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## TRIZ Challenge - July 2002

Editor | On 10, Jul 2002

By: Ian Care

We challenge you to use your TRIZ skills and your knowledge to help solve a humanitarian or social problem. We hope that you will submit your results for publication in the TRIZ journal. Every few months we will set a new challenge – but that does not mean that you cannot continue to work on previous challenges, indeed you may have chosen to work on this for your project or coursework.

Send your results, ideas, comments and suggestions for future challenges to [challenge@triz-journal.com](mailto:challenge@triz-journal.com)

This month's challenge is an engineering challenge with a humanitarian aspect. How can you make a pump to draw water from a well or river in a developing country (such as Uganda) for next to no cost using local materials?

By solving the access to water problem, people are not forced to drink dirty polluted water and because they can draw water for irrigation there is food to feed the family (and maybe some extra to sell). Gasoline powered pumps are out of the financial reach of subsistence farmers, never mind the continued cost of the fuel to run them. Electric pumps are cheaper but again if power is available the farmer cannot afford it. Then there would be the need to keep it secure. In places like Kenya, the water table lies below the reach of simple pumps being around 20 feet below the surface.

The challenge is to design a pump that can be built from materials obtained in the developing world that can pump up to 60 feet head of water and can be easily operated by either: available resource such as wind; 50 Kg (110lb) human possibly wearing a long skirt; a domestic animal. It should be capable of a flow rate of around 0.42 litres (US quarts) per second to irrigate an acre a day. The pump needs to be easily transportable, so if bought in the local market can be transported home by a mini-bus or jeep containing over 30 people.

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There are hundreds of designs from years ago, but none that can be made cheaply and are easily transportable. Recently the UK charity Actionaid, the US charity Approtec and Stanford University are all looking at this problem and have come up with suggested solutions – all of which have features that could be improved. Look at their web sites and see how they have used old raincoats, bits of PVC tubes, knotted ropes to make cheap prototypes.

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