



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



ILSSI Project Research Results and Outcomes

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ILSSI Stakeholder Consultation - Ghana, Coconut Grove Hotel Accra - 14th May 2018

Photo: Nana Kofi Acquah



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Entry points for SSI scaling: Economic feasibility with scaling through micro/rural finance and engaging the private sector

Key Areas

- Economic Feasibility
- Micro/Rural Finance
- Private Actors



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RESEARCH AIMS (1) – OVERALL

Assess economic feasibility of various SSI technology adoption by smallholder farm households.

Provide evidence to support investment decisions and scaling of various SSI technologies by smallholder farmers and others interested in the sector.

Develop suitable business models (access to land, financing, agric. inputs, markets...) to SSI sector



RESEARCH AIMS (2) – CREDIT/PRIVATE ACTORS

- **Effect of access to credit on SSI technology adoption** and the constraints and opportunities that exist for policy support.
- **Map the main private actors/players** in irrigation supply chain in Ghana (**Who are they?**)
- **Role of the main private actors** in SSI supply chain (**What do they do?**)
- **Role of enablers** in irrigation development (such as MoFA, GIDA, & others)



METHODOLOGY

- Plot level inputs and outputs data – (ILSSI-pilot farmers (UDS))
- Production inputs and outputs data - Interviews of pilot farmers(IWMI)
- Household surveys (2014 and 2015 by IFPRI) + survey of 36 ILSSI and 64 non-ILSSI farmers + 9 financial institutions
- Secondary data obtained from: MoFA - Ghana; GIDA; inputs dealers and market/price information
- Yield estimates from biophysical models (APEX) – (for FARMSIM)
- **Literature review and interview of private actors (work in progress)**
- **Analysis:** GMA (profitability); Scenario-Analysis; CBA; FARMSIM; Probability model (Probit)



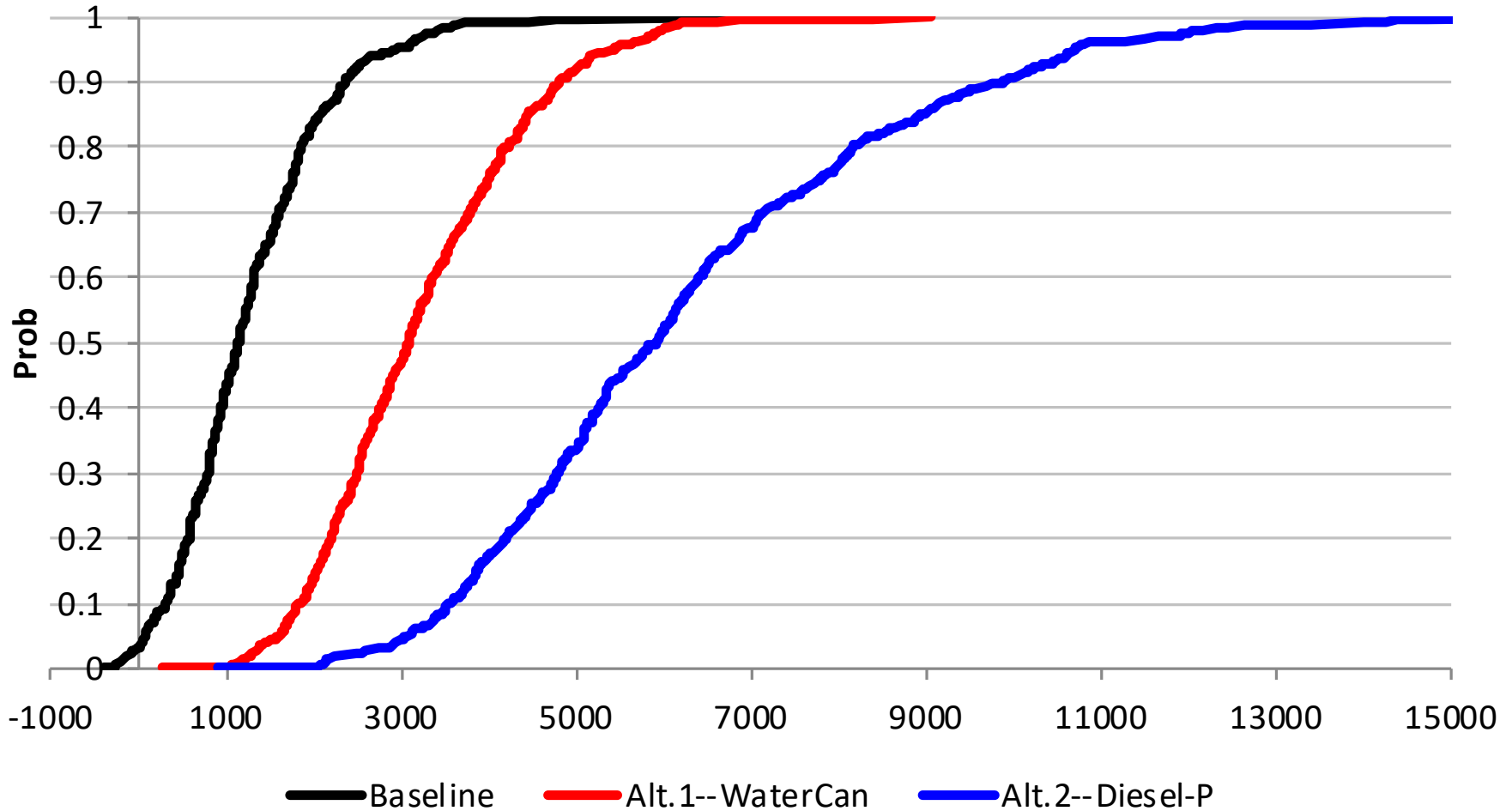


Economic and nutrition impacts of SSI in Bihinayilli Site

	Baseline	Alt. 1--Watering Can	Alt. 2--Diesel-P	
Avg. values in GHc/hh in year 5				
Net present value	22,779	28,270	36,731	
Avg. net profit	1,270	3,229	6,283	
% change profit: Alt to Baseline		154%	395%	
Benefit-Cost Ratio: Alt/Baseline		2.7	2.6	
Averages daily nutrients in year 5				<u>Min. required</u>
Energy (calories/AE)	4620.0	4629.0	4652.0	1,750
Proteins (grs/AE)	93.5	94.1	95.6	41
Fat (grs/AE)	73.1	73.1	73.2	39
Calcium (grs/AE)	0.18	0.24	0.37	1
Iron (grs/AE)	0.012	0.012	0.013	0.009
Vitamin A (grs/AE)	0.00002	0.00003	0.00003	0.0006



CDF of Net Cash Farm Income (Profit): Year 5



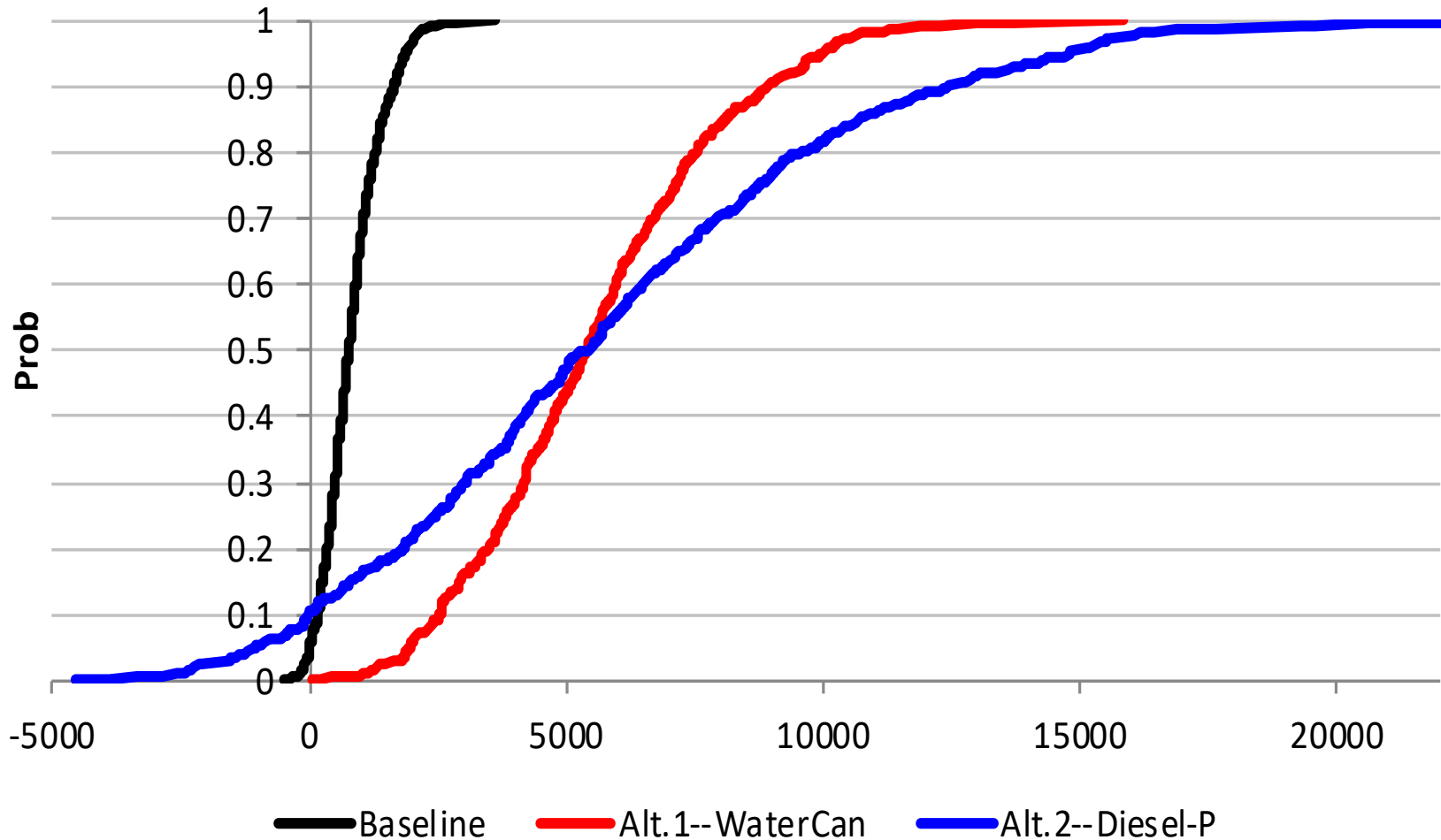


Economic and nutrition impacts of SSI in Zanlerigu Site

	Baseline	Alt. 1--Watering Can	Alt. 2--Diesel-P	
Avg. values in GHc /hh in year 5				
Net present value	17,859	38,107	46,674	
Avg. net profit	824	5,559	5,841	
% change profit: Alt to Baseline		574%	608%	
Benefit-Cost Ratio: Alt/Baseline		2.8	1.4	
Avg. daily nutrients in year 5				
				<u>Min. required</u>
Energy (calories/AE)	1967	2239	2475	1,750
Proteins (grs/AE)	50.6	73.2	90.0	41
Fat (grs/AE)	24.5	26.0	27.2	39
Calcium (grs/AE)	0.4	2	3	1
Iron (grs/AE)	0.015	0.037	0.052	0.009
Vitamin A (grs/AE)	0.00007	0.00017	0.00024	0.0006



CDF of NCFI (Net profit) in Year 5



- **Literature** - Access to credit have **significant positive influence** on technology adoption (Obuobisa-Darko, 2015; Daniel, 2015) and production efficiency (Duy, 2015)
- **How about other constraints?** unreliable **access to water**; inadequate **institutions** (e.g. land tenure); **equipment failure**; inadequate **supply chain** (fertilizer, improved varieties, extension services....); **lack of agronomic support; marketing problems; risk behaviour**; lack of **technical knowledge/skill**...(Burney & Taylor, 2012):
- Credit/Microfinance: 3 key sub-components of 'credit' need to be considered - **Availability; Access; & Utilization**
- A **weak link** exists between farmers access to credit and irrigation technology adoption.
- Only **3.7% of surveyed irrigators** have used credit during the 2016 cropping season.
- Who are these 3.7%?: Age(**young**), trust financial institution(**+ve**), less remittances income (**+ve**), and access to extension services (**+ve**).

Variable	Coefficient	Std. Error	z	Prob. z >Z*
Farmers' Age (AGE)	-0.0548***	0.0145	-3.78	0.0002
Farmer experience (EXP)	0.06713	0.02161	3.11	0.0019
Access to technology (ACTA)	0.5494	0.3608	1.52	0.1279
Farm size (FS)	0.6111	0.2389	2.56	0.0105
Perception of land constraint (PLC)	0.0190	0.3664	0.05	0.9585
Trust in financial institution (TRUST)	0.6204*	0.3272	1.90	0.0579
Access to remittances (REMA)	-0.6387**	0.3198	-2.00	0.0458
Access to market (MKT)	-0.1924	0.4193	-1.46	0.6463
Extension contact (EXT)	0.0990***	0.0321	3.08	0.0021
Farmer category (FARK)	-0.0053	0.3632	-0.01	0.9882
Savings (SVGS)	0.4977	0.3330	1.49	0.1351
Constant	-0.0907	0.6914	-0.13	0.8956



FINDINGS (6)- Private actors

- ca. 3.44% Ghana's land suitable for cultivation was under irrigation (MoFA, 2016)
- 2/3 irrigated farming are by private entities including individual farmers and community or FBO
- However, low presence of market-oriented private actors in AWM
- Small number of irrigation equipment suppliers (large operators) based in Accra (Reiss and Co, Agrimat, Dizengoff and K.G. Enterprise)
- Retailers- most involve in **water pumps, installation of water purification, & borehole drilling**
- Few informal machinists involved in production of pumps using very basic foundries: Kokompe (Accra); Suame Magazine (Kumasi), & Kokompe (Takoradi)



FINDINGS (6)- Private actors

- Pipes (PVC) - production is mostly local (Duraplast Ltd, Pipes and Plastics Products Ltd., Interplast Ltd.) and retail outlets, e.g., in Kumasi, Takoradi and Tamale.
- **Services** - Major distributors such as Agrimat and Dizengoff provide different services such as installation and training
- However, private suppliers have limited capacity to provide various services due to their concentration mostly in Accra.
- Thus, only limited numbers of clients (located nearby to big cities/towns) benefit from the '**after-sale services**'.

Strength

- Experience of established suppliers and distributors of irrigation equipment
- Existence of local manufactures of pipes
- Conducive weather for cultivating a wide range of high value irrigated crops

Weakness

- High cost of irrigation equipment
- Difficulty in accessing finance
- Concentration of suppliers in big cities
- High cost of energy/fuel
- Weak extension services

Opportunity

- Current policy support for agricultural growth and irrigation
- Growing local and international markets
- Presence of increasing donor support to the sector
- Stable political climate in Ghana

Threats

- Slow technology adoption (Risk behaviour, knowledge gap).
- Absence of preferential tariffs for irrigation equipment (incl. complex Bureaucracy)
- Lack of post-harvest facilities (e.g., Storage and agro-processing)



KEY MESSAGES (1)

- Investment in SSI technologies provides positive returns on investment (**economically feasible**).
- Adoption of SSI technologies **improve household welfare** (Increased income/consumption and nutrition)
- Use of **watering cans** still dominates among smallholders but there is growing interest in using motorised pumps
- **Cost of fuel and capital investment** required to purchase motor pumps are key constraints among smallholder irrigators.
- Improving **alternative energy** options (e.g. solar pumps) could increase SSI technology adoption.
- Credit access alone doesn't seem a panacea for the 'success of SSI' - **OTHER FACTORS! (seed, institution, capacity,...)**





KEY MESSAGES (2)

- **Geographical Access:** Sales point of irrigation equipment are usually located in urban centers while farmers are in rural areas)
- **Market Imperfection:** Farmers are usually not aware of the types & prices of irrigation equipment available in the market
- **Lack of extension support** – there is a general lack of irrigation extension support for farmers
- **Lack of technical know-how** – installations and maintenance
- **Quality** – influx of sub-standard irrigation equipment due to lack of enforcement of standards. **(unfair competition (sellers) + short life time (farmers)).**



RECOMMENDATIONS

- Create **innovative financing schemes**
- Enhance **extension services**
- Build **smallholders capacity**
- Introduce/improve **import polices/regulations** of irrigation equipment
- Incentivize **private actors (in irrigation supply chain) to extend their services** beyond big towns/cities
- Think **SSI as a package** (irrigation, credit, seed, fertilizer,...)



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