

# Diffusion of small-scale pump irrigation technologies: Evaluating adoption processes in Malawi



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# Irrigation development in Malawi

- Agriculture accounts for about 37% GDP, employs over 80% and mainly dependent on rainfall (*Chirwa, 2008*).
- Rain-fed production is affected by climate change contributing to increased poverty & food insecurity.
- Irrigation considered as a solution & categorized into private estate and smallholder.
- Smallholder irrigation (SSI) characterized by the use of various technologies e.g. small pumps

# The state of SSI in Malawi and research gap

- The estimated potential irrigated area for Malawi is about 450,000ha.
- Presently, 97,932ha is developed out which only 47% is under SSI (DOI, 2014).

Technology	Total area developed (Ha)	%
Gravity/river diversion	26,015.24	53
<b>Treadle Pump</b>	13,657.30	28
Watering can	5,494.14	11
<b>Motorised pump</b>	3,949.36	8
Total	49,116.04	100

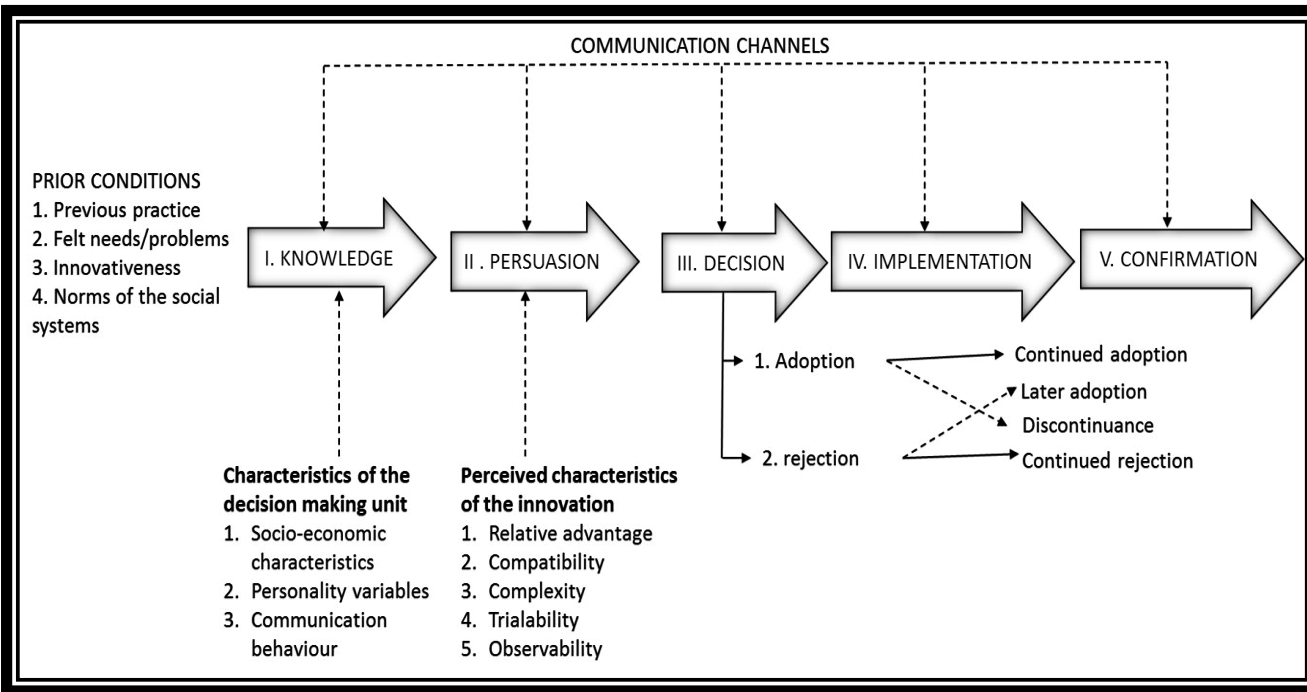
## The gap:

-Evidence show disparities on suitability of small pumps for the smallholders.

-Need for evidence to inform policies on sustainable promotion of SSI pumps: *scope of this research.*

# Exploring farmer adoption process

- Used the diffusion of innovation model (Rogers, 2003).



**-Two field surveys:**  
 Semi-structured interviews with farmers & stakeholders

**-Data analysis:**  
 descriptive statistics & content analysis

# Selected results

- 4 pumps identified: (1) individual treadle pumps; (2) group treadle pumps; (3) individual motorised; (4) group motorized pumps.
- Increased adoption of individual motorized and treadle pumps.
- High proportion of non-operating group motorized & treadle pumps.
- Except for individual motorized pumps the rest were accessed for free/subsidised

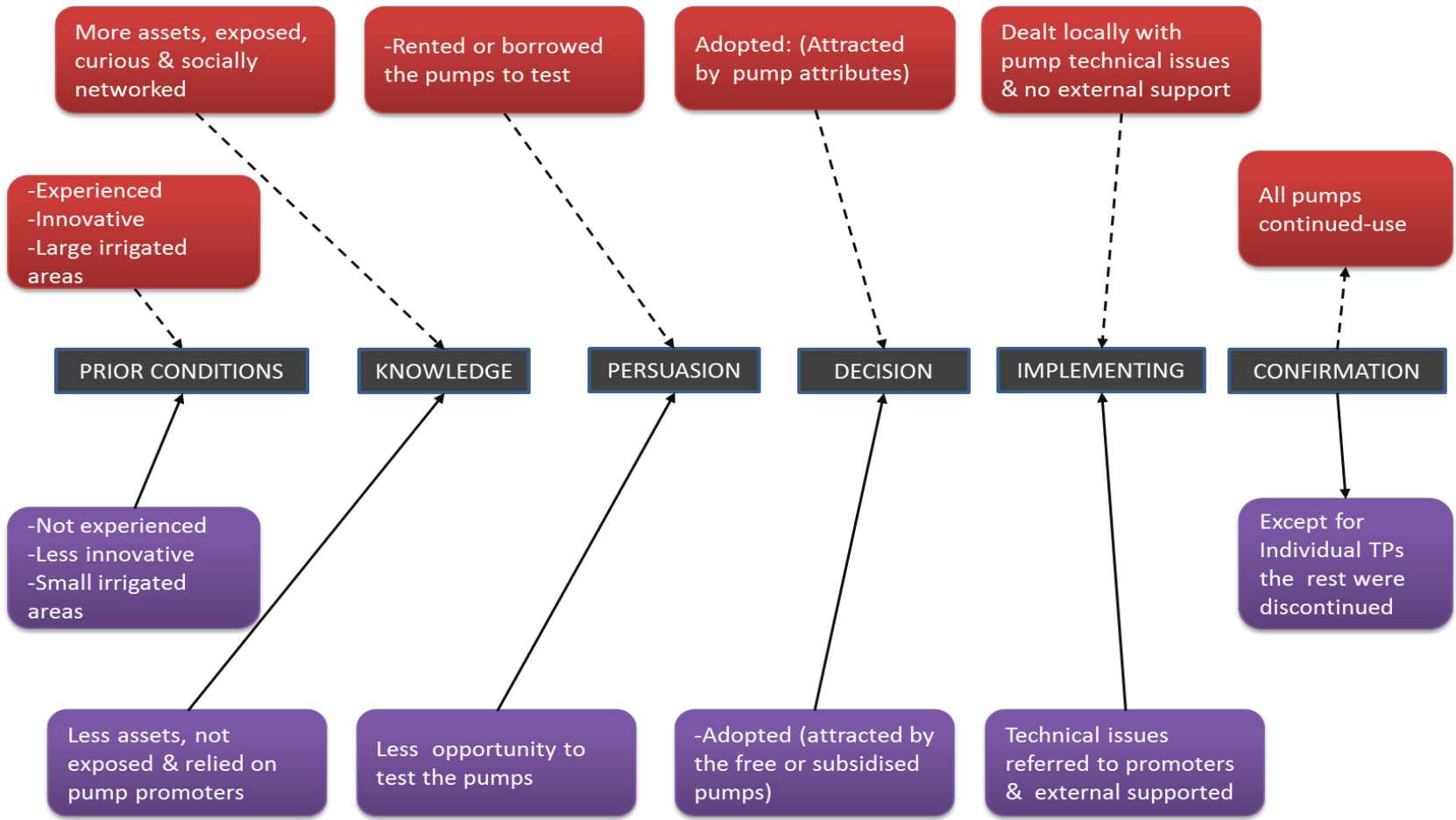


# Characteristics of the SSI pumps and their adopters

Characteristics	Individual TP*	Group TP*	Individual MP*	Group MP*
Source of power	Manual	Manual	Petrol	Diesel
Pump weight (kg)	20-35	20-35	17-310	100-310
Means of access	Free/subsidised/ private	Free/ subsidised	Private	Free
Percent still operating (%)	83	27	84	54
Pump manufacturers	Money Maker	Advainth	Mostly Chinese	Variant
Size of the irrigated area	Medium	Small	Large	Very small
Assets owned	Substantial	Substantial	Significant	Few
Stakeholders involved	Govt., NGOs, politicians, donors	Govt., NGOs, politicians, donors	Commercial distributors	Govt.

***\*TP-Treadle pumps; MP-Motorized pumps***

# Mapping the conditions influencing farmers to adopt *Cranfield* UNIVERSITY



# Discussion

- Pumps adopted by incentives (free/subsidised), do not necessarily follow the diffusion of innovation decision-making stages.
- Apart from the incentives, the ability to; fit in the existing farmers conditions, be observed and tried, facilitated the adoption and sustainability of the individual treadle pumps.
- The increased adoption of private motorized pumps can be explained by increased inflow of cheap-Chinese pumps and could be an indication of success for treadle pump irrigation (*since over 90% graduated from using treadle pumps*).



# Research implications

- The adoption choices for farmers with limited resources are narrow. If the target beneficiaries are the pro-poor – ***then policies promoting the uptake should consider supporting the potential adopters beyond pump affordability in order to be sustainable.***
- Adoption of the private pumps are based on socio-economic attributes of the adopters & pumps (Rogers, 2003). ***Policies that provide an enabling environment are sustainable.***

# Thank you



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Refer my PhD thesis and papers