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Innovations for Poverty Action

Examining Underinvestment in Agriculture & Disseminating Innovative Resources and Technologies to Smallholders

March 31st, 2014

Updated Project Implementation and Evaluation Plan

Innovations for Poverty Action (IPA) Ghana has worked closely with local partners to design the proposed DIRTS study. Both the implementation and evaluation components of DIRTS were designed collaboratively by Principal Investigators Christopher Udry PhD and Dean Karlan PhD of Yale University, and Co-investigators Mathias Fosu PhD of SARI, and Shashidhara Kolavalli PhD of IFPRI. Study design was also informed by the expertise of Joseph Faalong, former Regional Director for MoFA's Northern Region office. Furthermore, implementing partners for input supply and GAIP have helped fine-tune the implementation components.

Results from the earlier Examining Underinvestment in Agriculture (EUI) study, show that farmers with insurance have failed to realize profitable returns despite increased investment, while results from the Soil Health Project (SHP), a project managed by SARI and funded by the Alliance for a Green Revolution in Africa (AGRA), indicate that fertilizer technologies have the potential to be profitable in farming systems when combined with recommended agronomic practices. Using the randomized control trial methodology, DIRTS combines the insurance market innovations developed through EUI with intensified agricultural extension and input supply innovations to test which of these three barriers – alone or in combination – are most salient in determining the patterns of adoption of intensive cultivation technologies.

To further examine the hypothesis tested during EUI, that insurance increases farmer investment, **all farmers in the DIRTS program will be able to purchase a commercial rainfall index insurance product**, developed by the Ghana Agricultural Insurance Programme (GAIP), a member of the Ghana Insurers Association (GIA), and sanctioned by the National Insurance Commission.

To test the hypothesis that insured farmers are unable to successfully increase profitability of their farms as a result of unsurelayed and costly access to appropriate inputs, **DIRTS will partner with private sector input suppliers to make commercial inorganic fertilizer, certified seeds and other agro-inputs available to randomly selected communities**.

To test the hypothesis that smallholder farmers in northern Ghana are restricted by lack of knowledge of best practices, **randomly selected communities will be provided with more intensive extension through a Community Extension Agent (CEA)** - a community member who will be trained to use Android phone extension applications as a supplement to existing MoFA extension services. These individual treatments are interacted as described below.

Thus, the project aims at answering two majors questions:

- What is the effect of (a) access to insurance; (b) improved input supply; and (c) intensified extension – alone and in combination – on the adoption of intensified cultivation?
- What is the impact of these interventions on farm profits, welfare, and household welfare?

The key final indicators for the evaluation include farm profits, crop yield, and a set of indicators of household welfare (including food security, asset holdings, and child welfare). The intermediate indicators of cultivation intensification include cultivated area, agricultural labor use (including family labor), and input use (agrochemicals, tractor services, seeds). Finally, information on the adoption of specific improved practices at the plot level and knowledge of recommended practices serve as

immediate indicators. All of these indicators will be examined at the level of the individual as well as the household.

During the preparation stage of the project in 2013, some of the components were piloted (notably insurance sales, the CEA model and the agricultural labor weekly surveys), contracts and MoUs developed with implementing partners, content for the extension treatment prepared, and agro-input supply chains set-up. Through this process, the three interventions of the DIRTS project have been fine-tuned and activity plans finalized. The refined treatment designs plans are described in detail below, and a summary of changes is presented in table 1. Details of the timing of specific activities can be found in the following section, and in table 2 and figure 1. Further below, an updated list of project partners is provided, with details on their relationship with DIRTS.

Treatment designs

Insurance treatment design
Farmers will have the opportunity to purchase rainfall index insurance at prevailing market price, determined by the Ghana Agricultural Insurance Programme (GAIP) which is currently the only agency selling rainfall index insurance in Ghana. This is a commercially viable drought index insurance product, designed by the GAIP, which is managed by the Ghana Insurers Association; the insurance product was designed with input from IPA and customized to meet the demands of maize farmers in northern Ghana. The insurance product will be offered to all farmers living in randomly selected DIRTS communities.

Initially, IPA had planned to sell the insurance product at individually randomized prices. This would have allowed investigators to further explore how insurance price affects take-up and how this interacts with other treatments. However, in the 2013 farming season, IPA piloted insurance sales in 80 new communities, which had no prior exposure to rainfall index insurance and take-up was extremely low (<5%). Subsequent focus group discussions with farmers revealed that trust was a more important barrier than price.

During the EUI project, farmers had been provided free insurance in the first year and in following years uptake was 20-40% depending on the price. This shows that even when the price was relatively high uptake was a lot higher than in the 2013 communities with whom IPA had not built a trust relationship yet. In addition, GAIP asked IPA to help them explore more cost effective methods to market the insurance product to rural communities. IPA therefore decided that in 2014 it should prioritize testing marketing strategies that would increase the level of trust (and hence uptake) and reduce the cost of marketing (thereby increasing sustainability and scalability).

The benefits of community based marketers (CBM) are 1) the relatively low cost involved and 2) the fact that farmers know these people and are more likely to trust them than complete strangers. DIRTS will test how effective different types of community based marketers are in selling rainfall index insurance. Therefore, the bulk of insurance marketing will be performed by an external IPA/GAIP employee at a fixed point in time; however, at community level a Community Based Marketer (Insurance CBM) will be appointed to collect the insurance premiums over the course of three months. The CBM will be a community leader, a women organizer or a person selected on merit following a number of IPA pre-established criteria. This random variation is introduced to understand what makes an insurance marketer who is effective at addressing the issue of poor trust vis-à-vis the new insurance product.

At the beginning of the marketing season, all communities are visited by an IPA staff who explains the details of the insurance product to the farmers, and provides basic training to the CBMs. Subsequently, for 3 consecutive months, farmers are able to purchase policies from the CBMs. The policies are sold at GAIP's retail price. The cost of marketing and distribution to the communities is covered by the project. Finally, to ensure a minimum level of uptake among the farmers in the evaluation sample, IPA will give free insurance policies to 10 randomly selected farmers in each community.

A total of 12,150 households in all 162 DIRTS communities will be offered insurance, 3,240 of which will be surveyed as part of DIRTS (20 randomly selected households per community). In the first year of DIRTS, 1,620 households (10 households randomly selected from the evaluation sample in each community) will receive free insurance covering 3 acres of land.

Input treatment design

To increase farmers' access to agro-inputs, DIRTS will work through a network of 9 local private retailers trading in agro-inputs and active in the participating districts. The retailers were selected based on the types of inputs they trade in, their location vis-à-vis the intervention communities and their availability to stock all quantities and types of inputs ordered under DIRTS. In addition, DIRTS has identified wholesalers in Northern Region, who have confirmed their position to supply the selected inputs to the retailers.

Typically, input marketing has occurred after fertilizer subsidies are announced, butsubsidized fertilizer is not yet available when it is the best time to apply it. Furthermore, the Government of Ghana is struggling with abuse of the subsidy program and subsidies are likely to reduce significantly or possibly even phase out in the coming years. IPA hypothesizes that retailers have been hesitant to invest in marketing over the year because they are uncertain about demand before the immediate pre-planting season (i.e. prior to subsidy announcement).

At three points throughout the year, both off and during farming season, randomly selected communities will receive an opportunity to purchase from these retailers commercial inorganic fertilizers, certified improved maize, groundnut, soybean, vegetable and rice seeds, agro-chemicals and basic farming equipment. These agro-inputs will subsequently be delivered to farmers by a team of IPA and the said local agro-input retailers. IPA foresees that demand for inputs will be highest shortly after harvest time, when most farmers have cash on hand.

A comprehensive list of inputs was developed in collaboration with commercial retailers, wholesalers, the Ministry of Food and Agriculture and SARI. Farmers in the selected DIRTS communities are offered these inputs at the prevailing market price. IPA ensures that market price is applied consistently by running a short market assessment survey with several other agro-input retailers, to control whether prices are aligned.

Originally, IPA had planned to partner with CARD, a local organization that provides agro-inputs to farmers on credit. However, during contract negotiations IPA realized that CARD would rely on DIRTS for seed funding, which the project did not budget for. IPA therefore decided to partner with commercial agro-input retailers. There are several benefits to working with retailers, instead of an NGO. First, the cost of operations is much lower. Secondly, if sufficient farmers choose to purchase inputs when these are made available for sale in their communities, it could be commercially attractive for retailers to continue with these sales after DIRTS has ended. Thirdly, because farmers are expected to pay for the inputs immediately, rather than receiving them on credit, IPA is able to better investigate the hypothesis

that lack of access to inputs (not lack of funding) is a major barrier for farmers to increase the profitability of their farms. Finally, the retailers are more flexible with regards to the timing of input supplies (hence marketing can be done throughout the year) and they are willing to supply a wider range of inputs than CARD.

The project will facilitate the linkage between the communities and these agro-input retailers and provide the transportation of inputs to the communities. IPA has also engaged community members to help collect orders from farmers for a 3 week period after each marketing session. In DIRTS, inputs will be marketed to approximately 4,500 households in 60 randomly selected communities, where farmers have also been offered insurance.

Extension treatment design

The 81 communities receiving the intensive monitoring and extension treatment will be visited for interactive, individual-level trainings on best farming practices. In addition to the routine visits of MoFA Agricultural Extension Agents (AEA), DIRTS will recruit and train one Community Extension Agent (CEA) in each selected community to supplement AEA services, based on the "Community Knowledge Worker" model currently being implemented by the Grameen Foundation in Uganda.

CEAs are recruited within their own communities. All applicants complete a screening test, to confirm if they meet the basic requirements, including fluency in English and the local language, and their literacy level. Shortlisted candidate are interviewed by a panel comprising of an AEA, a distinguished member of the community and an IPA staff. Final candidates were selected by the panel. Each CEA will visit 10 pre-assigned farmers once a week for 30 weeks to provide a predesigned message on best farming practices. CEAs will be compensated per farmer interaction.

CEAs are equipped with an Android device, which contains 30 recorded messages in either video or audio format, as well as a "diagnostic" tool programmed using Open Data Kit (ODK) software. This tool will prompt the CEA to ask the farmer a few questions on the farm activities that he or she is planning to do, and, based on the responses, will guide the CEA to the most relevant extension message. The messages span the entire growing season, including topics such as field selection, land clearing and preparation, creation and application of organic matter, seed varieties, planting methodology, application of organic and inorganic fertilizers, weeding and field maintenance. In addition to the recorded messages, the CEAs are also provided with a handbook and other supplementary materials to enable them to share more detailed information with farmers, for example the maturity periods of different maize varieties.

The CEAs will be in close contact with AEAs, to whom they can refer when farmers have questions that they are not trained to address. Furthermore, AEAs will complement the work of the CEAs, by providing community level trainings on more complex topics such as pest and disease control. Together, the AEAs and CEAs will provide a full package of training, including advice on optimal timing of key farming activities in the growing season. Through the Android device, CEAs and DIRTS staff will also be fully connected by an innovative, two-way messaging application using both SMS and data channels. This allows the team to monitor the CEAs as well as provide up to date information to MOFA on challenges faced by farmers in the project communities. A team of team leaders and field managers, based in the operational areas, will provide continuous logistical support to the CEAs.

A total of 810 farmers in 81 communities will be visited by a CEA weekly during the agricultural season. These farmers are randomly selected from within the evaluation sample: half of the 20 farmers surveyed

in each community will receive one-on-one CEA services. This will allow IPA to investigate the diffusion of information within the communities. In addition, to evaluate the combination of input supply and extension, respondents in 30 randomly selected communities will have access to both inputs and CEA services.

Table 1, summary of updates and changes to the implementation plan since the proposal

	(Sub) objective	Original plan	Revised plan	Reasons for change
Insurance	To further demonstrate the robustness of the insurance demand curve, induce variation in take-up rates, and explore how insurance price and take-up interacts with other treatment	Offer insurance at individually-randomized prices. Marketing, premium collection and disbursement of policies done by IPA staff.	Offer insurance at one price. Premium collection is done for an extended period by community based marketers. Communities are randomly assigned to one of three types of CBM: 1) traditional leader, 2) women organizer or 3) candidate selected based on merit	Lack of trust and high cost of marketing have been identified as major barriers to up-take and sustainability of the insurance product, hence the need to investigate this in 2014. IPA is still planning to offer insurance at randomized prices in 2015, when farmers are familiar with the concept of rainfall index insurance.
Inputs	Ensure timely access to commercial agro-inputs for farmers in selected communities	Partner with CARD, who provides inputs on credit	DIRTS facilitates the linkages between local agro-input retailers and the communities, engages community agents to collect orders from farmers, and transports the inputs to the communities. Inputs are sold at prevailing market price.	CARD required the project to provide seed funding to cover the cost of their operations, which exceeded the budget. In addition to the reduced costs, partnering with commercial retailers has several advantages including increased sustainability and scalability of the intervention, if proven effective.
Extension	Test the hypothesis that smallholder farmers in northern Ghana are restricted by lack of knowledge of best practices	Provide weekly one-on-one extension to all 20 respondents randomly selected to participate in the evaluation	Provide weekly one-on-one extension to half of the 20 respondents randomly selected to participate in the evaluation. A section on social networks and questions on knowledge of agriculture best practices has been added to the annual surveys.	Individually targeted extension services are costly, even when provided by community embedded agents. Understanding how information is shared between community members will enable MoFA and other agencies target their extension to have the greatest impact.

Evaluation methods

IPA's core competence is conducting rigorous impact evaluations using the randomized controlled trial (RCT) method. For the DIRTS study, 3240 households in 162 communities will be randomized into one of four treatment groups: (1) insurance and extension (2) insurance and access to agro-inputs, (3) insurance, extension, and access to agro-inputs, and (4) insurance only.

Table 2, number of communities and households in each treatment group

Group	Total communities	Evaluation sample	Insurance	Extension	Agro-inputs
1	51	1020	All households offered insurance at market price. 510 randomly selected households (10/community) given free policies in 2014	510 households receive one-on-one extension every week for 30 weeks	0
2	30	600	All households offered insurance and market price. 300 randomly selected households (10/community) given free policies in 2014	0	All households are offered the option to purchase commercial agro-inputs within their community.

3	30	600	All households offered insurance and market price. 300 randomly selected households(10/community) given free policies in 2014	300 households receive one-on-one extension every week for 30 weeks	All households are offered the option to purchase commercial agro-inputs within their community.
4	51	1020	All households offered insurance and market price. 510 randomly selected households (10/community) given free policies in 2014	0	0
Totals	162	3240	12,150 households will be offered insurance at market price. 1620 households will be given a free policy covering 3 acres in 2014	810 households receive one-on-one extension every week for 30 weeks	4,500 households are offered the option to purchase commercial agro-inputs within their community.

Seven evaluation tools will be used to study DIRTS households. However, we have made a few changes to some of the research methods and these are described below.

1) Comprehensive annual surveys of all 3240 households
To collect detailed socio-economic data, information on cultivation practices and investment behavior, as well as yields and profits, all 3240 respondents in the DIRTS program will undergo a baseline, midline and endline survey. A team of well-trained local surveyors, team leaders and editors will be employed to conduct these surveys. Data collection will be done using netbooks and Blaise software, to enable the team to adequately monitor data quality and reduce the time needed for data management. The surveys will take place prior to the start of the farming season, when farmers are less busy.

2) Weekly farm input surveys of all respondents
Because household labor valuation is critical to estimating profitability, and because labor diaries and close substitutes tested during the pilot have not been fully effective, DIRTS will address the persistent issue of recall bias in measuring labor allocation through a CEA-style model, by training and employing locally-embedded Community Survey Assistants (CSAs) to collect labor data on a weekly basis over the course of the agricultural season. Like CEAs, CSAs are community residents who are compensated per interview and supervised by IPA enumerators. In intensive extension communities, CEAs will play the role of CSAs. Unfortunately, the frequent labor surveys with CSAs are quite expensive, and as a consequence IPA will not implement this data collection in the first year. However, IPA has applied for additional funding to support collection of this data in the second year.

3) Weekly farming activity monitoring
The CEAs will collect information on the on-going activities at the household level during their weekly visits to the 810 households in the extension treatment group. Using the ODK diagnostic tool they will record information on what activities the farmer did on his or her plots during the previous week and what he or she is planning to do the following week. In addition, they will record the main challenges faced by farmers with regards to agriculture.

4) GPS measurement of all farms
Accurate information on the location of farms is essential for correlating yield data to weather patterns. During annual surveys GPS coordinates of all farms will be collected.

5) Random audits of all aforementioned surveys
All data collection activities will be audited. For the annual surveys a special team of auditors in recruited and trained. For the other activities, team leaders and project managers will conduct these audits to ensure data is collected following the correct protocols.

6) Qualitative research
Qualitative instruments, such as focus group discussions, will also be used at various stages during the project's course.

7) Detailed information on input and insurance sales
During the marketing of agro-inputs information will be collected on the timing of demand for these products, volumes of the products sold at community level, and details on gender and choice of agro-inputs. This information will be useful for the agro-input dealers and GAIP, but also because this information is collected at the community level, not the individual household level, it will help place the findings from the annual surveys into a broader context.

Initially had IPA planned to use agronomic crop cuttings and soil analysis of a randomly selected subset to analyze and understand heterogeneity of responses to agricultural intensification. However, because of the high costs involved and the relatively short period of the project (the study period is likely too short to detect the impact of intensification on soil quality and related agronomic tests) it was decided to cancel this activity.

Key indicators
The key final indicators for the evaluation include farm profits, crop yield, and a set of indicators of household welfare (including food security, asset holdings, and child welfare). The intermediate indicators of cultivation intensification include cultivated area, agricultural labor use (including family labor), and input use (agrochemicals, tractor services, seeds). Finally, information on the adoption of specific improved practices at the plot level and knowledge of recommended practices serve as immediate indicators. All of these indicators will be examined at the level of the individual as well as the household.

Power
The most challenging problem for inference in this project is estimating the impact of improved market access on farmer yield or profits. This challenge arises because the improved market access treatment is randomized at the community level rather than the individual level. 60 communities receive the marketing treatment; the other 102 communities are control for this treatment. Given the variability and correlation structure of maize yields documented in the control group in Karlan et al. (2014), and the responsiveness of maize yields to increases in fertilizer use documented in SARI (2011), we can calculate our power to detect the causal impact of improved market access on maize yields.

Our power depends crucially on the responsiveness of farmers' fertilizer use to improve market access. If 10% of farmers in treatment communities move from using the baseline amount of fertilizer (almost 0) to ½ the recommended level of fertilizer use, power (at a significance level of .05) is over 99%. If only 1% of farmers increase their fertilizer use by this amount, power drops to 95%. So the power of the study to detect the direct effect of the marketing intervention is sufficient. The interaction effects are more challenging. If an additional 10% of farmers increase their fertilizer use when they have access to improved markets as well as to community extension agents our power remains very high at over 99%. However, our power to detect the change in yields is only 70% if the proportion of farmers using ½ the recommended level of fertilizer rises by only one percent.

Cost-benefit analysis

IPA is collecting detailed data on the costs of each of the three arms of the intervention. Because IPA is directly involved in the implementation, the cost data is readily available. The main challenge on the cost side is separating out the appropriate project management costs, because there is overlap in the efforts associated with implementing these interventions and that associated with data collection and the evaluation. However, it will be possible to provide a range of alternative cost-benefit estimates depending upon a range of plausible assumptions regarding the attribution of this component of costs. The evaluation is designed to provide rigorous estimates of the impact of each of the interventions on farm profits, which will serve as our measure of the benefits of each intervention. There may be benefits besides increased average profits. For example, there may be improved food security, reduced variance of consumption, or changes in the intra-household allocation of resources. These will be estimated and presented, but we have no direct way of comparing these to the costs of the interventions.

Internal and external validity

The foundation of this study as a randomized control trial provides reasonably strong assurance of the internal validity of its findings, provided that the implementation of the randomization remains smooth and data collection does not run into unforeseen problems. The study is designed to be cognizant (and to provide estimates) of potential spillovers involving either the insurance or community extension agent interventions. We are also collecting administrative data around the marketing intervention to check for potential spillovers in that dimension. The key survey instrument is a modified and improved version of one developed over the past five years for the predecessor study in this region (Karlan et al. 2014). The study is being carried out in 162 randomly selected communities across 12 districts in northern Ghana; validity for this large and crucially important region is our first goal.

The external validity of the study depends on its theoretical foundation. The specific extension advice being provided by the community extension agents, the particular form of the index insurance policy, in the set of agricultural inputs being made available in the marketing intervention are all designed to fit the economic and agro-ecological environment of northern Ghana. We do not expect the responses of profits to these specific interventions to be the same in other environments. However, imperfect information about the use of intensified inputs, uncertain and delayed access to agricultural inputs, and uninsured rainfall risk are ubiquitous features of small-scale agriculture in West Africa and more broadly in poor countries. Understanding farmers responses to changes in the institutional environment focused on these constraints is essential for developing appropriate policy.

Timing of activities

To enable smallholder farmers to access and utilize the above mentioned services to increase profitability of their farms, appropriate timing of the interventions is crucial. DIRTS will provide insurance, inputs and extension at different stages during the season. The program will last two years, as technology adoption and subsequent intensification is not an instantaneous process.

The rainfall index insurance and first session of input marketing will be offered to communities between January and March, immediately after the previous harvesting season, when farmers have cash. During this same period, IPA will conduct a detailed baseline survey of 20 randomly selected respondents per community. In March and April, inputs will undergo a second round of marketing just prior to the agricultural season, and a third round of marketing after government fertilizer subsidies have been announced. All inputs will be delivered within five weeks after marketing.

From January to April, CEA content database will be refined and finalized, using results of a pilot study and stakeholder workshops. CEAs have been selected in December 2013, and will attend an intensive 3 week training, prior to the agricultural season. They will begin providing extension in April and continue throughout the agricultural season. Each household will be visited one time per week, totaling 30 visits between April and November.

During DIRTS project, IPA will organize three rounds of a comprehensive annual survey (2014, 2015 and 2016). These surveys will be organized between January and April each year. As a complementary of the annual survey, IPA will organize a bi-monthly labor survey during the agriculture season of 2015. IPA will also take GPS measurement and coordinates of all selected plots. A market survey will be completed to gather data on crop prices and unit of conversion.

DIRTS TIMELINE: 2014

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BASELINE SURVEY											
INPUT MARKETING – 3 ROUNDS											
INSURANCE MARKETING											
					INSURANCE COVERAGE						
				COMMUNITY-BASED E-EXTENSION SERVICES							
			MONITORING, AUDITING AND OBSERVATIONAL VISITS								
									YEAR 1 REPORT		

DIRTS TIMELINE: 2015

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MIDLINE SURVEY											
				WEEKLY COMMUNITY SURVEYS							
INPUT MARKETING – 3 ROUNDS											
INSURANCE MARKETING											
					INSURANCE COVERAGE						
		COMMUNITY-BASED E-EXTENSION SERVICES									
		MONITORING, AUDITING AND OBSERVATIONAL VISITS									
									YEAR 2 REPORT		
	YEAR 1 DISSEMINATION										
								YEAR 2 DISSEMINATION			

DIRTS TIMELINE: 2016

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ENDLINE SURVEY											
				IMPACT EVALUATION REPORT							
							REPORT DISSEMINATION				

Table 3, Detailed activity plan

Activity		Details	Timing
Census	Household census in 193 communities	IPA has conducted a census in 12 districts in Northern Ghana where the project beneficiaries are located. The census includes 193 communities selected from a list of communities received from CARD (initially planned to be an implementation partner on inputs supply). The census instrument consisted of questions relating to occupations, access to land, and relationship to other household members, to be asked of all adults in a household. The GPS coordinate of each community was also collected during the census exercise.	January-March 2013
Piloting	4 month CEA pilot in 28 (non-DIRTS) communities	Test logistics of the CEA model, including the recruitment and payment of CEAs, the use of the Android phone, and farmer feedback on different ways of presenting messages (i.e. video, text, pictures).	April-July 2013
	4 month CSA pilot in 10 (non DIRTS) communities	Test feasibility of collecting weekly labor data using community survey assistants (CSA).	April-July 2013
	Marketing insurance in 81 communities (44 DIRTS and 37 non-DIRTS)	Explore uptake of insurance in communities with no prior exposure to rainfall index insurance.	May 2013
Insurance	Recruitment of CBMs	One community based marketer in each of the 162 communities was selected. In 54 randomly selected communities IPA selected the traditional leader, in 54 communities the women organizer and in 54 communities IPA advertised the position and selected the best candidate based on merit. This overlay experiment will help understand what type of community based marketer is most effective in selling rainfall index insurance.	January-February 2014
	Insurance marketing	IPA staff together with the CBMs held a 2-3 hour marketing session in each community to explain the details and parameters of the insurance product.	February – March 2014
	Premium collection	The CBMs will sell insurance policies within their communities and collect premiums for a 2 month period. IPA staff will visit each CBM 2 times during this period to ensure they understand the system for recording sales. CBMs are paid a commission on each policy sold (which is a model that GAIP would like to adopt in future).	March-April 2014
	Distribution of free insurance policies	To ensure a minimum level of take-up in the DIRTS sample, half of the respondents in the 162 communities will be randomly selected to receive free insurance covering three acres of land.	May 2014
	Period covered by insurance policy	The GAIP- and IPA-designed Faarigu rainfall index insurance product is sold per acre at prevailing market price and insures estimated farmer's investment of GHC100 per acre. The premium rate equals 12% of farmer's investment on a cultivated acre. Payouts are calculated as percentages of the total investment insured over a coverage period of 120 days, during which the numbers of consecutive dry days or rainfall amounts per catchment area are monitored.	May – October 2014
	Notifications and pay-outs	All communities will be visited by IPA staff who will inform them of the recorded rainfall and any related pay-outs in their community. Farmers who are entitled to a pay-out will be paid.	November 2014
	2015 insurance activities	These will follow a similar timeline as the 2014 activities	
Extension	Prepare, pretest and	A range of methods was used to develop the extension messages: literature reviews,	March

	refine content for extension messages	multiple focus group discussions with farmers, individual consultations with extension experts at SARI and MoFA, and two content development workshops (including representatives from MoFA, SARI and farmers). All content is reviewed and approved by scientists at SARI	2013-January 2014
	Produce extension materials, including videos, audio messages and handbook	A company specialized in the production of agricultural extension videos has been contracted to convert 20 messages into short videos, which can be uploaded onto the Android phones. These messages are between 2 and 5 minutes long and translated into the local language. The remaining messages are recorded as audio messages by IPA, also in the local language. Additional information is presented in a handbook for CEAs.	October 2013-April 2014
	Recruit 81 CEAs	A team of IPA fieldstaff travelled to all 81 communties to advertise the position. A week later all applicants completed a screening test and those shortlisted were interviewed by a panel comprising of an AEA, a community member and an IPA staff. The top two candidates were selected by the panel.	December 2013
	Recruit Team Leaders and Field Managers	Nine team leaders and 3 field managers are recruited to help manage the 81 CEAs. They will be deployed to the various operational areas.	January 2014
	CEA training	A three week intensive training course led by SARI scientists and MoFA AEAs is held in Tamale. CEAs are trained on agricultural best practices, the use of the Android phone and ODK tool, and their field protocols. The training consists of lectures, group discussions and individual assignments.	March-April 2014
	Weekly household visits	CEAs will visit 10 pre-assigned farmers once week for thirty weeks spanning the entire growing seasons in 2014 and 2015	April-November 2014/2015
Inputs	Census of agro-input input retailers in DIRTS operational districts	A census was conducted of all agro-input retailers in the 12 districts covered by DIRTS. Information was collected on products sold, prices, size of business, willingness to participate in the program. The objective of this exercise was to identify retailers to partner with on the input supply component of DIRTS. Contracts were prepared with each retailer	September-October 2013
	Market survey of transportation options	DIRTS will cover the cost of transporting inputs to the selected communities at three points in the year. A market survey was conducted to determine the most cost-effective transport providers in each district.	January 2014
	Input supply workshop	A one-day workshop was organized to discuss and agree on the comprehensive list of inputs and the supply chain logistics. Participants included the input retailers, wholesalers, MoFA district directors, two project PIs (Dr. Fosu and Dr. Kolavalli) and IPA staff.	November 2013
	Preparation of inputs catalog	A catalog containing pictures and short descriptions of all the inputs on sale was prepared. This will enable farmers to select the inputs they would like to order from the retailers. Criteria for selecting agro-inputs for the catalog were that they had to be recommended by MoFA and SARI and be commercially available at wholesale outlets in the Northern Region. All participating retailers agree to source all the selected inputs if requested by farmers.	January-February 2014
	Recruitment of CBM	In each of the 60 communities that are part of the input supply component of DIRTS, the community was requested to nominate a trusted person who would be able to collect input orders (and related payments) on their behalf.	February 2014
	Marketing (1st round)	A 2-3 hour marketing session, led by the retailer, an IPA staff and the CBM, was held in each selected community. The order collection, payment and delivery systems were explained to the farmers and they were given the opportunity to ask questions about specific inputs.	February 2014
	Order collection (1st round)	Orders for inputs were placed with the CBM during a 3 week period, following the marketing session. When placing an order, farmers are asked to make the necessary payments and cash is stored by the CBM in a cash box. The retailer will receive the money upon delivery of the goods. In the recently completed first round, 96 bags of fertilizers, 215 chemicals and 6 pieces of farming equipment.	February-March 2014
	Order delivery (1st round)	The first round of orders was successfully delivered by the retailers.	March 2014
	Marketing (2nd round)		April 2014
	Order collection (2nd round)		April-May 2014
	Order delivery (2nd round)	The second round of order deliveries are scheduled to take place shortly before the 2014 planting season starts	May 2014
	Marketing (3rd round)	The timing of the third round of input supplies is tied to the announcement of the government subsidies (notably for fertilizer and seeds). Inputs in this round will be offered at the subsidized price.	Expected June 2014

	Order collection (3rd round)		Expected June-July 2014
	Order delivery (3rd round)		Expected July 2014
	2015 input supply activities	Next year's input supply activities will follow a similar timeline	
Annual survey	Baseline	A comprehensive annual survey will be administered to 3,240 households. The comprehensive surveys will be conducted by IPA surveyors, and will include questions about household finances, as well as investment, yields and profitability for each plot. The survey was programmed in Blaise and conducted using electronic netbooks.	January-April 2014
	Midline	A second round of the annual survey will be organized at the end of the year1 of the implementation using the same instrument.	January-April 2015
	Endline	A Third round of the annual survey will be organized at the end of the year 2 of the implementation using the same instrument.	January-April 2016
Bi-weekly labor survey	A 7 months high frequency data collection on agriculture labor	IPA will recruit community survey assistants (CSAs) to collect agriculture labor data on a bi-weekly basis over the course of the agricultural season.	May-November 2015

Partner organizations and respective roles on the project

Project partner organization	Point person within organization	Location		Role on project
		Country	City	
Savannah Agricultural Research Institute (SARI)	Mathias Fosu	Ghana	Tamale	SARI Researchers review and validate the content of **Agricultural Extension Messages** used under the DIRTS CEA component. SARI also assists in the conversion of the said messages into video scripts for **Agricultural Extension Videos** and provides technical support during the agricultural season in fine-tuning the content of Agricultural Extension materials to be used by Community Extension Agents in Year 1 and 2 of DIRTS. SARI also provided its technical expertise to **set up and manage all activities relating to a maize Demonstration Field** used to showcase a number of agronomic best practices featured in the 20 Agricultural Extension Videos to be used in Year 1 of the project. The Demonstration Field also served as an outdoor lab for the training of DIRTS' 81 Community Extension Agents.
International Food Policy Research Institute (IFPRI)	Shashidhara Kolavalli, Senior Research Staff	Ghana	Accra	As a partner organization, IFPRI extended technical support for **Agriculture Extension Advice and Input Supply Chain Development** of DIRTS. In particular, a Principal Investigator (PI) from IFPRI provided guidance in the early stages of project design thus contributing to the conceptualization of the various treatments, with a significant involvement in the agricultural inputs and extension components. The extension arm includes guidance on **optimal inputs usage and experimentation of farming techniques** – both areas where IFPRI has strong expertise and could advise to shape implementation.
Ministry of Food & Agriculture, Ghana (MOFA)	Williams Boakye-Acheampong, Northern Regional Directorate	Ghana	Accra	The MoFA Regional Directorate and District Offices facilitate the implementation of DIRTS as a whole with a pivotal role to play under the CEA component. MoFA District Offices facilitate the implementation of the CEA component by allowing a number of Agricultural Extension Agents (AEAs) to participate in the community extension activities of DIRTS. The Regional and District Offices avail some **34 Agricultural Extension Agents to train and backstop DIRTS CEAs in 81 DIRTS communities and by sanctioning the rainfall insurance product**

Project partner organization	Point person within organization	Location		Role on project
		Country	City	
				marketed in all 162 DIRTS sample communities.
Ghana Agricultural Insurance Programme (GAIP)	Mr. A. Katu, General Manager	Ghana	Accra	A grouping of 19 private insurance companies and managed by the Ghana Insurance Association (GIA), GAIP is currently the only Rainfall Index Insurance Provider in Ghana. GAIP and IPA have partnered to **co-design and market the Faarigu insurance product in all of DIRTS treatment communities**. Faarigu is a commercially viable drought index insurance product and customized to meet the demands of maize farmers in northern Ghana.

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MILESTONE REPORT 2
Grant No. AID-OAA-F-13-00057

Innovations for Poverty Action

Examining Underinvestment in Agriculture & Disseminating Innovative Resources and Technologies to Smallholders

September 2nd, 2014

Part 1 - Progress Report

Evaluation:

To date, the Disseminating Innovative Resources and Technologies to Smallholders (DIRTS) project has pursued the following activities: (1) community and respondent selection (2) piloting and refinement of data collection instruments and (3) execution of the comprehensive annual survey and market survey. The three DIRTS interventions have been rolled out, including: (1) Rainfall index insurance, (2) Extension advice, and (3) Inputs supply.

Community and Respondent Selection

In October 2013 the randomization strategy changed. One major criteria has been added to the eligibility of a community. The community should be more than 1 km away from any other community to be qualified to be part of the DIRTS community. This change was implemented to enhance our ability to track spillovers. As per that criteria, the research team could not find 162 eligible communities from the list of 187 communities where the census was done between January and March 2013 since communities that were within one km of each other were disqualified. The evaluation team, therefore, had to carry out a census in six additional communities. The census in the six additional communities followed the same protocol as the earlier census.

A two-step randomization was followed for this study: a) at the community level and b) at household level. First, the 162 eligible communities were randomly assigned to four treatment groups balanced on 1) number of compounds (less than 500 compounds/community), 2) average household size and 3) access to markets, where market access is defined as "high" or "low", according to whether community is more or less than 2 hours away from the nearest town of 250,000+ inhabitants.

The community level treatment groups are as follows:

- T1: Insurance and Extension 52
- T2: Insurance and Agricultural Inputs (Marketing) 31
- T3: Insurance, Extension and Agricultural Inputs (Marketing) 29
- T4: Control (Insurance only) 50

These totals differ slightly from our original plans as a result of a community mix-up in the early stages of implementation[1].

[1] In early June 2014 the inputs treatment was found to be active in one community (Kpachaa) instead of another (Kpachayili). Kpachaa was supposed to receive insurance treatment only and Kpachayili was to receive insurance plus extension plus input treatment. This happened because at the time of community entry, the informant in Kpachayili who should direct the inputs team to the community could not be reached; therefore, the team used a different informant, who misled the team to the wrong community (Kpachaa). The backchecks did not detect this mistake, likely due to the similarity in the names of the two communities. Due to the fact that Kpachaa mistakenly received input treatment instead of Kpachayili, both communities have been reclassified. Kpachaa is now classified as insurance plus input community and Kpachayili as insurance plus extension community.

Table 1: Summary of DIRTS implementation and intervention communities and households

Intervention	Recipients	T1	T2	T3	T4
	Total communities	52	31	29	50
	Total farmers per community in evaluation (total farmers evaluated per treatment group)	20 (1,040)	20 (620)	20 (580)	20 (1000)
Insurance	• Insurance will be offered at market price to all community members. • In year 1,free insurance covering 3 acres will be given to 10 randomly selected farmers from the evaluation sample in each community (for a total of 1,620 farmers) • In years 2 and 3, insurance policies may be sold at subsidized prices to ensure sufficient take-up	**X**	**X**	**X**	**X**
Extension	• Individually targeted extension messages will be delivered to 10 randomly selected farmers from the evaluation sample in each extension treatment community • In years 2 and 3, the extension will be expanded to additional farmers within the same households	**X**		**X**	
Inputs	• Agricultural inputs will be offered at market price to all community members. Transport costs to the communities will be covered by IPA, up to a maximum of 9 bags (or the equivalent) per household.		**X**	**X**	

Twenty households were randomly selected in each community for the evaluation, balanced on the 1) household head (also being the head of their compound), 2) the size of the household and 3) their total acreage. In total, the sample is comprised of 3,240 households. Within each household, two people serve as respondents, the first is the household head (R1), the second (R2) was chosen with priority to a female spouse who cultivates, or any other female adult if a female spouse was unavailable, and if no adult females were available, any other male adult who cultivates. At the household level, treatment groups were assigned as follows:

Treatment 1- Insurance and Extension: all households have access to insurance at market prices. 20 households are randomly selected to be surveyed as a part of the evaluation. These 20 households were randomly assigned to four sub-treatment groups balanced on literacy, farm size, crop grown, fertilizer used, harvest and social network. These four groups are:

- T1, 1: Free Insurance 5
- T1, 2: Free Insurance plus Extension 5
- T1, 3: Extension 5
- T1, 4: Control 5

Treatment 2- Insurance and Agricultural Inputs: all households have access to insurance at market price and to the inputs marketing treatment. 20 households are randomly selected to be surveyed as a part of the evaluation. Of these 20 households, 10 households are randomly selected to receive the grant of free insurance balanced on literacy, farm size, crop grown, fertilizer used, harvest and social network.

- T2, 1: Input marketing 10
- T2, 2: Free Insurance plus Input marketing 10

Treatment 3- Insurance, Extension and Agricultural Inputs: all households have access to insurance at market price and to the marketing treatment. 20 households are randomly selected to be surveyed as a part of the evaluation. These 20 households were randomly assigned to four sub-treatment groups balanced on literacy, farm size, crop grown, fertilizer used, harvest and social network. These four groups are:

- T3, 1: Free Insurance plus marketing 5
- T3, 2: Free Insurance plus Extension plus marketing 5
- T3, 3: Extension plus marketing 5
- T3, 4: Marketing 5

Treatment 4- Insurance only: all households are given the opportunity to buy insurance at market price. 20 households are randomly selected to be surveyed as a part of the evaluation. Of these 20 households, 10 households are randomly selected to receive the grant of free insurance balanced on literacy, farm size, crop grown, fertilizer used, harvest and social network.

- T4, 1: Free Insurance 10
- T4, 2: Control 10

Furthermore, in order to test the effect of different types of Community Based Marketers (CBM) on the uptake of insurance, IPA assigned each community to one of three sub-treatments (balanced on number of compounds, average household size and access to market):

Table 2: Summary of insurance CBM overlay treatment

CBM status	Number of communities
Community headman	54 communities
Women organizer	54 communities
Person selected based on merit	54 communities

Testing data collection instruments

The comprehensive annual survey was extensively piloted in non-DIRTS communities in late 2013 and early this year (2014). The pilot focused on the additional sections that had been added to the original questionnaire. Based on results from the pilot, the questionnaire was restructured and a second round

of piloting was completed in November 2013. Once the questionnaire had been programmed in Blaise, the electronic survey was pretested in January 2014, during a Principal Investigator visit to the country office. Feedback from the pilots greatly helped to refine the survey instruments

Comprehensive annual survey

The DIRTS team completed a comprehensive annual survey in all the 162 DIRTS communities from March 18th to April 27th, 2014, covering 3,236 households across 12 districts. Four households had to be dropped from the original sample, because neither the original randomly selected farmers, nor back-ups were able to participate. The annual survey instrument covers data about farmers' livelihoods, land tenure, farm labor activities, social network, finance, investment, health and education, and risk aversion. It was programmed in Blaise and administered with the aid of netbooks. The full questionnaire was administered to the household head while only agriculture sections were administered to the second respondent.

Market survey

In early May 2014, the DIRTS team completed a market survey in the project area. In total, 21 markets were surveyed. Data was collected on food prices and common units of measuring the crops at markets, including the conversion of these units to kilograms. IPA surveyors visited the markets with a scale in hand and weighed each article to get their equivalent measurements in kilograms while also collecting their respective prices in various units of measure. By early June, the data was inputted and converted into Stata files for analysis.

Intervention:

A. Insurance

2013 Rainfall Insurance Pilot. In 2013, IPA conducted a Pilot of its weather insurance sales program, intended to inform the full-scale Disseminating Innovative Resources and Technologies to Smallholders (DIRTS) to be conducted the following year. IPA and the Ghana Agriculture Insurance Pool (GAIP) developed insurance products for geographic pixels including 81 DIRTS sample communities. About half (40) of these communities were assigned to be offered weather insurance in the 2013 Pilot. To increase the total number of communities receiving insurance marketing in the Pilot, insurance was offered to an additional 41 non-sample communities located in the same geographic pixels.

Under the Pilot, two insurance products were offered, a basic (low-premium) and a more comprehensive (high-premium) one. This Pilot was conducted to investigate overall uptake, as well as to see how demand for insurance was affected by price and level of insured risk offered by the package. Overall uptake was extremely low, with only 67 farmers buying insurance. Of the 81 communities where insurance was marketed, only 25 had anyone who purchased insurance. In addition, the marketing structure was very expensive, with IPA staff travelling to all the communities various times for marketing and premium collection.

The average community attendance at the marketing sessions was about 24 individuals. In communities where at least one farmer purchased insurance, the number of farmers who purchased insurance was equal to about 11 percent of those in attendance at the marketing session on average. Among those who bought insurance, the average coverage amounted to 1.36 acres.

There are a couple factors that could explain the low uptake. First, these communities lack previous experience with rainfall insurance. Trust in the product and the organization behind the policy product also appears to be a factor. Lastly, the timing of the marketing and sales sessions was not ideal. A number of farmers reported that they would have liked to buy insurance, but could not gather the money in time. The hypothesis was made that marketing and selling insurance immediately after harvest, and allowing more time between marketing and collection of premiums, could improve uptake. Further, a number of farmers mentioned the premium as a barrier to purchasing insurance during focus group discussions.

Demand was slightly higher for the basic product; about 64 percent of farmers who bought insurance bought the basic product, while 36 percent bought the comprehensive product. Those buying the comprehensive product purchased, on average, coverage for slightly more acres—1.4 acres versus 1.3 acres—but the difference was not statistically significant. Payouts were given in 24 communities, of which 16 are also DIRTS communities.

DIRTS Insurance in 2014. Under DIRTS, insurance was offered to all members of 162 communities; farmers were given the opportunity to purchase rainfall index insurance at (above actuarially fair) market price. This is a commercially viable drought index insurance product, designed by the Ghana Agricultural Insurance Programme (GAIP), managed by the Ghana Insurers Association, with input from IPA. Besides selling at a fair-market premium, 10 randomly selected policyholders received a free introductory offer of insurance for three acres. The design of this experiment allows investigators to examine the impact of grants of index insurance on farming activities and other outcomes, and the interactions between these impacts and those of the extension and marketing treatments. In addition, we will be able to measure the role of social networking in insurance uptake in the second year of DIRTS.

While the bulk of insurance marketing was performed by an external IPA/GAIP employee at a fixed point in time, at the community level a Community Based Marketer (Insurance CBM) was appointed to answer general questions on the insurance product and collect the premiums over the course of two months, in exchange for a commission of GHS 1 per acre sold. The CBM could be a community leader, a women organizer, or a person selected on merit in accordance with a number of IPA pre-established criteria. This random variation was introduced to understand the qualities that make an insurance marketer effective at addressing the issue of poor trust vis-à-vis the new insurance product. Introducing CBMs was also meant to address the costliness of the previous marketing structure, used in both the Pilot and the earlier Examining Underinvestment in Agriculture (EUI)[2] project, under which IPA staff travelled to communities to conduct group and one-on-one marketing sessions.

Insurance Product. According to the initial design, farmers would be offered the chance to buy insurance policies with varying trigger parameters according to location, while the per acre premium would be the same in all communities. To avoid breaching farmers' trust in cases where farmers would not understand why farmers in other communities, possibly neighboring ones, paid the same amount per acre for a policy demanding less dry days to trigger a payout, IPA agreed with GAIP that they would sell a standardized insurance product with equal trigger days in all communities. Because the odds of reaching the standardized trigger vary across communities, GAIP proposed different premiums according to location. An agreement was reached that the policy be sold at a "nominal" flat rate of GHS 12 per acre, with IPA covering the cost difference between the project rate and the "real" location-specific premium.

[2] Examining Underinvestment in Agriculture (2009-2012) http://www.poverty-action.org/project/0072

Insurance Marketing and Activity Monitoring. CBMs were recruited and trained in December 2013 and February 2014, respectively. The CBM types were distributed in equal measures across the 162 communities, with 54 having community headmen, 54 women organizers and 54 selected based on performance on a test. At the same time, IPA drafted an insurance marketing script following the template used in the 2013 Pilot and based on provisional trigger values provided by GAIP. The insurance marketing was tested in three communities in February and then approved by GAIP.

The script was used during the marketing, during which an IPA marketer and the CBM worked together to present the insurance product to each community, marking the beginning of the premium collection period, which spanned from March 3rd through April 30th[3]. Some of the communities also requested a second round of marketing since they said they still did not clearly understand all the components of the insurance. A second round of marketing was therefore conducted alongside CBM monitoring (described below) in order to boost farmers' understanding of the product. Marketing of insurance to the 162 DIRTS communities started on February 16th and ended on March 16th.

Premium collection overlapped with the monitoring of CBM activities conducted in April; this monitoring took place in two phases: the first started on March 27th and ended on April 10th. The second monitoring round was added partly due to the low patronage of policies in the initial round and at the request of the CBMs as they reported that most farmers still did not clearly comprehend the policy details. The second round of monitoring started on April 23rd. The number of policies sold increased relative to the first round since communities were reminded of the deadline for premium collection and also as a result of an improved grasp of the policy structure.

Results. In the first half of May, following the end of the marketing period, CBMs collected premiums from the communities and received their commissions. IPA then awarded the free policies and distributed the insurance certificates to policyholders. These activities started on May 2nd and ended around May 15th. Because insurance implementation activities were completed by this time, it is now possible to advance some preliminary analysis of the implementation data from this arm of DIRTS – unlike extension and inputs which are, respectively, still ongoing or wrapping up at the time of writing.

Sales Figures. Overall, a total of 437 policies were sold covering a total of 601 acres, while IPA awarded free insurance for an extra 4,860 acres. A total amount of GHS 7,212 was received as payment for 601 acres sold at GHS 12 each in DIRTS communities and GHS 601 were paid in commissions to the CBMs (GHS 1 per insured acre). Insurance was bought in 90 out of the 162 communities. In line with the sales pattern that emerged from the 2013 Pilot, policy holders in 2014 insured 1.33 acres on average (as compared to 1.36 acres during the Pilot) and 3.7 acres per community. Out of these sales, the minimum number of acres insured was one and the maximum was 10. Average uptake per community was 1.58 percent, considering that the average size of the 162 DIRTS communities is 67 households, 39 compounds, 203 adults[4]. Prior exposure to insurance seems to be a key factor in uptake this year: of the 81 Pilot communities, 41 are also in the current DIRTS sample. These 41 communities exhibited an uptake 1.67 times larger than the communities that were not part of the Pilot. This effect is even more evident in communities that actually purchased insurance in the Pilot stage. These communities had an uptake 3.2 times larger than other communities in the sample;it should also be noted that all farmers who purchased insurance in the Pilot ended up receiving a payout.

[3] Premium collection from community members which was initially expected to end on the 18th of April was postponed to the 30th of April.

[4] Based on the DIRTS 2013 census data, the average community size of the 162 DIRTS communities is 67 households, 39 compounds, 203 adults.

The preceding EUI project and the 2013 Pilot have shown that trust is major obstacle to insurance uptake. This proved to be the case during the implementation of DIRTS as well: it was found that some community members still feel the involvement of CBMs does not guarantee that the product is trustworthy. However, field monitoring showed that communities in which the insurance and inputs interventions intersected and in which it was clear that the two programs were led by the same agents, trust increased after the first round of inputs delivery was successfully completed.

Policyholders' profiles. Wrap-up questionnaires were administered to 313 of these policyholders at the time of collecting premiums from the communities, with the objective of capturing some basic profile information on insurance buyers and their level of understanding of the product. In general, the majority of farmers who purchased insurance were between the ages of 25 and 45, with most being around 30 years of age. This differs from the distribution of ages that was collected from the community DIRTS baseline survey, where the majority of residents were between the ages of 15 and 30, with a peak at 20.

Women comprised 38 percent of buyers, and on average, they purchased 1.27 acres of coverage in comparison to the men who purchased 1.43 acres of coverage. However, men cultivated an average of 11.13 acres of land, which is significantly more than the average woman who cultivated 4.9 acres of land. Consequently, men only insured 13 percent of the land they cultivated, whereas women insured 26 percent of their land.

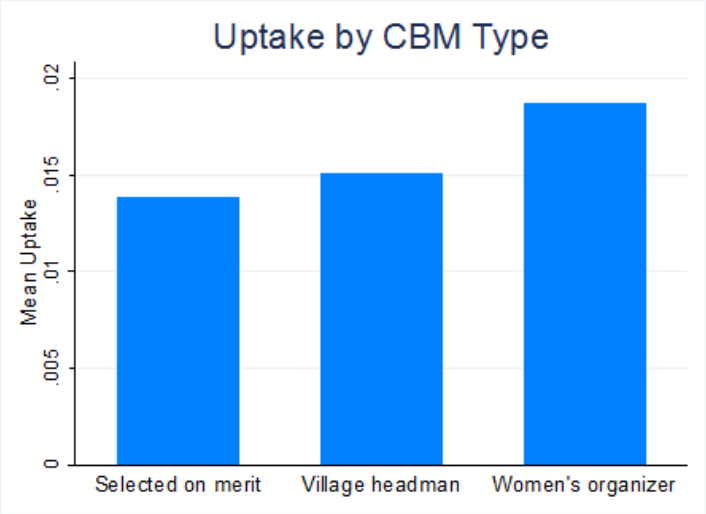
The majority of farmers who purchased insurance cultivated between 3 and 4 crops. A negative correlation exists between the number of crops that a farmer cultivates and the number of acres of insurance that he or she purchases. This could be an indication that by planting various kinds of crops, farmers feel they face less risk from poor weather and, hence, would not benefit as greatly from insurance.

Effectiveness of CBMs. In each community, a CBM was randomly assigned from 3 possible options: a women organizer, a community headman or a person selected through merit. Overall, 54 of each type of CBM were chosen. The women organizers sold the most acres of coverage to the greatest number of farmers. They sold an average coverage of 4.3 acres to an average of 3.2 farmers per community, giving an average of about 1.34 acres per person. The community headmen followed, selling an average coverage of 2.72 acres to 2.94 farmers. Last were the CBMs selected on merit, who sold an average coverage of 3.16 acres to an average of 2.18 farmers. However, the differences in sales between the CBM types were not statistically significant.

To ensure that these results were not skewed by the population size of communities to which CBMs were assigned, uptake as a percentage of the population was tested. This confirmed that women organizers had the highest average uptake of the 3 CBM types.

Of all female buyers, 57 percent purchased from a women organizer, although women bought similar amounts of coverage from each CBM type. Men were most likely to purchase from the community headman and purchased more coverage from each CBM type than women did.

Chart 1: Insurance uptake rates by type of CBM



Knowledge of Community Members. Community members' understanding of the insurance product was also a major factor in determining their willingness to purchase it. Four questions to test farmers' knowledge of the product were included as part of the questionnaire administered to policyholders. Farmers with a women organizer as their CBM scored the highest, followed by those with a village headman as their CBM and lastly those with a CBM selected based on merit. However, there was no connection between the number of acres policyholders purchased and their score on the quiz. Notwithstanding the lack of correlation, the general concept of insurance is still seen by community members as a product for those who are literate. They are not used to the concept of paying for future services. Some farmers voiced a feeling that it is not a profitable use of money to pay for a product that protects against a future event. Hence, more time and awareness-raising will be required to encourage community members to change their notion of insurance.

Issues/challenges. Issues encountered during implementation and the solutions applied consequently are as follows:

Issues with CBM Recruitment. It was detected by the insurance team during field monitoring that some of the recruited CBMs were not at post. An inquiry revealed that these CBMs had been recruited both as Community Extension Agents and for the Insurance CBM role. An agreement was reached internally and the insurance team replaced the CBM in those communities, while the former maintained the role of CEA.

CBM Capability and Availability. Most women organizers and some of the community headmen selected as CBMs could not read or write in English and were therefore advised to look for an assistant to help them record sales. It happened that some of these CBMs were ready to make further sales but the assistant was not always available; in some of these cases, IPA staff on monitoring duty helped the CBM proceed with some of the sales.

Procrastination of Community Members. Most CBMs pointed to the fact that during the marketing period community members postponed the decision to buy until the end of the marketing period. Early decision-making was encouraged by the CBMs, as procrastination could lead farmers to overlook the

April 30th deadline or to find themselves cashless and therefore unable to buy insurance at the close of the marketing period.

Community Mismatch. During certificate distribution in May, the insurance team detected Nyankpala to be a DIRTS community instead of Kukpalgu (where an insurance CBM was recruited and insurance was marketed). This emerged when the insurance team found the farmers randomly selected for free policies were all found in Nyankpala instead of Kukpalgu. The CEA team also immediately followed up and confirmed the CEA was recruited in Kukpalgu and currently travels to Nyankpala for CEA activities.

The team debriefed on the cause of this error and found that during the 2013 preparatory census, the census auditor who visited Kukpalgu was redirected by some community members to Nyankpala which they stated to be the real Kukpalgu. In 2014, the evaluation field staff who worked in that area during the Farmer Survey did not bring to the notice of the Project Manager that the assigned respondents were found in Nyankpala instead of Kukpalgu. The Project Manager for evaluation and Implementation Manager for CEA made a second visit to the community. The GPS coordinates for Nyankpala were taken during this visit and compared to the coordinates obtained for Kukpalgu at the time of the 2013 census. The coordinates were the same. This means that the census auditor did census and picked the GPS coordinates in Nyankpala but used the name Kukpalgu. Consequently, insurance was not marketed in Nyankpala (a DIRTS community) but in Kukpalgu[5] (a non-DIRTS community).

Recent Developments and Way Forward. Following the end of insurance sales, voice messages were sent to policy holders in their preferred local language (Dagbani or Komkomba) to remind them of the time frame known as the "planting window" (from May 21st through June 19th) marking the start of the insurance coverage period. IPA currently receives rainfall data every 10 days from the rainfall data provider for continuous monitoring of community eligibility for payouts.

B. Extension

Preparatory Phase and Changes to Original Design. The DIRTS extension model engages Community-based Extension Agents (CEAs) who, equipped with an Android device, offer one-on-one extension services to 10 pre-assigned smallholder farmers in their community. As per the original intervention design, all 20 survey respondents in communities in the extension arm were to receive extension messages from the CEAs. Piloting revealed that it was feasible to offer individually randomized access to the community extension agents. Therefore the design was changed so that only 10 of the 20 farmers receive messages. This change was motivated by the increase in power generated by the individual randomization.

The extension content is delivered in the form of video (20) and audio (10) messages. Extensive content development work was done through August 2013. Following that, Savanna Agricultural Research Institute (SARI) Scientists reviewed and validated their content while the messages were still in script only. SARI's role was also to oversee the conversion of such scripts into the final video or audio messages; in particular, SARI checked the contents of the video scripts making sure they were consistent with the messages originally developed.

Video production of the activities spanned several months, from October 2013 through March 2014. To that end, IPA contracted a video making company, Countrywise Communications. The contractor shot

[5] Uptake of insurance in Kukpalgu was 0.

videos in various locations of the Northern and Brong-Ahafo Regions, as well as on a demonstration farm facilitated by IPA and managed by SARI from November 2013 to April 2014. Not only did this one-acre field serve as the main setting for the shooting of videos, it was also used for on-field practical training of the 81 CEAs in March/April.

In December 2013, 81 CEAs were recruited by a team of IPA staff. The position was first advertised through posters in the respective communities and interested candidates were invited to complete application forms with women particularly encouraged to apply. All candidates who met the required criteria underwent a screening test and were interviewed by a panel comprising an IPA staff, a MoFA Agriculture Extension Agent (AEA) and a community member. The panel selected a CEA in each community, as well as a backup, wherever possible.

CEA Training. IPA facilitated a three-week training between March and April for the 81 CEAs at the Tamale Polytechnic. The training included technical lectures on agricultural best practices led by SARI Scientists, followed by small group discussions on these topics led by MoFA AEAs. In addition, the CEAs were taught communication skills, field protocols and how to use their mobile devices equipped with the ODK Diagnostic tools. Several field trips allowed the CEAs to practice providing extension services to real farmers. A trip to the demonstration field was organized and proved very beneficial to the group. During this trip, most of the CEAs had the chance to see some maize farms. The scientist from SARI pointed out some common poor agronomic/agricultural practices on these fields and explained how to correct them. This was very helpful because the CEAs attested to these practices being carried out in their communities as well - thus the field trip built their capacities in providing on-farm advice to farmers. CEAs also visited the premises of SARI to interact with researchers in the various departments, observe some scientific soil and disease testing procedures as well as the mechanical workshop to see some farm machinery.

To successfully complete the training, CEAs had to pass quizzes and a final exam. Two people did not succeed, despite additional one-on-one tutorials. A third person had to resign after being accepted for tertiary education. Accordingly, three replacements were hired and trained. On April 28th, the CEAs began their weekly household visits and will continue until the end of November for a total of 30 weeks.

Rollout. Since late April, 81 CEAs have been conducting weekly visits to the 10 randomly pre-selected farmers in their communities. During each visit, the CEA asks the farmers a few questions about their farming activities and then “delivers” an appropriate video or audio extension message on their Android phone. Thirty messages on agricultural best practices are be delivered, one at a time, to farmers on a weekly basis. The messages (20 video and 10 audio) are preloaded on the Android device. CEAs also have a handbook with additional information on each topic. If the CEA is technically challenged in addressing questions from a farmer or issues on a farmer’s field, he or she resorts to a supervising MoFA AEA for support.

What makes the model even more effective is that the Android devices are programmed with a diagnostic tool that utilizes farmers’ feedback and responses to recommend the specific video or audio message that is most relevant to the farmer at that point in time. In addition, the tool allows for real-time information flow back to the project team, describing what activities farmers are undertaking and what issues they are facing.

For instance, through the CEA interactions in June, it emerged that 787 (90 percent) farmers prepared their land and roughly 500 (61 percent) bought maize seeds and planted (see Table 3 for the breakdown for April-May and June). This information has been shared with MoFA and will help AEAs tailor their support to the communities. It will also allow the implementation team to improve the content of the extension messages for next year.

Table 3: 810 farmers' activities in June

787 *prepared land*
492 *bought maize seeds*
474 *planted maize*
214 *refilled and thinned*
190 *applied fertilizer*
196 *used agrochemicals*
202 *weeded maize*

The Diagnostic Tool – the nucleus of the program – through its facilitation of a real time two-way dataflow between the CEAs and the IPA Tamale project team, helps detect field problems on a daily basis. It also makes it possible to coordinate the provision of timely assistance to CEAs through a team of nine well-trained and highly mobile Team Leaders (TLs) stationed in the project districts.

MoFA Involvement. The success of the CEA program goes beyond the numbers collected and analyzed through the Tool. One of our main objectives was to build a strong network between CEAs and the MoFA AEAs. Throughout the preparatory process and rollout, IPA has regularly engaged with officials of the Ministry of Food and Agriculture (MoFA), either as participants of dissemination and content sharing events or as co-parties in Memoranda of Understanding at the regional and district level. MoFA Agriculture Extension Agents (AEAs) helped recruit and train the CEAs. They are also the first point of contact for questions raised by farmers during the CEAs' weekly visits.

In addition, the program makes provisions for AEAs to visit each CEA twice during the course of the season to provide on-ground technical support in the delivery of messages and in addressing concerns of farmers. However, feedback from CEAs indicate that AEAs are playing a much larger support role: most AEAs have already visited their CEAs more than four times, only 10 weeks into the program. In another instance, an AEA invited a CEA along to a non-project community to assist him in providing training to farmers on good agricultural practices. In addition, some CEAs meet regularly to discuss new messages prior to delivery in order to enhance their understanding of the topics and to share experiences from previous visits. These are very interesting developments which further highlight the immense potential of the CEA system and guide us in our attempts to adjust the program design so as to make it even more useful and beneficial for the farmers.

Results. The first week of July marked the tenth week of extension message delivery under the CEA intervention. As of the end of June, CEA coverage rate stood at 91 percent of farmers with a total of 6,937 messages (visits) recorded. Between the end of April and the end of June selected community members have thus far received 6,534 need-sensitive extension messages in video or audio format, with 3,479 messages delivered in June alone. In response, farmers asked a total of 4,498 questions, for which the CEAs reached out to AEAs 392 times. By the end of June, the nine most delivered messages were received in equal measures, numbering about 10 percent of deliveries each (see Chart 2).

The diagnostic tool also allows detecting whether the practices described by the messages are new to farmers and whether or not they used to practice them previously. Interestingly, the four most popular messages that were delivered in June were new to at least 67 percent of the farmers and at least 68 percent of them had not practiced these practices in the previous year.

Most Popular Messages in June:

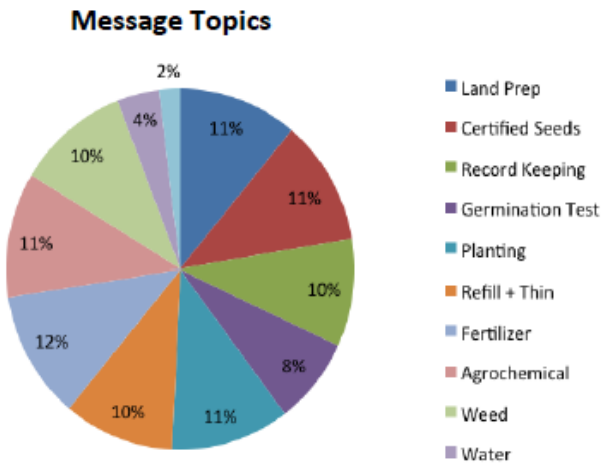
1. Refill & Thin— New 71%; Did Not Practice Last Year 68%
2. First Fertilizer App — New 73%; Did Not Practice Last Year 71%
3. Proper Use of Agrochemicals — New 72%; Did Not Practice Last Year 76%
4. Weed Management — New 67%; Did Not Practice Last Year 76%

Farmers asked a lot of questions; the most common for each period are as follows:

April-May

1. Where/how they could get certified seeds?
2. What month/time or When should I prepare my land/plant?
3. Why/How should we keep records of our expenses and revenues?
4. Why should we plant in rows? How should I use ropes to do so? And what is the proper spacing?
5. Is it not OK to burn the field to clear the land?

Chart 2: breakdown of most popular messages delivered through June



June

1. Can I use different seeds to refill?
2. Why do we refill/thin?
3. Where can I buy chemicals/ knap sack/ protective clothing?
4. How many bags of fertilizer should I use?
5. Can I apply fertilizer to my maize without rainfall?

Recent Developments and Way Forward. The CEAs will continue to deliver messages through the end of November (with one week's break in mid-August). Meanwhile, the DIRTS team is planning to roll out a brief survey to test farmers' knowledge and adoption of best practices discussed in the CEA messages. A new demonstration field has also been secured and will serve as the main setting for the production of additional videos. In the 2015 season, new extension messages will be introduced and focus on legumes, while also covering the crucial aspects of maize cultivation. Work on this year's demonstration field has already started; land preparation (plowing and harrowing) was completed early in July and planting followed shortly after. IPA has selected a new video company (Yaroo Media) to produce next year's videos. Several clips are already available and filming activities are generally on track.

C. Inputs Marketing

Preparatory Phase. IPA's first attempt in 2013 at establishing a supply chain with a local NGO[6] facilitating the purchase of agro-products by farmers was replaced by the decision of working directly through private agro-input retailers. Exploratory work showed that, in the interest of ensuring scale-up and sustainability of inputs supply off-season, working through local retailers would be preferable. Retailers have a special interest in investigating (a) whether demand for such inputs exists at different times of the year, and in particular before subsidy announcement, and (b) whether CBMs can facilitate their retail outreach to farmers.

After deciding to work with private retailers, a market assessment was conducted in September 2013, in order to survey the existence of established retailers that actively sell all year round and their willingness to partner with IPA for the inputs supply intervention. The assessment produced a selection of seven viable partners; these retailers were selected based on the types of inputs they offer, their location vis-à-vis the intervention communities, and their capacity to stock all quantities and types of inputs ordered under DIRTS. In addition, wholesalers in the north were identified and approached to ascertain their capability of supplying the selected inputs to the retailers.

Between September and November 2013, IPA developed a comprehensive list of agricultural inputs to be marketed in the communities. In a partial departure from the original plan, the inputs marketing treatment was not limited to fertilizer sales. The list of marketed items also included certified seeds, weedicides, pesticides and a few other items. Total inputs included in this list number about 100 (~10 fertilizers, ~10 weedicides, ~10 pesticides, 3 insecticides and 2 storage chemicals; the remainder are certified seeds as well as various other products – gum boots, sprayer bags, gloves, goggles, inoculants).

IPA compiled this list of target inputs from suggestions from community members (gathered at the time of the September 2013 market assessment), inputs retailers, and District Directors of the Department of Agriculture[7], as well as in consultation with the MoFA Crops Unit in various districts and SARI Scientists. This information was collected through individual meetings (Crops Unit, community members) and through a workshop that took place in November 2013 aimed at introducing the program to the District Directors and the retailers, sharing ideas on how to operationalize the supply chain, and compiling the said inputs list.

Rollout. In January 2014, the team recruited CBMs in 59 communities[8] as appointed by the respective community members and later instructed them on their roles. At the same time (January-February), IPA entered into contracts with the partner retailers stating the details of their commitment to supplying the inputs and arranging delivery. Retailers were willing to arrange the delivery with IPA responsible for subsidizing the transport costs - this was the only transfer of funds envisaged initially. Rates were agreed in these contracts and according to the initial agreement the going market price of products would be

[6] IPA initially intended to partner with CARD, an NGO providing inputs on credit. This partnership was eventually discarded (in mid-2013) because CARD required the project to provide seed funding to cover the cost of their operations, which exceeded the project's budget.

[7] Formerly, District Directors of the Ministry of Food and Agriculture.

[8] One community, Kpalsi (a quasi-urban community in the Sagnarigu District) declined to participate in the inputs program. Many farmers live in this community but their plots are located elsewhere, far from Kpalsi; the community saw no benefit in having a supply of agro-inputs where they live, which is not where they farm.

paid in full by the farmers. These agreements were reached under the assumption that the prices of fuel and inputs would remain stable throughout the program.

However, in February, just one week into the beginning of the first marketing round, the prices of inputs and fuel increased due to the devaluation of the local currency, the Cedi (GHS). As a result, IPA was forced to renegotiate to some extent the transportation rates and decided to cover the price difference between the inputs prices communicated to farmers at the beginning of the marketing round and the market prices at its end. The Cedi devaluation continued to affect inputs prices in the rest of the marketing rounds; so starting from the second round, IPA communicated updated prices to communities on a weekly basis, so that the price difference IPA would cover was minimized[9] and in some cases null.

The three marketing rounds initially planned were scheduled for (1) January/February shortly after harvesting when farmers have cash in hand; (2) March/April before the planting season, to enable farmers to use certified seeds and apply fertilizers within two weeks after planting, and, crucially before the end of the insurance marketing period; and (3) June/July once fertilizer subsidies are announced, which is when historically most inputs have been sold in the past. An extra round was added in May, timed to coincide with the delivery of extension messages in the 81 CEA communities under the CEA arm of DIRTS on planting and the use of certified seeds. In fact, as of mid-May, a significant portion of farmers in these communities had received these messages and so were best positioned to make informed decisions on which agro-inputs to buy for the season.

Table 4: Historic dates of subsidy announcements

Year	Subsidy announcement
2013	April
2012	June
2011	May
2010	July
2009	April
2008	July

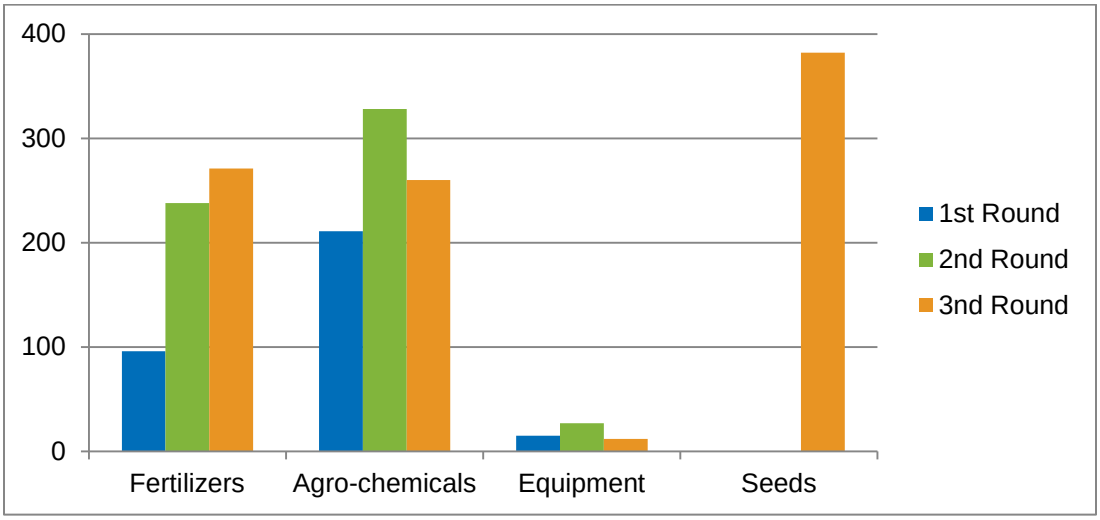
The last round started on July 3rd. The fourth round was supposed to be timed along with the announcement of fertilizer subsidies, but these have been delayed. The team waited until early July, in hopes that subsidies would be announced, considering that in most preceding years the subsidy had been released by this time (see *Table 4*). According to recent news articles and press releases, subsidies will apply this year as well[10], but waiting further was deemed risky. After discussing with the retailers it became clear that hardly any sales would be made if the round was postponed to any time after early July. The fourth round ended on July 23rd.

Results. Over the three rounds across the 60 marketing communities, the following inputs were sold: 605 bags of fertilizer, 799 chemicals (weedicides and pesticides), 54 other items (such as knapsacks, gum boots, etc.) and 391 kg of seeds. Seeds were only offered in the third round of marketing, as they were not available before mid-May.

[9] A price difference was paid by IPA only if prices changed in the week-long timespan between one price update and the next.

[10] Amankwah Baafi, A., 'Government still subsidising fertilizer — Department of Agriculture Minister', *Graphic Online*, 15 July 2014. http://graphic.com.gh/business/business-news/27122-govt-still-subsidisng-fertilizer-dep-agric-minister.html#sthash.AriOykJN.dpuf

Chart 3: Total sales by marketing round



Over the 3 rounds, inputs were bought in 49 out of 60 communities by a total of 448 farmers. Average uptake rate per community was 5.95 percent, considering that the average community size for inputs communities is 66 households, 39 compounds, 203 adults. The most widely sold input was Sarosate, a general weedicide for the control of annual grasses and broad leaf weeds, totaling 319 bottles sold over the first three rounds. On average, respondents in our annual survey bought 0.82 bottles of Sarosate last year. On average, those who have bought Sarosate this year through IPA bought larger quantities than the survey respondents who purchased it last year (6.25 vs. 5.61 bottles).

The most widely sold fertilizer was NPK 15-15-15, a concentrated, water soluble, granular fertilizer with a 15:15:15 ratio of nitrogen, phosphorus and potassium; sales of this totaled 241 bags. On average, survey respondents bought 1.18 bags of NPK 15-15-15 last year. On average, those who have bought NPK 15-15-15 this year through IPA so far bought less than the survey respondents who purchased it last year (2.43 vs 5.01). This is not surprising, as this year's sales happened under a non-subsidized regime. It is not yet possible to determine how many of our respondents bought, because the identification process is still ongoing. It is also worth noting that only 51 farmers purchased Sarosate while 99 farmers purchased NPK 15-15-15. Also, NPK15-15-15 is about 5 to 6 times more expensive than Sarosate, with Sarosate costing roughly GHS 11 per bottle and NPK 15-15-15 costing GHS 85 per bag.

In total, there were 11 "treatment" communities where no orders were made (until the third round). IPA will not know uptake for the control group until next year (survey question asks about previous year's purchases). Up to the end of the third round, total sales amounted to GHS 51,573 to the retailers, with the least being GHS 741 (earned by a retailer supplying five communities in two districts), and the highest amount being GHS 25,701.5 (earned by a retailer supplying 17 communities in three districts).

Issues/challenges. Issues encountered during implementation and solutions applied are reported as follows:

Community Reclassification. In early June, the implementation team realized inputs had been marketed in Kpachaa (a control community) instead of Kpachayili (an inputs and CEA community). The team debriefed to understand the cause of this error: it became clear that at the time of community entry, the inputs informant that should have guided the implementation team to Kpachayili could not be

reached; therefore, the team used a different source to reach that community, but this individual misled the team who ended up in the wrong community (Kpachaa). The backchecks did not detect this mistake until June. This issue has been raised to PIs attention and they have decided to keep the inputs marketing in Kpachaa, and reclassify Kpachayili as a CEA community.

Markup to Inputs Prices. One possible threat to successful implementation was that retailers would apply a markup to the products sold through DIRTS, instead of using the going market price. To ensure this did not happen, in March the team conducted a comprehensive assessment[11] of prices set by other retailers to the same selection of inputs; the outcomes of this assessment were positive, given that most other shops were not even open at that time of the year, while those who were used prices in line with those used by the DIRTS partner retailers. We also ensured no markup was applied through occasional anonymous shopper visits to the retailers' shops.

Low patronage by CBMs. Most of the CBMs in the first round were not committed to the program and did not put much effort into marketing the inputs. This issue was addressed and partly solved by organizing a refresher training in April, right before the second round, during which the team endeavored to increase CBM motivation and commitment to the role. Furthermore the team is considering introducing a CBM commission next year, similar to the commission earned by Insurance CBMs. This would be based on the value of sales a CBM secures and might act as an incentive to market more intensively.

Inputs Availability. In a few isolated cases, retailers were unable to source orders due to stock shortages. The implementation team succeeded in sourcing these orders from retailers elsewhere (failed orders were only five of uncommon crop varieties totaling 32 kg).

Latest developments and way forward. At the time of writing, the fourth and last marketing round had just concluded; the team is currently inputting the latest sales data. The implementation of the inputs intervention is complete for the 2014 season. Activities will resume in September with a new market assessment of existing retailers and analysis of inputs prices.

Part 2 – Competitive Landscaping and Cost-effectiveness Assessment Plans

DIRTS builds on several lessons learned from EUI, which showed that while cash grants did not yield significant increases in farm investments, risk mitigation through index insurance could. DIRTS findings can provide clues on what makes farmers invest more and increase their incomes.

DIRTS builds on the earlier index insurance results to examine how the behavior of farmers changes in a context where rainfall index insurance is offered together with other interventions with potential direct impact on farming practices. However, whenever relevant, groundwork to find cost effective implementation strategies has already been partly conducted.
Insurance: The insurance product could not be provided on more cost-effective terms, because GAIP is the only provider of weather insurance in Ghana at the moment. Insurance policies are provided at the

[11] To compare input prices, the team visited most retailers listed in a recent and well-informed directory of agro-dealers in the north: *Agro-Dealer Directory for the Northern Region, Ghana* (2013), compiled by: Alliance for a Green Revolution (AGRA), Ghana Agricultural Business and Information Centre (GAABIC), and Danish International Development Agency (DANIDA).

prevailing market price, dictated by GAIP as the product's sole provider. In EUI, and in the subsequent 2013 DIRTS Insurance Pilot, insurance was marketed by IPA hires to groups of farmers or on a one-on-one basis. This strategy was suboptimal in two respects: it was expensive and time-consuming, and it did not enhance trust among farmers. It was assumed that insurance would be patronized more by farmers if the product was offered to them by individuals they could trust and relate to. After EUI and the 2013 Pilot experience, GAIP asked IPA to help them explore more cost-effective methods to market the insurance product to rural communities.

IPA therefore decided that in 2014 it should prioritize testing marketing strategies that would increase the level of trust (and hence uptake) and reduce the cost of marketing (thereby increasing sustainability and scalability) by introducing the CBMs. The benefits of CBMs are 1) the relatively low cost involved and 2) the fact that farmers know them and are more likely to trust them than complete strangers. Moreover, at little to no additional cost, IPA extended the insurance marketing and purchasing period compared to EUI and Pilot days, going from two weeks to three months to enable farmers to take purchasing decisions over a longer time span and gather the necessary liquidity. Thus, even if sales in the first year of DIRTS were not sizeable, marketing costs were lower, resulting in higher cost-effectiveness. IPA has also conducted a costing exercise fleshing out all steps involved in setting up and training the CBM network, including CBM recruitment, training and administrative costs. Reflection upon this model ahead of the second year of DIRTS will make it possible to further improve the implementation protocol to increase the cost-effectiveness of the insurance arm. In the long run, further reductions in the transaction costs of index insurance will depend upon the extension of mobile banking networks into the rural areas of northern Ghana.

CEA: The extension treatment of DIRTS looks at what happens to investment if the flow of information to farmers intensifies in combination with offering insurance and increasing access to high-yield inputs. In principle there could be other ways to intensify information flows. However, for large-scale, rural, dispersed communities, the principal information channel remains the extension network and the most cost-effective solution is to capitalize on the existing MoFA extension system. The cost-effectiveness plan should be a comparison between CEA and other extension or mobile extension programs.

In the design of DIRTS, information flows to farmers are intensified by way of CEAs. The cost effectiveness of this design has been pre-tested in different countries and by pioneers in mobile extension. IPA effectively engaged in such competitive landscaping activities ahead of the inception of DIRTS: as a result, in setting up CEA, IPA decided to draw lessons from Grameen Foundation AppLab's Community Knowledge Workers (CKWs), one of the most established mobile extension models to date. Furthermore, in preparation for the full DIRTS study, IPA conducted a CEA Pilot in 2013 in cooperation with Grameen Foundation in Tamale to optimize the technical aspects and the costing of the operations. CEA has greater reach than the traditional extension system, but it is yet to be seen whether the extension messages result in increased knowledge as well as adoption of best agricultural practices. Therefore, it is not yet possible to estimate the impact per dollar spent in CEA.

IPA will determine whether CEA is effective in heightening knowledge and adoption of agricultural best practices partly through a harvest survey (to be conducted in late 2014), and predominantly through its annual surveys (2014, 2015, 2016). Concomitantly, IPA will assemble the total cost involved by CEA in hopes to be able to compare that against the cost of MoFA extension and relative returns for each model. To compare outcomes across communities with different treatments, IPA will analyze knowledge, adoption and actual farm returns (yields and incomes) in the four types of communities:

those with no extension, CEA communities, communities receiving MoFA extension, and those receiving combinations of the above.

Inputs: The inputs supply intervention is mostly instrumental; broadly, it looks at what happens to farm investment when inputs are made more readily available in the presence of the other treatments and in the evolving regime of national subsidies for agro-inputs. Farmers' purchasing decisions will emerge from this treatment, as farmers are confronted with lowering levels of fertilizer subsidies, access to rainfall insurance and extension services. To minimize costs and maximize the chances to inform concerned stakeholders of the research outcomes, IPA decided to partner with private input retailers for this intervention after discarding the partner initially selected, CARD, due to its underfunding. Conversely, IPA can rely on the retailers' permanent presence and continued interest. As per the original design, the principal cost incurred by IPA has been the transportation of the orders, the hiring of personnel for leading the marketing days and monitoring of the CBMs, and covering price difference of inputs over week-long periods. The last cost component was introduced due to the rapid depreciation of the local currency, thus increasing considerably the nominal price of several inputs from the first round of 2014 marketing.

Part 3 – DIRTS Sustainability, Scaling and Dissemination Strategies

IPA's core competence is evaluating programs using RCTs; however, in the case of DIRTS it is also the overall implementer behind the three intervention arms, in collaboration with other partners. IPA keeps in constant touch with its implementing partners and can advise in the future how to replicate and scale interventions as desirable. What follows is a detailed account of how IPA has engaged with DIRTS stakeholders so far and preliminary plans to ensure sustainability and scaling in the future.

DIRTS' activities are expected to be of interest to national and regional policymakers, development practitioners, insurance companies, agricultural input suppliers, and funders in the following ways:

1) Testing the overall effectiveness of extension services, input provision, and rainfall index insurance in the Northern Ghanaian context. Identifying the agricultural policies which do or don't work will allow policymakers to better target their scarce resources towards effective policies. Stakeholders who may be interested in this work include policymakers from regional ministries of agriculture, development practitioners, and funding organizations.

2) Potential for commercialization and scalability of existing products and services. Information collected on the demand for insurance, extension services and intensified agricultural inputs as well as the profitability of each will inform the potential and scope of privatization for each component.

It is too early to determine whether DIRTS results will be significant enough to be turned into policy prescriptions. However, as a research institution, IPA's goal is to keep concerned stakeholders informed on the progress and final outcomes of its research. For the time being, only preliminary plans can be made of how DIRTS results might feed into policy and how these can be scaled and made sustainable.

To follow through on the general vision of stakeholder engagement described above, IPA involved relevant stakeholders from its early days. Activities undertaken on a regular basis include a quarterly newsletter and, when possible, participation in the monthly meetings of the Agricultural Sector Working Group in Accra. In addition, the DIRTS team has participated in the following standalone events:

Table 5: DIRTS stakeholder meetings in 2013 and 2014

Date	Location	Organizer	Participant	Event Title
08/2013 (2 days)	Tamale & Accra	IPA & TAMSAT	DIRTS Implementation Coordinator	Implications of Remote Sensing in Insurance
08/2013 (2 days)	Reading, UK	University of Reading, UK	DIRTS Project Manager	Weather-based Index Insurance Expert Workshop
11/2013 (1 day)	Tamale	IPA and MoFA	DIRTS Implementation Team	Round Table with MoFA District Directors and Agro-inputs Dealers
01/2014 (1 day)	Tamale	IPA and MoFA	DIRTS Implementation Coordinator	Content Development Workshop with AEAs from 12 Districts
02/2014 (1 day)	Yendi	Yendi Municipality	DIRTS Implementation Associate	Joint Agricultural Stakeholders Forum for Yendi, Mion, Saboba and Chereponi Districts
02/2014 (1 day)	Tolon	Tolon Municipality	DIRTS Implementation Associate	Joint Agricultural Stakeholders Forum for the Tolon and Kumbungu Zones
03/2014 (2 days)	Tamale	USAID Feed the Future Agriculture Technology Transfer Project	IPA Northern Regional Manager	Knowledge Management & Learning Workshop
07/2014 (1 day)	Tamale	USAID Feed the Future Agricultural Policy Support (APS) project	DIRTS Implementation Associate	USAID/Ghana FtF APS Project Consultative Meeting

In July 2014, IPA hosted a dissemination conference during which Principal Investigators Prof. Christopher Udry, Prof. Dean Karlan, Prof. Shashidara Kolavalli and Dr. Mathias Fosu presented on DIRTS. The presentation explained the project design, detailed the accomplishments so far, and provided an overview of project timetable for the next two years. The DIRTS presentation was broken down by project arm: Insurance, Extension, Inputs and Evaluation. Each segment of the presentation was followed by an open discussion. Provided in Annex is the event's agenda and list of participants (Annex A). This and an international conference at the end of project activities have been budgeted for to ensure visibility for DIRTS and its eventual findings.

Dissemination so far has also consisted of a number of stakeholder-specific activities, geared towards the possible handover and scaling of the DIRTS treatments. As far as the insurance arm is concerned, IPA is in regular communication with GAIP, and both take part in the effort to make the insurance product financially accessible for farmers and commercially sustainable for the provider. As mentioned above, IPA has developed a model to cost out the CBM model and will share the details of it with GAIP, so that they can later decide whether this is a competitive model they wish to pursue. IPA is also ready to share its field experience with GAIP and other rainfall insurance providers in the future to develop products that suit farmers' needs.

In August 2014, DIRTS connected with the USAID, FinGAP, the African Center for Economic Transformation (ACET) and other implementing partners working with GAIP; they have formed a committee to ensure the provision of agricultural insurance products at reasonable rates on a sustainable basis, thus enabling financial sustainability of the product from both provider and client's perspective. To this end, the committee intends to organize a series of meetings with the GAIP Chairman; such meetings will be used as a platform to discuss product development and to structure new marketing efforts, to draw in further insurance agents (e.g. financial institutions), and to scope the potential for expansion of GAIP presence in the Northern regions and the specific role of the 19 insurance companies constituting the Pool.

Mr. Mulangu also added that the meeting they had earlier basically looked into the effectiveness of GAIP in running the Agricultural insurance product. He stated GAIP approached USAID to help in funding the organization which USAID is currently not interested due to issues of inefficiency about GAIP. USAID also think GAIP is not having the technical ability to run the product effectively. He added that USAID agreed they will consider assisting them with funding after reviewing their financial statement for 2013, 2014 till date and also their budget till 2016.

Additionally, IPA is exploring whether the CBM marketing model truly enhances trust and understanding and influences farmers' purchasing decisions. In order to do that, IPA 1) administered a questionnaire at the end of premium collection to all buyers and CBMs and 2) had some focus group discussions (FGDs) with farmers in DIRTS and DIRTS insurance pilot communities. The questionnaires asked about farmers' understanding and trust in the product and tapped into their opinions to make the product more appealing and user-friendly.

As far as scaleup is concerned, IPA has worked with GAIP to refine the product and to encourage agents to make it available in more and more locations. IPA would like to engage with rural banks and other possible marketers/agents of insurance or NGOs already in the business of facilitating the marketing of rainfall index insurance. The general impression is that insurance may not be attractive if the administrative and marketing costs exceed the expected profit. However, some organizations were identified as possible interest-holders because they have enough capital, are relative risk-takers, have institutional expertise in agriculture and, most importantly, have an extensive network of field workers. These include some local rural banks and microfinance institutions (MFIs), established agro-input dealers, government agencies (MoFA or SADA), some of GAIP's current agents, possibly some international NGOs and Masara N'Arziki, a small-scale maize growers' cooperative with an in-built outgrower scheme which is active in the whole of northern Ghana. It should be noted, however, that these are still preliminary plans.

Communication and information sharing is ongoing between IPA and stakeholders in the CEA treatment, among which MoFA is the principal counterpart, and to which the CEA model may be handed over in

future years. Through DIRTS, IPA has entered 13 Memoranda of Understanding with the MoFA Regional and District Offices. The MoUs detail the scope of DIRTS and the involvement of MoFA and IPA in facilitating the rollout of CEA. Additionally, IPA sends monthly summaries of the outcomes of CEA, including key figures on the messages delivered, whether or not the extension content was new to the recipients, and the questions asked most frequently by farmers.

MoFA officials also play an active role in backstopping and monitoring CEAs. The MoFA District Directors in DIRTS locations are invited for one CEA field trip to witness firsthand how CEAs work, while MoFA AEAs regularly support CEA interactions with farmers and play a key role in addressing in-depth questions pertaining to the extension content. Feedback gathered from AEAs so far on such interactions has been very positive, which leads to think that CEA is well-perceived within the Ministry and it might be possible to transmit it as a legacy to MoFA in future years.

From a policy making perspective, MoFA has a keen interest in expanding and intensifying the current extension system. Testing new models of extension delivery, DIRTS seeks to overcome the constraints of infrequent government AEA visits by supplementing government-provided AEA services with CEAs using mobile technologies. Through DIRTS, MoFA will be in a good position to set up and bring the community extension agent program to scale, while other regional ministries of agriculture could pursue similar community-based extension programs in partnership with technology providers such as the Grameen Foundation AppLab.

IPA's first step would be to connect with counterparts in the Ministry at the national level to share the evidence backing this model and, if well received, IPA may assign policy work to a dedicated hire, such as a Senior Policy Manager to work hand in hand with MoFA to lend support in replicating and scaling up the CEA model. In the private sector, CEA might be of interest to other providers of mobile services or other commercial ventures that might harness the potential of this model and spread it in the rest of the North and beyond, as well as in countries other than Ghana.

Plans are in the making for disseminating the findings emerging from the inputs supply arm as well. Input dealers do not have a good sense of demand during the farming stages before subsidy announcement, but typically subsidized fertilizer is not yet available when it is the best time to apply it. Furthermore, the Government of Ghana is struggling with abuse of the subsidy program and subsidies are likely to reduce significantly or possibly even be phased out in the coming years. It is uncommon for retailers to sell before subsidies as they naturally assume that price elasticity of demand is very high and that farmers will refuse to pay at non-subsidized prices. In a context of dwindling subsidy levels, DIRTS investigates whether farmers are likely to buy even at non-manipulated market price.

Individual retailers and the national agro-input dealer association (GAIDA) should be interested in a research finding exposing farmers' willingness to purchase at different times of the year and evolving sensitivity to agricultural best practices when farmers are offered innovative risk mitigation tools and complementary extension services. The inputs supply arm is a mechanism to determine farmers' willingness to buy (price elasticity of demand) and if this elasticity changes in the presence of increased information channels (extension) and risk mitigation schemes (insurance). This is also important information for policy makers so that they know how to possibly make farmers less reliant on inputs subsidies (e.g. if they realized that insured farmers feel relatively shielded from risk and know how to make best use of inputs, and as a result are ready to spend more on agro-inputs).

IPA convened a meeting with the seven partner retailers of the inputs arm at the end of the third round of marketing, during which the retailers expressed that sales over the first three rounds had not been extremely high, but they were keen to be engaged in the subsequent rounds. IPA is also considering producing customized fact sheets per retailer to flesh out if any sales patterns exist. Off-season marketing may later be patronized by them, other retailers, and outgrowers if sales at these times are considerable in the absence of subsidies and paired with the provision of extension and/or insurance. These findings will feed important policy lessons to MoFA as well, as the Government of Ghana endeavors to phase out the subsidy system without penalizing the smallholders.

Part 4 – DIRTS Information on the Impact of Intensified Cultivation on Farmer Welfare and Organization

DIRTS implementation started less than a year ago, and thus we do not have results from the core interventions ready for dissemination. This section provides a description of the evaluation tools used to extract the relevant information, while the table describes the information to be obtained according to the various research questions and the tools developed to do so; suggestions are made on possible dissemination strategies as well.

The key final indicators for the evaluation include farm profits, crop yield, and a set of indicators of household welfare (including food security, asset holdings, women's empowerment and child welfare). The intermediate indicators of cultivation intensification include cultivated area, agricultural labor use (including family labor), and input use (agrochemicals, tractor services, seeds). Finally, information on the adoption of specific improved practices at the plot level and knowledge of recommended practices serve as immediate indicators. All of these indicators will be examined at the level of the individual as well as the household, and will be collected through the following tools:

1) Comprehensive annual surveys
Timeline: March-April 2014, February-March 2015, February-March 2016
Target: 2 respondents in 20 households in 162 communities
The survey is employed to collect detailed socio-economic data, information on cultivation practices and investment behavior, as well as yields and profits, with all 3240 respondents in the DIRTS program undergoing a baseline, midline and endline survey.

2) Weekly farm input surveys of all respondents
Timeline: April-November 2015, April-November 2016
Target: a subsample of the survey respondents
Since household labor valuation is critical to estimating profitability, and because labor diaries and close substitutes tested during the pilot have not been fully effective, DIRTS will address the persistent issue of recall bias in measuring labor allocation through a CEA-style model, by training and employing locally-embedded Community Survey Assistants (CSAs) to collect labor data on a weekly basis over the course of the agricultural season. Like CEAs, CSAs are community residents who are compensated per interview and supervised by IPA enumerators. In intensive extension communities, CEAs will play the role of CSAs.

3) Harvest survey
Timeline: November 2014, November 2015, November 2016
Target: all annual survey respondents

The harvest survey will gather information on farmers' knowledge and adoption of best practices, in all DIRTS communities enabling, among other things, an assessment of the effectiveness of CEA-delivered information among direct and indirect recipients.

4) Weekly farming activity monitoring
Timeline: April-November 2014, April-November 2015, April-November 2016
Target: CEA-assigned farmers
The CEAs will collect information on the ongoing activities at the household level during their weekly visits to the 810 households in the extension treatment group. Using the ODK diagnostic tool they will record information on what activities the farmer did on his or her plots during the previous week and what he or she is planning to do the following week. In addition, they will record the main challenges faced by farmers with regards to agriculture.

5) GPS measurement of all farms
Timeline: December 2014
Target: farms of all the survey respondents
Accurate information on the location of farms is essential for correlating yield data to weather patterns.

Table 6: Research Questions – Tools and Information Dissemination Plans

Topic	Tool					Information	Dissemination
	Annual survey	CSA	Harvest Survey	CEA	GPS		
Land tenure	**X**				**X**	- How do farmers obtain plots or gain right to farm such plots? - What is the extent of land ownership vs rent or usufruct rights via group membership? - Is propensity to invest affected by strength of perceived or actual land rights? - Are farmers without secure rights to land less prone to invest on their lands and do they achieve lower outputs/profits and as a consequence lower incomes too?	- International conference at project end with key stakeholders (likely 2016) - Final paper by PIs (likely 2017) End of project roundtable with MoFA counterparts (likely 2016) - as a result of such exchanges MoFA, the National Land Commission and other concerned agencies may decide to act to ensure access to secured land and to ascertain existing rights in given areas
Learning	**X**		**X**			- How do social network connections impact on farmers' learning of best practices and subsequent adoption? - What is the result of learning through direct or indirect connections on farmers' yields, profits and income?	- International conference at project end with key stakeholders (likely 2016) - Final paper by PIs (likely 2017) - Social network analysis - End of project roundtable with MoFA counterparts (likely 2016)
Labor markets	**X**	**X**				-Comparison of reported labor use and annual retrospective survey versus continuous collection for the farming season - Evaluation the profitability of intensified cultivation with accurate measures of own and family labor use - Is intensification limited by intra-seasonal labor constraints? - How does this interact with the increased availability of labor saving inputs? -Does labor distribution change when plots are	- International conference at project end with key stakeholders (likely 2016) - Final paper by PIs (likely 2017)

Topic	Tool					Information	Dissemination
	Annual survey	CSA	Harvest Survey	CEA	GPS		
						intercropped as opposed to single-cropping? - What is the impact of intercropping on female use of time?	
Savings & dynamic incentives	**X**					- In a context of chronic illiquidity where savings in-cash is often replaced by in-kind (current) assets that also act as risk mitigation tools, what is the role insurance might play? Does it replace some of these assets, or it complements them?	- International conference at project end with key stakeholders (likely 2016) - Final paper by PIs (likely 2017) - IFPRI paper
Gender dynamics	**X**	**X**				- Even if both men and women farm, they typically achieve very different yields and profits, with men achieving much higher yields than women do: does gender affect investment? - Would extension messages change/decrease yield differentials across genders? - How is the gender division of labor and control over land and crop choice affected by extension messages that are optimized for crops typically cultivated by women (in this context, legumes)?	- International conference at project end with key stakeholders (likely 2016) - Final paper by PIs (likely 2017)

ANNEX A – DIRTS DISSEMINATION EVENT AGENDA AND PARTICIPANTS LIST

Disseminating Innovative Resources and Technologies (DIRTS) project
DISSEMINATION CONFERENCE AGENDA, 21st JULY, 2014
Venue: Gillbt Training Centre – Tamale

TIME	ACTIVITY	LEAD(S)
4:00 - 5:00 PM	Arrival and Registration of Guests	John Sumbo Beatrice Bruce
5:00 - 5:10 PM	Welcome Address & Introductions	Xorla Adzoyi
5:10 - 5:25 PM	Presentation on EUI	Principal Investigator (PI)
5:25 - 5:30 PM	Q & A on EUI	Xorla Adzoyi
5:30 - 5:40 PM	Presentation on DIRTS-Insurance	Principal Investigator (PI)
5:40 - 6:00 PM	Discussions on Insurance	Damba Mumin
6:00 - 6:15 PM	Presentation on DIRTS-CEA	Principal Investigator (PI)
6:15 - 6:35 PM	Discussions on CEA	Damba Majeed
6:35 - 6:50 PM	Prayer & Fasting Break	
6:50 - 7:00 PM	Presentation on DIRTS-Inputs	Principal Investigator (PI)
7:00 - 7:15 PM	Discussions on Inputs	Dan Janamah
7:15 - 7:25 PM	Presentation on DIRTS-Evaluation	Principal Investigator (PI)
7:25 - 7:30 PM	Discussions on Evaluation	Siraj Sulemana
7:30 - 8:00 PM	Dinner & Networking	
8:00 - 8:05 PM	Closing	Xorla Adzoyi

DISSEMINATION CONFERENCE PARTICIPANTS LIST- 21/07/2014

Name	Title	Institution
Mathias Fosu	Program Manager	ACDEP
Bawah Alima	News editor	Bishara radio
Stephan Grabner	Intern	Burro
Zain Yaro	Camera Man/Editor	Channel 5
Alhassan A Ibrahim	Editor	Development News Agency
Ibrahim Rafiu	News reporter	Diamond FM
Janathan Haley	Officer	EWB
Yusharu Jahanfo	News presenter	Fila FM
Albert Futukpor	Reporter	Ghana News Agency (GNA)
Shashidhara Kolavalli	Program Leader	IFPRI
Jawula A. Ibrahim	Photographer	IK Photos
Dauda Salam	CEO	Inputs dealer
Abukari Nasam Gannye	Secretary	Inputs dealer
Christopher Udry	PI on DIRTS	Yale University
Dean Karlan	PI on DIRTS	Yale University
Madeleen Husselman	Dep. Country Director	Innovations for Poverty Action
Gabriel Lawin	Project Coordinator	Innovations for Poverty Action
Mohammed Siraj Sulemana	Project Manager	Innovations for Poverty Action
John Balankoo Sumbo	Project Assistant	Innovations for Poverty Action
Simon Quach	Intern	Innovations for Poverty Action
Diane Broinshtein	Intern	Innovations for Poverty Action
Becca Toole	Intern	Innovations for Poverty Action
Tracy Xu	Intern	Innovations for Poverty Action
Beatrice Nanka-Bruce	Office Manager	Innovations for Poverty Action
Sana Khan	Research Manager	Innovations for Poverty Action
Gabriele Warwick	Intern	Innovations for Poverty Action
Enoch Pabby Okyere	Procurement Officer	Innovations for Poverty Action
Yuan-Ting Meng	Intern	Innovations for Poverty Action
Salifu Abass	Project Driver	Innovations for Poverty Action
Abubakari Bukari	Survey Coordinator	Innovations for Poverty Action
Michael Polansky	Blaise Programmer	Innovations for Poverty Action
Hsi-Ling Liao	Intern	Innovations for Poverty Action
Peach Indrovadh	Intern	Innovations for Poverty Action
Isaure Delaporte	Intern	Innovations for Poverty Action
Damba Mumin	Implementation Manager	Innovations for Poverty Action
Damba Mohammed Majeed	Project Manager	Innovations for Poverty Action

DISSEMINATION CONFERENCE PARTICIPANTS LIST- 21/07/2014

Fred Adzoyi	Implementation Manager	Innovations for Poverty Action
Daniel Janamah	Implementation Manager	Innovations for Poverty Action
Alhassan A. Sadik	Reporter	ISD
Saani M. Lukman	Editor	Kesmi FM
William Boakye Acheampong	Regional Director	Ministry of Food & Agriculture
Luke Nayi	Regional Extension Head	Ministry of Food & Agriculture
Hawah Musah	District Director	Ministry of Food & Agriculture
Dominic Ayisin	District Director	Ministry of Food & Agriculture
Alhassan Alidu	District Director	Ministry of Food & Agriculture
Swalihu Napari Baba	District Director	Ministry of Food & Agriculture
Francis Neindow	District Director	Ministry of Food & Agriculture
Alhaji Shaika	District Director	Ministry of Food & Agriculture
Bawa Abdulai	District Director	Ministry of Food & Agriculture
Iddrisu Musah	District Director	Ministry of Food & Agriculture
Ambruce Ansaayiri	District Director	Ministry of Food & Agriculture
Adua Mathew	District Director	Ministry of Food & Agriculture
Adam Fuseini	Agricultural Extension Agent	Ministry of Food & Agriculture
Fuseini Dokurugu	District Director	Ministry of Food & Agriculture
Adam Yussifu	Manager	North star
Benjamin Ahiabor	Rev. Dr. Snr Research Scientist	SARI
Johnson A. Agolmah	Programme Coordinator	Trias Ghana
Sule Dada	Camera Man	TV 3
Zack Kadri	Regional Correspondant	TV 3
Kaz Fujiwura	JPO	WFP
Francesca Viola	Consultant	World Bank
Mohammed Ibrahim	News editor	Zaa Radio

USAID
FROM THE AMERICAN PEOPLE

MILESTONE REPORT 3
Grant No. AID-OAA-F-13-00057

Innovations for Poverty Action
Disseminating Innovative Resources and Technologies to Smallholders

November 28th, 2014

ACRONYMNS AND ABBREVIATIONS

AEA	Agricultural Extension Agents
APSP	Agricultural Policy Support Project
CBM	Community Based Marker
CEA	Community Extension Agent
CSA	Community Survey Assistants
CSIR	Council of Scientific and Industrial Research
DIRTS	Disseminating Innovative Resources and Technologies to Smallholders
FoodSPAN	Food Security Policy Advocacy Network
FtF	Feed the Future
GAIP	Ghana Agricultural Insurance Program
GAP	Good Agronomic Practices
IITA	International Institute of Tropical Agriculture
IPA	Innovations for Poverty Action
KPS	Knowledge and Practice Survey
MoFA	Ministry of Food and Agriculture
NASWG	Northern Agricultural Sector Working Group
NOAA	National Oceanic Atmospheric Administration
ODK	Open Data Kit
SARI	Savanna Agricultural Research Institute
USAID	United States Agency for International Development

Introduction

Pursuant to the grant agreement reporting time lines and following the submission of milestone 2 report three months ago, IPA hereby presents the milestone 3 progress report on activities carried out between September and November 2014. The report highlights outputs of work on implementation and evaluation activities of the Disseminating Innovative Resources and Technologies to Smallholders (DIRTS) project with a focus on modest changes on key deliverables under (1) Rainfall index insurance, (2) Community Extension Agents, and (3) Inputs supply. Latest information on geographic location of project communities as well as preparations and key upcoming activities for next milestone are also captured.

PART 1: EVALUATION

To date, the DIRTS project has conducted the following activities: (i) community and respondent selection, (ii) piloting and refinement of data collection instruments and iii) execution of surveys - comprehensive annual and market surveys. The three arms of the DIRTS project being evaluated are: (1) Rainfall index insurance, (2) Community Extension and (3) Inputs supply. Data cleaning, preparation for annual and bi-weekly surveys, piloting of the Knowledge and Practice Survey (KPS), and initiation of Community Survey Assistants recruitment process are among the major activities covered in this reporting period.

A. SURVEY METHODS

In line with the DIRTS project work plan, IPA undertakes comprehensive annual and bi-weekly labor surveys to provide data on outcomes of agricultural practices. To enable IPA to provide a measure of the impact of the agricultural extension (including information on production per area of farm land) and insurance components of the project, a third survey instrument - Knowledge and Practice Survey (KPS), will be introduced in years two and three.

i. Comprehensive Annual Survey

IPA completed the first annual survey in the 162 DIRTS partner communities, covering 3,236 households across 12 the districts. Data cleaning, analysis and reporting are among the major activities undertaken on the comprehensive annual survey in this reporting period. Review of data collection instruments and the enumerator recruitment process have begun in preparations for the second comprehensive annual survey to be conducted between March and April 2015.

ii. Bi-weekly labor surveys

To accurately capture the fundamental measures related to labor (the most impactful input in agricultural work), a bi-weekly labor survey instrument is designed as one of the evaluation tools to be used in 2015. This instrument will be used to collect data on the amount, sources, costs and other characteristic associated with farm labor. From April to November 2015, the survey will be administered to the 20 farmers in all 162 project communities participating in the study.

Initial programming in Open Data Kit (ODK) is underway. The survey will be applied on bi-weekly basis to the 20 farmers participating in the study in all 162 project communities. The labor survey will be applied for the first time from April to November 2015. From January to March 2015, IPA will recruit and train 162 Community Survey Assistants (CSAs) to administer the labor survey in 2015.

iii. Knowledge and Practice Survey (KPS)

IPA is determined to provide timely measures on the immediate impact of agricultural extension, insurance and input supply components of the project. Hence, a new survey instrument (Knowledge and Practice Survey), has been added to the list of data collection tools, and will be administered to each of the 3,236 households across the 12 districts shortly after the 2014 and 2015 farming seasons.

The tool has three sections. The first section is intended to evaluate: (i) the farmers' current level of knowledge on the agricultural best practices; (ii) the use of subsets of specific agronomic practices, including use of agricultural inputs; and (iii) the rainfall insurance scheme outreach impact, as well as the farmers' intention to purchase the insurance products.

The second section is aimed at collecting digital photos of respondents; to develop an interactive social network application that will make it possible for respondents to visually identify members of their social networks in the subsequent surveys. During the upcoming annual survey, respondents will be asked to provide answers to questionnaire items on the frequency and intensity of their social connections with specific members of their communities.

The KPS was piloted in November 2014 and the survey instrument refined. Experienced surveyors were shortlisted from the IPA surveyor database and trained to administer the KPS starting December 2014. They will use Android phones with Survey CTO software to collect the data. We anticipate that the survey will take four weeks to complete.

The third section consists of plot measurements (geo-referenced coordinates of plot locations of respondents and total plot sizes). This will facilitate accurate measures of yield (output per hectare), and allow the research to account for spatially-correlated variation in production conditions. Following cost-benefit considerations, this component will be performed by CSAs, in February 2015. The CSAs will be provided with Android phones and training to do the farm measurement of 12,090 plots in the 162 project communities in 2015. A team of experiences Senior Field Officers will monitor the process and supervise the CSAs.

B. REPORT ON BASELINE SURVEY

The baseline survey analysis is completed. Some of the important variables explored in the baseline survey were household size, age and literacy levels of the household head, total and cultivated acres of land and number of days worked by men and women in the selected households. Other variables explored were wage paid to labor, wage paid to family members, value of agro chemical inputs, cost of land preparation, value of total inputs and value of total harvest. A detailed report on the baseline is being finalized. Randomization into treatment groups occurred at both the community and household level, so the baseline survey was used to check for balance at both levels with respect to key outcome variables (household demographics, landholdings and cultivated acres, agricultural inputs including

labor, and chemical inputs, and farm output). We cannot reject the hypothesis that the randomization into treatment groups was balanced at both of these levels.

C. UPCOMING ACTIVITES

Evaluation of the three arms of DIRTS project will continue in year two. Apart from the Comprehensive Annual Survey covering all 3,236 households across 12 the districts, bi-weekly Labor Surveys, and a Knowledge and Practice Survey will be conducted. IPA will train experienced surveyors and in the event of dropout, recruit and train equally high caliber data collectors. Recurrent piloting and debriefing is a regular practice on all IPA surveys, as a means to take a good measure of the success on the field and to keep a tight screening of issues that may arise.

PART 2: IMPLEMENTATION

In the past year, the DIRTS team, together with our local partners, successfully implemented the three components of the project: (1) Rainfall index insurance, (2) Community Extension Agents, and (3) Inputs supply. Most of the related field activities were tied to the farming season and ended September/October. In the following months, the team has begun preparing for the 2015 activities.

A. INSURANCE

The Rainfall Index Insurance coverage period ended on October 17, 2014, in all the 162 DIRTS communities. Rainfall satellite data received from National Oceanic Atmospheric Administration (NOAA) was analyzed by IPA using an in-house payout calculator (using the pre-determined conditions set by GAIP for the FAARIGU Drought Insurance). NOAA is a US state agency, focused on the condition of the oceans and the atmosphere and is currently monitoring rainfall data for the Ghana Agricultural Insurance Program (GAIP). Based on the rainfall recorded in all the 162 DIRTS communities (throughout the 120 days), no payout was due in any of the communities in the 2014 farming season. This meant that, the rainfall data recorded in all the 162 communities were adequate enough for maize production. The results were forwarded to GAIP for validation on October 24, and on October 30, 2014 GAIP confirmed that “no claims” were due to any of the policyholders.

i. Notification of Payout Outcome

In November 2014, IPA organized a training for field staff to conduct insurance notification in all the 162 project communities. A majority of the project communities (about 75%) have been have been informed about the outcome of the insurance coverage. The notification visits will be completed in December 2014.

IPA staff have encountered mixed reactions during the notification meetings. While policyholders in most of the communities readily confirmed the rainfall records, a few others expressed concerns that the rainfall data did not fully represent the situation in their communities. Elsewhere, even though

community members accepted the rainfall data that were recorded by NOAA, some of the community members argued that the rainfall in their community did not start early enough which resulted in drought, based on their observations at the time of crop germination. Follow-up visits to these communities revealed that planting in these communities happened earlier than advised per the policy due to characteristic of the soil in these communities (according to farmers' reports) and outset of some parasitic weeds that compete with the maize for plant nutrients.

On the face of the ubiquitous challenges posed by the basis risk inherent to drought insurance, and to measure the extent of this risk, in the second year of DIRTS, IPA will obtain rainfall data from NOAA (as in 2014), every 10 days from the rainfall data provider for continuous monitoring of community eligibility for payouts, while also selecting and training community members in each of the 162 communities to measure actual rainfall using a rain gauge and send daily rainfall recordings via text messages to the IPA office. This will be compared to the outcome of satellite data from the rainfall data provider at the end of the 2015 maize farming season.

ii. Policyholders' Concern about Insurance Package

The total area of one acre plot of farm land insured under the FAARIGU Drought Index Insurance policy was sold at a cost of GHS12 per acre. The compensation for the same acre plot of farm land in the event of severe drought is a maximum of GHS100 per acre of farm insured. This is supposed to cover the amount a farmer typically invests on one acre of land. However, some of the policyholders reported that with strict adherence to the recommended agronomic practices - application of three bags of fertilizer per acre, use of certified seeds, weedicides and other farm inputs - an average of GHS 350 is spent on an acre of farm land. This indicates that, with the 2014 insurance policy, about 28.60% of the total investment on one acre plot of farm was insured.

IPA has recommended that community members buy more than one premium to cover an acre plot of farm land in the 2015 farming season. IPA will continue to communicate this to community members during insurance marketing in the 2015 farming season to enable policyholders adequately secure their investments in farming.

iii. Policyholders and Successful Community Based Marketers (CBMs) Survey

Alongside the notification process, a five minutes survey was administered to selected policyholders to assess policyholders' views on levels of satisfaction and fairness of the FAARIGU insurance policy outcome, whether the policyholders would like to buy the insurance product again in the next farming season, and other general comments the farmers had about the insurance product. A second data collection tool was administered to the CBMs, who were successful in marketing the index insurance during the 2014 farming season. This questionnaire captured the CBMs' views on effective and efficient strategies for reaching out to community members and suggestions on how to improve CBMs' and community members' understanding of the insurance policy The data will be analyzed and lessons gathered will inform decisions on best practices in 2015 faring season.

B. **COMMUNITY EXTENSION AGENTS**

As part of the Community Extension component of DIRTS, a wide range of activities have been carried out in this first year. Ten pre-selected farmers in 81 DIRTS communities, were visited by a CEA (either at their homes or farm) to deliver an audio- or video-format extension message. The extension message delivery for 2014 ended in September. During this reporting period, activities focused on wrapping up the 2014 extension program and reviewing lessons learned by the field team to revise the field protocols for next year. Furthermore, preparations for the 2015 season have started, including preparation of new extension messages covering best practices for legume cultivation the establishment of a demonstration farm for the shooting of extension videos and the programming of the Android application that probes the CEAs to deliver timely messages to the farmers. Furthermore, real-time data collected though this application, including questions that farmers asked the CEAs, are currently being analyzed. This will allow us to improve the 2015 messages as well as provide useful information to the Ministry of Food and Agriculture.

i. Revision of Existing Field Protocols for Message Deliveries

Due to the ever changing factors that have direct impact on timelines of agricultural activities, it was necessary for the team to adjust some field protocols that were developed at the beginning of the season to ensure that intervention materials and messages remained relevant to beneficiaries. The schedule of extension message deliveries was originally weekly. However with delays of rains and other factors, IPA realized that farmers had changed their timelines for some of their activities. Accordingly, IPA has adjusted timelines for message deliveries within particular windows for 2 messages to be delivered per week. This is to ensure that extension messages remain relevant and correspond to the activity schedules of farmers.

ii. Preparations for 2015 Program Activities: Content Development for Legume Extension Messages

Between September and November 2014, the CEA team hosted two separate workshops with Agricultural Extension Agents (AEAs) from the Ministry of Food and Agriculture (MoFA) to develop content for the legume messages on soya, cowpea and groundnut which will be extended to program beneficiaries in the next farming season. Currently, extension messages being delivered only cover maize (a predominantly male-cultivated crop). With the addition of messages on soya, cowpea and groundnut, IPA will be effectively addressing two major concerns: 1) the provision of much needed extension services covering crops with significant economic importance to livelihoods in Northern Ghana, and 2) the effective inclusion of female beneficiaries in program activities to address gender balance concerns, as legumes are often cultivated by women.

iii. Agreement with Savanna Agricultural Research Institute (SARI)

In October 2014, a service provider contract was finalized between IPA and the Council of Scientific and Industrial Research (CSIR). CSIR is the nationally mandated institution that carries out research into all scientific fields through its subsidiary – Savanna Agricultural Research Institute (SARI). The Agreement formalized arrangements to have SARI review all extension content being developed for next 2015. Materials to be reviewed include extension messages, extension videos and extension handbooks.

iv. Production of Extension Videos covering Legume Messages

A video production company was contracted to shoot new extension videos based on the SARI-validated extension messages focused on best practices for legume cultivation. To facilitate the filming of the good agronomic practices, the DIRTS team established a demonstration field, supervised by the Ministry of Food and Agriculture. Most of the legume extension videos were shot on this field.

v. Field Visits with Directors of MoFA

Between September and November 2014, the Extension team visited project communities with all 13 District Directors (in project zones) of the Ministry of Food and Agriculture to have them witness project activities within communities and provide them with an opportunity to interact with project beneficiaries and assess the work being done. A similar field visit was carried out with the Northern Regional Director of MoFA where he went to a selected district to meet with DIRTS Extension Agents and interacted with project beneficiaries. In November 2014, IPA was invited for meeting dedicated to planning of the Northern Regional Farmers Day Celebration. Dignitaries present at the meeting were the Northern Regional Minster, District Directors of Ministry of Food and Agriculture, and representatives of other organizations. IPA used that opportunity to introduce the DIRTS project and advocated for support for sustained agricultural extension service delivery beyond the project. The meeting also offered chance for networking with other likeminded organizations and potential partners.

C. INPUTS

The inputs marketing and deliveries for the 2014 farming season were completed in July. In this reporting period the team has been drawing lessons from the previous season to improve the inputs supply chain in 2015, as well as start the preparations for the next round of marketing, which is scheduled to begin in January.

i. Data collection (input prices)

The Inputs intervention of the DIRTS project spent the months of September, October and November in data cleaning and preparation for 2015 inputs marketing. The data collected on total orders made by the Community Based Marketers (CBMs) in 59 DIRTS communities through the inputs supply chain included inputs prices, total DIRTS subsidies, and popular farm inputs in the project communities.

Price fluctuations affected the inputs supply on the project in 2014. For example, the time between orders made by CBMs and the time of supply coincided with drastic increments in prices due to the depreciation of the Ghana Cedi. Of all the farm inputs sold, the three (3) best-selling products (in terms of number of units sold) were: NPK fertilizer (562 bags), Sarosate weedicide (329 liters) and Sunphosate weedicide (283 liters).

ii. Lessons Learned

IPA did not include organic fertilizer in the list of agrochemicals marketed in 2014, but many farmers reported popularity of this product. IPA has therefore decided to revise the input catalogue for the 2015 farming season to include organic fertilizer.

Furthermore, input dealers in the inputs supply chain have pointed out that the collaboration with CBMs have proven useful in the input sales and therefore CBMs capacity should be strengthened to improve on this relationship and further improve sales of agro inputs in the coming farming season.

During the 2014 season, the team realized that some CBMs were less effective in selling the agro-inputs because they did not put much effort into the sales or they were absent from their communities. Hence, IPA will review the output of all CBMs and replace non performing CBMs in 2015.

D. UPCOMING ACTIVITIES

In addition to receiving rainfall data every 10 days from the rainfall data provider for continuous monitoring of community eligibility for payouts, IPA will also select community members who will send daily rainfall recordings via text messages to IPA office. This will be compared to the outcome of satellite data from the rainfall data provider at the end of the 2015 maize farming season.

DIRTS communities will be re-sensitized on the allowable premium that can be bought to insure one acre plot of farm during insurance marketing in 2015. IPA will continue to communicate this to community members during insurance marketing in the 2015 farming season to enable policyholders adequately secure their investments in farming.

Based on revised extension messages and development of new messages for legumes, CEAs will be trained and their mobile handsets updated to ensure that all CEAs are equipped with latest information on good agronomic practices.

The inputs catalog (tool used for inputs marketing) is being updated to include all relevant agro inputs used in the partner communities. Outdated items in the input catalogue will also be removed. All logistics needed for full scale project implementation activities in 2015 farming season are being mobilized.

PART 3: PARTNERSHIPS

To ensure effective design and implementation of the different components of the DIRTS project, to share experiences, best practices and resources, as well as increase our visibility in the sector to enable effective communication of the findings of the impact evaluation, the DIRTS team has been strengthening existing relationships with stakeholders in the agriculture sector and building new partnerships. Below some important relationships that have been strengthen or established in this reporting period are described.

A. MINISTRY OF FOOD AND AGRICULTURE (MOFA)

The DIRTS team has engaged intensively with MOFA at both the regional and district levels, in particular through their involvement in the CEA program (see above). Field visits by both the Regional Director and the District Directors helped increase their enthusiasm in the program. In 2015 the team plans to engage MoFA more intensively in the CEA component, but also in the input supply and insurance marketing. Furthermore, in 2015, we will involve MoFA in our evaluation activities and focus on capacity building around data collection and analysis.

B. NORTHERN AGRICULTURAL SECTOR WORKIG GROUP (NASWG)

The Northern Agricultural Sector Working Group (NASWG) is a network of stakeholders implementing agricultural development programs and activities across Northern Ghana. Through this platform, the DIRTS team has been able to successfully interact with other institutions to share knowledge, experience and resources.

C. FoodSPAN

The Food Security Policy Advocacy Network (FoodSPAN) is a national network of agricultural sector stakeholders, and represents civil society on the board for the Agricultural Policy Review. In November 2014, IPA, through DIRTS,applied for membership on the FoodSPAN Network.

D. USAID APSP

Under the Feed the Future (FtF) Initiative of USAID's agricultural initiatives, the Agricultural Policy Support Project (APSP) was formed to engage Government in policy formulation and advocacy. To begin their work APSP sought to partner with key stakeholders carrying out significant work in agricultural development with which to leverage their advocacy activities.

Seen as a study investigating very key components of the current (extension & access to input technologies) and future (drought index insurance) agricultural landscape, IPA was invited as collaborators on the project. Currently, we have committed to participate in the OCA (Organizational Capacity Assessment) and the ACA (Advocacy Capacity Assessment) which will serve as launch-pads to assess participating organizations and identify key areas requiring strengthening for effective engagement of Government in Policy Reform.

E. IITA

Recognizing the capacity of International Institute of Tropical Agriculture (IITA) through its N2Africa project as a key project working on legumes in Ghana and other parts of Africa, IPA found it strategic to resume our partnership with IITA considering the planned activities for 2015, especially as DIRTS will provide agricultural extension messages on legumes.

REQUEST FOR ADVANCE OR REIMBURSEMENT

(See instructions on back)

OMB APPROVAL NO. 0348-0004

PAGE 1 OF 2 PAGES

1 TYPE OF PAYMENT REQUESTED

a. *"X" one or both boxes* ☐ ADVANCE ☑ REIMBURSEMENT

b. *"X" the applicable box* ☐ FINAL ☑ PARTIAL

2. BASIS OF REQUEST ☐ CASH ☑ ACCRUAL

3. FEDERAL SPONSORING AGENCY AND ORGANIZATIONAL ELEMENT TO WHICH THIS REPORT IS SUBMITTED: USAID/IDEA/DIV

4. FEDERAL GRANT OR OTHER IDENTIFYING NUMBER ASSIGNED BY FEDERAL AGENCY: AID-OAA-F-13-00057

5. PARTIAL PAYMENT REQUEST NUMBER FOR THIS REQUEST: 4

6. EMPLOYER IDENTIFICATION NUMBER: 06-1660068

7. RECIPIENT'S ACCOUNT NUMBER OR IDENTIFYING NUMBER: USA0022

8. PERIOD COVERED BY THIS REQUEST

FROM *(month, day, year)*: 12/1/2014

TO *(month, day, year)*: 7/31/2015

9. RECIPIENT ORGANIZATION

Name: INNOVATIONS FOR POVERTY ACTION

Number and Street: 101 WHITNEY AVENUE, SECOND FLOOR

City, State and ZIP Code: NEW HAVEN, CT 06510

10. PAYEE *(Where check is to be sent if different than item 9)*

Name: INNOVATIONS FOR POVERTY ACTION

Number and Street: 101 WHITNEY AVENUE, SECOND FLOOR

City, State and ZIP Code: NEW HAVEN, CT 06510

11. COMPUTATION OF AMOUNT OF REIMBURSEMENTS/ADVANCES REQUESTED

PROGRAMS/FUNCTIONS/ACTIVITIES ►		(a) Milestone 4	(b)	(c)	TOTAL
a. Total program outlays to date	*(As of date)* 11/30/2014	$ 445,621.50	$	$	$ 445,621.50
b. *Less:* Cumulative program income					0.00
c. Net program outlays *(Line a minus line b)*		445,621.50	0.00	0.00	445,621.50
d. Estimated net cash outlays for advance period					0.00
e. Total *(Sum of lines c & d)*		445,621.50	0.00	0.00	445,621.50
f. Non-Federal share of amount on line e					0.00
g. Federal share of amount on line e		445,621.50			445,621.50
h. Federal payments previously requested		346,594.50			346,594.50
i. Federal share now requested *(Line g minus line h)*		99,027.00	0.00	0.00	99,027.00
j. Advances required by month, when requested by Federal grantor agency for use in making prescheduled advances	1st month				0.00
	2nd month				0.00
	3rd month				0.00

12. ALTERNATE COMPUTATION FOR ADVANCES ONLY

a. Estimated Federal cash outlays that will be made during period covered by the advance	$
b. *Less:* Estimated balance of Federal cash on hand as of beginning of advance period	
c. Amount requested *(Line a minus line b)*	$ 0.00

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(Continued on Reverse)

STANDARD FORM 270 (Rev. 7-97)
Prescribed by OMB Circulars A-102 and A-110

13.	CERTIFICATION	
I certify that to the best of my knowledge and belief the data on the reverse are correct and that all outlays were made in accordance with the grant conditions or other agreement and that payment is due and has not been previously requested.	SIGNATURE OR AUTHORIZED CERTIFYING OFFICIAL Vivian M. Brady-Jones	DATE REQUEST SUBMITTED July 31, 2015
	TYPED OR PRINTED NAME AND TITLE Vivian M. Brady, Jones, CPA CFO	TELEPHONE (AREA CODE, NUMBER, EXTENSION) 203-772-2216

This space for agency use

Public reporting burden for this collection of information is estimated to average 60 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0004), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

INSTRUCTIONS

Please type or print legibly. Items 1, 3, 5, 9, 10, 11e, 11f, 11g, 11i, 12 and 13 are self-explanatory; specific instructions for other items are as follows:

Item	*Entry*
2	Indicate whether request is prepared on cash or accrued expenditure basis. All requests for advances shall be prepared on a cash basis.
4	Enter the Federal grant number, or other identifying number assigned by the Federal sponsoring agency. If the advance or reimbursement is for more than one grant or other agreement, insert N/A; then, show the aggregate amounts. On a separate sheet, list each grant or agreement number and the Federal share of outlays made against the grant or agreement.
6	Enter the employer identification number assigned by the U.S. Internal Revenue Service, or the FICE (institution) code if requested by the Federal agency.
7	This space is reserved for an account number or other identifying number that may be assigned by the recipient.
8	Enter the month, day, and year for the beginning and ending of the period covered in this request. If the request is for an advance or for both an advance and reimbursement, show the period that the advance will cover. If the request is for reimbursement, show the period for which the reimbursement is requested.
Note:	The Federal sponsoring agencies have the option of requiring recipients to complete items 11 or 12, but not both. Item 12 should be used when only a minimum amount of information is needed to make an advance and outlay information contained in item 11 can be obtained in a timely manner from other reports.
11	The purpose of the vertical columns (a), (b), and (c) is to provide space for separate cost breakdowns when a project has been planned and budgeted by program, function, or activity. If additional columns are needed, use as many additional forms as needed and indicate page number in space provided in upper right; however, the summary totals of all programs, functions, or activities should be shown in the "total" column on the first page.
11a	Enter in "as of date," the month, day, and year of the ending of the accounting period to which this amount applies. Enter program outlays to date (net of refunds, rebates, and discounts), in the appropriate columns. For requests prepared on a cash basis, outlays are the sum of actual cash disbursements for goods and services, the amount of indirect expenses charged, the value of in-kind contributions applied, and the amount of cash advances and payments made to subcontractors and subrecipients. For requests prepared on an accrued expenditure basis, outlays are the sum of the actual cash disbursements, the amount of indirect expenses incurred, and the net increase (or decrease) in the amounts owed by the recipient for goods and other property received and for services performed by employees, contracts, subgrantees and other payees.
11b	Enter the cumulative cash income received to date, if requests are prepared on a cash basis. For requests prepared on an accrued expenditure basis, enter the cumulative income earned to date. Under either basis, enter only the amount applicable to program income that was required to be used for the project or program by the terms of the grant or other agreement.
11d	Only when making requests for advance payments, enter the total estimated amount of cash outlays that will be made during the period covered by the advance.
13	Complete the certification before submitting this request.