



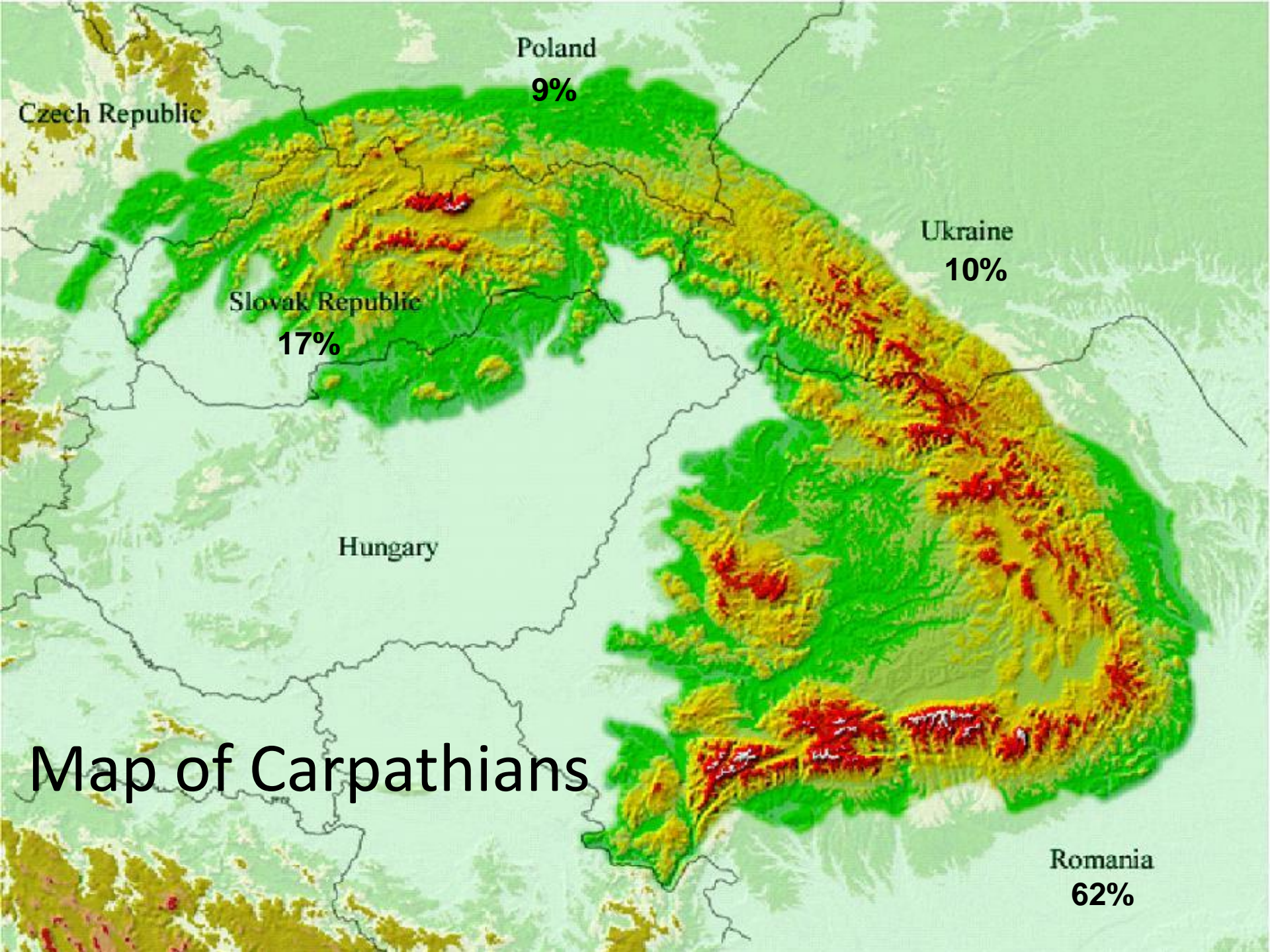
PASTORALISM IN THE SOUTH EASTERN CARPATHIANS (ROMANIA)

Past, present and future



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Poland
9%

Czech Republic

Slovak Republic
17%

Ukraine
10%

Hungary

Map of Carpathians

Romania
62%

PASTORALISM = TRANSHUMANITY

Latin origin: **trans** (the other side, over, beyond) + **humus** (ground, boundary)

- **DEX** (2016) „ *Seasonal movement of shepherds and flocks of sheep, spring-summer from the plateau to the mountain and autumn from the mountain to the plateau*” ;
- **LAROUSSE** „ *Pastoralism is an extensive way of growing, practiced by the nomadic population and based on the exploitation of natural vegetation, mainly on steppe and semi-humid areas*”;
- **WIKIPEDIA** "*Pastoralism is a branch of agriculture, which has a mobile aspect of moving animals to areas with fresh meadows and plenty of water*"

The main historical stages in transhumance (1)

Years:

106 – conquest of Dacia by the Romans led by Emperor Traian

641 - Byzantine Empire and the Orthodox religion replacing the Latin language with the Greek language then Slavic - Valahii - Aromanians and Romanian animal breeders have kept the language and their habits until today.

1453 - Constantinople was conquered by the Ottoman Empire;

1830 – 1855 - maximum development of the great transhumance in the Carpathians and the Ottoman Empire;

After 1920 - the beginning of the reduction of traditional transhumance after the agrarian reform;

The main historical stages in transhumance (2)

Years:

1952 – 1955 - the communist regime's ban on transhumance;

1985 – the herd arrived at about 18.5 million;

Après 1990 – the decrease in sheep numbers by half after the dismantling of cooperatives and state farms;

Après 2000 – In Romania there are:

- * about 1,050 medium-sized breeders (200-500 sheep)

- * about 135 large breeders (more than 500 sheep)

APPEARANCE IN THE CARPATO - BALKAN AREA

Assumption:

The transhumance system was brought by the Roman colonies in the 1st - 3rd centuries after Christ from the current territories of SPAIN and ITALY

Arguments:

- 1) all transhumant shepherds are Romanians and Aromanians with languages of Latin origin and
- 2) the sheep breeds of the transhumant shepherds come from Spain and Italy: the **Romanian Tzigai** breed comes from the Merino and Raso breeds and the **Romanian Tzurcana** breed comes from the **Laxa – Manech** and **Churo** breeds. Similarly, the **Ruda** races of the Romanians from the Balkans come from the **Italian Bergamosca** type races.

ROMÂNIA

SCALA 1:800 000

MINISTERUL ÎNVĂȚĂMÎNTULUI
DIRECȚIA NAȚIONALĂ DE ÎNVĂȚĂMÎNT ȘI DOCUMENTARE

LEGENDĂ

Forme de relief:

- 1000 m și mai puțin
- 1000 - 2000 m
- 2000 - 3000 m
- 3000 - 4000 m
- 4000 - 5000 m
- 5000 m și mai mult

Clădiri:

- Clădire de lemn
- Clădire de cărămidă
- Clădire de piatră
- Clădire de beton
- Clădire de metal
- Clădire de sticlă
- Clădire de cărămidă și piatră
- Clădire de piatră și cărămidă
- Clădire de piatră și beton
- Clădire de piatră și metal
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Locuiri:

- Localitate de tip sat
- Localitate de tip sat cu elemente de oraș
- Localitate de tip sat cu elemente de oraș și oraș
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Transhumance centers



Plan from Romania



DISTANȚE ÎN ȚARĂ

Distanta	1000 m	2000 m	3000 m	4000 m	5000 m	6000 m	7000 m	8000 m	9000 m	10000 m
1000 m	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
2000 m	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000
3000 m	3000	6000	9000	12000	15000	18000	21000	24000	27000	30000
4000 m	4000	8000	12000	16000	20000	24000	28000	32000	36000	40000
5000 m	5000	10000	15000	20000	25000	30000	35000	40000	45000	50000
6000 m	6000	12000	18000	24000	30000	36000	42000	48000	54000	60000
7000 m	7000	14000	21000	28000	35000	42000	49000	56000	63000	70000
8000 m	8000	16000	24000	32000	40000	48000	56000	64000	72000	80000
9000 m	9000	18000	27000	36000	45000	54000	63000	72000	81000	90000
10000 m	10000	20000	30000	40000	50000	60000	70000	80000	90000	100000

Romanian Transhumance Centers (1830 - 1855)

(DRAGANESCU,2006 from the dates of CONSTANTINESCU-MIRCESTI, 1976)

No.	Department	Number of villages passing the (s)		Breed sheep
		Carpathian Mountains	Danube	
Transhumance Centers				
1.	Sibiu	27	16	Tsurcana
2.	Braşov	19	7	Tzigai
3.	Bran	10	10	Tsurcana, Tzigai
4.	Covasna	6	3	Tzigai
Balancing production system (reduced transhumance)				
1.	Hunedoara	30	1	Tsurcana
2.	Făgăraş	22	1	Tsurcana
3.	Severin	15	-	Tsurcana
4.	Alba	10	-	Tsurcana
5.	Haţeg	4	-	Tsurcana
6,7,8.	Târnava Mare, Mică, Caraş	4	-	Tsurcana
Total villages		147	38	

**The structure of herds from transhumance centers crossing the Danube Customs
Brăila 4.03. - 27.04.1831;flocks returning from Türkiye**

(DRAGANESCU, 2006 from the dates of CONSTANTINESCU - MIRCESTI, 1976)

Department	Owners no. %		Sheep				Others		
			No.	Mean	Max.	Min.	Horses	Donkeys	Shepherds
Sibiu	80	77	107887	1348	3380	628	1522	179	786
Braşov	18	17	19877	1104	2230	500	60	34	157
Bran	4	4	5427	1350	1967	490	22	8	43
Other regions	2	2	886	443	556	330	6	3	8
TOTAL	104	100	134077	1289	3380	330	1610	224	988

TYPES OF SHEPHERDING IN THE PAST

(after Romulus VUIA 1964)

I. Local agricultural pastoralism;

II. Agricultural shepherding with a flock in the mountains;

III. The shepherd in the hayfield;










IV. Grazing based on alpine pasture (mountain hollow) and wintering in the lowlands

Today, mainly local agricultural herding is practiced (I) and less often with the mountain herd (II).




Types III and IV have almost disappeared.

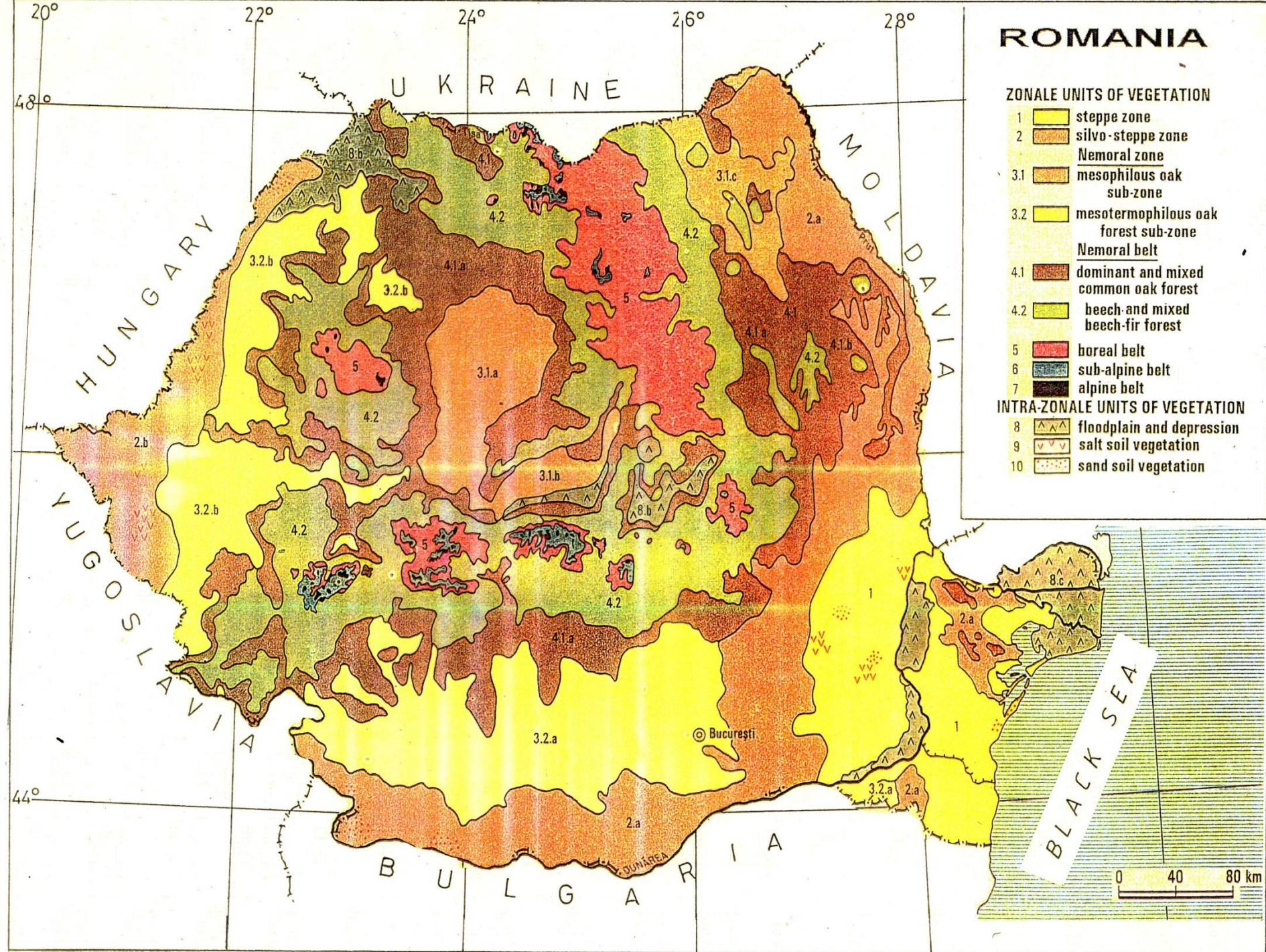
ROMANIA

ZONALE UNITS OF VEGETATION

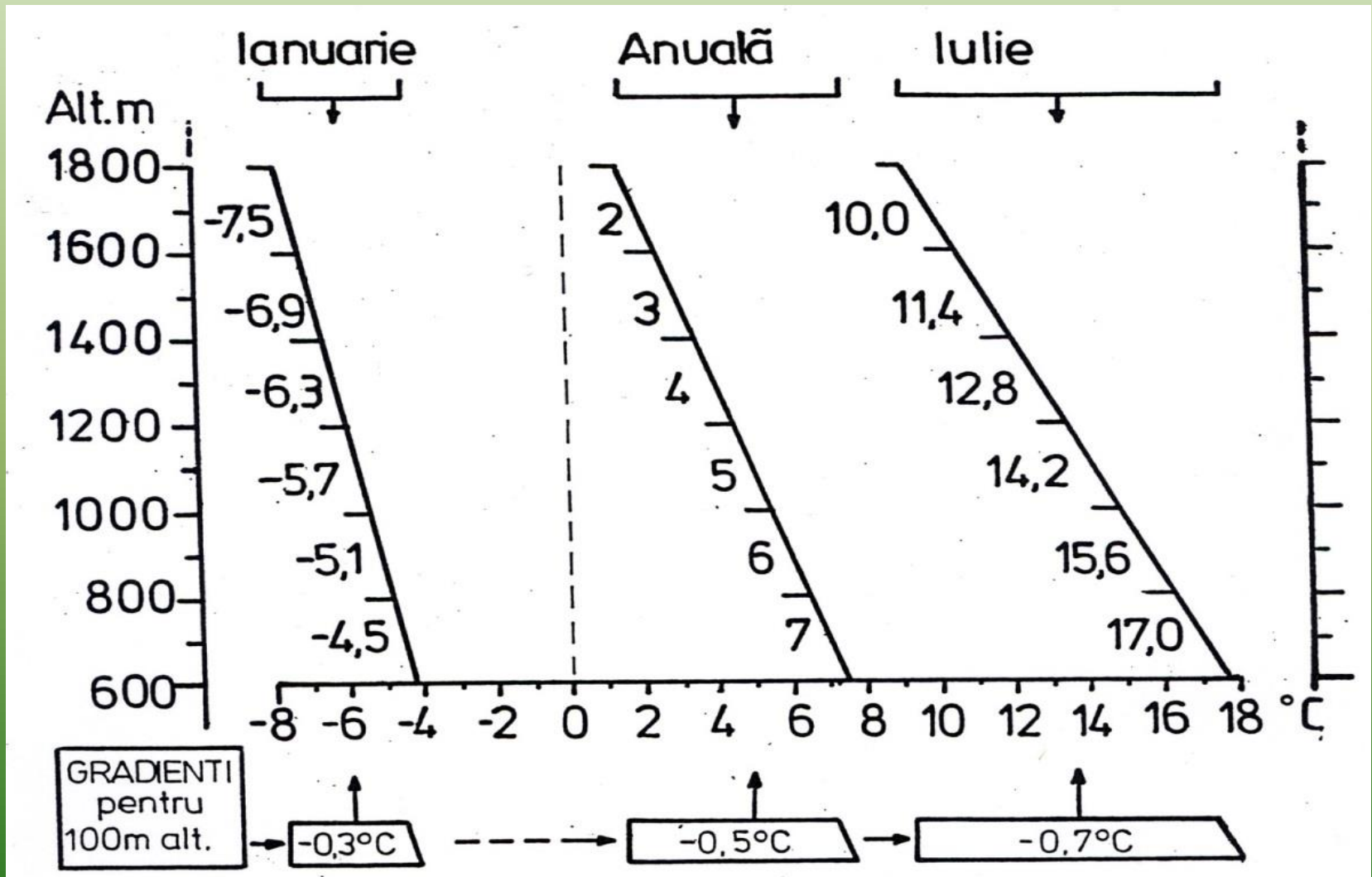
- 1  steppe zone
- 2  silvo-steppe zone
- Nemoral zone
- 3.1  mesophilous oak sub-zone
- 3.2  mesotermophilous oak forest sub-zone
- Nemoral belt
- 4.1  dominant and mixed common oak forest
- 4.2  beech and mixed beech-fir forest
- 5  boreal belt
- 6  sub-alpine belt
- 7  alpine belt

INTRA-ZONALE UNITS OF VEGETATION

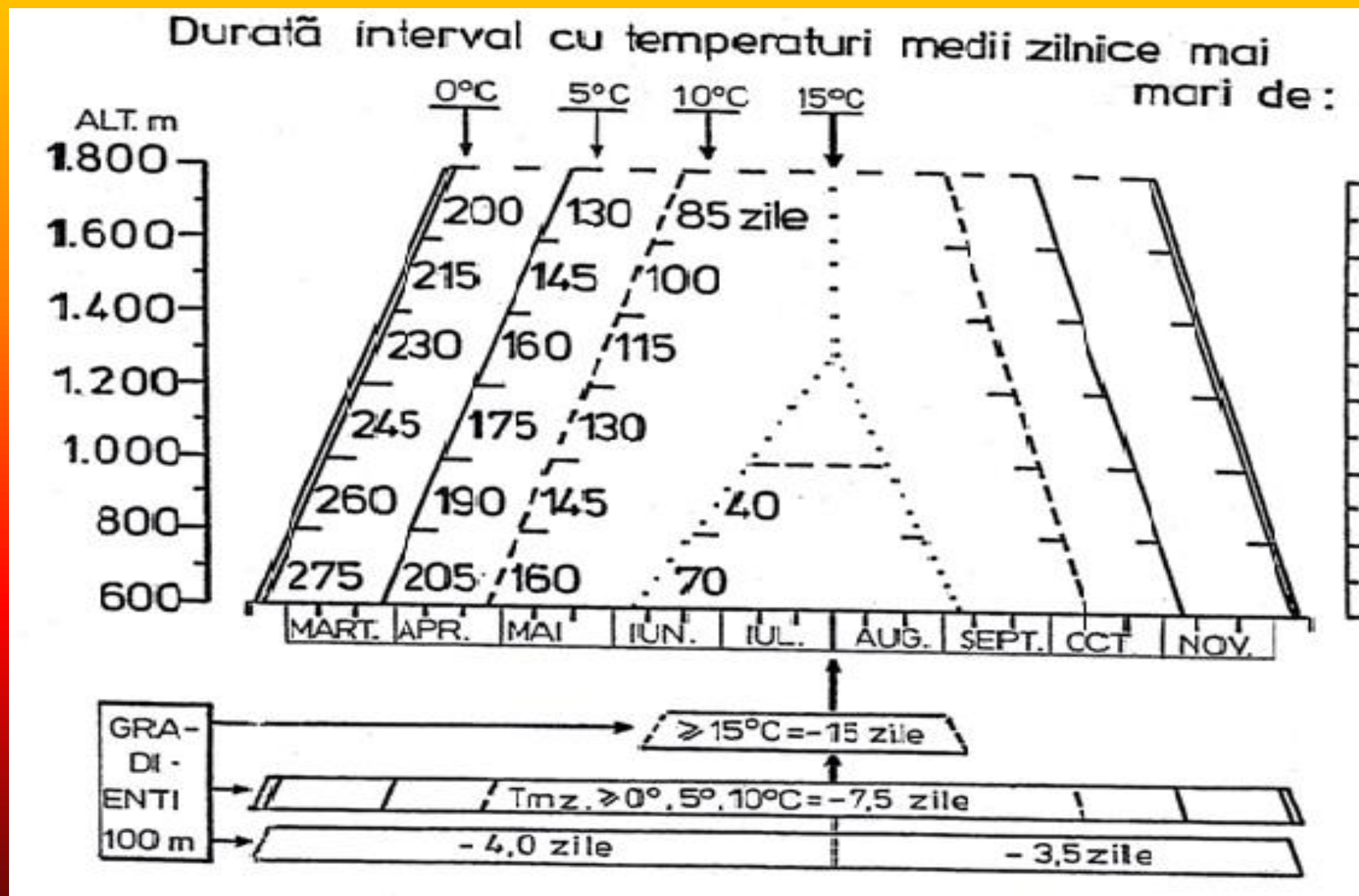
- 8  floodplain and depression
- 9  salt soil vegetation
- 10  sand soil vegetation



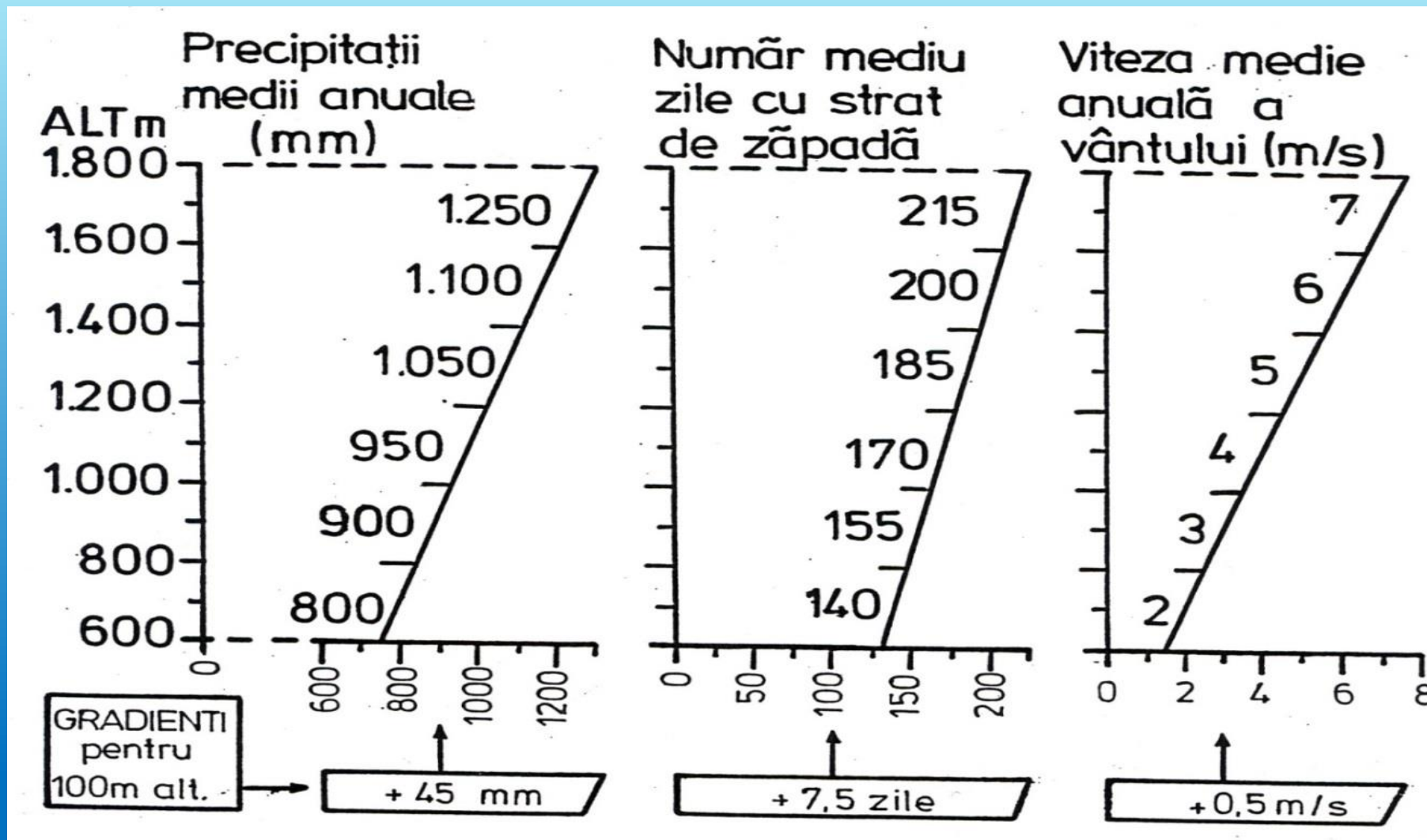
The evolution of the average air temperatures in the area of the mountain forests in Romania by altitude

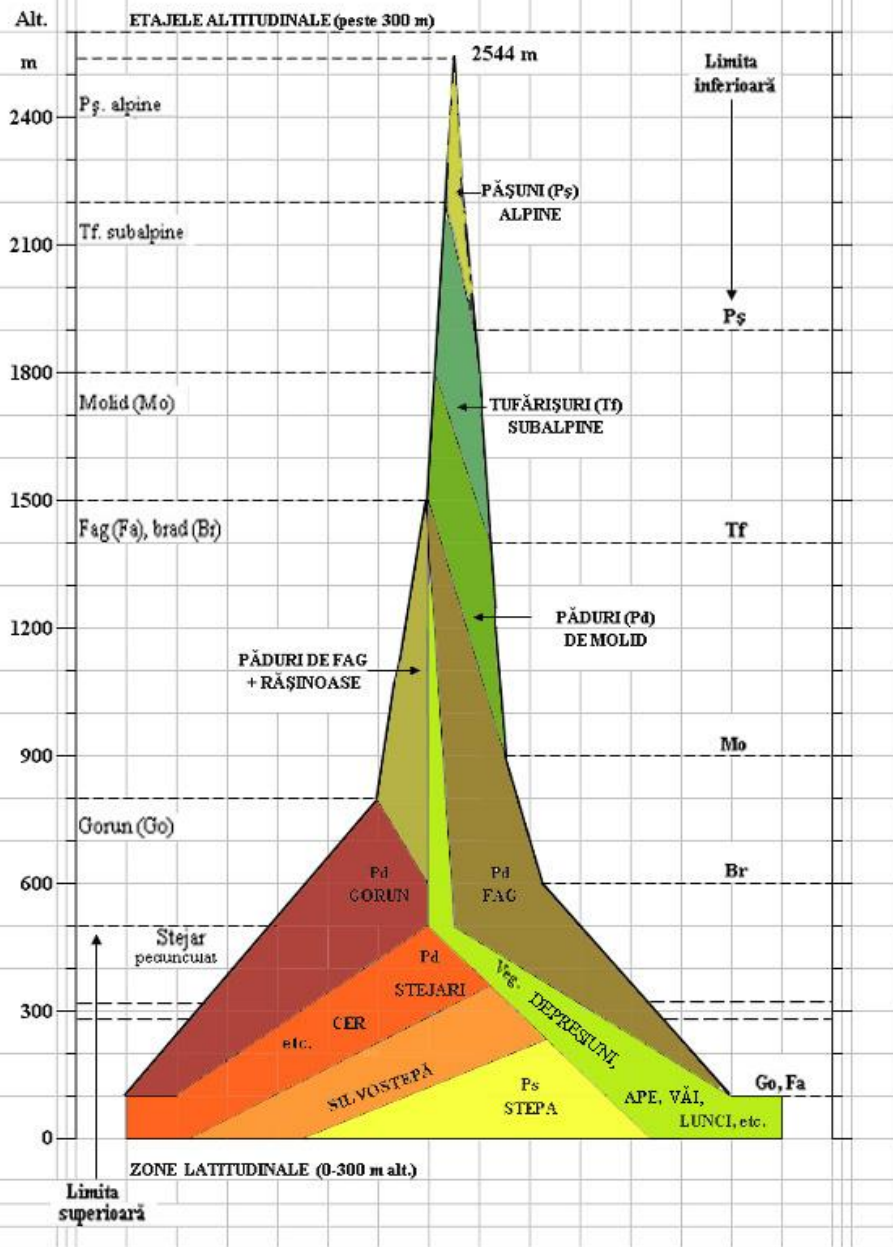


The evolution by altitude of the duration of the intervals with some average daily temperatures in the Romanian Carpathians



Evolution of precipitation, days with snow cover and average wind speed between 600 and 1800 m altitude





ZONES AND ALTITUDINAL LEVEL WITH PRIMARY VEGETATION ON ROMANIAN TERRITORY

PERMANENT MOUNTAINOUS PASTURES

Area \approx **2.100.000 ha** (42 % from 4,9 million ha, total pasture area in Romania)
 from which: **40.000 ha** (2%) alpine pasture level
60.000 ha (3%) subalpine level (glades, spruce, juniper bushes)
1000 .000 ha (47%) boreal level (coniferous forests - spruce, fir, etc.)
1000.000 ha (48%) nemoral level (deciduous forests - beech, oak etc)

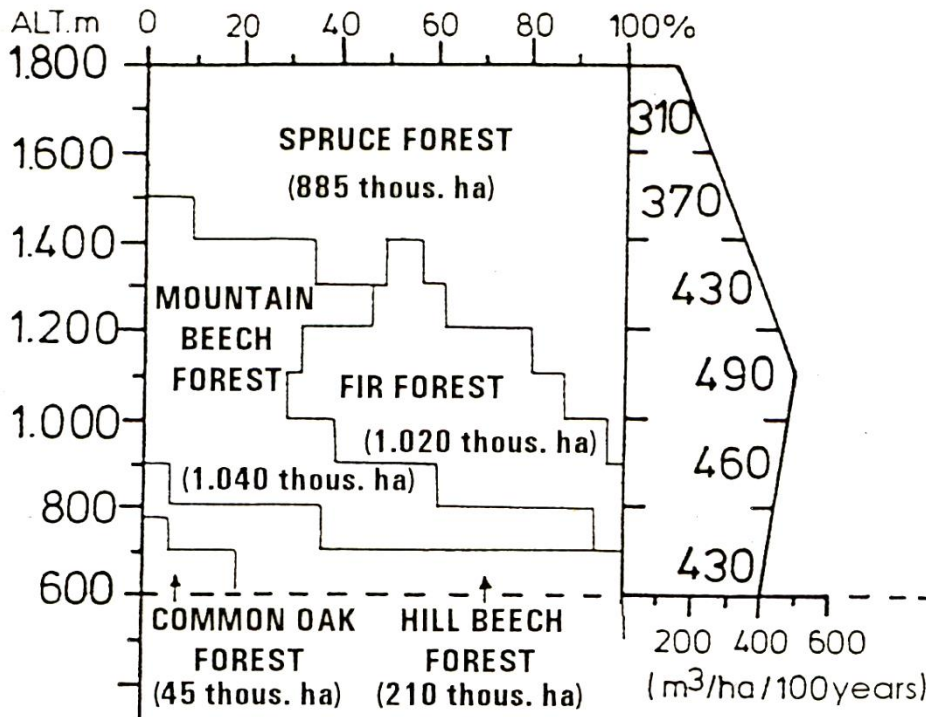
DISPERSION - ORIGIN – PROVENANCE
 mountainous pastures(600 -800 m \longrightarrow 2544 m alt.)

Primary vegetation: about 100.000 ha (5%)
 alpine pastures, rocks, marshes, wet valleys etc.

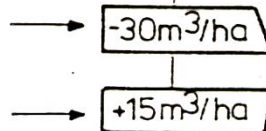
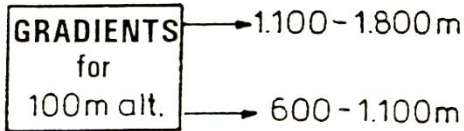
Secondary vegetation: about 2000.000 mii ha
 (95%) resulted from human intervention
 (deforestation, fire, grazing, mowing etc.)

FOREST ECOSYSTEMS

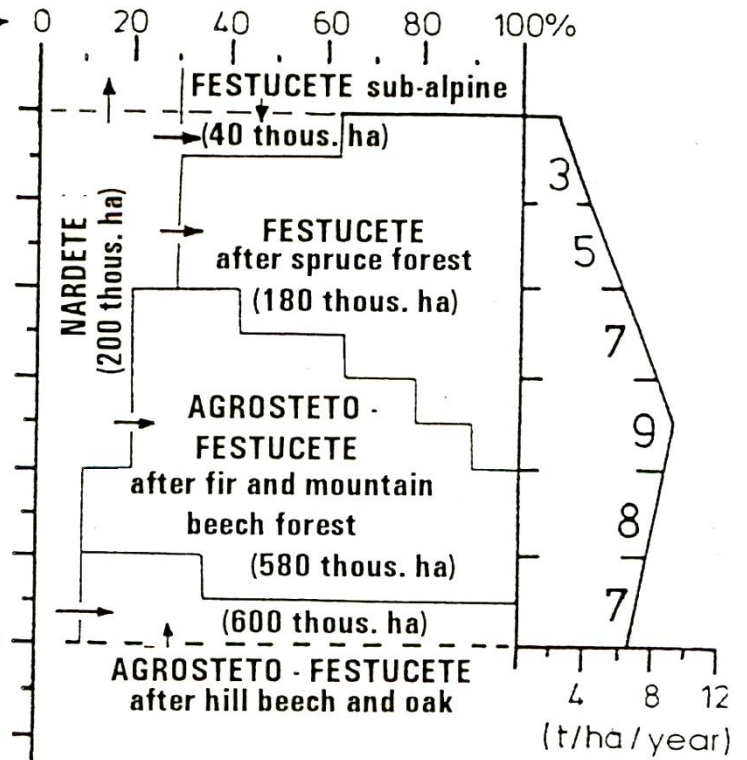
Distribution on altitude



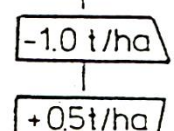
VOLUME → wood



GRASSLAND ECOSYSTEMS



PRODUCTION → grass



Altitudinal dynamics of forest and grassland production

Alpin stage (1900 -2544 m)



Black goat





Young sheep on pasture (2400 m alt.)

Subalpine stage (1400 -2200 m)



Mixed pasture – sheep - cows (1700 m)



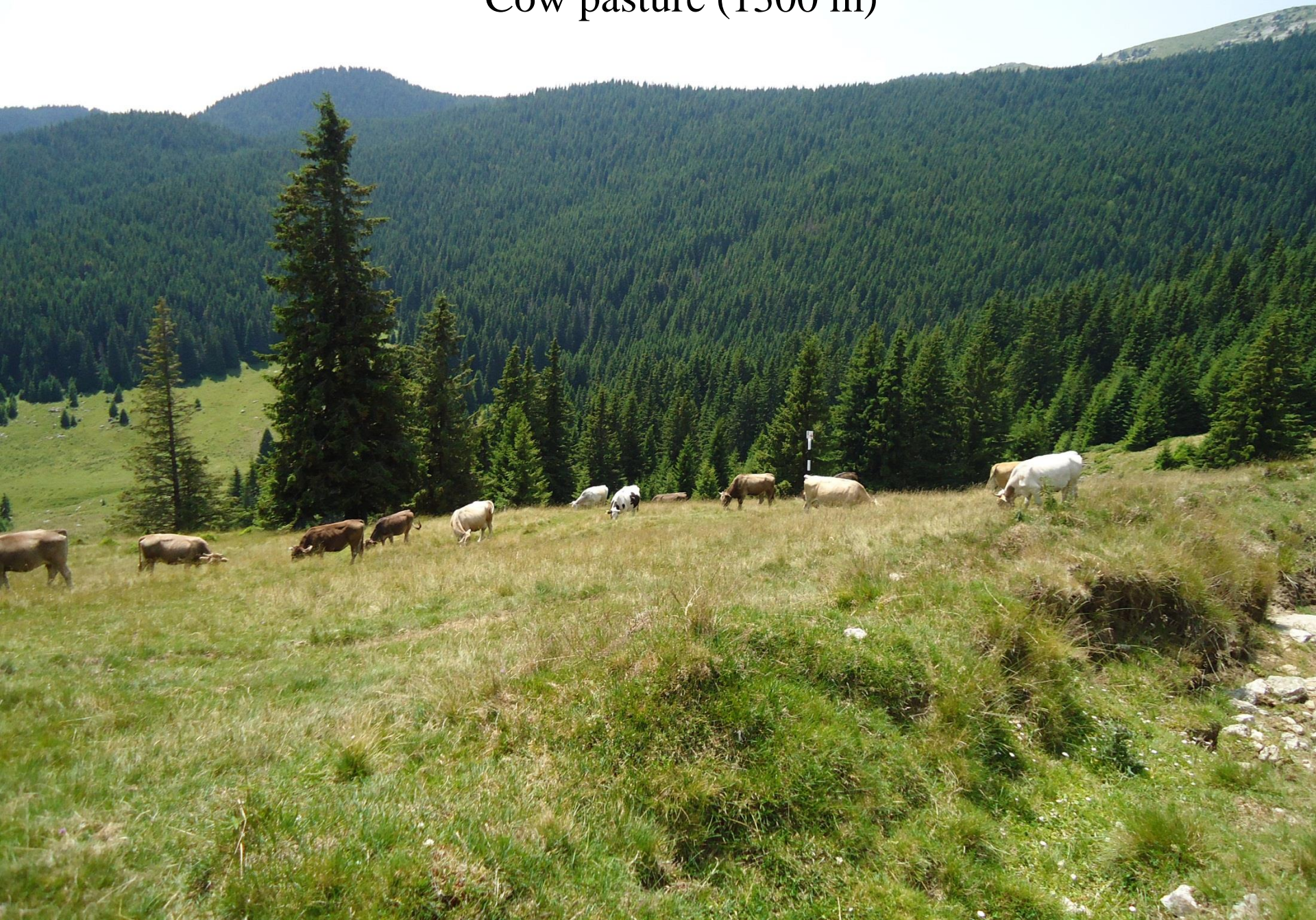
Boreal stage (900 -1800 m)







Cow pasture (1300 m)





Nemoral stage (600 -1500 m)



MONTAIN PASTORAL PATRIMONY

VEGETATION

- PERMANENT PASTURES with the grassy carpet of primary or secondary origin
- WOOD VEGETATION with shrubs and trees

ANIMALS

- CATTLE, SHEEPS, GOATS, HORSES and other species in the grazing season

WATER SUPPLY

- SPRINGS, RIVERS, PONDS, LAKES, WELLS with gutters etc.

ACCES WAYS

- PATH, EARTH ROADS, STONE ROADS, MODERNIZED ROADS etc.

ANIMAL PROTECTION MEANS

- TREES, LIGHT CONSTRUCTIONS, SHELTERS for shade, bad weather etc..

HUMAN CONFORT

- SHEPERD HOUSING, provided with electricity, running water, bathroom,radio,TV etc.

- RATIONAL UTILIZATION OF PASTURE

- FENCING with fixed fences (wood, stone, barbed wire, nets), electric fencing etc.

FERTILIZATION, STORAGE AND SPREADING OF ANIMAL FECALS

- PADDOCKING GATES, COLLECTORS, DISTRIBUTION SYSTEMS, Semi-liquide fertiliser etc..

PREPARATION AND STORAGE OF ANIMAL PRODUCTS

- SHEEPFOLD, CHEESE PREPARING, SLAUGHTER POINTS, SMOKERS, REFRIGERATED WAREHOUSE etc.

MATERIAL WAREHOUSE AND MACHINES FOR MAINTENANCE OF SWARD

Young Shepherds



Old sheepfold

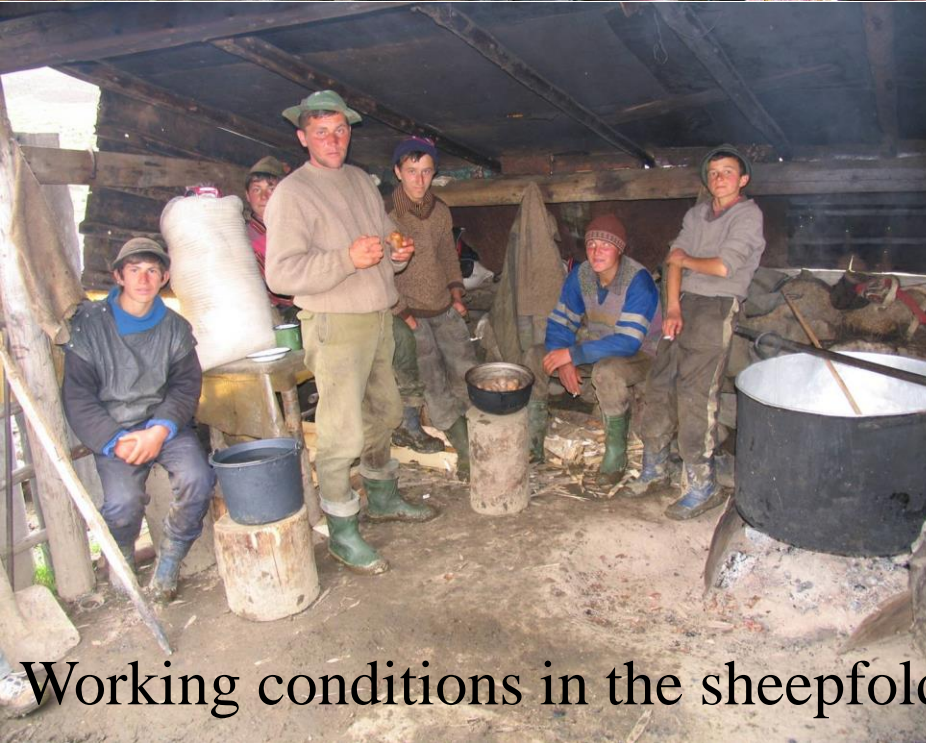


Place of rest and safety against wild animals in the sheepfold



New sheepfold





Working conditions in the sheepfold



Cheese storage warehouse

Comparative study of pastoral activities in Bucegi Natural Park
8 750 hectares of alpine meadows

Specification	2005	2017	Dif. ± 2017-2005	%
Number sites				
Sheep	4	2	-2	50
Mixte	30	15	-15	50
Cattle	6	3	-3	50
Total	40	20	-20	50
Breeders of animal				
Number of carers	230	80	-150	35
Average number per flock	6	4	-2	67
Effective animals				
Adult sheep	12500	7870	-4.630	63
Youthful sheep	6700	3210	-3.490	48
Adult cattle	1800	820	-980	46
Youth cattle	400	260	-140	65
Horses	200	30	-170	15
Donkeys	30	10	-20	33
Shepherd dogs	270	110	-160	41
Total LU	5186	2605	Specification	50
<i>Nr. LU / sheepfold</i>	<i>130</i>	<i>130</i>	<i>0</i>	<i>100</i>
<i>Nr. LU / Shepherd</i>	<i>22,5</i>	<i>32,6</i>	<i>+10,1</i>	<i>145</i>
<i>Nr. LU / ha</i>	<i>0,59</i>	<i>0,30</i>	<i>-0,29</i>	<i>51</i>

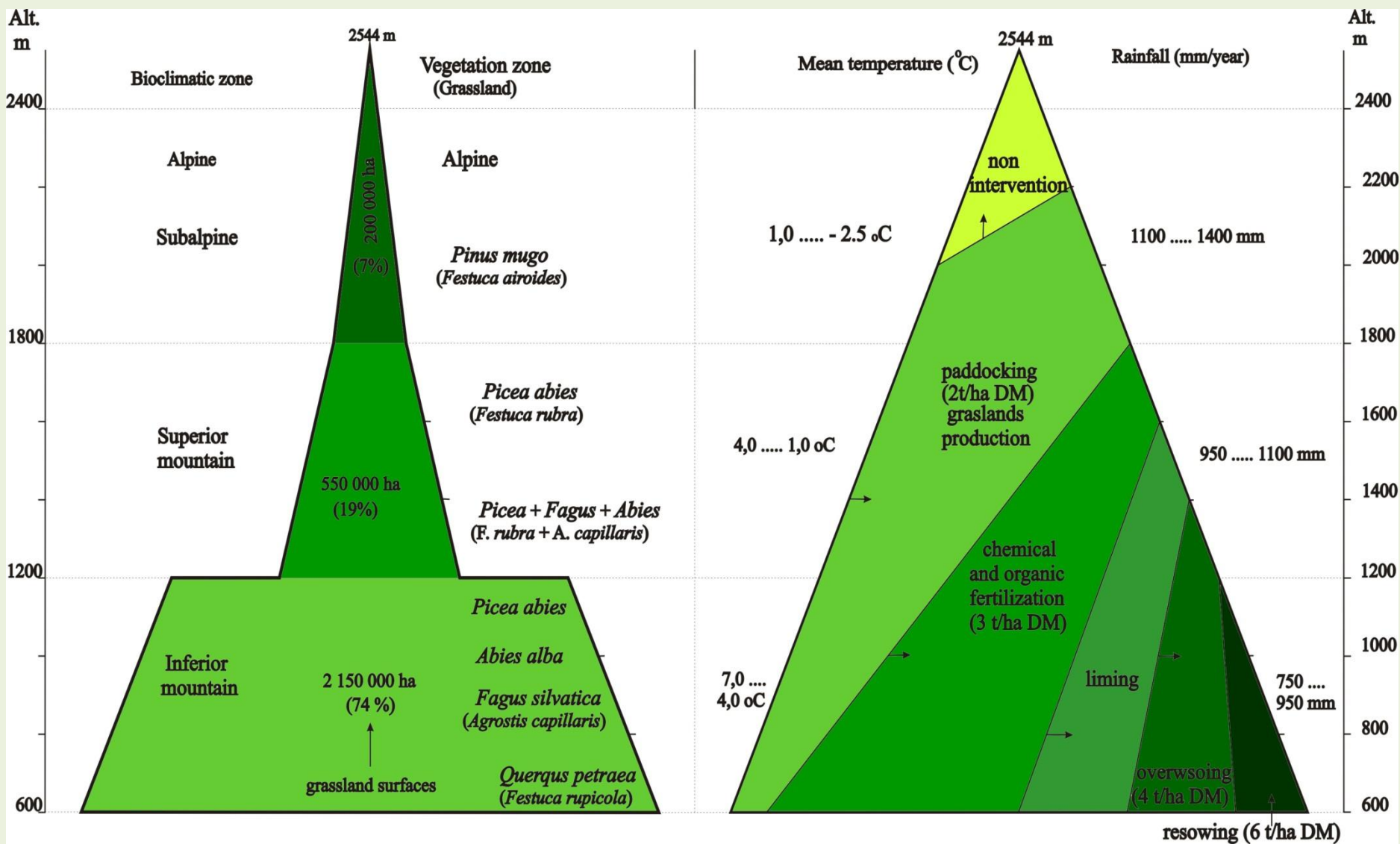
Age of animal caretakers

Specification	2005		2017		Difference +, - 2017 – 2005	
	nr.	%	nr.	%	nr.	%
Under 20 years	35	15	2	3	-33	6
21 – 30	39	17	9	11	-30	23
31 – 40	53	23	17	21	-36	32
41 – 50	41	18	34	43	-7	83
51 – 60	37	16	12	15	-25	32
61 – 70	16	7	5	6	-11	31
71 – 80	9	4	1	1	-8	11
T O T A L	230	100	80	100	-150	35
Average age (years)	39	X	43	X	+ 4	110

Caregiver education

Specification	2005		2017		Difference +, - 2017 – 2005	
	nr.	%	nr.	%	nr.	%
No school training	2	1	1	1	-1	50
Under 7 – 8 grades (unfinished)	28	12	33	41	+ 5	118
Graduates 7 – 8 classes	156	68	34	43	- 122	22
Graduates 10 classes	37	16	7	9	- 30	19
High school graduates	7	3	5	6	- 1	71

Altitudinal bioclimatic and vegetation areas with the possibility of improvement of mountain meadows



Rationally dairy cow grazing in Bucegi at 1.800 m altitude



(the animal owners are from Moroieni village – Dambovită County)

Hand milking on the pasture



25-year average comparative data on subalpine *Nardus stricta* pasture productivity improved by different methods, Blana - Bucegi 1996 - 2020

Variants ((The group of cows))	Dry matter production (DM)		Cow's milk production	
	t/ha	%	L/ha	%
T *) – control plot <i>Nardus stricta</i>, cov. 40–60 %	1.20	100	846	100
A **) –rational grazing partially paddocked	1.93	160	1224	145
B ***)– fertilization NPK + paddocking + P	3.58	298	3463	409
C***) –liming CaO + NPK +paddocking+ P	4.09	341	4188	495
D***) – sowing + CaO + NPK +paddocking+ P	5.48	457	4454	526

*) T = the herd outside of the experimental field in Bucegi Plateau on period data 1996 to 1999, with a stocking rate of 0.6 UVM / ha in 85 days of grazing **)

A = the herd grazing in the experimental field on 27 hectares in the period 1996 to 2020, with a stocking rate of 1.2 UVM / ha in 85 days of grazing***)

B, C and D between 1996 and 2020 with an average stocking rate of 4 UVM / ha in 85 days




HEIFER
INTERNATIONAL

PROIECT CARPATIC


POMNA



AGROTURISTIC FARM

Tulghes commune,
Harghita county

- 25 sheepfolds ready for the present
- 20 sheepfolds ready in 2012
- 2500 - 3000 sheepfolds needed for the future



STAGE OF PASTORALISM IN ROMANIA

- We still do not have a proper pastoralism association in the European sense, apart from those of animal breeding by species and breeds and the Romanian Grasslands Society, which although they have some connection with pastoralism, these organizations do not have specific concerns to promote this complex field of agricultural activity and not only;
- The land associations of pastoral land owners did not appear to conclude multi-year grazing agreements with animal breeders;
- In other words, we have nothing organized for the progress of the pastoral fund of the country, everyone makes their own law in their own interest, far from the perspective goals that the other European countries with developed animal husbandry have in mind;
- Pastoral activity is not subsidized.

Aspects regarding the degree of disadvantage on altitudinal levels in the mountain area compared to the hill and plain area, considered as a reference level (100%) (according to Maruşca 2001)

Altitude limits (m)	Work possibilities outdoor	Activity difficulties in unfavorable climate	Additional efforts feed animals in the stable	Animal production level	Estimated expenses for the same food product
1400-1600	75	125	150	50	200
1200-1400	80	120	140	60	180
1000-1200	85	115	130	70	160
800-1000	90	110	120	80	140
600-800	95	105	110	90	120
0-600	100	100	100	100	100
Evolution for 100 m alt.	- 2,5%	+ 2,5	+ 5%	- 5%	+ 10%

The necessary level of subsidies, compensations and other facilities for the inhabitants of the mountain area compared to the other socio-economically favored areas (according to Marușca 2001)

Limite altitudinale (m)	Additional subsidies for agricultural production	Consumption compensations energy for household	Lower prices of construction materials, agricultural machinery, breeding animals	Tax reduction, interest charges on loans, transport costs	Shared utility expenses share
1400-1600	100	75	50	75	0
1200-1400	80	60	60	80	20
1000-1200	60	45	70	85	40
800-1000	40	30	80	90	60
600-800	20	15	90	95	80
0-600	0	0	100	100	100
Evolution for 100 m alt.	+10%	+7,5%	-5%	-2,5%	-10%

Percentage altitudinal distribution of landforms in the territory of Romania (according to Geograpy of Romania vol.I, 1983)

Altitude (m)	% from the territory of Romania (237.5 thousand km ²)	from which:		
		Mountains	Hills	Plains
peste 2000	1	3		
1500 - 2000	3	7		
1000 - 1500	6	19		
700 - 1000	12	36	3	
500 - 700	10	16	12	
300 - 500	18	12	38	1
200 - 500	12	7	24	5
100 - 200	18		18	35
0 - 100	20		5	59
Over 500 m	32	81	15	
Under the 500 m *)	68	19	85	100

*) territory affected by aridification and desertification in case of an increase in average air temperature with 3 °C, forecast until 2070.

**MODIFICATION OF BIOCLIMATIC AND VEGETATION FLOORS AT A GROWTH AVERAGE
AIR TEMPERATURE BY 3⁰C (2070 forecast)**

Current floors (areas)	Altitude (m)	Average annual temperature (°C)		Annual precipitation (mm)		Possible floors (areas) after hundreds of years
		Actual	2070	Actual	2070	
Alpine	2200- 2400	- 1	2	1500	1250	Juniper
Juniper	2000-2200	0	3	1450	1150	Juniper
Juniper	1800-2000	1	4	1350	1050	Juniper + Beech
Spruce	1600-1800	2	5	1250	950	Beech
Spruce	1400-1600	3	6	1150	850	Beech
Spruce+Beech	1200-1400	4	7	1050	800	Sessile
Beech	1000-1200	5	8	950	700	Oaks
Beech	800-1000	6	9	850	600	Silvosteppe
Sessile	600-800	7	10	800	500	Steppe
(Oaks) (Silvosteppe) (Steppe)	GRADIENTS for 100 m alt.	-0,5 °C	-0,5 °C	+ 45 mm	+ 45 mm	(Subhumid - dry) (Semiarid) (Arid - deserts)

Change in soil conditions with an increase in the average air temperature by 3 °C (forecast year 2070)

Current floors (areas)	Altitude (m)	Soil layer thickness (cm)		Horizontally A			
		Actual	Distant future	pH in water		V %	
				Actual	More utopian future	Actual	More utopian future
Alpine	2200- 2400	20	Very slow growth (approx.1 cm per 100 years)	3,6	4,5	6	24
Juniper	2000-2200	35		3,9	4,8	12	30
Juniper	1800-2000	50		4,2	5,1	18	36
Spruce	1600-1800	65		4,5	5,4	24	42
Spruce	1400-1600	80		4,8	5,7	30	48
Spruce+ Beech	1200-1400	95		5,1	6,0	36	54
Beech	1000-1200	110		5,4	6,3	42	60
Beech	800-1000	125		5,7	6,6	48	66
Sessile	600-800	140		6,0	6,9	54	72
(Oaks) (Silvosteppe) (Steppe)	GRADIENTS for 100 m alt.	- 7,5 mm			- 0,15	- 0,15	- 3 %



Ukraine



Poland





Thanks for your attention!