

ชื่อเรื่อง

Studies on Establishment of Vegetative Barriers and Their Effect Erosion Control and Crop Yield

ชื่อผู้วิจัย

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Abstract

Earthen embankments/dykes along with masonry structures used to reduce and conduct runoff from arable or non-arable land to avoid erosion. These barriers and structures fail to conduct runoff greater than designed capacity or fail for want of proper and timely maintenance. Experiments were initiated at RRSKA of FAU at Ballowai Saunkhri, Hoshiarpur to study i) feasibility of vegetative barriers, and ii) selection of suitable material for these barriers. Grasses viz. vetiver (*Vetiveria zizanioides*), Kanna (*Saccharum munja*), babbar (*Eulaliopsis binata*) and Napier bajra hybrid (*Pennisetum purpureum*) were planted in two 10 cm apart rows with 10 cm plant to plant distance on deep sandy loam soil with 5% slope in 1991 to erect across the slope grass barriers at 1 metre vertical interval. Runoff and soil loss was recorded after the second year of establishment of the barriers. Observations were taken on establishment and biomass production.

The survival of Napier bajra hybrid, Vetiver, Kanna and Babbar was 89.7, 44.6, 56.0 and 30.8% respectively when planted with one slip out it was increased to 98.0, 95.3, 96.6 and 83.0% when planted with four slips. Napier produced maximum biomass and significantly more biomass than all other grasses in the first two years. But by the fourth year the order of biomass production was kanna>vetiver> babbar>napier. Biomass yield was in the order : Napier-bajra hybrid (12 t/ha)>Kanna (6.0 t/ha)> Vetiver (2.5 t/ha)>Babbar (1.8 t/ha) respectively in the first year. But the trend in biomass yield in third year was Kanna (12.6 t/ha)>Napier (5.7 t/ha)>Vetiver (2.9 t/ha)>Babbar (1.9 t/ha). The Napier bajra hybrid yielded minimum (1.7 t/ha) in the fourth year. For the first two years after establishment Napier had the maximum girth but in later years the clump girth of grasses was in the order : Kanna>Napier>Babbar>

Vetiver. The vegetative barriers being more porous, flexible and of deep root system protected fields more effectively during high runoff events where mechanical methods failed. Maize and wheat grain yield was significantly more where vegetative barriers were used than control.

The results showed that vegetative barriers reduced runoff and sediment loss in the order of Kanna>Napier bajra hybrid=Vetiver=Babar>Without barrier. The terraces between barriers were gradually leveled and at end of three years the decrease in terrace slope was 27 to 33% with vegetative barriers as compared with control (17%). Plots with vegetative barriers had 2 to 4 cm/ 180 cm more profile water than control after each runoff event. Maize and wheat grain yields were significantly more in plots with grass barriers than control.

Table. Grain yield (q/ha) of maize and wheat from fields with vegetative erosion control barriers (4 yrs.old)

Treatment	Biomass of	Grain yield			
	Barriers kg/ 10 m 1993-94	Maize 1992	Maize 1995	Wheat 1992-93	Wheat 1995-94
Control		14.2	13.5	11.4	7.4
Vetiver	19	21.1	17.0	10.4	9.9
Babar	14	21.2	18.0	11.1	9.6
Kanna	75	22.1	17.0	10.9	10.2
Napier	37	17.4	16.0	12.2	9.6
CD at 5%		2.8	1.6	N.S.	1.6

The studies clearly show that vegetative barriers can be effectively used to reduce runoff and sediment loss, conserve soil and moisture and improve crop yield.