Application of the Vetiver System in Off-Site Pollution Control

(Presentation at the Second International Vetiver Conference, Thailand, Jan 2000)

Trapping Agrochemicals and Nutrients from Sugarcane and Cotton crops

Dr. Paul Truong,Frank Mason,David Waters and Phil Moody

Queensland Department of Natural Resources, BrisbaneAustralia

Severe erosion in productive sugarcane land causes significant economic loss and pollution to the environment.

Offsite impact of soil erosion. Eroded material has high nutrient content

On coastal lowland, acid sulphate soil is highly erodible and toxic to plant growth. Stabilisation is slow and difficult.

Typical erosion on the bank of a drain on acid sulphate soil in north Queensland, Australia

Vetiver was planted to stop further erosion

One year after planting

High nutrient in runoff water leads to increased weed growth

Short grass strip buffer is often not adequate to contain runoff from crops with high agrochemicals and nutrients use like sugarcane

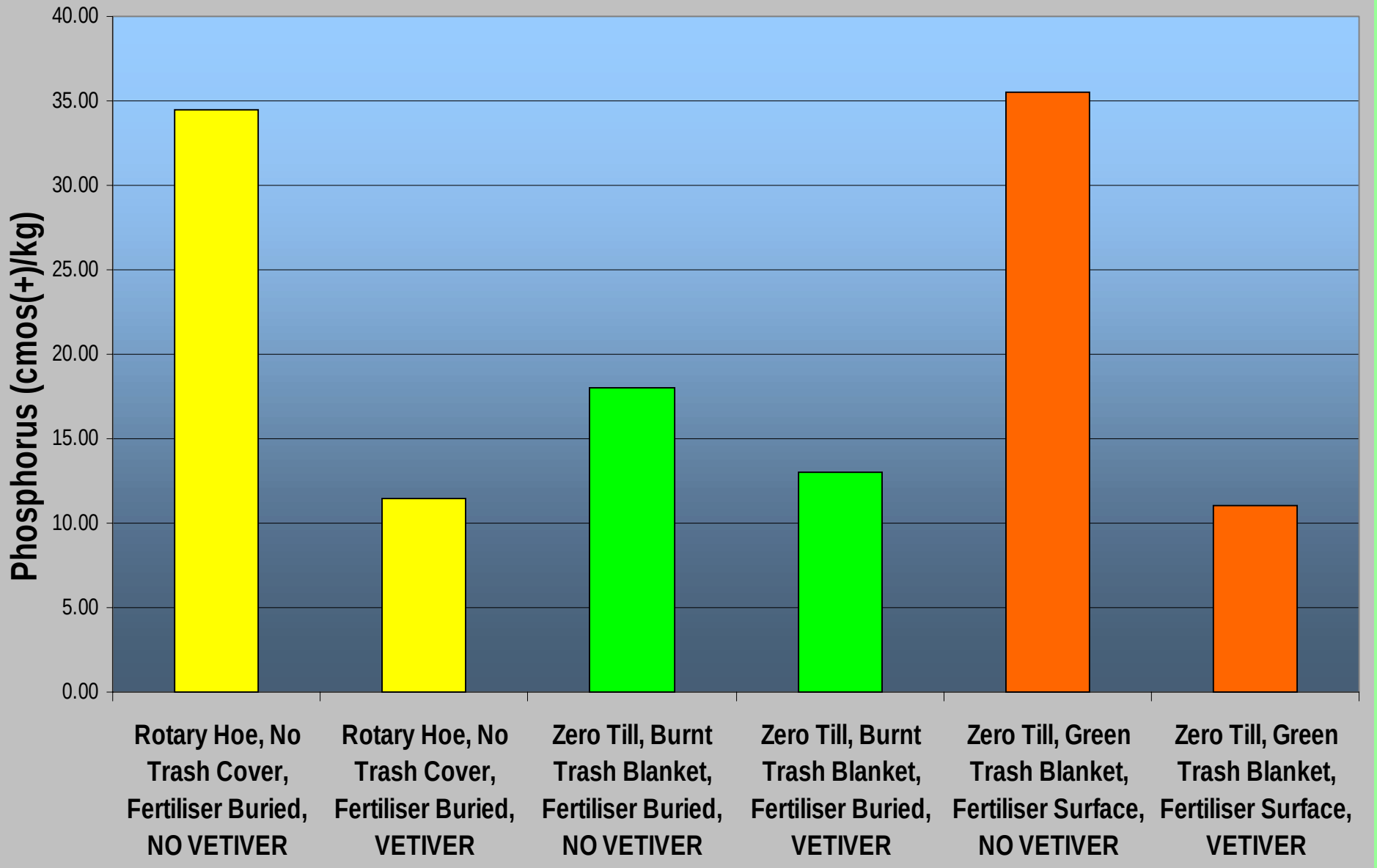
Fish kills are highly emotive issue. This is due to both low oxygen and high concentration of agrochemicals in water

Research conducted to determine soil loss, agrochemicals and nutrients movement in a sugar cane sub catchment.

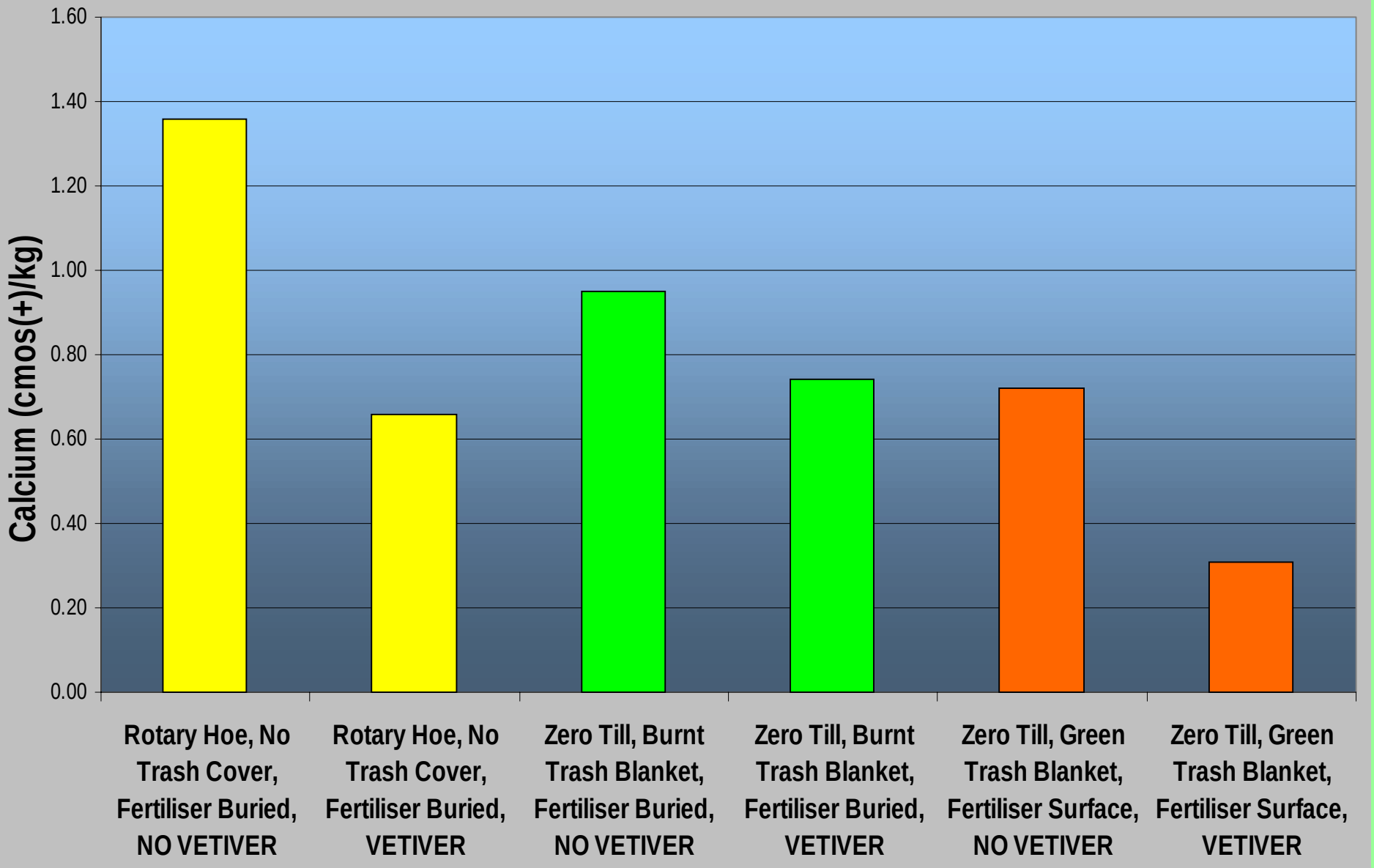
Trial being set up to determine the efficiency of vetiver hedges in trapping nutrients and agrochemicals in a sugarcane field

Trial being set up to determine the efficiency of vetiver hedges in trapping nutrients and agrochemicals under different management systems

Phosphorus Concentration in Sediment



Calcium Concentration in Sediment



Vetiver hedges are very effective in trapping coarse sediment

Trapping more than 0.3m of silt in one season

Vetiver was planted in a waterway on a sugarcane farm to trap eroded sediment

Eight months after planting

Large silt fan trapped by this hedge

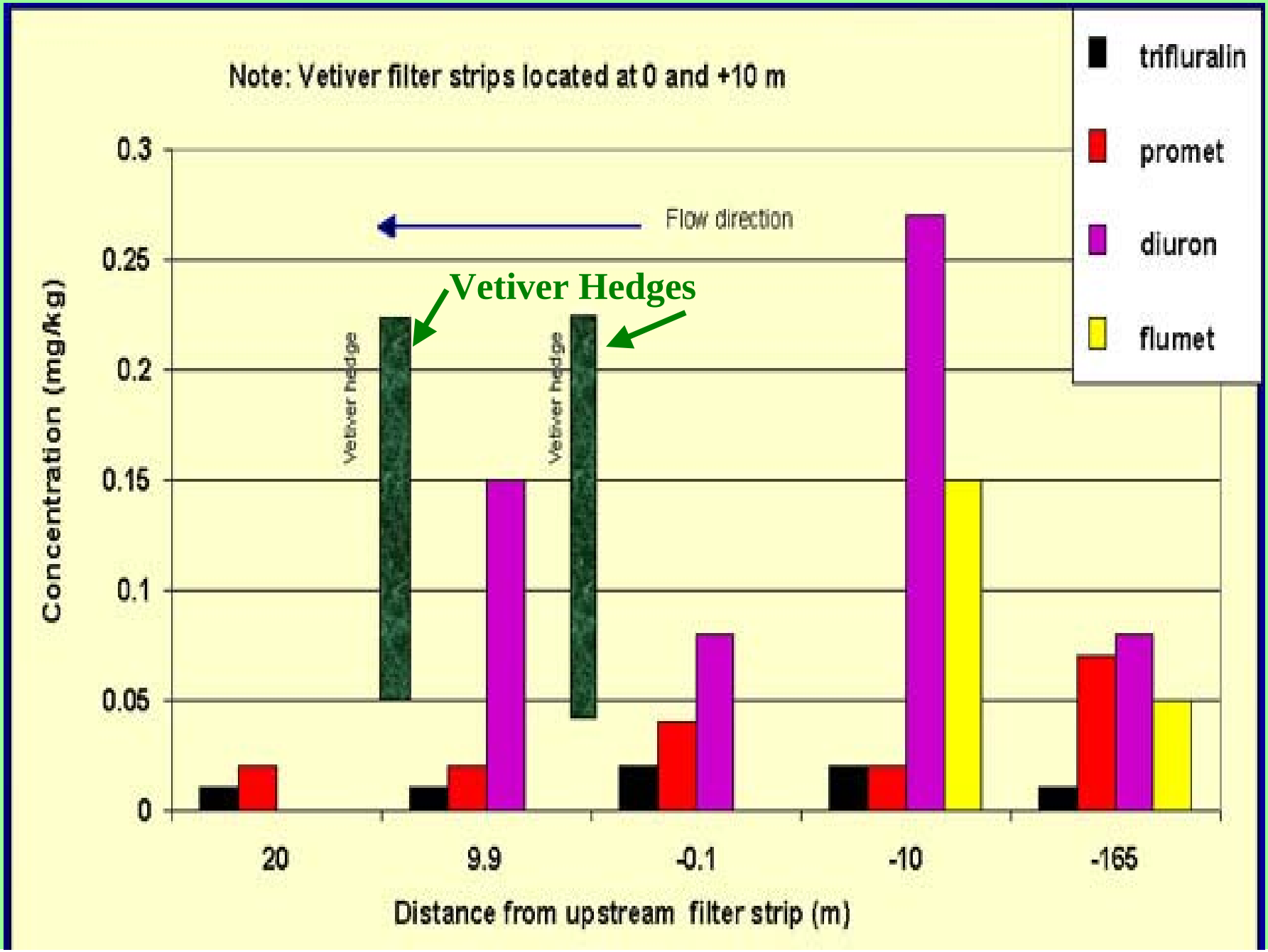
Newly planted vetiver hedges on a sugarcane farm in North Queensland to replace contour banks (terraces)

Two years later, contour banks replacement of on steep cane farm in Australia

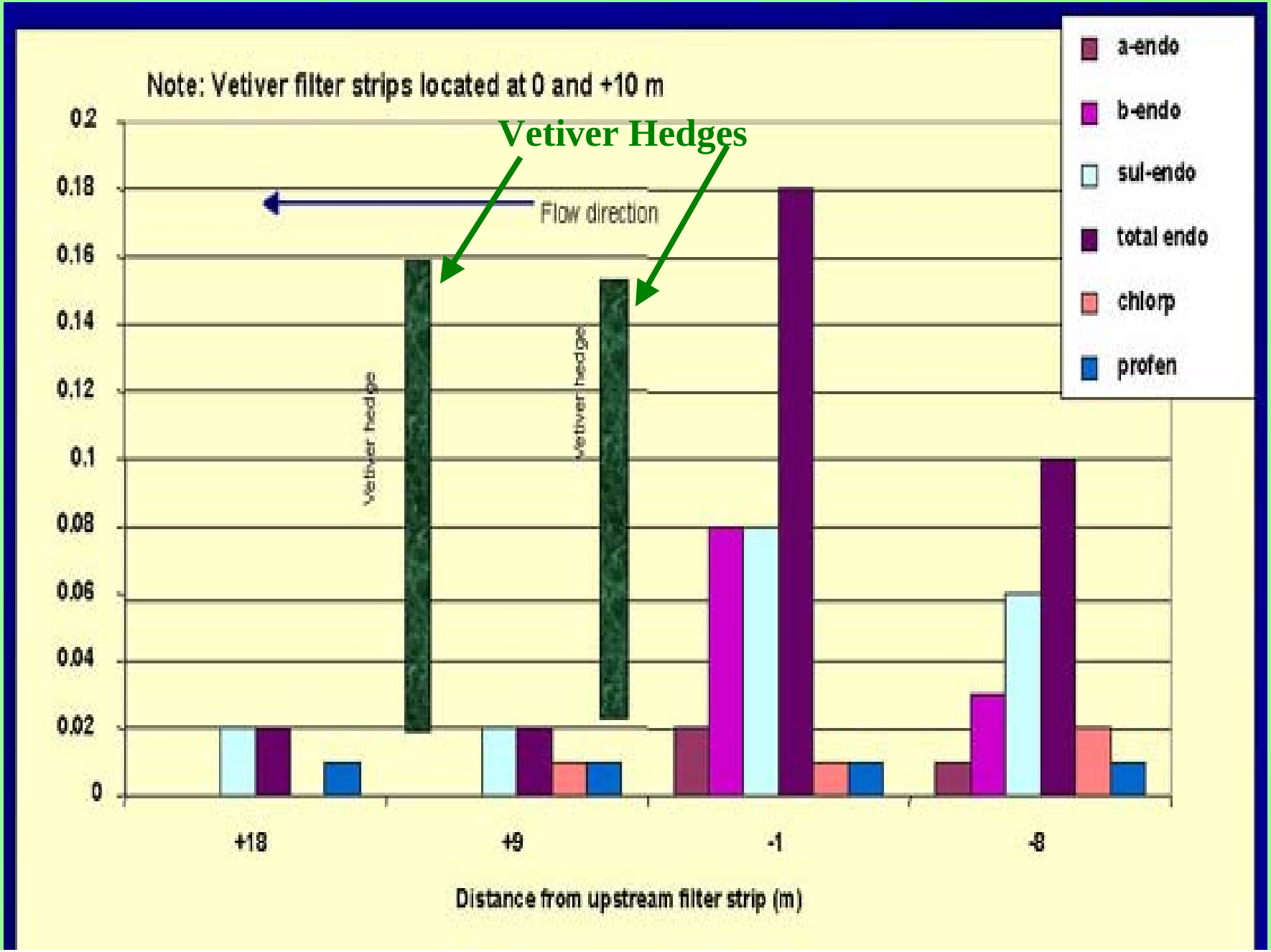
Planting on drainage channel to trap eroded material on a cotton farm

Three months after planting

Trapping herbicides



Trapping pesticides



RESULTS

- Vetiver has the ability to trap particulate-bound nutrients such as P (67%)and Ca (51%).
- Vetiver has limited effect on soluble nutrients such as N and K
- Vetiver has also the ability to trap herbicides and pesticides which are attached to sediment in runoff water (in cotton, 86 % of Endosulfan and 67% of Chlorpyrifos.