COST-EFFECTIVENESS OF EROSION CONTROL MEASURES ON SLOPING LANDS

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THE SLOPE LANDS OF THE REPUBLIC ARE EROSION-HAZARDOUS, THEREFORE, THE REQUIREMENTS FOR PROTECTING THEM FROM EROSION SHOULD BE TAKEN INTO ACCOUNT WHEN DECIDING ON THE SPECIALIZATION OF FARMS AND DEKHKAN FARMS AND THE ORGANIZATION OF THEIR TERRITORY - THE PLACEMENT OF CROP ROTATIONS, BLOCKS AND CELLS OF PERENNIAL PLANTATIONS, ROADS AND OTHER LINEAR ELEMENTS OF THE ORGANIZATION OF THE TERRITORY. THESE REQUIREMENTS SHOULD ALSO BE TAKEN INTO ACCOUNT WHEN SUBSTANTIATING SOIL TILLAGE SYSTEMS AND APPLYING FERTILIZERS, HERBICIDES, PEST AND DISEASE CONTROL, AND OTHER MEASURES.

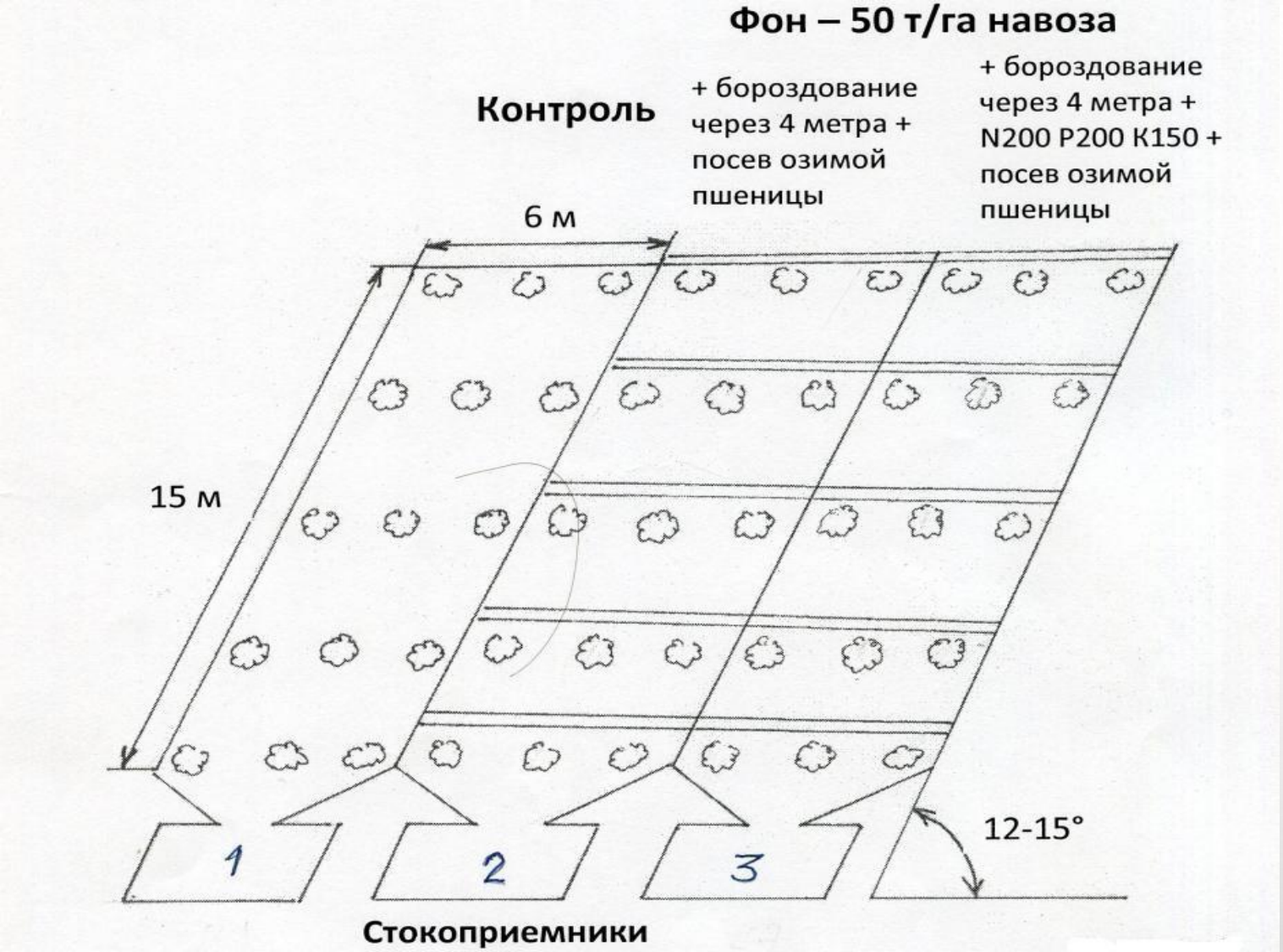


FIG. 1. FIELD EXPERIENCE DIAGRAM

The goals and objectives of the research: Preservation and increase of soil fertility of slopes, protection against erosion, prevention of erosion processes by the application of anti-erosion techniques on slope lands. Development of various technologies of anti-erosion measures, moisture retention during processing of aisles of orchards and vineyards on sloping lands.

TABLE 1. THE EFFECT OF AGRICULTURAL ACTIVITIES ON SOIL RUNOFF (M3 / HA) AND SOIL LOSS (KG / HA) ON BROWN-CARBONATE SOILS (FOUR-YEAR AVERAGE)

Options	March		April		May		Total per year	
	Soil Runoff	Soil Loss	Soil Runoff	Soil Loss	Soil Runoff	Soil Loss	Soil Runoff	**Soil Loss**
Control	178	3779	209	3284	88	2243	630	10156
Manure 50 t / ha - Fertilized Soil	114	2509	145	2219	59	1535	453	6823
Fertilized Soil + furrowing + sowing sidereal crops between rows	71	1334	84	839	36	894	253	3369
Fertilized Soil + N200P200 K150 + furrowing + seeding of sidereal crops between rows	54	1021	67	655	28	712	197	2611

TABLE 2. SOIL RUNOFF (M3 / HA), SOIL LOSS (KG / HA) AND NUTRIENT LOSS, KG / HA (4-YEAR AVERAGE)

Options	Soil Runoff	Soil Loss	Gumus	Nitrogen	Phosphorus	Potassium
Control	630	10156	1.3	9.2	16.3	244
Manure 50 t / ha - Fertilized Soil	453	6823	1.3	6.2	10.9	164
Fertilized Soil + furrowing + sowing sidereal crops between rows	253	3369	1.00	3.0	5.4	80.0
Fertilized Soil + N200P200 K150 + furrowing + seeding of sidereal crops between rows	197	2611	0,3	2.3	4.1	62.0

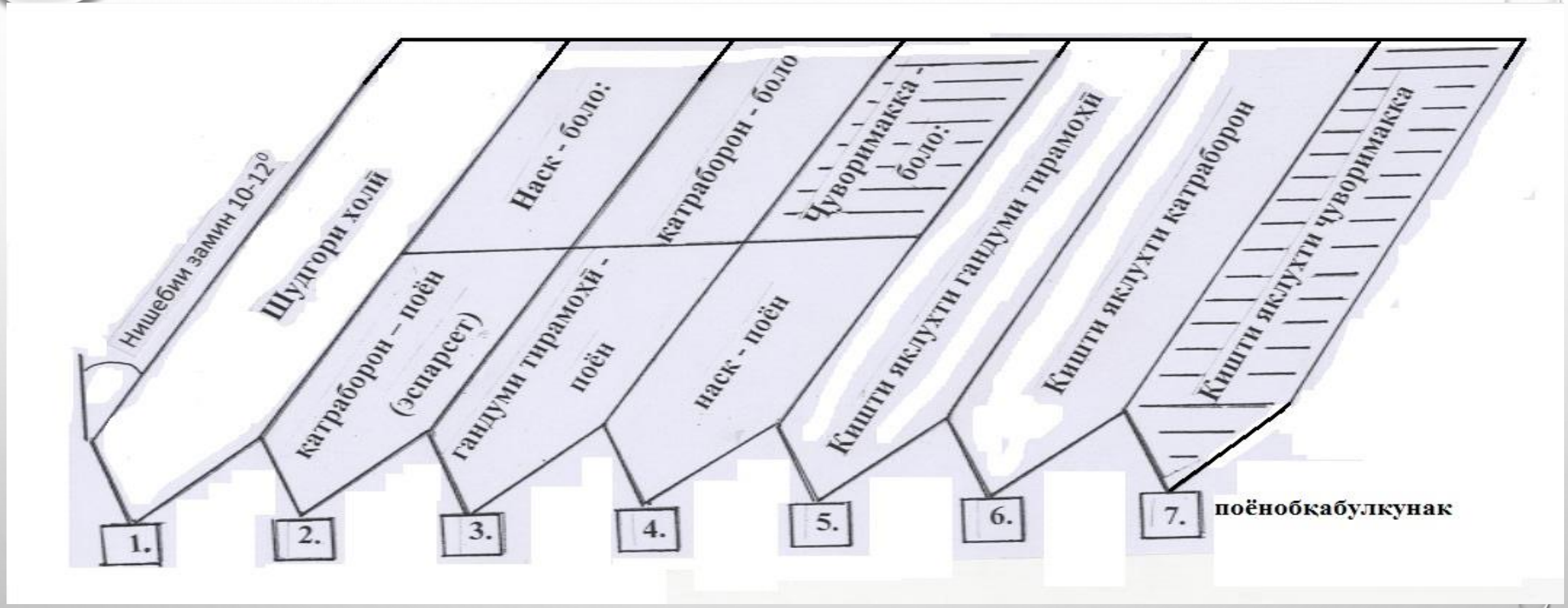
TABLE 3. VINEYARD YIELD, KG / HA

Options	Yield	Increase c/ha	%
Control	**11.1**	**-**	**-**
Manure 50 t / ha - Fertilized Soil	**16.7**	**5.6**	**50.5**
Fertilized Soil + furrowing + sowing sidereal crops between rows	**18.9**	**7.8**	**70.2**
Fertilized Soil + N200P200 K150 + furrowing + seeding of sidereal crops between rows **HCP 05 = 1,71 s/ha**	**27.8**	**16.7**	**150.4**

TABLE 4. COST-EFFECTIVENESS OF THE USE OF FERTILIZERS AND SOIL PROTECTION MEASURES UNDER THE VINEYARDS

Options	Yield increase, c / ha	Expenses	Cost of additional products	Net income	Payback of one somoni	Profitability, %
Control	-----					
Manure 50 t / ha - Fertilized Soil	5,6	227	1120	893	4.93	395
Fertilized Soil + furrowing + sowing sidereal crops between rows	13,3	910	2260	1749	2.92	195
Fertilized Soil + N200P200 K150 + furrowing + seeding of sidereal crops between rows	16,7	984	3340	2355	2.32	235

SCHEME OF EXPERIENCE WITH STRIP AND CONTINUOUS SOWING OF CROPS TO PREVENT SOIL RUNOFF AND SOIL LOSS.



Targets and goals

- Preservation and increase of soil fertility of slopes and protection against erosion.

- Prevention of erosion by applying anti-erosion techniques on sloping lands.

- Development of various technologies of anti-erosion measures, moisture retention during the row tillage of orchards and vineyards on sloping lands

STRIP AND CONTINUOUS SOWING OF CROPS

Control (plowing)

Strip Lentil Sainfoin

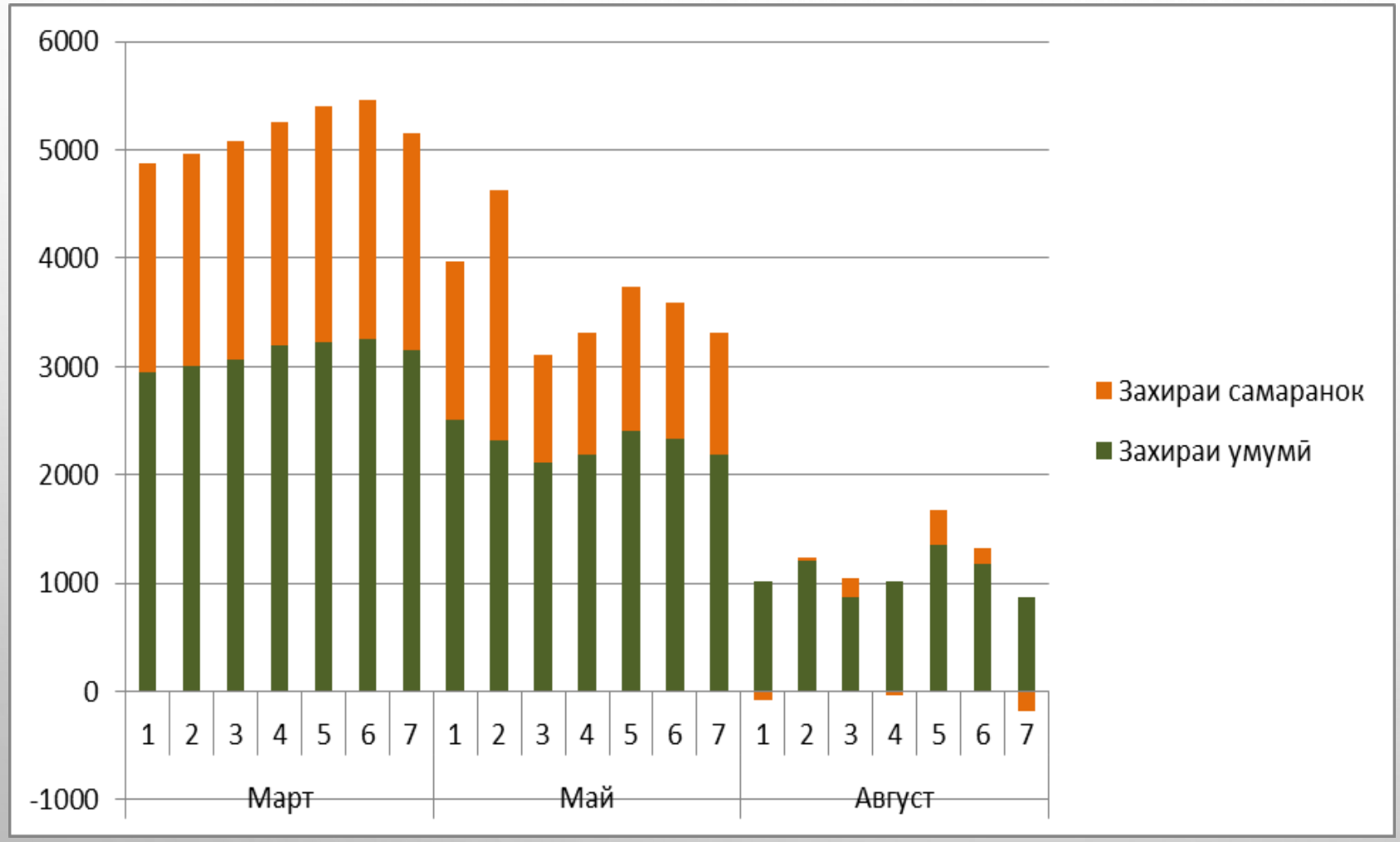
Continuous sowing

Continuous sowing

TABLE 5. SOIL RUNOFF (M3 / HA) AND SOIL LOSS (KG / HA) FOR STRIP AND CONTINUOUS SOWING OF CROPS

№	Options	Date of sampling								Total
		16.04	24.04	25.04	26.04	28.04	29.04	21.05	25.05	
1	Plowing	500 1375	500	750 150	475 3710	400 80,0	900 7200	500 3787	950 6168	497,5 22,470
2	Lentil Sainfoin	50,0 ---	———	———	———	———	———	———	———	50,0 ———
3	Sainfoin Winter wheat	250 2125	125 ----	270 1620	200 900	125 ----	125 400	50 200	300 270	144,5 5515
4	Corn Lentils	250 3000	200 ----	260 208	225 2362	130 78	250 3200	50 ----	325 3900	169,0 12748
5	Continuous sowing Winter wheat	250 3000	200 ----	260 130	225 180	125 ----	250 2625	-----	340 3672	1650 9607
6	Continuous sowing of sainfoin	-----	----	----	----	-----	-----	----	-----	———
7	**Precipitation, mm**	**35,0**	**20,5**	**32,5**	**13,0**	**8,8**	**22,5**	**13,8**	**28,4**	**174,5**

CHART 1. TOTAL MOISTURE RESERVE AND EFFICIENCY (M3/HA) ON RAINFED SLOPING LANDS



1. **Plowing;**
2. **Lentils (top): Sainfoin (top);**
3. **Sainfoin (top): Winter wheat (bottom);**
4. **Corn (top): Lentils (bottom);**
5. **Continuous sowing of winter wheat;**
6. **Continuous sowing of sainfoin;**
7. **Continuous sowing of corn.**

TABLE 6. COST-EFFECTIVENESS OF THE PLACEMENT OF VARIOUS CROPS

List of crops	Yield, kg / ha	The cost of 1 kg of the product	Total cost, TJS	Expenses, TJS	Net income, TJS
Plowing	-------		--------	--------	--------
Continuous sowing of wheat	14,0	2.0	2800,0	1000,0	1800
Hay, grain	-----	1.0	1400	-----	1400
Total			3200	1000,0	3200
Lentils (top) Sainfoin (bottom)	8,3 21.0	8.0 2.0	6640 4200,0	520,0 450,0	6120 3750
Sainfoin (top) Winter wheat	18,0 13,2	2.0 2.0	3600,0 2640.0	450,0 900,0	3150 1740
Continuous sowing of sainfoin	21.0	2.0	4200	450	3750

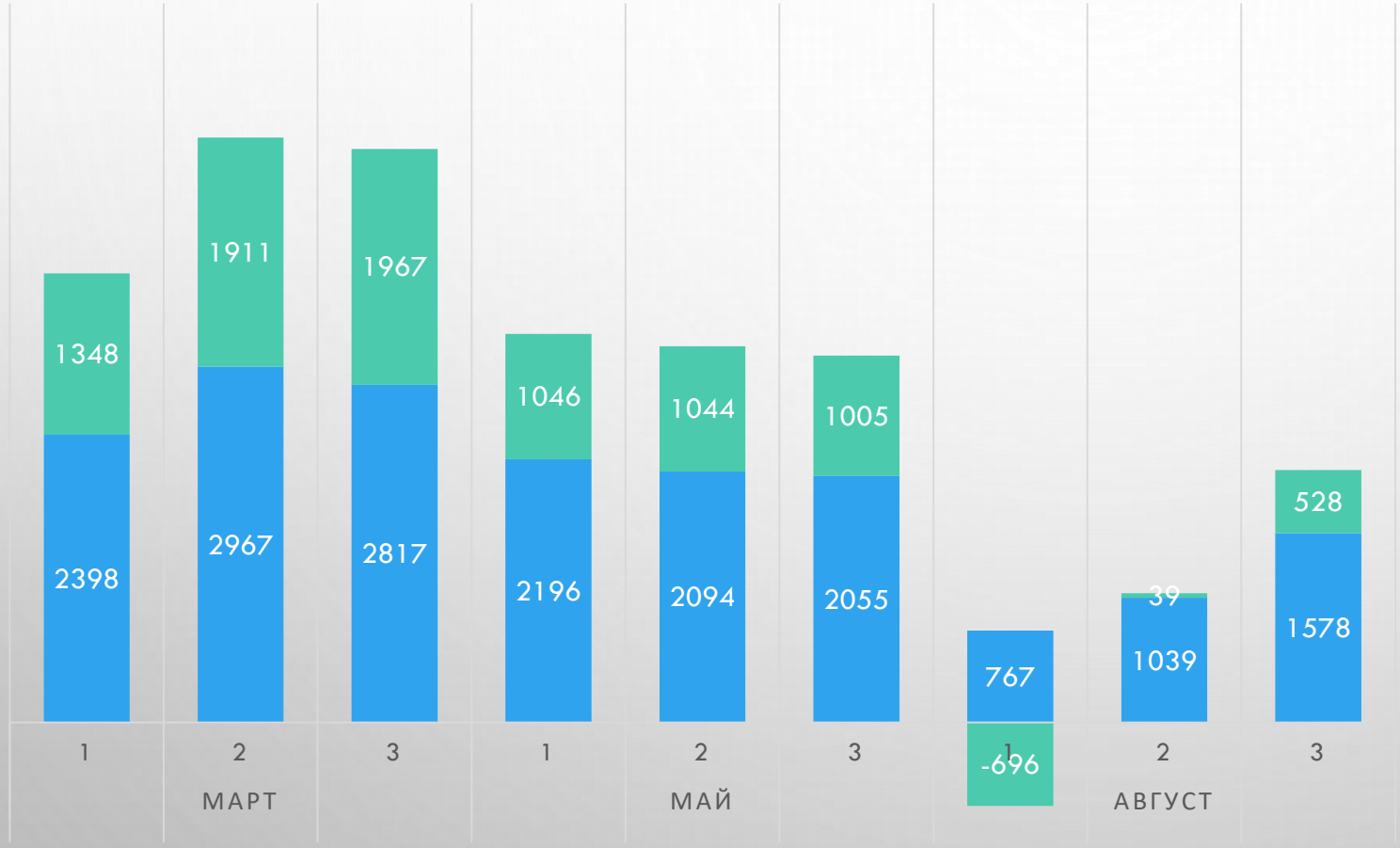
GOALS AND OBJECTIVES OF RESEARCH

1. Introduction of moisture accumulation methods on rain-fed sloping lands to increase soil productivity
2. Determination of the stock of total and productive moisture for the growth and development of a vineyard in rainfed conditions
3. Improving the water-physical and chemical properties of mountain brown soils

RESEARCH METHODS

- PLOWING.
- MULCHING WITH HAY OR GRASS RESIDUES
- MULCHING WITH THE REMAINS OF THE VINE.

MOISTURE SUPPLY (M3 / HA) WITH VARIOUS MULCHING METHODS ON TERRACES



1. Plowing;
2. Mulching with hay or grass residues;
3. Mulching with the remains of the vine;

SECTION TO DETERMINE BULK DENSITY AND NUTRIENTS

Figure 1. Plowing

Figure 2. Mulching with hay or grass residues;

Figure 3. Mulching with the remains of the vine;

Table 7. Agrochemical indicators with various mulching methods

Options	Depth sm	Gumus %	NH_4 mg / kg	NO_3 mg / kg	P_2O_5 mg / kg	K_2O mg / kg
Section 1 Plowing	0-16	0.70	5.7	4.2	8.7	68
	16-37	0.48	3.5	4.0	3.5	60
	37-63	0.35	3.5	3.5	2.5	48
	63-84	0.20	2.2	2.8	1.2	46
	84-100	0.30	1.3	2.1	1.2	54
Section 2 Mulching with hay or grass residues	0-6	1.83	26.2	5.8	17.0	192
	6-16	1.03	12.8	4.2	10.0	140
	16-26	0.68	6.2	3.5	5.0	132
	26-50	0.73	4.0	3.5	3.7	80
	50-70	0.45	4.0	2.8	2.5	60
	70-100	0.33	6.2	2.8	1.5	56
Section 3 Mulching the remains of a vine	0-16	0.83	10.2	4.2	10.5	112
	16-33	0.60	8.0	2.5	5.5	86
	33-57	0.30	4.0	2.1	1.2	56
	57-81	0.15	2.2	1.8	1.2	50
	81-100	0.15	8.8	1.4	1.2	54

TABLE 8. VINEYARD HARVEST WITH VARIOUS MULCHING

№	Options	Years					Yield, s/ha	
		2011	2012	2013	2014	2015	average	increase
1	Plowing	32,5	21.2	55,6	20,8	40,6	34,1	----
2	Mulching the remains of a vine	80,2	26.1	80,0	100,0	70,0	71,2	37,1
3	Mulching with hay or grass residues	100,0	24.2	100,0	116,0	80,0	84,0	49,9

TABLE 9. ECONOMIC EFFICIENCY AT DIFFERENT METHOD MULCHING

Options	Area, ha	Productivity c / ha	Total production, kg	Cost of 1 kg of products, TJS	Total cost, TJS	Expenses, TJS	Profit, TJS
Plowing	0,015	55,6	8,34	4,0	33,36	3,5	29,8
Mulching the remains of a vine	0,015	80,0	12,0	4,0	48,0	2,50	45,5
Mulching with hay or grass residues	0,015	100,0	15,0	4,0	60,0	2,50	57,5

The results show that for the same cost of mulching, the profit is from 3833.00 to 5333.00 TJS per hectare.

The influence of mulching methods on the yield of the vineyard

THANK YOU FOR ATTENTION