An Example of a Soft Technology Machine

Girish Tractor
(Operator propelled but no drudgery)

The new vision in ecology of technology provides a lot of scope for creative design and development of technology which generates less entropy, which is designed for human energy and has less of an impact on nature. Let’s call it ‘soft technology!’

Here is an example of such soft technology machine, Girish Tractor, which is self propelled which means farmer can plough alone with no heavy physical efforts (drudgery) on his part.

Ploughing requires one of the largest hauling forces in agricultural operations, considered much beyond the human capacity. Hence, animal or fuel power is used for the same.

Girish Tractor is designed and developed to find solution to these problems in the following way:

Advantages

“Girish Tractor” proves to be very useful to small land holders or in hilly terrain for the following reasons:
- Low initial cost due to simple and light-weight construction,
- Easy manoeuverability due to small size, reaching corners and boundaries; increased width eliminates possibility of overturning.
- Little maintenance and long-life.
**Principle of operation**

Girish tractor converts vertical acting operator’s self-weight force into a horizontal acting hauling force large enough for ploughing.

Operator stands on the rungs and his own weight forces the wheels to rotational motion. Traction is achieved since the rung at the lowest position bites into the soil. Maximum force, almost equal to weight of the operator, is exerted when the operator stands on the rung in the horizontal plane. When transferred to the ploughing tool through a trailing frame, this force is sufficient for hauling operations like ploughing. Operator’s effort is like climbing a ladder, an action most natural, and strains no particular muscle.

**Operational stages**

1. Trailer wheel is lifted from the ground and locked to a height such that desired ploughing depth is reached. (Ploughing depth depends on the soil condition and self-weight of the operator). Operator stands on the other side and tugs/pulls a rung as shown. The tine plunges into soil as the tractor rolls until the normal hand pull is unable to move the tractor further.
2. One foot is then pushed against the appropriate rung. Further movement of the tractor depends on the foot pressure, soil, and the depth of the tine.
3. If no movement occurs, the operator climbs up the next rung. Tractor rolls onto him and he climbs on the next descending rung. Tractor continues to move backwards from the operator’s viewpoint.
4. In case the tractor is stuck due to heavy load, operator leans backward so that much of the body weight is taken away from the axle and helps overcome the heavy load. If this happens more frequently lowering the trailer wheel will reduce the tine depth, decreasing the drag.

With little bit of practice, all the four stages of operation are performed in a smooth natural sequence.

Since the tine is constantly visible to the operator, root-clogs, large stones or clod, hollows and porous soil can be managed
intelligently.

Various other implements like spades and ploughs can also be used.

For idle movement or reversing, the tool is lifted above the ground level and trailer wheel lowered for rolling support.

6 meter per minute ploughing is possible for a normal operator weighing 60 kg and expending 60 watts of power.

Safety

Though ergonomically designed, it is recommended that one uses proper shoes, hand gloves and leg pads. Canopy for shelter is also possible.
It is important to note here that there is no mass scale production unit of this tractor. The objective is to provide a demonstration of soft technology which is easily replicable anywhere according to the local needs. Centralized production and distribution involves losses in energy and cost, which is avoided in the spread of soft technology.

There can be many more such examples which cater to self reliant, environment friendly alternative lifestyle. It is for the readers and users to keep the sensitivity alive for healthy, happy and self reliant life style which is less expensive, less exploitative and egalitarian.

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