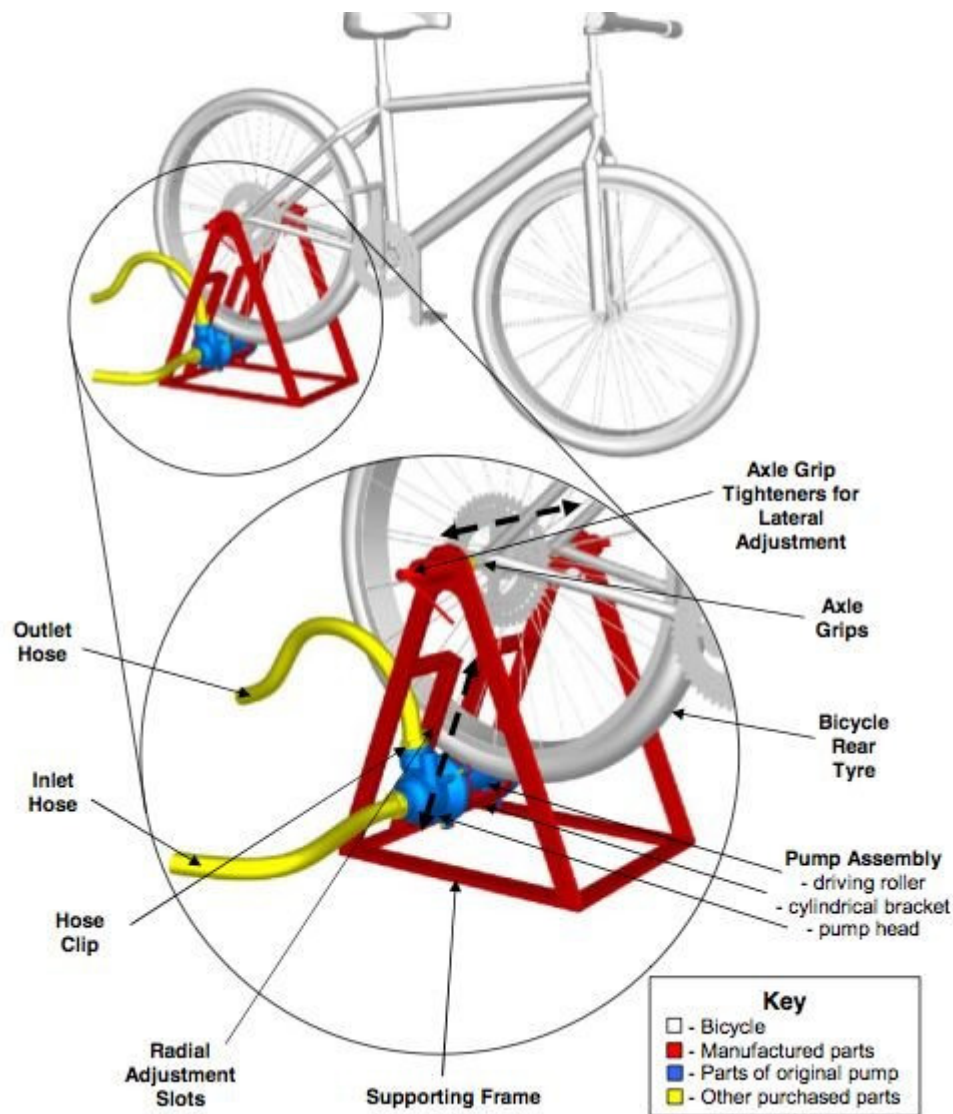


Schematic of Jon Leary's mobile bicycle-powered pump



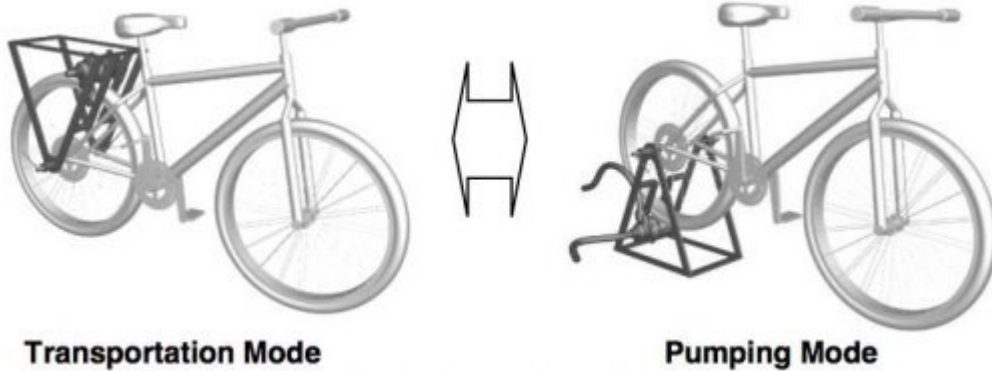
Jon Leary and friends, with his mobile bicycle-powered pump

University of Sheffield student Jon Leary was required to “make something useful out of rubbish” as part of his dissertation. What he ended up doing was transforming lives. As part of his studies as a Mechanical Engineering major, Leary spent four months in Guatemala. There, he introduced the locals to his bicibomba movil, a mobile bicycle-powered water pump. Now, using cast-off bicycles and discarded pumps, Guatemalan farmers can irrigate their land much more easily and effectively than ever before.

Leary developed the system while still in the UK. Basically, it consists of an old electrical pump attached to a metal frame, which pivots around the rear axle of a bicycle. When in transport mode, the frame and pump flip up and rest above the back wheel, so the bicycle can be pedaled. When it's time to pump, the bicycle stops and the frame flips down underneath

the back wheel, with the bike's tire resting against the armature of the pump. Much like a stationary resistance trainer, the rider then pedals in place, thus spinning the armature and powering the pump. On flat ground, it can move water at a rate of 40 liters per minute.

“The inspiration came from regular pannier racks that are used on touring bikes to carry things over the back wheel of a bike” Leary told us. “I was sketching up a few designs and noticed that the stand for lifting the rear wheel of the bike off the ground that I kept drawing could work just like a pannier rack if flipped upside down.”



The bicibomba movil was introduced with the help of Maya Pedal, a local organization that champions pedal-powered technology in the region. Using unwanted bikes donated from the US and Canada, Maya Pedal was already making bicimáquinas (bicycle machines) that included washing machines, electrical generators and corn mills. They even already had a stationary water pump, for bringing water up out of wells.

The mobile aspect of Leary's invention, however, makes it attractive to farmers. Many of them have land that is on an incline, and the only way of getting water to the top is by lugging it up there. With the bicibomba, however, they can pump from the bottom up to a midway tank, then ride up to the midway tank and pump from it to the top - or to any number of other midway tanks, riding from each one to the next.





Jon's device can reportedly be made quite easily, using standard tools along with old bikes, bits of metal, and scrapped electric centrifugal water pumps. Since he left Guatemala, the locals have made six more. Students from Strathclyde University are also trying to bring knowledge of the machine to Malawi.

"I've produced a construction manual for the machine that is freely available to download on [Maya Pedal's website](#) so that anyone can have a go at making it" says Leary. "If more people have access to the bicycle technology that they produce, then more people will be able to work their way out of poverty."

Jon's project was funded by the [University of Sheffield](#)'s Department of Mechanical Engineering and [Engineers Without Borders](#).