/2012	\$293,146	Yes			Academic
Turning the Tap Off on Multi Drug Resistant TB and Extensively Drug Resistant TB	OperationASH A	India/Cambodia	2	10/1/2012	\$897,324	Yes			NGO
Improving Health Service Delivery Through Community Monitoring and Non-Financial Awards	Innovations for Poverty Action	Sierra Leone	2	10/1/2012	\$432,258	No			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
Scaling Biochar: Investing in soils, improving livelihoods and sequestering carbon	Innovations for Poverty Action	Kenya	1	9/20/2012	\$99,952	Yes			NGO
Developing and Testing a Sustainable Distribution Model for Improved Cook stoves in Darfur and Ethiopia	Potential Energy	Ethiopia, Sudan	2	4/18/2012	\$1,500,000	Yes	250,000		NGO
Women's Network to Improve Clean Energy	Solar Sister, Inc.	Uganda South Sudan Tanzania	2	5/28/2012	\$1,000,000	No			NGO
Chlorine Dispensers: Bringing Safe Water to Scale	Innovations for Poverty Action	Kenya, Uganda, Rwanda, others TBD (Malawi later substituted for Rwanda)	3	6/20/2012	\$5,516,606	Yes	1,280,536	Evidence Action; Abt Associates; Liberty Foundation; Skoll Foundation; MercyCorps; Stone Family Foundation; Ceniarth Foundation; Kiva; One Acre Fund; Gov't of Malawi	NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
								(Ministry of Health); Gov't of Kenya	
Scaling BoOptical Care Hub Model in India	VisionSpring	India	2	8/20/2012	\$585,350	No	140,000		NGO
How to Make Better Businesses: Experimental Evidence of the Components of Entrepreneurship	Innovations for Poverty Action	Uganda	1	8/27/2012	\$93,612	Yes			NGO
Ghana National Apprenticeship Program Impact Evaluation: Effort, Incentives and Returns	Innovations for Poverty Action	Ghana	2	10/1/2012	\$474,033	Yes			NGO

## DIV Awards: 43 Awards from 2010-2012

Project Name	Grantee	Country	DIV Stage	DIV Award Start Date	DIV Award Value	Development Economics Researchers Involved <sup>12</sup>	Reach if over 100,000	Key Entities Involved in Scaling	Type of Organization
<b>Total</b>			<b>43</b>		<b>\$17,427,668</b>	<b>26</b>	<b>24,110,313</b>		



## Appendix Two: Detailed Information on Innovations That Have Reached More Than 100,000 People

### The Right to Vote Right: Testing Voter Education Campaigns in India

<http://www.usaid.gov/div/portfolio/right-vote-right> (Stage 1)

<http://www.usaid.gov/div/portfolio/improving-governance-and> (Stage 2)

**DIV contribution:** Stage 1 and 2 Funding

**Award Amount:** \$98,957 (Stage 1), \$200,000 (Stage 2)

**Award Period:** 2010-2012

Researchers conducted a multi-year project to test 1) whether better electoral outcomes can be achieved by directly providing voters with information, either on politician responsibilities or on actual politician performance and qualifications, 2) whether anticipation of and actual public disclosures on responsibilities and/or performance can cause incumbents to improve their service delivery and performance and change decisions on whether to stand for re-election, and 3) whether governance can be strengthened by directly providing elected officials with information about the quality of service and does this, in turn, affect usage of these amenities.

An initial evaluation that showed that voters respond to information. Banerjee, Pande, Kumar, and Su (2010) show that “The campaign increased voter turnout by 3.5 percent, or two percentage points (from 57.5% to 59.5%). While it did not influence average incumbent vote share, worse performing incumbents and those facing better qualified challengers received significantly fewer votes (...). Cash-based vote-buying was 19 percentage points less likely to occur in treatment polling “stations”. Subsequently, DIV provided funding for a second evaluation which was designed to shed light on questions 2) and 3), and subsequent funding for a follow-up evaluation to test the impact of voter education campaigns in Bihar, one of the poorest states in India. Official results for those projects are still pending and the researcher has requested that interim results not be provided in this document, although they have been provided to DIV and shared with others.

Satark Nagrik Sangathan (SNS), an Indian civil society organization that promotes transparency and accountability in government and collaborated with J-PAL South Asia in the design of the research, has created information report cards for councilor elections in Delhi and MP elections across the country. Newspapers have published this content, presumably because it was free and they believed it would be of interest to their readers. Based on the outlets where the information was sent and its circulation, we estimate that since 2012 (the first elections to take place after the first DIV award to support this innovation), these efforts have reached **approximately 10 million voters**. Note, however, that this program was less intensive and costly than that examined under the original evaluation, because it did not involve field workers dropping off the newspapers door to door, and the impact may thus differ. SNS also circulated the reports cards via internet and television stations broadcast report card information, but these sources of reach are not included in the totals below.

Campaign	Newspaper	Circulation	Voting Age Adults per hh	Election Turnout	Estimated # of Voters Reached
Councillor Report Cards 2012	Hindustan Times Hindi (Delhi edition)	299,576	2	0.58	347,508
	Hindustan Times (Delhi edition)	964,500	2	0.58	1,118,820
MP Report Cards 2014	India Today magazine - Hindi (National Edition)	494,000	2	0.664	656,032
	Hindustan Times - Hindi (national edition)	6,123,000	2	0.664	8,131,344
<b>Total</b>					<b>10,253,704</b>

## **Assumptions**

1. People reached is a function of total circulation of newspapers and magazines in which report cards were printed, multiplied by the number of voting-age adults per household, and adjusted by the turnout in that particular election.
2. In cases where readership but not circulation figures were available, circulation was estimated by dividing by 2. On average, we calculate readership to be about 2x circulation, based on data on several Indian newspapers provided by Business Standard ([http://www.business-standard.com/content/general\\_pdf/021012\\_01.pdf](http://www.business-standard.com/content/general_pdf/021012_01.pdf)).
3. Average household size in India according to the 2011 census is 4.8. We assume that, on average, there are 2 voting age adults (18+) per household.

## Election Monitoring in Afghanistan<sup>14</sup>

<http://www.usaid.gov/div/portfolio/caught-camera-testing>

**DIV contribution:** Stage 1 Funding

**Award Amount:** \$99,922

**Award Period:** 2010 – 2011

**Problem:** Irregularities plague elections in emerging democracies, undermining voters' ability to hold their leaders accountable.

**Innovation:** One low-cost alternative to having international election observers is to use mobile technology to record and transmit information about votes cast at specific polling stations. Researchers designed an anti-fraud technology called "photo quick count" which allows local election monitors to photograph provisional vote tally sheets at individual polling centers and compare them to the official vote count after aggregation (In a clean election, the before and after tallies should be identical). Letters announcing the photographic vote count verification were sent to a random sample of polling stations during the 2010 parliamentary elections in Afghanistan. This study covered 471 polling stations, about 5% of the national sample.

**Impact:** Results from a randomized impact evaluation show that announcing the photographic quick counts reduced the theft of election materials by 60% and reduced votes for politically powerful candidates by 25%. Researchers estimate that between 9.37 and 17.17 fewer votes changed during the aggregation process in cases where candidates had close ties to the official in charge of aggregating votes.

**Reach:** During the 2010 parliamentary elections in Afghanistan, 326,661 people<sup>15</sup> voted at polling stations where photographic monitoring took place. Ashraf Ghani's political campaign implemented a modified version of the "photo quick count" monitoring system, recording votes for the purposes of comparison using paper and clipboards rather than photographs, during the first round of the 2014 Presidential election in Afghanistan. Campaign staff, indicate reaching as much as 80 percent of the polling centers operating on Election Day in Afghanistan, potentially having an impact on as many as 5.25 million voters.<sup>16</sup> Though Ashraf Ghani ultimately won the presidency, the subsequent runoff election was marred by charges of fraud on both sides. Photo quick count was not, to our knowledge, used in the runoff election.

Building on the positive results from the 2010 trial in Afghanistan, researchers replicated the approach in Uganda during the 2011 Presidential and Parliamentary elections, in Kenya during the 2013 national election, and in South Africa during the 2014 national election. These efforts have reached over 2.8 million people since the original DIV-supported evaluation.

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<sup>14</sup> Long, James D. "Innovations to Reduce Electoral Corruption and Increase Citizen Engagement Using Information and Communications Technology and Digital Media in Emerging Democracies." June 25, 2014.

<sup>15</sup> Email from James Long, August 13, 2014.

<sup>16</sup> Email from Michael Callen, December 8, 2014.

In Uganda, field teams were given smartphones equipped with a mobile app designed for collecting photo quick counts. They visited 1001 polling stations (approximately 5% of the national sample), reaching 412,625 voters.

In Kenya, field teams visited 1200 polling stations (approximately 4% of the national sample), reaching 494,347 voters.

In South Africa, 1,936,450 people voted at polling stations where smartphone monitoring technology was being used during the 2014 national election. With Stage 2 funding from DIV, the use of information and communications technology (ICT) is being expanded to enable voters to engage in the electoral process in the lead-up to and during the 2014 national election in South Africa. A randomized evaluation is currently being conducted and results are forthcoming. See the write-up on "[Improving Electoral Performance through Citizen Engagement in South Africa](#)" for a full description of this project.

**Additional Resources:**

J-PAL Evaluation Summary: <http://www.povertyactionlab.org/evaluation/election-fraud-and-government-legitimacy-afghanistan>.

## Digital Attendance Monitoring in Rural Health Clinics

<http://www.usaid.gov/div/portfolio/thumbs-monitoring-health>

**DIV contribution:** Stage 1 Funding

**Award Amount:** \$172,679

**Award Period:** 2011-2013

**Partner:** Government of Karnataka (Health Department)

**Problem:** The government is the primary health care provider in many developing countries. However, despite large budgetary allocations and an extensive network of public health centers, health outcomes often remain poor. Evidence suggests that high rates of staff absenteeism, enabled by poor systems of accountability, may be a reason why health care systems do not function as intended.

India has a vast network of over 24,000 public Primary Health Centers (PHCs) that provide basic services such as immunization and antenatal care to the poor. Yet absenteeism is high in PHCs across the country. In the PHCs in this study, doctors were present only 36 percent of the time in 2010. As a result, many citizens coming to receive care leave unattended, and often end up visiting untrained or unqualified providers for treatment.

**Innovation:** The government of Karnataka state in India partnered with researchers to implement and evaluate a biometric monitoring system that objectively records attendance and reports it to supervisors in real time, combined with a robust system of incentives and penalties for unauthorized absences to improve staff attendance and patient health.

From a sample of 322 PHCs across five socio-economically diverse districts, 140 were randomly selected to receive the biometric devices consisting of a fingerprint reader and a mobile phone, while the remaining 182 continued with the status quo paper system of marking attendance. The device was used to record staff attendance via thumb impression at the beginning and end of each day. It was also capable of recording details about cash benefits paid to patients along with photographs and signatures and thumb impressions of beneficiaries taken at the clinic, and statistics regarding number of patients seen and the diseases treated. In practice it was primarily used for attendance monitoring.

Attendance data could be transferred wirelessly using the existing cellular network to the state health headquarters in Bangalore so supervisors could track staff attendance in near real time. This data was analyzed and processed and then communicated back to the districts. This attendance information was coupled with an extensive system of incentives and penalties to encourage better attendance. Based on the attendance data, the government planned to issue both positive incentives, such as awards for staff members with good attendance records, as well as negative incentives, such as reprimand letters, disciplinary action, suspension from service, docking of pay, and deduction of earned leave for employees with unauthorized absences.

**Impact:** Even though the official leave policy was not strictly enforced, the monitoring system increased medical staff attendance by 5.5 percentage points (15 percent) relative to medical staff in comparison PHCs. It had the greatest impact on nurses, lab technicians, and pharmacists (an 18 percent increase), but virtually no effect on doctors. The new monitoring system seemed to have led to improved antenatal care and infant health. Pregnant women in treatment PHCs were 10.6 percentage points (27 percent) more likely to receive recommended Iron Folic Acid tablets. Relative to expectant mothers in comparison PHCs, mothers in treatment PHCs were 8 percentage points (16 percent) more likely to have their baby delivered by a doctor. Their newborn children were 4.6 percentage points (26 percent) less likely to be born underweight and weighed 67 grams more on average.

The main finding of the project is that even though the top-down monitoring is very hard to sustain, even small gains in attendance can have large impacts on health outcomes.

**Reach:** During the intervention spanning about 18 months, the primary health centers in the treatment group attended to about 1,800,000 patients.

Given the challenges of hiring and retaining doctors willing to work in remote health clinics and its inability to effectively monitor, the government of Karnataka state decided in 2013 not to scale up the digital attendance monitoring program that had been piloted. In 2014, Government of India started rolling out digital attendance gathering, but in the much easier to monitor context of staff working in government offices in cities like the national capital Delhi. It is not clear how effective the monitoring is, and if it has led to an increase in attendance.

## Mobile Tools for Community Health Workers

<http://www.usaid.gov/div/portfolio/scaling-commcare-deliver>

**DIV contribution:** Stage 1 and 2 Funding

**Award Amount:** \$99,624 (Stage 1), \$996,424 (Stage 2)

**Award Period:** 2010 – ongoing

**Problem:** In India and elsewhere, resource-strapped public health departments and supporting NGOs are increasingly reliant on community health workers (CHWs) to provide life-saving services in areas that traditional medical providers struggle to reach. However, training, supervision, and evaluation of CHWs are major challenges to ensuring that people served by CHWs receive the same level of care as those able to access treatment from traditional medical providers. Mobile-based solutions are potentially cost-effective and scalable way to empower CHWs to deliver better care.

**Innovation:** CommCare is one such mobile platform that enables CHWs to enroll and manage clients, to create patient intake forms, to conduct more timely visits, and to access learning resources with information about healthy behavior. Developed by Dimagi, a social enterprise that makes open source software to improve healthcare in developing countries and for the underserved, CommCare provides actionable data to help CHWs improve their performance. CHWs can submit patient data in real-time to a central cloud server, where it is privacy-protected and backed up. Supervisors can view each CHW's performance indicators, including daily activity, number of clients, length of visits, and follow-up rates.

**Impact:** A randomized controlled trial showed that reminders from CommCare, with eventual escalation to supervisor notification, led to 85% more timely visits compared to CHW's not receiving reminders.<sup>17</sup> Additional studies have shown that CommCare helps increase CHWs' knowledge of health risks and improve data completeness and accuracy. Dimagi is continually evaluating, publishing, and presenting results and lessons learned from deploying and scaling CommCare, and CommCare has more evidence attesting to its effectiveness than any other mHealth platform.<sup>18</sup>

Stage 2 expansion is being accompanied by several ongoing randomized evaluations in partnership with CARE and Mathematica Policy Research.

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<sup>17</sup> B. DeRenzi, L. Findlater, G. Borriello, J. Jackson, J. Payne, B. Birnbaum, T. Parikh, N. Lesh, "Improving Community Health Worker Performance Through Automated SMS", ICTD 2013.

<sup>18</sup> Chatfield, A., Javetski, G., Lesh, N., CommCare Evidence Base. February 2013.

<https://confluence.dimagi.com/download/attachments/12226140/CommCare+Evidence+Base+February+2013.pdf?version=1&modificationDate=1363619871232>

**Reach:** In 2010, Dimagi received Stage 1 funding from DIV to establish proof of concept for CommCare. Dimagi was able to support 11 organizations in 8 states in India. Six of these projects from the Stage 1 grant continue to be active, and 500 CHWs use CommCare to reach over 32,000 patients. After a successful initial grant, Dimagi received Stage 2 funding to increase their field team, further develop the evidence base for CommCare, and build the organizational capacity to expand CommCare across India. As of May 2014, Dimagi introduced CommCare to 58 organizations within India, reaching 2,736 CHWs and 530,340 patients.<sup>19</sup>

## Consumer Action and Matatu Safety<sup>20</sup>

<http://www.usaid.gov/div/matatus>

**DIV contribution:** Stage 2 and 3 Funding

**Award Amount:** \$291,154 (Stage 2), \$2,990,570 (Stage 3)

**Award Period:** 2011-2013, 2014 – ongoing

**Problem:** Road traffic accidents are a leading cause of death among people aged 5-44 in Africa, and it is estimated that accidents cost the continent \$10 billion per year. Many interventions to reduce road accidents have been undertaken in developed economies, including programs to reduce the volume of driving, to improve the safety features of road networks, and to enforce traffic regulations more effectively, but few studies have explored how such interventions might work in developing countries.

In Kenya, minibuses, called *matatus*, are a popular form of transportation. A fleet of roughly 30,000 matatus carries approximately 3 million passengers a day (100 each).

**Innovation:** Researchers partnered with a local NGO and Safaricom, a major telecom company, to design and implement a road safety messaging campaign. “Speak Up!” stickers encouraging passengers to speak up against bad driving were placed in a random sample of minibuses, and drivers were rewarded through a lottery for keeping the stickers in place. These rewards ranged from US \$60 to \$25. The stickers, about 11 by 3 inches, and were placed on the metal panel between a passenger window and the ceiling of the vehicle, ensuring that at least one sticker was within eyesight of each passenger sitting in the main cabin. The first study covered 2,400 matatus operating along a set of long-distance routes.

**Impact:** The campaign was highly effective: using data from four large Kenyan insurance companies, compared to rates for buses without stickers, road accident insurance claims fell by over 50%, and claims involving injury or death dropped by 60%. The cost of the intervention was just under \$2 per vehicle for the stickers, and \$5 per vehicle per year for the lottery, or a total of \$7,000 per 1000 vehicles per year. Researchers estimate that the intervention saved 1200 disability-adjusted years of life at a cost of \$5.80 per year.

**Reach:** In stage two, 800,000 people rode in matatus with “Speak Up!” stickers each day. An estimated 3 million commuters in Kenya rode in a matatu with a “Speak Up!” sticker over the life of the program.<sup>21</sup>

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<sup>19</sup> USAID DIV Milestone 12 – PMP – 14 July 2014. Obtained from Dimagi.

<sup>20</sup> Habyarimana, James and William Jack. 2011. “[Heckle and Chide: Results from a randomized road safety intervention in Kenya.](#)” *Journal of Public Economics*. 95(11-12): 1438-1446.

Three insurance companies have recently orally agreed to expand up the program to all matatus they cover. A formal MoU has been signed with Kenya's largest insurance provider (which has more than 50% of the market) to implement the program. .

## Bringing Safe Water to Scale<sup>22</sup>

<http://www.usaid.gov/div/portfolio/chlorine>

**DIV contribution:** Stage 3 Funding

**Award Amount:** \$7,416,557

**Award Period:** June 2012 – ongoing

**Problem:** Diarrheal disease, which spreads through contaminated drinking water, kills nearly 1 million children under the age of 5 every year. Protecting communal water sources by encasing them in concrete, for example, is one way to prevent contamination. However, clean water stored in homes can become re-contaminated with a dirty cup or an unwashed hand. In response, the World Health Organization recommends the use of dilute chlorine, which not only disinfects water, but provides ongoing protection from recontamination for over 24 hours.

The standard approach to encourage rural populations to adopt chlorination has typically been via social marketing—the promotion and sale of small bottles of chlorine through the private sector. Despite the significant health benefits, and relatively low price of chlorine (\$0.30 for a family of five for a month in Kenya<sup>23</sup>), adoption remains low.

**Innovation:** A free, point-of-collection water chlorination system was designed to address the issue of recontamination and low usage rates of dilute chlorine available for purchase. Chlorine dispensers are placed at water sources, which serve as a visual reminder to treat water when it is most salient—at the time of collection. The source-based approach makes drinking water treatment convenient because the dispenser valve delivers an accurate dose of chlorine to treat the most commonly used water collection containers, while the public nature of the dispenser also contributes to learning and habit formation. In addition, local promoters provide frequent reminders and encouragement to other community members to use the product. At scale, chlorine dispensers could cost less than \$0.50 per person annually, making them one of the most cost effective ways to reduce diarrheal disease and save lives.

**Impact:** Results from a randomized impact evaluation conducted in Kenya showed that three to six months after introducing the point-of-collection chlorine dispensers, take-up was 60% compared to only 7% for socially marketed in-home chlorine treatment.<sup>24</sup> Several years later, program monitoring of the at-scale program finds that take-up of chlorine averages approximately 41%.

Evidence Action estimates that point-of-collection dispensers in Kenya, Uganda, and Malawi have averted over half a million cases of diarrhea and nearly 14,000 disability adjusted life years (DALYs).

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<sup>21</sup> Email from Billy Jack, August 10, 2014.

<sup>22</sup> Ahuja, Amrita, Michael Kremer, and Alix Peterson Zwane. 2010. [Providing Safe Water: Evidence from Randomized Evaluations](#), *Annual Review of Resource Economics* 2: 237-256

<sup>23</sup> Kremer, Miguel, Null, and Zwane. "Water Technologies case study: what works best in poor countries," *Boston Review*, September/October 2008. Available online at <http://bostonreview.net/BR33.5/miguel.php>

<sup>24</sup> Ahuja et al., 2010.

	Kenya	Uganda	Malawi	Total
<b># Dispensers installed</b>	11,642	3,680	710	<b>16,032</b>
<b># Cases diarrhea averted</b>	394,474	128,515	1,729	<b>524,717</b>
<b># DALYs averted</b>	10,534	3,412	46	<b>13,993</b>
<b># People who use chlorine</b>	657,169	401,306	222,061	<b>1,280,536</b>

**Reach:** The expansion of point-of-collection chlorine dispensers began in Kenya in 2008 and has expanded both within Kenya and also to Uganda and Malawi with the support of DIV. To date, 16,032 dispensers have been installed, enabling over 3 million people to have access to safe water and over 1.2 million people to consume water treated with chlorine.

Evidence Action, an organization dedicated to bringing cost-effective and evidence-based interventions to scale, is spearheading these efforts and has already secured over \$15 million in funding to sustain this program through 2021. Of this, a significant portion has been committed in the form of carbon credit presales, with the remainder coming from high net worth individuals, grants, and in-kind support from developing country governments. Carbon credits are generated by dispensers by providing a clean technology that avoids and averts water boiling as a means of purification.

**Additional Resources:**

- J-PAL Evaluation Summary: <http://www.povertyactionlab.org/evaluation/source-dispensers-and-home-delivery-chlorine-kenya>
- J-PAL Policy Bulletin: <http://www.povertyactionlab.org/publication/the-price-is-wrong>

**Recruiting Community Health Workers in Zambia<sup>25</sup>**

<http://www.usaid.gov/div/portfolio/Zambia-Community-Health-Workers-IPA>

**DIV contribution:** Stage 1 Funding

**Award Amount:** \$99,032

**Award Period:** 2012 - 2014

**Problem:** Community health workers (CHWs) are commonly regarded as a potential solution to the shortage of formal health workers throughout sub-Saharan Africa. Recruited from their communities, trained, and then deployed back to their communities, it is thought that CHWs are more likely to have the necessary relationships, local knowledge, and sense of community responsibility to deliver health services to underserved populations in rural areas, where retention of formal health workers is a perennial challenge.

Employing community health workers may help governments address the shortage of health-care providers in Sub-Saharan Africa. However, it is unclear how offering incentives such as career advancement opportunities might affect who applies for the position. For instance, do certain recruitment strategies encourage people with particular personalities or skills to self-select into a job?

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<sup>25</sup> Ashraf, Nava, Oriana Bandiera, and Scott Lee. "[Do-Gooders and Go-Getters: Career Incentives, Selection, and Performance in Public Service Delivery.](#)" Working Paper, July 2014.

And if so, how can recruitment strategies be adapted to identify applicants with desirable skills and screen out those who are less likely to perform well on the job?

**Innovation:** The Government of Zambia worked with researchers to test the effects of two recruitment strategies on applicants' characteristics and job performance. From a sample of 330 CHWs at 165 rural health posts in 48 districts of Zambia, half were randomly chosen to receive recruitment posters emphasizing the "social" benefits of becoming a CHW, such as serving and being a leader in one's community, while the other half received recruitment posters emphasizing "career" benefits, such as opportunities for promotion and professional development.

**Impact:** Results show that making career incentives, rather than social incentives, salient in recruitment posters attracted workers who were more qualified, performed better on the job, and had similar levels of prosocial preferences. CHWs recruited via career incentives had higher secondary school graduation exam scores and were more likely to qualify for university admission. They conducted 30% more patient visits than those recruited through social incentives, and did not achieve these gains by targeting easy-to-reach households or by spending less time on each visit. CHWs in the career incentives group also hosted more than twice as many community meetings as their peers in the social incentives group. Researchers believe that these effects were driven by high performing CHWs who would not have chosen to apply for the position had they not seen materials emphasizing opportunities for career advancement.

**Reach:** The Government of Zambia is now exclusively using career incentives to recruit all new community health workers around the country, with the aim of hiring and training 5,000 new CHWs over the next several years. To date, the 500 CHWs recruited using career incentives posters have conducted 49,000 additional household visits over 18 months, reaching approximately 240,100 more people than would have been reached by CHWs in the control group.<sup>26</sup> The Government of Zambia is continuing to work with researchers to identify ways in which this recruitment strategy can be used effectively for other civil service positions.

**Additional Resources:**

- Academic paper - <http://www.povertyactionlab.org/publication/do-gooders-and-go-getters-career-incentives-selection-and-performance-public-service-del>
- J-PAL Evaluation Summary - <http://www.povertyactionlab.org/evaluation/recruiting-and-motivating-community-health-workers-zambia>
- IGC Video on "Co-Producing Knowledge" - <https://www.youtube.com/watch?v=7jtuOldV3j4>

## Envisioning Affordable Eye Care for All

<http://www.usaid.gov/div/portfolio/optical-solution-envisioning>

**DIV contribution:** Stage 2 Funding

**Award Amount:** \$585,350

**Award Period:** 2012 - 2015

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<sup>26</sup> Email from Oriana Bandiera 12.11.2014. Total reach calculated using an average household size of 4.9 as reported in the [2007 Demographic and Health Survey](#):  $49,000 \times 4.9 = 240,100$ .

**Problem:** An estimated 544 million people around the world could have their vision restored with a simple pair of reading glasses. For many living in developing countries suffering from vision loss, a pair of eyeglasses could mean the difference between opportunity and loss of income and quality of life.

**Innovation:** VisionSpring reaches base of the income pyramid (BoP) customers in rural and peri-urban areas through outreach efforts that provide vision screenings and access to affordable glasses. Its business model supports the sale of glasses to the poorest customers (a target 70 percent of all customers) with revenue from higher-priced products sold to wealthier customers.

VisionSpring has ten years of experience serving the global BoP optical market including successful implementation of the BoPtical Care Model in El Salvador. DIV supports this program in India, designed to reach 1.2 million people in six years.

Each of VisionSpring's 10 BoPtical Care Hubs aim to reach 12,000 individuals annually with high-quality affordable eye care. VisionSpring hopes to drive down total costs from \$18 to \$6.51 for each pair of glasses, increasing their affordability for BoP customers.

**Reach:** VisionSpring has sold over 140,000 pairs of glasses in India.

### **Providing Electricity to Rural India through Renewable Microgrids**

<http://www.usaid.gov/div/portfolio/bright-answer-providing>

**DIV contribution:** Stage 2 Funding

**Award Amount:** \$300,000

**Award Period:** 2011 - 2013

**Problem:** In India, limited power generation, transmission and distribution infrastructure have made access to electricity a major development challenge. According to estimates from the Government of India, 300 million people, comprising 61 million households, live without power.

While the World Resources Institute has estimated the market for off-grid energy products in India at \$2 billion, an extremely small fraction of that market is currently being served by NGOs and the private sector. Households off the electrical grid currently rely on low-quality energy sources like kerosene, wood, diesel, candles and disposable batteries. Low cost-effectiveness, detrimental public health effects, and negative environmental impact characterize these sources.

**Innovation:** Mera Gao Power (MGP) has designed a solar-powered, village-level microgrid to provide electricity to off-grid villages in India. Through the microgrid model, renewable power is generated by solar panels and stored in battery banks that charge during the day and are discharged at night. Power is distributed to households through short length distribution lines to high-efficiency LED lights that keep power consumption low.

DIV provided Stage 2 funding for MGP to establish its first commercial microgrids. Using DIV funding, MGP was able to improve the cost-effectiveness of its microgrid design, reducing the cost of a microgrid capable of providing power to 50 homes from \$3,000 to \$1,000. Construction time was reduced from one week to one day per village. A three-person team is currently able to construct the backbone of the microgrid within a few hours and connect customers by the end of the same day.

**Reach:** Mera Gao has provided electricity to more than 100,000 people.

## **Fueling the Cookstoves Market in East Africa**

<http://www.usaid.gov/div/portfolio/potential-energy-fueling>

**DIV contribution:** Stage 2 Funding

**Award Amount:** \$1,500,000

**Award Period:** 2012 - 2015

**Problem:** It is estimated that each year over 4 million people die from illness related to breathing smoke from cooking fires. Collection of firewood can be time consuming. Many models for high-efficiency stoves exist to replace traditional open fire methods, but few have achieved widespread use or commercial sustainability.

**Innovation:** Originally the Darfur Stoves Project, Potential Energy was founded as a volunteer organization in 2005 by Dr. Ashok Gadgil, Faculty Senior Scientist and Director of the Environmental Energy Technologies Division of Lawrence Berkeley National Laboratory. Dr. Gadgil led a team of Berkeley scientists and engineers in the development of a Berkeley-Darfur stove, pursuing market-testing and end-user feedback in Darfur. The stove requires half as much firewood as traditional cooking methods.

Using lessons learned from early work on cookstove adoption in Darfur, Potential Energy is pursuing a market creation strategy in Ethiopia. The DIV award was intended to help the organization grow its distribution and marketing network and develop innovative pricing models and flexible financing options for consumers, and help it assess the group's impact and the relative effectiveness of the different marketing strategies it pursues using a randomized control trial, which is ongoing at the time of this writing.

**Reach:** Potential Energy has distributed clean cookstoves to nearly 250,000 beneficiaries in Darfur.