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Analysis of Farmers' Willingness to Pay and the Feasibility of Household Irrigation Technologies

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Photo: Desalegne Tadesse/IWMI



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Background

- 4 type of irrigation technologies field tested in 4 sites



Pulley

- Cost: 1350 Birr/unit including tanker and hose
- Vegetable and fodder

Rope & Washer

- Cost: 4000 Birr/unit
- Vegetable, fruit, and fodder

Solar pump

- Cost: 8000 Birr/unit
- Water application: Drip, hose, furrow
- Vegetable and fodder

Petrol Pump

- Cost 13000 Birr/unit
- Shared by 4 farmers
- Vegetable for market



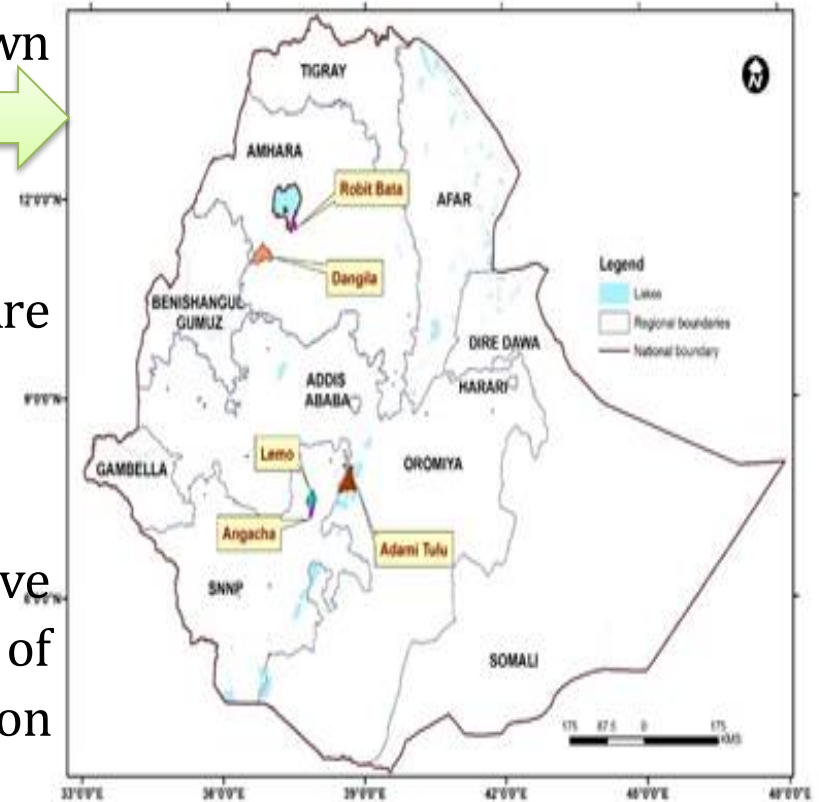
Research objectives

- To answer the following research questions.
 1. What is the average amount that farmers are willing to pay for household level water lifting irrigation technologies?
 2. Whether the feasibility/profitability of the technology has a relationship with the average willingness to pay? if not,
 3. What other factors affect farmers' willingness to pay?

Methodology

Data and data source

- Survey data from 400 farmers drawn from four research sites in Ethiopia
- 143 households (48 female headed) are **project target households.**
- 184 of the sample households have adopted at least one or a mix of household level water lifting irrigation technologies, including





Methodology

- A contingent valuation method (CVM) was used
- Two price bids
- The second bid is contingent upon the response to the first bid.
- The respondent is engaged in two rounds of bidding where she/he is asked to respond yes or no to a stated sum of initial bid and then the second bid will increase or decrease, respectively
- So, the price elicitation format is double-bounded dichotomous choice method



Methodology

- If the agent responds "yes" to the first bid (β_i), the second bid (β_i^u) is greater than the first bid

$$(\beta_i < \beta_i^u)$$

- On the other hand, if the agent responds "no" to the first bid (β_i), the second bid (β_i^d) is smaller than the first bid

$$(\beta_i^d < \beta_i)$$

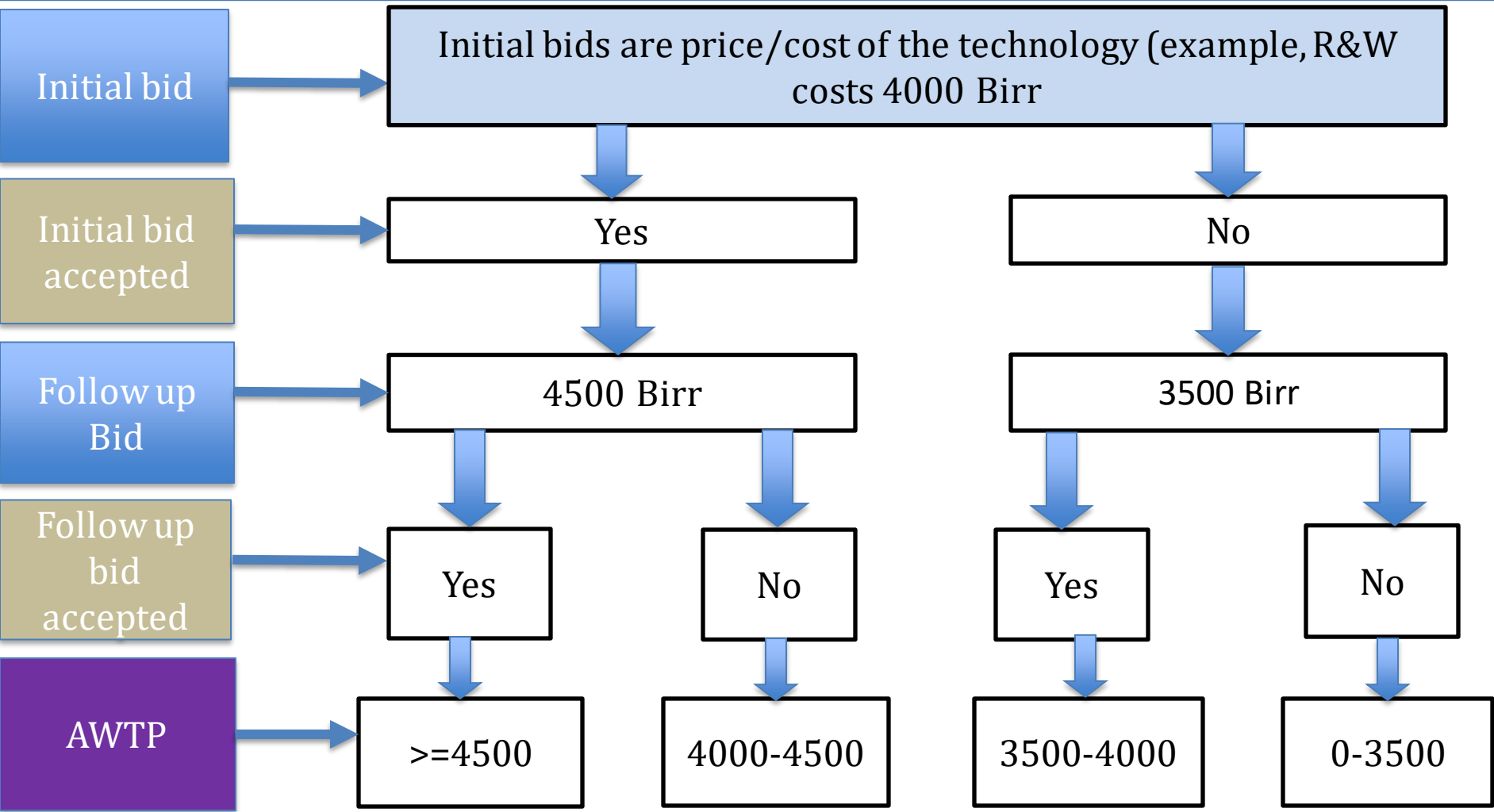
- Accordingly, there are four possible outcomes:





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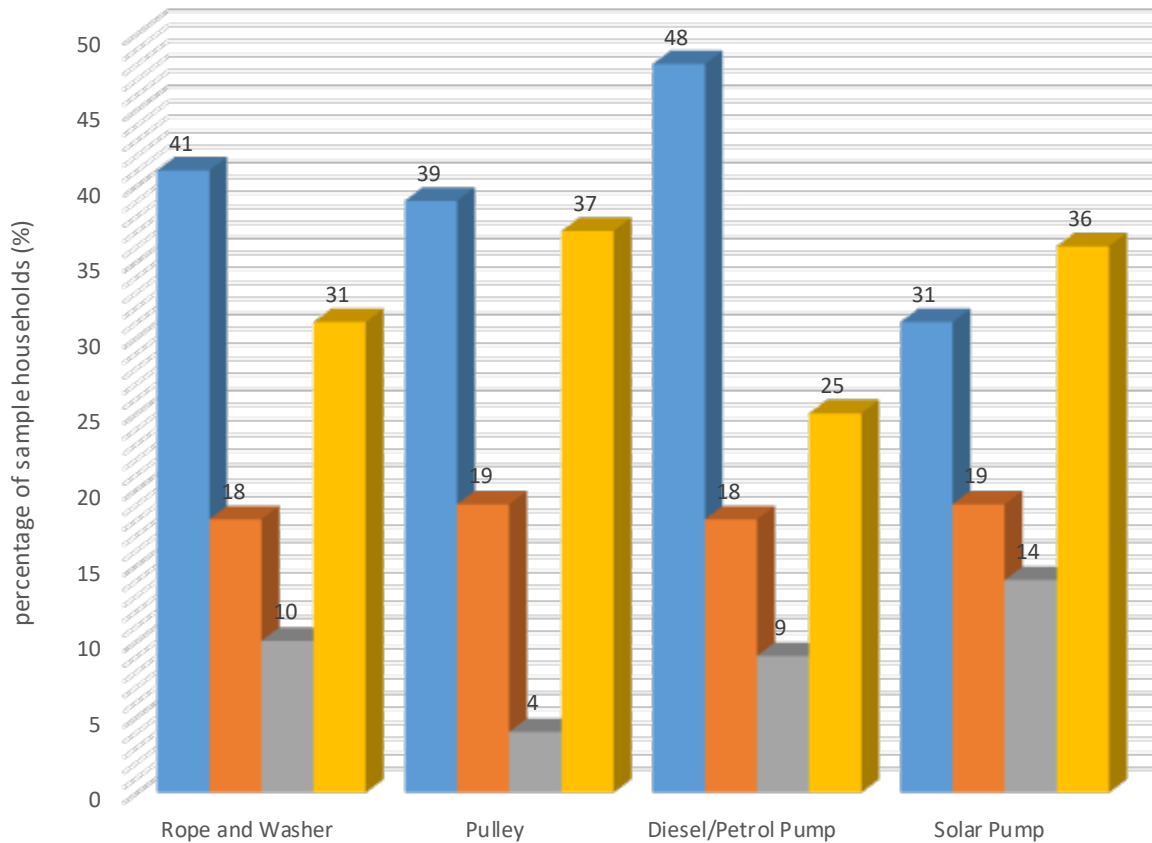




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Results- Proportion of sample households willing to pay a bids price



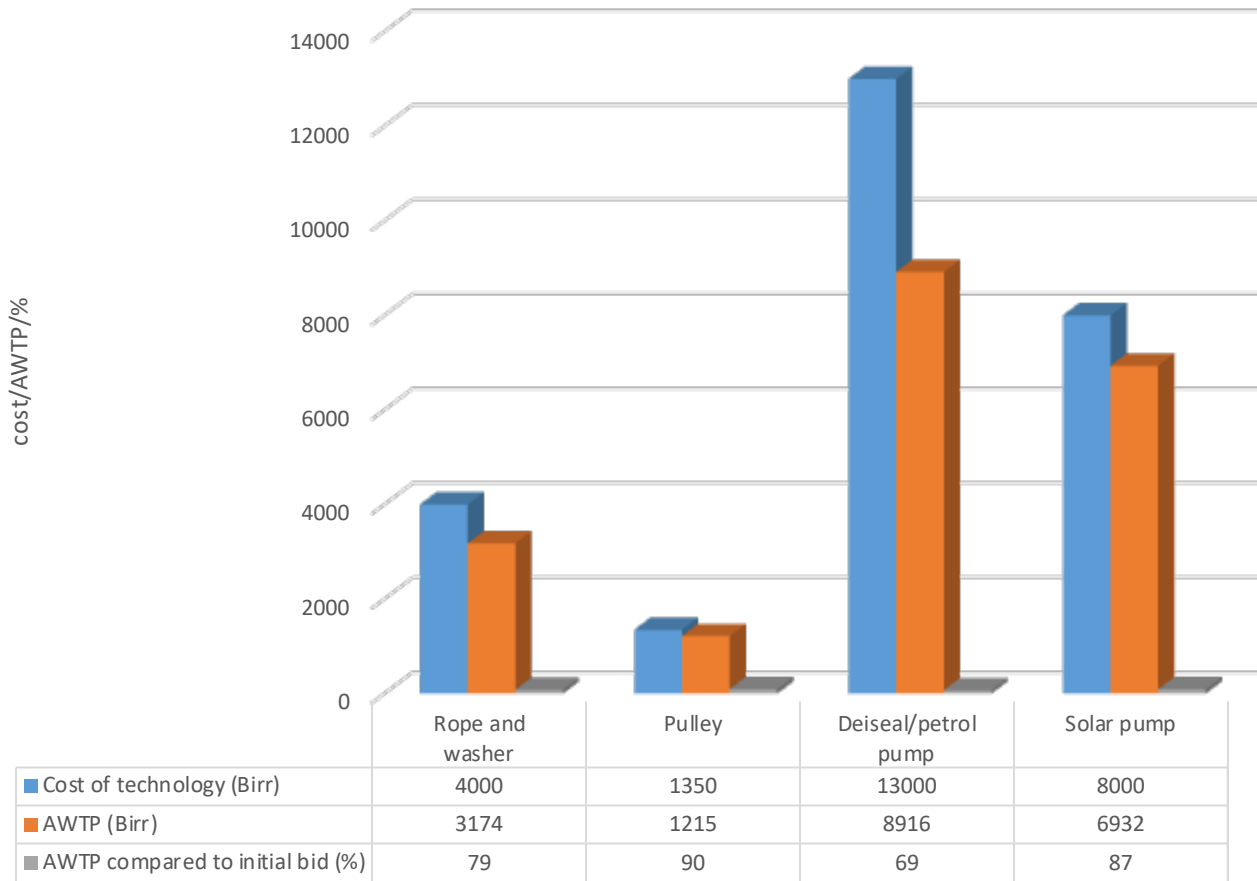
- Not willing to pay the minimum bid price (0-3500)
- Willing to pay between the minimum and initial bid prices (3500-4000)
- Willing to pay between initial and higher bid prices (4000-4500)
- Willing to pay greater higher bid price (>4500)



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Results- Farmers' average willingness to pay and cost of technologies



- AWTP ranges between 69 to 90 percent of the actual cost

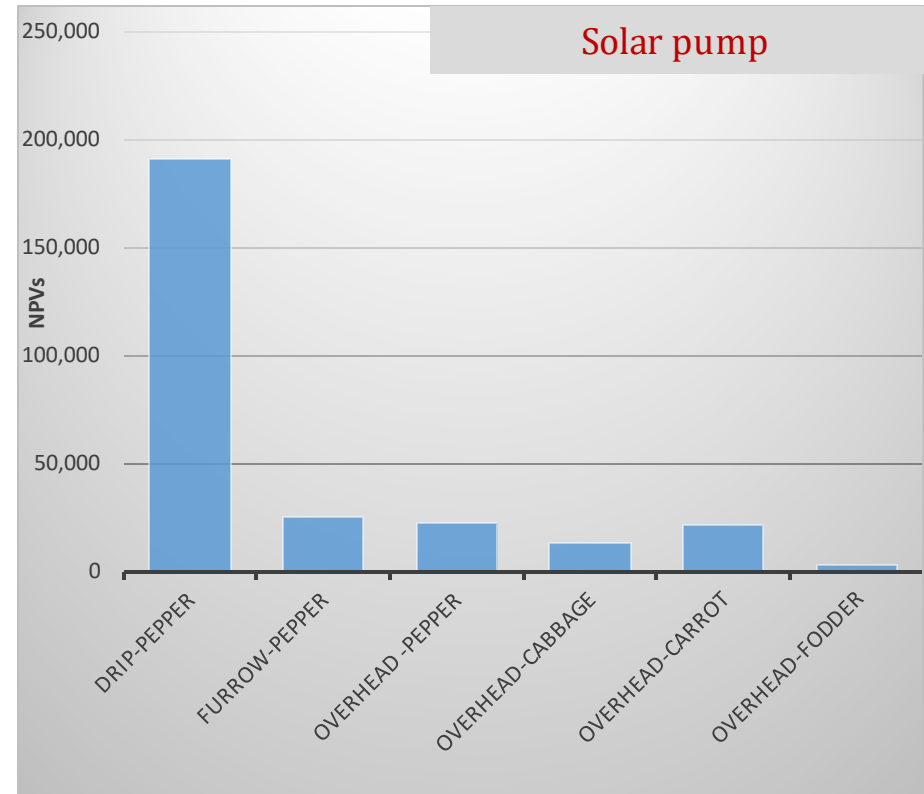
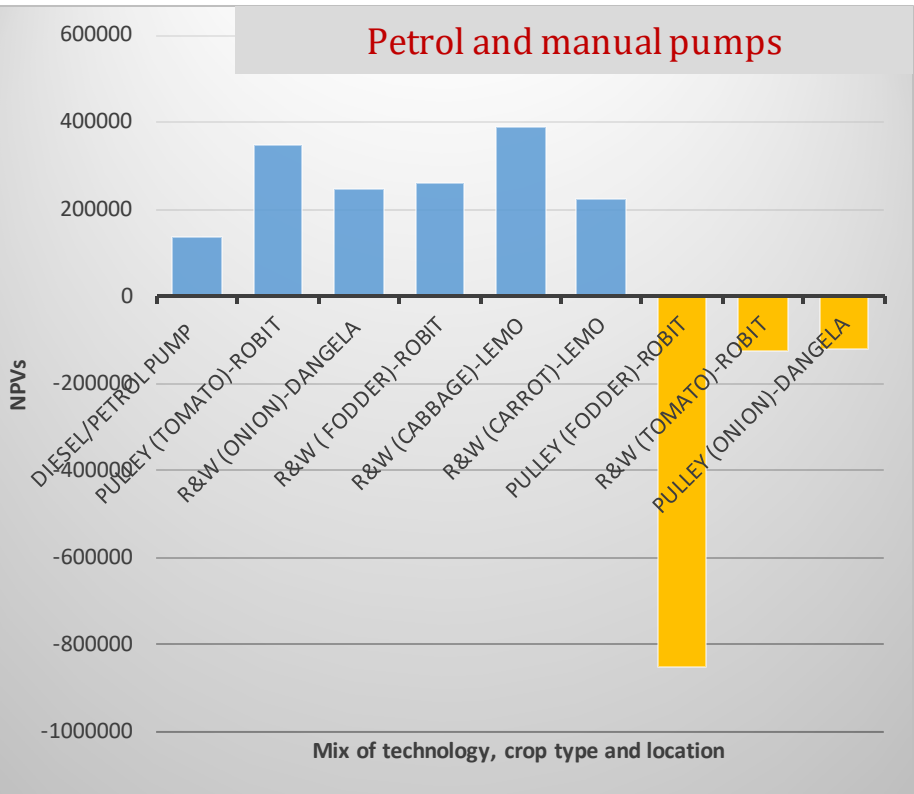


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- Feasibility/profitability of technologies depend of crop type, water application and location

- No relationship between farmers AWTP and feasibility/profitability of the technology



- Farmers' WTP is influenced by a host of factors ranging from demographic to socioeconomic and farm specific factors

	R&W	Pulley	Petrol pump	Solar pump
Age	-11	-0	-84***	-15
Literacy/numerical skills	607	135	1069	2329***
Distance to microfinance	-6***	-2***	-36****	3
Applied for credit	459**	161***	1377*	1364***
Distance to market	-10***	-4***	-44***	-41***
Irr. experience (1=yes)	-681**	-169*	3363***	2189***
Land holding (ha.)	-2333***	-380	-3150	1066
Agricultural income	0.174***	0.043***	0.364**	0.306**
Groundwater (1=yes)	857***	168*	2753**	1250*



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Key Messages

1. Farmers are willing to pay for household irrigation technologies
 - But, support/subsidize/tariff is important for successful adoption and scaling-up
2. An income based differential approach of support/subsidize is advisable
 - Income based differential approach can:
 - Ensure most households have the ability to pay.
 - Uniform support mechanism could be:
 - Discouraging and creates income inequality as the poor cannot afford



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3. Investment need to be resource and objective based

Manual pumps

- Often used for multiple uses
- Used for homestead irrigation
- Too small to produce surplus for the market,
- Improve household consumption
- Women tend to control income from

Motorized pumps

- More market-oriented
- Surplus production for the market
- 0.25 ha. is the minimum threshold for financially viable investment in motor pump



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Production and consumption by technology

Variables	Petrol pump	Manual pump
Value of income from irrigated agriculture (Birr/ha)	11142	4760
Value of per adult annual food consumption (Birr)	4094	6708



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Key Messages

4. Investment in education and training of farmers can accelerate the adoption/scaling up of technology,

- It increases their ability to access, analyze and efficiently use information.

5. Improve access to credit, extension services and markets



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