

# THE IMPACT OF EROSION CONTROL SYSTEM ON SOIL LOSSES IN PERIENI COUNTY

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## ABSTRACT

Buffer strips are a very important practice in preventing surface run-off and sediment entering watercourses. However, they are effective solution to reduce sediment pollution of water or the leaching of nutrients.

The paper presents the results obtained in long term studies and research carried out in Perieni, Plateau Bârlad, regarding to the structure and crop rotation on sloping land, culture systems and different measures to prevent and reduce erosion processes on sloping land: buffer strips; contour farming; strip cropping. Using the buffer strip system, in the condition of Plateau Bârlad, the soil and water losses were reduced by 3 to 4 times compared with unprotected cultivated slope.

## OBTAINED RESULTS

The obtained results are presented in Tables 1-9.

Table 1

The influence of crop structure on soil losses  
(average value for a period of 13 years), Perieni

Crop	Slope land			
	16%		24%	
	Eroded soil, to/ha	%	Eroded soil, to/ha	%
Perennial grasses in second year	0.5	1.5	1.2	1.3
Winter wheat	4.0	12.3	10.0	13.7
Peas	7.0	27.5	14.0	19.3
Maize (control)	32.5	100.0	72.3	100.0

The influence of plowing direction on erosion, after RDCSEC Perieni

Table 5

Slope land, %	Plowing on sloping land follow the contour (control)		Plowing across the slope	
	Eroded soil, to/ha	%	Eroded soil, to/ha	%
9-10	11.4	100	32.3	233.3
14-15	17.2	100	45.7	265.6
18-20	23.3	100	55.2	231.9

Table 6

The influence of sowing direction on erosion to maize crop, after RDCSEC Perieni

Sowing direction	Eroded soil	
	to/ha	%
Sowing on sloping land follow the contour (control)	48.2	100
Sowing across the slope	174.5	362

The influence of strip cropping on erosion, after RDCSEC Perieni

Table 7

Slope, %	Rain characteristics			Strip width, noxm	Crop	Eroded soil	
	mm	min	mm/min			to/ha	%
5-10	41.9	15	2.0	1x140	maize	158	100
				2x70	maize+wheat	32	20
12	18.4	20	0.82	1x160	maize	17	100
				4x40	2 maize+2 wheat	7	41
10-15	41.9	15	2.0	1x60	maize	76	100
				2x30	maize + peas	33	43
14-16	16.3	10	1.14	1x80	peas	17	100
				2x40	maize + peas	2	18
16-20	41.9	15	2.0	1x120	maize	280	100
				6x20	3 wheat+3 maize	41	15

Table 8

Structure (%) of grasses mixture used for buffer strips, after RDCSEC Perieni

Type of grasses	Zone					
	a wet		b semi-wet		a dry	
<i>Poa pratensis</i>	20					
<i>Arrhenatherum elatius</i>	20	60	15			
<i>Dactylis glomerata</i>	10		30			
<i>Bromus inermis</i>			10	40	20	
<i>Agropyrum cristatum</i>					40	50
<i>Lotus corniculatus</i>	20	40	10			
<i>Medicago sativa</i>	5		20	30	30	50
<i>Onobrychis viciifolia</i>			15	30	10	
<i>Trifolium repens</i>	25					
Total	100	100	100	100	100	100

The influence of buffer strips on erosion, after RDCSEC Perieni

Table 9

Year	Eroded soil			
	Unprotected land		Protected land with buffer strips	
	to/ha	%	to/ha	%
1960	12.8	100	6.1	48
1961	20.6	100	3.9	19
1962	31.7	100	6.7	21
1963	54.0	100	8.9	16
1964	33.3	100	6.1	18
1965	18.9	100	2.2	12
1966	20.6	100	7.8	38
1967	30.0	100	5.6	19
1968	36.1	100	17.2	48
1969	41.7	100	6.1	15
Average	26.7	100	6.7	25

The level of yields at different crops cultivated on sloping land  
(average value for a period of 13 years), Perieni

Table 2

Crop	Level of fertilisation	Moderate eroded soil	Strongly eroded soil
		Kg/ha	Kg/ha
Maize	Control (without fertilisation)	3300	1200
	N <sub>100</sub> P <sub>50</sub>	5200	3700
	N <sub>100</sub> P <sub>100</sub>	6500	3900
Grasses for hay	Control (without fertilisation)	3700	1750
	N <sub>100</sub> P <sub>50</sub>	4100	3900
	N <sub>100</sub> P <sub>100</sub>	5300	5000
Winter wheat	Control (without fertilisation)	2400	900
	N <sub>100</sub> P <sub>50</sub>	2900	2500
	N <sub>100</sub> P <sub>100</sub>	3200	2500
Sunflowers	Control (without fertilisation)	1500	100
	N <sub>100</sub> P <sub>50</sub>	1700	1250
	N <sub>100</sub> P <sub>100</sub>	1850	1370
Peas	Control (without fertilisation)	1600	700
	N <sub>100</sub> P <sub>50</sub>	1700	1050
	N <sub>100</sub> P <sub>100</sub>	1850	1100
Beans	Control (without fertilisation)	1300	900
	N <sub>100</sub> P <sub>50</sub>	1450	1200
	N <sub>100</sub> P <sub>100</sub>	1500	1200
Flax for oil	Control (without fertilisation)	800	300
	N <sub>100</sub> P <sub>50</sub>	980	700
	N <sub>100</sub> P <sub>100</sub>	1150	900

Table 3

Structure crops (%) on hilly terrain, after RDCSEC Perieni

Crop	SLOPE %			
	< 5	5 - 10	10 - 20	20 - 25
Small grains	20	20	40	35
Row crops	60	50	30	15
Annual leguminous and technical crops	15	20	20	15
Fodder crops	5	10	10	35

Table 4

Soil losses in different crop rotation on hilly terrain, with slopes over 35%, Perieni

Crop structure (%)	Soil losses to/ha	
	Total	Without maize
20% wheat, 33% perennial grasses, 17% maize, 17% peas	42.0	16.1
33% wheat, 67% grasses	16.8	16.8
17% wheat, 17% maize, 66% grasses	29.4	4.4
100% grasses	1.2	1.2

## CONCLUSIONS

- The crops provide a different level of soil protection, which increases with their degree of soil cover.
  - Introduction within crop rotation for soil protection, the crops that require annual processing of soil, especially row crops is contraindicated.
  - Plowing on the contour direction, as the only measure, reduces erosion by 61%.
  - Sowing the maize crop on the general direction of contours, as the only measure, reduces erosion by 72%.
  - Using the strip cropping system compared with cultivated slopes to only maize, in the conditions of Bârlad Plateau conditions, ensure a reduction of soil losses from 2 to 8 times.
  - The soil and water losses are reduced by 3 to 4 times with buffer strip system compared with unprotected slope.
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