


Improved water management for sugarcane production


Godavari Basin, India

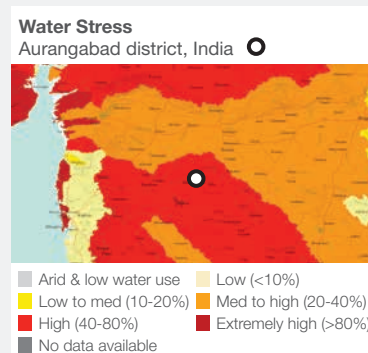
water scarcity impact

Reduced withdrawal	●
Reduced consumption	
Improved water quality	●
Increased productivity	●
Net basin benefit	●

volumetric impact
22 080 000 m³/yr



programme cost
\$744 000 

estimated unit cost of water
<5 ¢/m³ 



Water Stress Map:
Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2013. "Aqueduct Global Maps 2.0."

Confidence level
 Low
  Medium
  High

Water Scarcity Impact Key
 Main
  Minor

Credits
We wish to acknowledge Mr Murlidhar of WWF India for his assistance in the compilation of this case study.

Project Overview

India is the world's largest sugar consumer and the second largest producer. The livelihoods of almost 35 million people are dependent on sugarcane production and it is grown on over 4.1 million hectares within the country. However, productivity is highly variable from 40 tonnes per hectare (t/ha) to 269t/ha. In the Aurangabad district 40% of the population is involved in cultivating sugar cane with yields at around 100t/ha. Sugar cane farmers in the region have little incentive to save water; there is no charge for water use, no fixed allocation and electricity for pumping is of minimal cost. As a result whilst the annual irrigation requirement is around 1 600mm the average application of water is up to 4 000mm. The project area covers Karanjkheda, Phulambri and Gangapur and is intercepted by two seasonal tributaries of the Godavari river. Borehole, river abstraction and small check dams are the major sources of irrigation water which is distributed by approximately 20km of canals. High evaporation rates and geological features (the Deccan Traps) make water storage difficult.

The intervention focused on introducing improved water management practices to reduce water use in parallel with improved crop practices to increase crop yield. The programme started with forty farmers and grew to over 1 000 farmers (direct project interventions). Based on an independent evaluation it is estimated that the intervention resulted in reduced water usage of up to 22 080 000m³/yr over an area of 8 000ha and an increase in crop yield of up to 20%.

Key Elements

- Replacement of serpentine irrigation with furrow irrigation.
- Irrigation scheduling dependent upon estimated soil moisture content and crop demand.
- Improvements in soil nutrient management.
- Application of mulching to conserve soil moisture content.
- Incentives agreed with sugar cane buyers to pay increased prices for better quality sugar cane.

Key Outcomes

- 15% to 20% increase in sugarcane yield.
- Potential of 174 900 000m³/yr reduction in water abstraction for irrigation over the 3000 farms in the area.
- 30% increase in gross profit margin of farmers.



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Intervention Features

- Irrigation scheduling
- Furrow irrigation
- Mulching

Project Levers

The traditional approach of the sugar cane farmers is to irrigate using serpentine (flood) irrigation with continuous pumping whenever electricity is available regardless of crop water demand; this results in excessive water abstraction, water logging of fields, leaching of nutrients, evaporation losses, high salinity and poor water quality as a result of high nitrogen return flows.

(1) Furrow irrigation:

In order to reduce irrigation water demand the scheme encouraged the implementation of improved irrigation methods; in the vast majority of cases this involved moving to furrow irrigation. Technical support was provided to farmers in the re-profiling of fields, establishment of furrows and installation of balancing tanks.

(2) Irrigation scheduling:

Scheduling of irrigation was determined using a crop water demand model that took account of precipitation and crop requirements. Farmers were advised by SMS text messages as to when and for how long they should irrigate. Advice was provided approximately once a month and resulted in a significantly reduced water demand.

(3) Guidance and training:

Recommendations for improved water management were accompanied with recommendations for improved crop and field management methods. This included advice on transplanting of seedlings, crop spacing, mulching to maintain soil moisture content, nutrient management and intercropping. These recommendations helped farmers significantly increase their crop yield.

(4) Limiting market prices to crop quality:

The project was not only of benefit to farmers but also to the sugar cane mills who received a better product with higher sucrose content from those farms that were part of the scheme. This presented opportunity for uptake and upscaling; the mills would pay an increased price for a better quality product and their staff were trained in the improved techniques in order to maintain ongoing application of best practice after completion of the programme.

Outcomes and Challenges

The adoption of improved water management and crop management practices resulted in significant gains in yield and reductions in water use. In turn run-off from fields was also reduced which reduced downstream pollution and loss of nutrients from the fields.

- Sugarcane yield of the farmers adopting the recommended practices increased from an average of 62.5t/ha to 87t/ha.
- Average total water use was reduced from 318 000 000m³/yr to 143 100 000m³/yr.
- 35% reduction in the use of chemical fertilisers
- Profit to farmers have increased almost 48% to RS11 000/ha.



Above: Maintaining soil moisture content through mulching (© WWF India); Straight furrow irrigation with siphon tubes (© WWF India)