

## WATER LIFTING TECHNOLOGY — HYDRAULIC RAM (HYDRAM)

LEDeG has been implementing sustainable decentralised water supply systems since 1994 and has introduced the water lifting technology of the Hydraulic Ram (Hydram) which is a feasible solution for the geographic and economic conditions of the farmers in Ladakh. These simple constructed pumps lift water to areas not covered by gravity-fed channels. The Hydram use part of the water flow to generate the energy and lift water to a greater height. The Hydram does not require any conventional energy such as electricity or fossil fuel. The machine is robust, remarkably efficient and requires minimum maintenance.

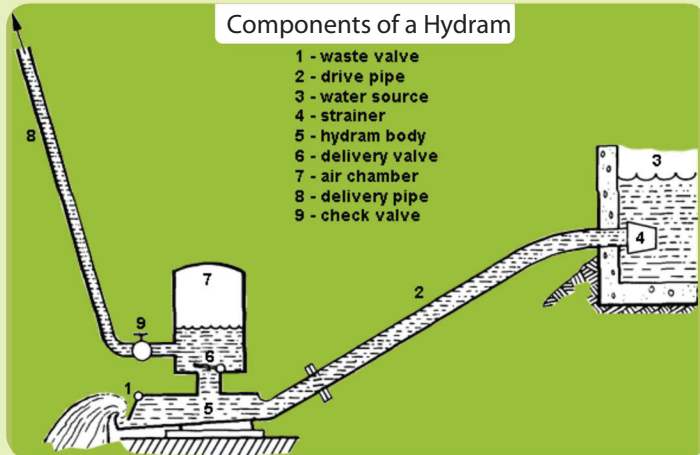
80% of the farmers in Ladakh depend on glacier fed water for irrigation but the peak times for water availability do not coincide with farmers' needs and cropping season. The glaciers are receding rapidly, snow melts away quickly and winters are getting shorter and warmer. One of the main focus areas of LEDeG is to keep traditional knowledge alive and to provide simple technologies such as the hydraulic ram pump to sustain cooperative farming in the region. Compared with other water lifting or pumping systems, the Hydram is the most appropriate technology to be used in mountainous areas where hydraulic resources are available.

### Benefits:

- Increasing water supply for irrigation and additional crops
- Increase in productivity through shifting to cash crops and plantations
- Less dependence on fossil fuels/ conventional fuels
- Horticulture, tree plantation, and varied cropping pattern as a profitable investment
- Increased number of livestock due to fodder availability
- Change in livelihood
- Mitigation measure for climate change

### Components of a Hydram

- 1 - waste valve
- 2 - drive pipe
- 3 - water source
- 4 - strainer
- 5 - hydram body
- 6 - delivery valve
- 7 - air chamber
- 8 - delivery pipe
- 9 - check valve



## ABOUT LED EG

Founded in 1981, and registered in 1983 as an NGO under the Societies Registration Act of India, LEDeG is an indigenous Ladakhi organisation with the vision of a sustainable future for Ladakh built on its culture and environment. To achieve this, the mission is to demonstrate ecologically sound development models and to advocate regionally appropriate development policies.

### Programmatic approach:

- **Renewable Energy**(Passive solar housing, improved water mills, micro hydro power, hydrams, solar power)
- **Rural Livelihoods** (handicrafts, wool processing, food processing, watershed development, agriculture)
- **Urban Initiative** (Information, education and communication on solid waste, pollution, groundwater, environmental education, etc.)
- **Research and Advocacy**(Impact on climate change on human lives, sustainable use and management of groundwater)

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## Water Lifting Technology Hydraulic Ram (Hydram)



Ladakh Ecological Development Group  
(LEDeG)



in collaboration with



Consortium for  
DEWATS  
Dissemination  
Society



BORDA

## CASE STUDY | Rukruk VILLAGE

In Rukruk, a 40 household village in Zangskar of Kargil District Hydrams has installed two Hydrams. The first installation was in 2008 with community involvement and funding support by BORDA (4" x 2" model). The pump provides an alternative water supply for four households, mainly for tree plantations, fodder and horticulture crops. In July 2010, a second Hydrant (size 4' x 2') has been installed. The capacity of the installed hydrant is 1 litre per second, the length of the newly constructed water canal is 400 meters, the size of the fore bay tank is 3'.6" x 3', length of penstock pipe 18 meters, size 4" , the size of the foundation is 2'.6"x 2'.6" and the length of the delivery pipe is approx. 240 meters.

The four families are in charge of the overall management, operation and maintenance of the installed hydraulic ram pump. The operator of the Hydrant has undergone on-site practical training provided by the technical team of LEDeG for the sustainability of the water device.

### Installation Cost Hydrant 2008 (Example)

Hydrant machine	Rs. 35,537
Drive pipe	Rs. 13,500
Delivery pipe	Rs. 43,200
Civil works	Rs. 5,000
Storage tank	Rs. 5,000
Transportation	Rs. 8,500
Installation	Rs. 2,880
<b>Total</b>	<b>Rs. 113,617</b>

### Information on the village

- Population: 40 households
- Name of the site: Ruk Ruk (Yokma)
- District: Kargil
- Hydrant installed: 4' x 2'
- Beneficiaries: 4 households
- Extent of land irrigated: 809 m<sup>2</sup>
- Months of running: May - Aug.
- No. of hours used per day: 12
- Year of Installation: 2008
- Use of Hydrant: plantation and horticulture

## CASE STUDY | BARSO VILLAGE

### Information on the village

- Population: 20 households
- Major source of income: Agriculture (Alfalfa plantation), Cattle
- Major source of water: Suru River (100 feet below the village)
- Accessibility to funds: Low
- Accessibility to major towns: Low (roads open only for 6 months)

### Impact assessment of Hydrant

	Before	After	Change
Land irrigated	5 Kanals (0.625 acres)	20 Kanals (2.5 acres)	+ 34%
Crops grown	Foodgrains (wheat, jowar)	Foodgrains + fodder + cash crops (brafchang, kikar)	N.A.
Livestock held			
Sheep & Goats	6	10	+67%
Zhomo	1	2	+ 100%
Cow	6	7	+ 17%



*Regular follow ups and post installation service is handled by experienced field staff*

## THE LEDeG WAY

LEDeG installed 66 Hydrants in Ladakh between 1994 and 2008 (58 were supported by BORDA / Bremen Overseas Research and Development Agency and 8 by DCA / Dan Church Aid) for irrigation and domestic use. The three models of Hydrants installed are: 3"x 1.5"; 4" x 2"; 6" x 3".



*Hydrants can be owned by individual households or communities*

- 16 years of experience in hydro related projects in and around Ladakh
- Experienced field staff handling the installation and training of communities/ owners/ operators
- Hydrants funded by LEDeG and the community (Community contribution is on average 50%)
- Regular follow ups and post installation service (With community contribution)