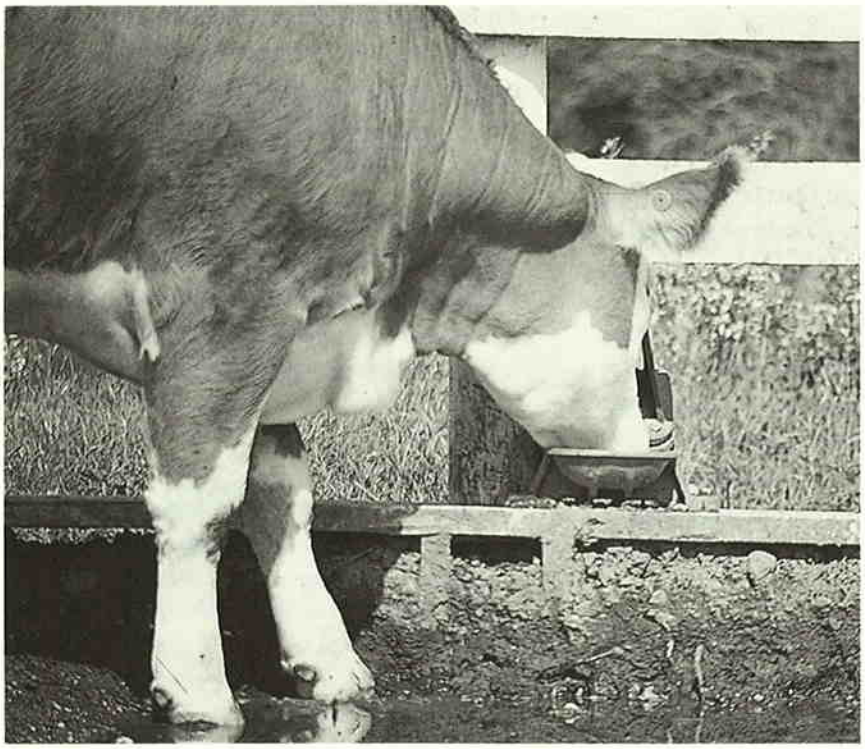
Sustainable Agriculture Facts
Growing for tomorrow
Technical Information for Conservation Farmers



Pasture Pumping Systems

Traditionally, livestock have had direct access to water, whether a stream, slough or man-made dugout. But more and more, producers are fencing livestock away from the water and pumping it to the animals. Although there is a capital expenditure involved and some annual operating and maintenance costs, most producers are finding that the long-term economic and environmental benefits outweigh the costs.

Many types of pumps can be used for livestock watering. Become familiar with the various systems by talking to producers who already have systems, and to dealers and government agriculture staff.

A Pumping Primer

Animal operated nose pumps

With these devices, cattle pump water for themselves by pushing a pendulum with their noses. Nose pumps are the lowest-cost pumping systems available for pasture stock watering. They work well with nearby surface water sources but have somewhat limited use with wells.

Cost: $350 to $450 per pump

Capability: 25 to 30 head, depending on the manufacturer. Install one more pump than the herd size would indicate. For example, for 90 cattle, install four pumps.

Advantages:

- very portable
- inexpensive
- requires no water storage structure, can draw directly from water sources
- requires no power source. Pumping is mechanical, by the animal itself

continued on page 2

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Install solar systems in an area with a clear view of the sun all day, if possible. Shadows from fence posts, trees and other obstructions reduce solar power production drastically.

Limitations:
- can only lift water vertically about 20 feet
- appropriate fencing is required to ensure cattle approach the pump from the front
- producer may spend several days "coaching" the animals to use the pump
- pasture should be close to water to allow less-aggressive animals more frequent access to the pumps

Solar pumping systems

Solar energy is collected by solar panels and converted to electrical energy. This energy may be used to power DC pumps directly, or stored in rechargeable batteries to serve the pumps as required.

A range of options are available. Water may be pumped from a well or surface source into a temporary storage facility, such as a tank or an elevated surface impoundment, then gravity-fed to the stock tank. Pumps may be controlled by floats in the stock tank to provide water when levels drop below a pre-determined point.

Water may be pumped from deep wells or across distances, so the major limiting factor is power. More power is produced by using larger or additional solar panels and batteries. Therefore, the cost of the system is directly related to the amount of hardware needed to produce the power required.

Solid set solar systems

Stationary solar panels recharge batteries that provide power to the pumps.

Cost: $2,000 to $6,000 for an entire system. Prices vary according to size of the system, amount of water required and distance it must be pumped.

A system capable of providing 1,800 gallons per day (120 cow/calf) from a nearby surface water source could cost as little as $2,000 to $2,500. Pumping the same amount of water from a deep well or from a distance could cost up to twice as much.

Capability: The system can be built according to specific needs. One 43-watt solar panel will generally handle 40 cow/calf pairs under normal circumstances and two 43s will service 90 pairs. Solar panels are available in a variety of capacities.

Advantages:
- low maintenance
- does not need an external energy source
- may be designed to suit individual needs
- can draw from deep wells or distant surface water sources

Limitations:
- relies on the sun
- at least two days water supply should be available in case of poor sun conditions and battery run-down

Keeping livestock out of the water has many benefits:

- ***Fewer livestock will drown and get stuck in the mud.***
- ***Water quality is improved, which can result in increased weight gain or milk production from the herd.***
- ***Shorelines and banks are preserved. In the case of dugouts, bank slumping is reduced, removing the need for dredging every three to five years.***
- ***Foot rot, mastitis and other diseases can be more easily controlled.***
- ***Nitrates in the water from animal waste are dramatically reduced. Algal blooms and the possibility of poisoning due to blue-green algae are decreased. Water treatment downstream is less complicated.***
- ***Fish spawning grounds and eggs are protected.***

Tracker solar systems

With tracker systems, the second type of solar system, the panels follow the sun during the day to maximize solar energy capture. These systems generally pump directly into the stock tank or a temporary storage facility.

Advantages:
- maximizes the use of solar energy

Limitations:
- because of possible variations in sunlight, there should be at least a three day supply of water available at all times
- moving parts can accumulate dirt and grit and eventually bog down
- the swivel unit is more susceptible to buffeting from the wind than a stationary unit
- more expensive than fixed panel system

Windmills

Large windmills

The traditional prairie windmill still works well but is expensive to build. A 30 to 40 foot tower operating a cylinder pump can pump water from all types of wells and can be converted to pump from surface water sources. These large windmills are best suited to pumping into a storage facility which in turn feeds a float-controlled stock tank.

Cost: at least $5,000

Capability: Generally speaking, capability is limited only by the size of the storage facility. Large windmills are capable of providing water for 75 to 100 head of cattle.

Advantage:
- can pump a lot of water from a great depth or distance

Limitations:
- relies on the wind - a large storage facility will help overcome this problem
- expensive

Small windmills

Smaller, less expensive windmills - nine to 12 feet high - are also available to draw water from surface sources such as dugouts, or from shallow wells. The mechanism uses compressed air for pumping. The wind vane shaft activates a diaphragm, which pumps air. These windmills may also be used to aerate dugouts.

Cost: $1,000 to $1,500

Capability: 50 cow/calf pairs with a 2,250 gallon tank

Advantages:
- inexpensive
- may be used to aerate water source

Limitations:
- should have an auxiliary system to take over during periods of low wind
- should have a minimum of three days storage of water
- limited vertical lift
- relatively low capacity

Small windmills should be placed high on dugout banks, away from trees and other obstructions that might shelter the wind.

Gas-powered water systems

Gasoline pumps can be used to pump water into dugouts, storage tanks and other facilities as required.

Cost: as little as $1,200

Capability: high capacity depending on size of pump

Advantage:
- inexpensive, high capacity, portable

Limitation:
- you must be there to run it

It's a Fact

Yearling steers or heifers require about eight to 10 gallons of water per day; cow-calf pairs need 12 to 15 gallons per day.

The Slingpump

The slingpump floats and can be anchored in a creek or river where it is powered by the current. Since it runs continuously, it may be best suited to filling off-channel storage facilities.

Cost: $800 to $1,200

Capability: can pump from 800 to 4,000 gallons per day depending on size

Advantages:

- does not require an external power source
- portable, easy to install

Disadvantages:

- requires moving water at least 12 to 16 inches deep

Recommendations for choosing pumps

When developing groundwater sources, always run a pumping test to determine the capacity of the water source before deciding on the size and type of pump.

For dugouts, determine the depth of water and overall storage capacity. If sediments on the bottom are more than one foot deep, remove them and haul them away where they will not be washed back into the dugout.

On creeks and rivers, determine the minimum summer water depths before designing the water system. A small dam may be required to hold water during low-water periods and allow for efficient pump operation.

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