

# CPWF POLICY BRIEF

## Managing Water Through Livestock in the Nile Basin

This CPWF project 'Increasing Water-Use Efficiency for Food Production through Better Livestock Management - The Nile River Basin', collaborated with the Agricultural Research Corporation (Sudan), Animal Resources Research Corporation (Sudan), Department of Animal Science (Makerere University, Uganda), Ethiopian Institute for Agricultural Research, the International Water Management Research Institute (IWMI) and the International Livestock Research Institute (ILRI).

### A RESEARCH OUTCOME YOU CAN USE

Livestock use and degrade much water in the Nile River Basin. New research suggests that integrated development and management of water and livestock resources will conserve water and increase the profitability and environmental sustainability of investments by governments, development agencies, and farmers.

Practical opportunities exist to enhance food security, reduce poverty, and foster benefit sharing. Institutions responsible for water resources may benefit from partnering with the livestock sector when developing water resources.

### BACKGROUND

The Nile River Basin is home to 150 million cattle, sheep, and goats, and many poultry, swine and equines. Animals outnumber humans and consume more food by weight than people. About 90% of the Nile Basin supports livestock production. Animals provide meat, milk, eggs, hides, manure, and traction power. In the absence of a financial sector, livestock also serve as a means to accumulate wealth and to insure against risks.

Like people, livestock require clean drinking water. However the amount of water used in producing animal feed is 50 times greater than what they drink. The total volume of water used to produce animal feed exceeds that required for production of human food.

As with crops, poorly adapted, malnourished, and diseased animals have low levels of production. Quality of animal products such as meat and milk constrain marketing opportunities. Disease and stress lead to high levels of mortality and morbidity. All these factors undermine the productivity of water used to sustain livestock.

Livestock also 'use' water indirectly by de-grading land and water resources. Inappropriately managed livestock overgraze pastures especially near fresh water sources causing excessive evaporation, run-off, soil loss, and siltation of lakes, rivers, reservoirs, and ponds. Uncontrolled drinking leads to animals physically entering water bodies that are also important for irrigation and domestic use.

Contamination of water with sediments and disease-causing organisms threatens both human and animal health. Trampling and grazing aggravate loss of water quality and destroy riparian and aquatic biodiversity and ecosystem services. Overcoming these constraints is a practical strategy for improving benefits derived from agricultural water in the Nile Basin.

New research on livestock and water in the Nile region shows that

deliberate integration of livestock and agricultural water development activities can potentially enhance the social and economic returns on investments, as well as their environmental sustainability. This is true basin-wide, in irrigated and rainfed farming systems and on pastoral and agro-pastoral lands.

### OPPORTUNITIES FOR CHANGE

The key to making better use of water where livestock are important is maximizing their benefits and minimizing water loss through evaporation, excessive runoff and flooding, and contamination. Four livestock management strategies or opportunities can help improve water management:

#### 1. Better management of animal feed production

In irrigated and rainfed crop production, growing crops that simultaneously produce grains for people and crop residues and by-products for feeding livestock is often more profitable than producing food products or forages alone. These dual purpose 'food-feed' crops potentially realize greater benefits from water than single purpose crops. Inclusion of forages in crop rotation may further increase profitability.

For example, sale of animal products makes up 35% of farmers' income in Sudan's Gezira irrigation scheme. In dry and sloping lands, grazing may be the best agricultural option for utilizing rain water especially where cultivated fields are vulnerable to erosion and run-off. Here, the opportunity costs for water use are low.

#### 2. Adoption of state-of-the art animal sciences (genetics, nutrition, husbandry, and veterinary care) to enhance animal production and reduce mortality and morbidity

Where poor quality crop residues are used for feed, this includes providing small amounts high quality feed supplements. Very low animal productivity aggravated by high levels of mortality and morbidity means that any water used by livestock results in very little gains for herders and farmers.

Integrating livestock and water management can help overcome these constraints. Productive animal use of water can also be enhanced by encouraging value added production by farmers. For example, integrated water resources development might encourage production of butter from milk and developing market opportunities for livestock keepers.



### **3. Applying grazing and watering practices that help conserve water resources**

Although overgrazing is a major cause of land and water degradation, moderately grazed pasture is one of the best options for controlling runoff and encouraging infiltration and ground water recharge. Limiting grazing pressure to ensure that vegetation covers at least 50% of the ground area is usually sufficient to control runoff and erosion.

The most severe overgrazing often occurs in proximity to drinking water sites. Loss of upslope pasture and trekking to water leads to destruction of riparian and aquatic habitats and siltation and lower water quality of reservoirs. In irrigation systems, animals frequently damage canals and degrade water in their efforts to access drinking water. Installation of drinking water troughs and exclusion of animals from open water bodies will facilitate more productive use of water in watersheds and protect irrigation infrastructure.

### **4. Establishing drinking water sites**

Within the Nile Basin, especially Sudan, vast areas of underutilized grazing land receive a large fraction of the basin rainfall. Lack of drinking water limits animal access. Thus, the fourth opportunity is establishing drinking water sites to enable animal production where there are no other agricultural alternatives. However, animal numbers and grazing pressure must be limited to avoid consequent land and water degradation.

At the basin level and national levels, livestock and water managers may need to address macro-level issues. For example, establishment of new irrigation systems has often marginalized and displaced herders leading to loss of livelihoods, increased vulnerability reduced capacity to effectively utilize adjacent grazing lands.

Irrigation designs that include production of alternative feeds, migration corridors, corals, and access to drinking water can mitigate this problem. Within basins, some lands are more suitable for crops and others for livestock production. Allocating lands according to best use of natural resources including water can help make most effective use of available water and enhance benefit sharing in the basin.

The foregoing examples of proven intervention options require integrated and coherent implementation by water, crop, livestock, and environmental institutions on a location by location basis. Some need to be implemented by basin and national level authorities while others are the domain of communities and households. Jointly, they hold promise of enhancing the success of agricultural water investments in the Nile Basin.

## **RECOMMENDATION**

Basin and national institutions responsible for investing in and developing water resources in the Nile region may benefit from the systematic integration of improved livestock production practices, within newly developed and rehabilitated infrastructure, and land-use planning that considers water resources.

## **FOR MORE INFORMATION**

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