iDE – Drip Irrigation System

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This project works with iDE to redesign the valve and filter for their existing low-pressure drip irrigation systems. iDE is a non-governmental organization that focuses on creating income and opportunities for poor rural households in developing countries. iDE looks to create technologies and methods that farmers can autonomously adopt and thus work towards true self-sufficiency. These techniques are intended to progressively move a farmer from day-to-day subsistence to surplus production.

Current systems are intended for use by $1/day farmers as an alternative to the expensive, high-pressure irrigation systems used by most commercial farmers. iDE systems use a water tank elevated 2-5 feet above the ground to provide roughly 1 psi of hydrostatic pressure throughout the irrigation system. The design challenge is twofold: existing filters provide adequate filtration but result in a 2-3 psi pressure loss in the system. This loss, while insignificant on commercial systems operating at 15 psi, is an unacceptable penalty for iDE's 1 psi systems. The filter design must adequately filter the water to prevent emitter clogging while simultaneously keeping pressure loss at less than 0.5 psi. No market-available products currently fulfill these requirements.

Additionally, the current irrigation system uses a ball valve above the filter to stop and start the flow. This valve is more robust than system operating pressures require and too expensive ($3-4 each). A different design needs to be implemented to reduce valve cost to roughly $0.50 per unit.