

Nutrient Management Plans for Farms included in Nitrate Vulnerable Zones in Romania

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Maximum application rate

The application rate of fertilizer N has to be based on a balance between the foreseeable N requirements of the crops, and the N supply to the crops from the soil and other sources, including the amount of available N in the soil at the moment when the crop starts to use it, the supply of available N through atmospheric deposition, irrigation water, biological fixation and the net mineralization of organic N in the soil during the growing season, the supply of available N through livestock manures, composts, residues, wastes and/or any fertilizer

Farm classification related to environmental standards

- Farms over 100 Animal Units needs an Environment Permit that requires a detailed nutrient management plan provided by County Soil Testing Laboratory (OSPA) based on soil sampling (at least at four years) in all fields where manure is spreaded.
According with FADN classification these farms are “very big” and “extra”
- Farmers with less than 100 AU are encouraged to ask for similar nutrient management plans.
Alternative, it is to comply with Maximum Nutrient Application Standards calculated for their pedo-climatic conditions and cropping system

Maximum nutrient application standards

Use of simulation modelling on long-time climatic series with local pedo-transfer functions for all suitable crop rotations.

Simulation model : ROIMPEL using algorithms for water and nitrogen component dynamics provided by SWAT model

Maximum nutrient application standards

Expected yields based on land marking system :
0 – 100 points based on soil, climate and terrain characteristics + standard crop yield value per point

In each administrative unit (NUTS5: comuna) are designated using soil and terrain maps + climate data areas covered by 5 land classes having a given average land mark

Maximum nutrient application standards

Simulation runs for all NUTS5 units included in NVZ are executed by ICPA for all crops in the area.

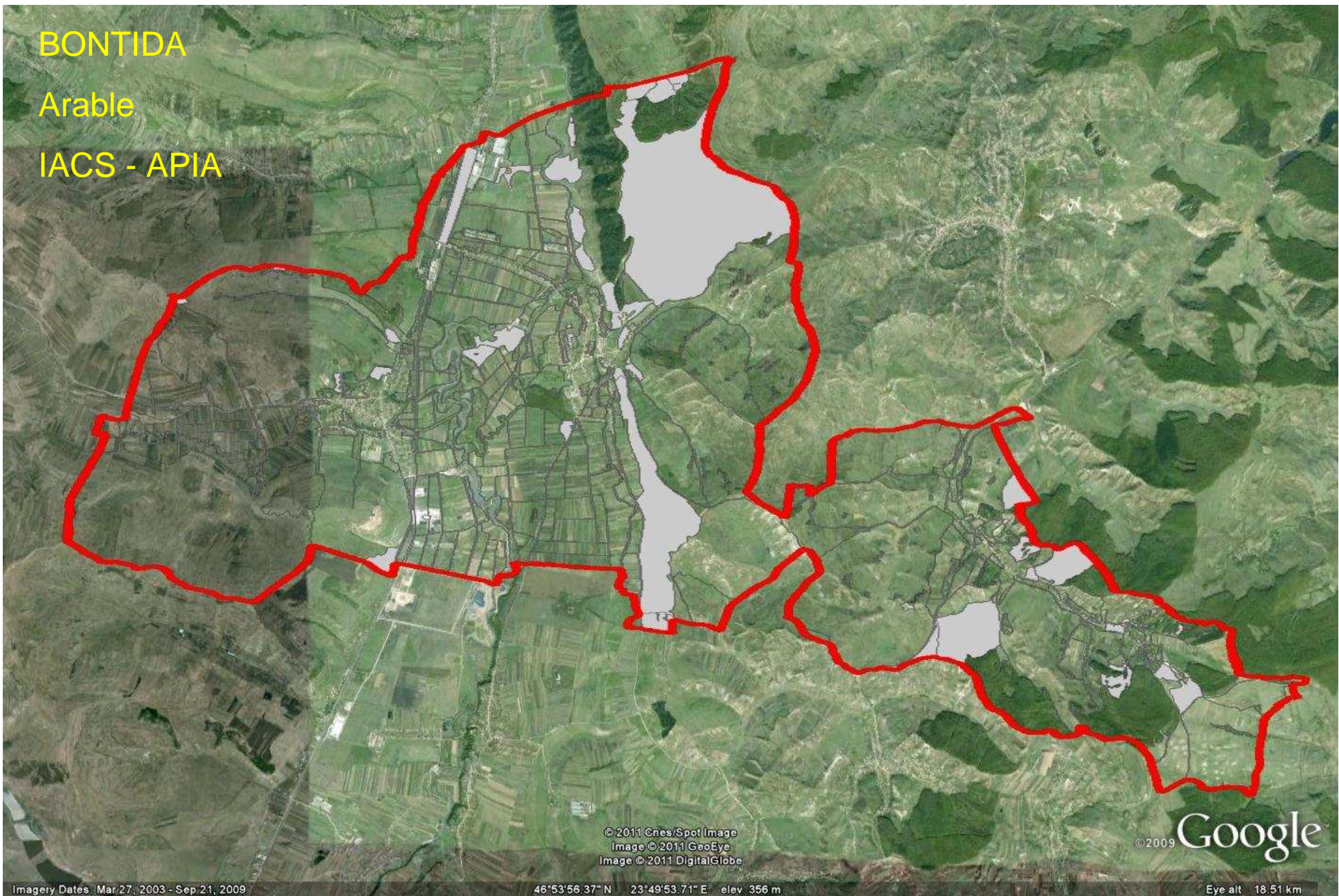
Output values (average N, P and K) maximum fertiliser rates are included in tables to be used by local farmers

http://icpa.ro/proiecte/Suport_curs/Plan_Nutrienti/N.html

BONTIDA

Arable

IACS - APIA



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Imagery Dates: Mar 27, 2003 - Sep 21, 2009

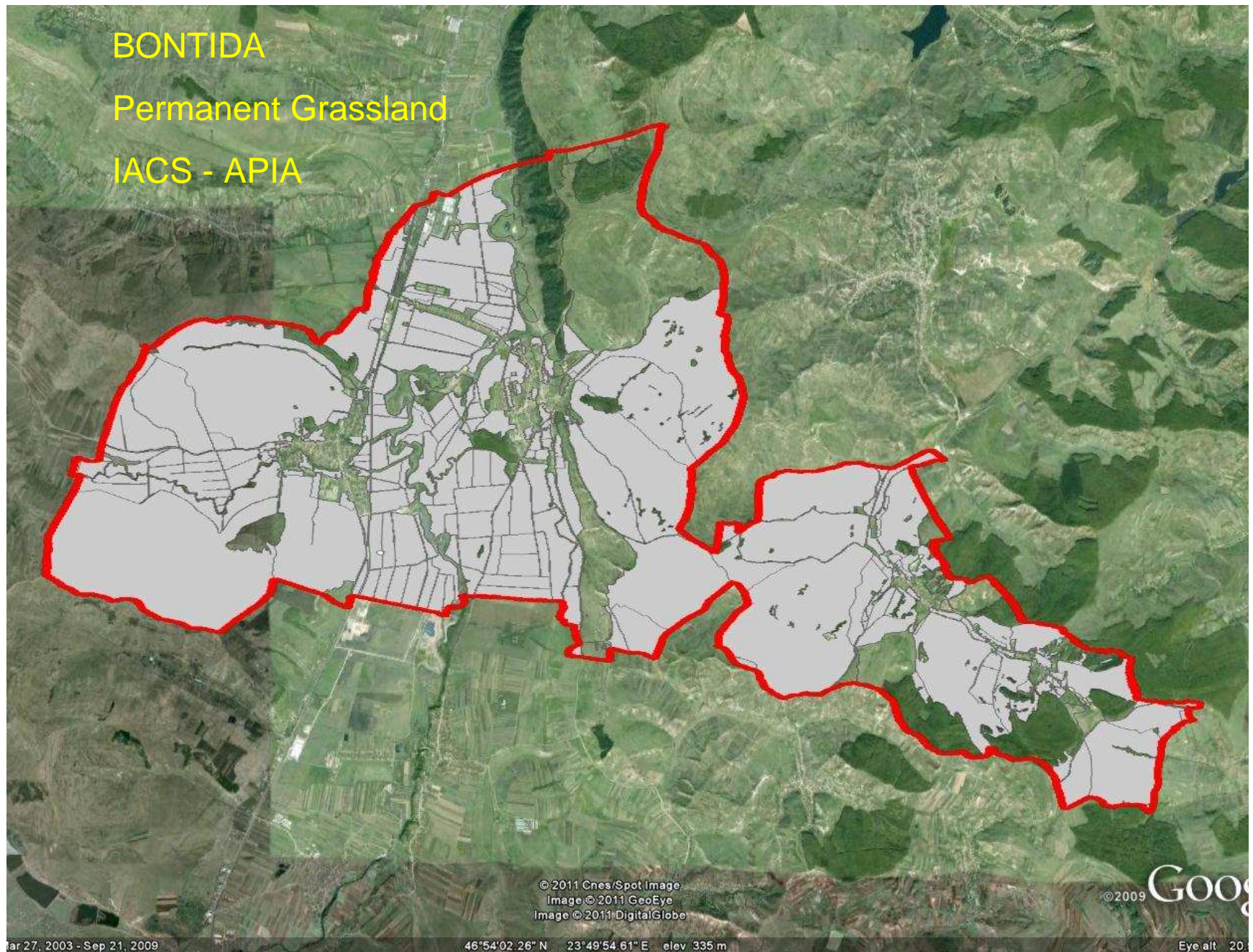
46°53'56.37" N 23°49'53.71" E elev 356 m

Eye alt 18.51 km

BONTIDA

Permanent Grassland

IACS - APIA



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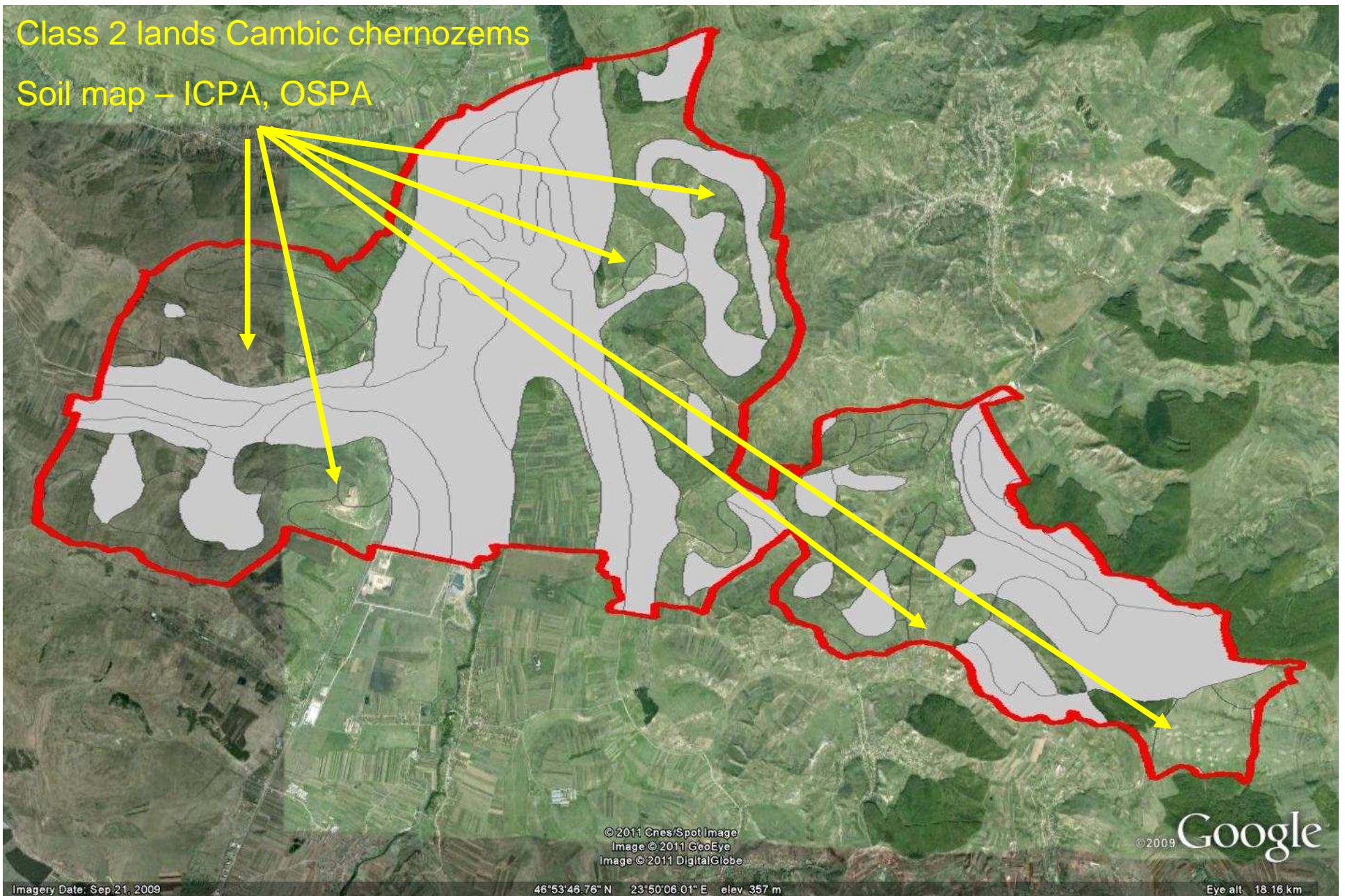
Mar 27, 2003 - Sep 21, 2009

46°54'02.26" N 23°49'54.61" E elev 335 m

Eye alt 20.3

Class 2 lands Cambic chernozems

Soil map – ICPA, OSPA



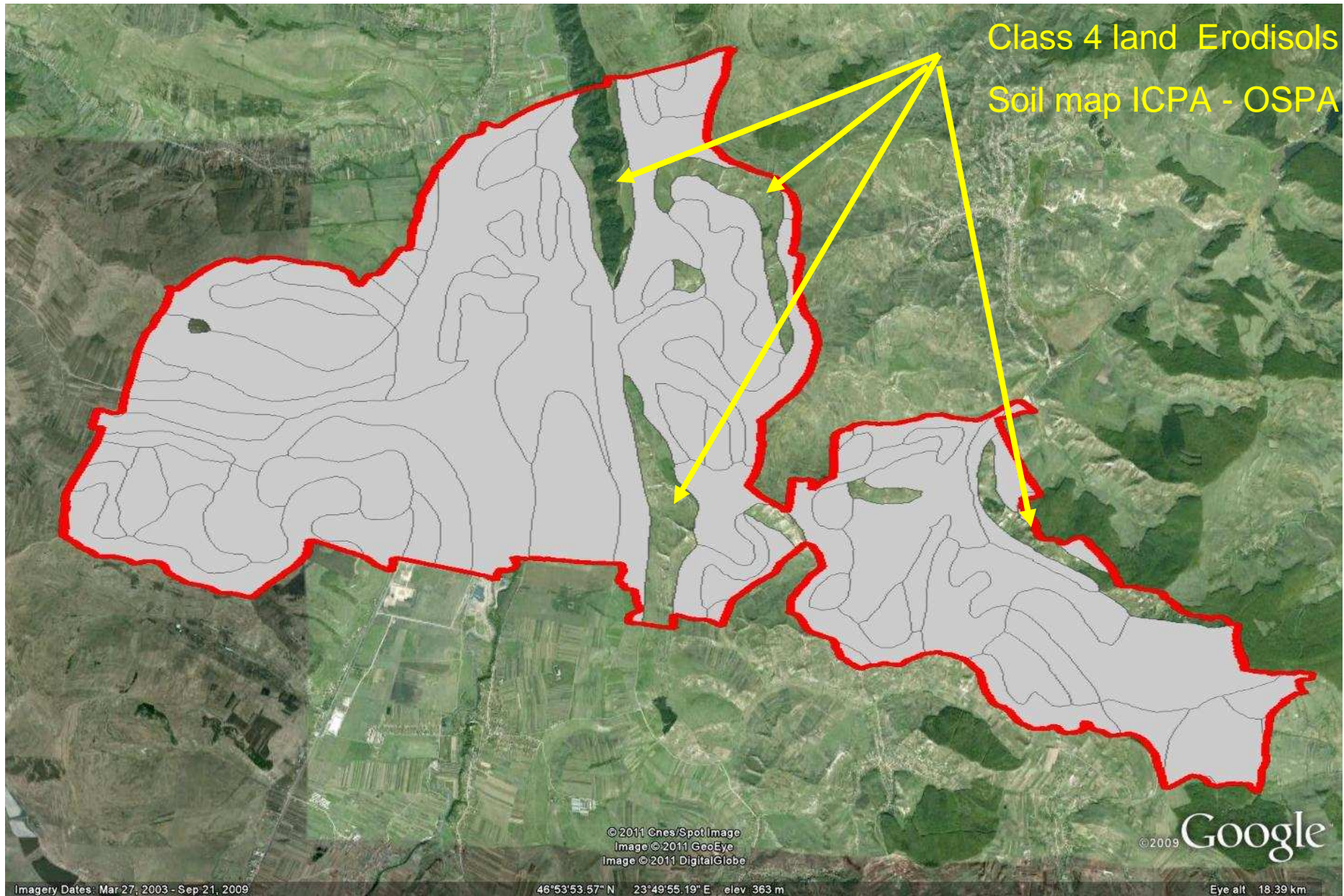
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Imagery Date: Sep 21, 2009

46°53'46.76" N 23°50'06.01" E elev. 357 m

Eye alt. 18.16 km



Class 4 land Erodisolts
Soil map ICPA - OSPA

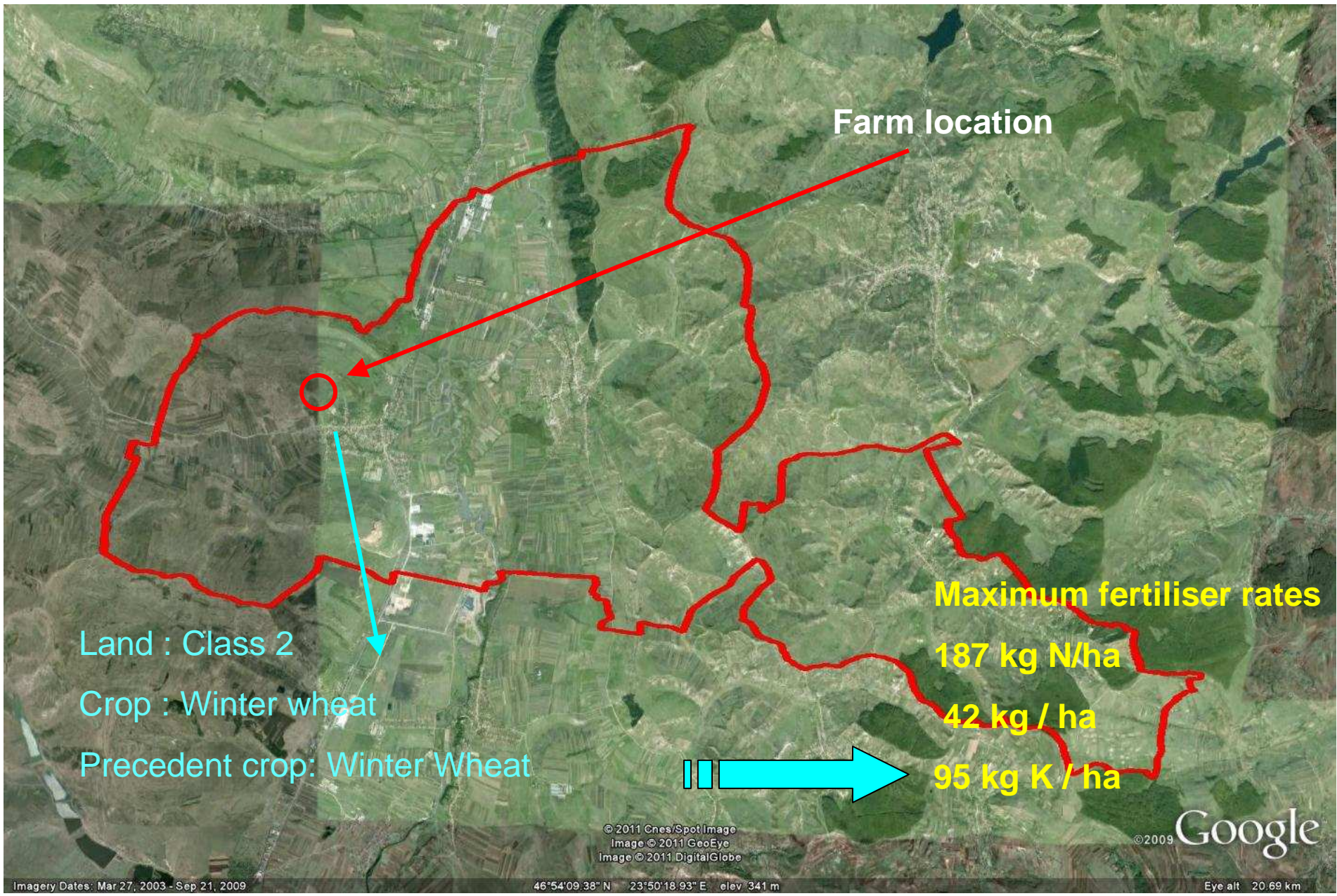
Imagery Dates: Mar 27, 2003 - Sep 21, 2009

46°53'53.57" N 23°49'55.19" E elev 363 m

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Eye alt 18.39 km

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STANDARDE MAXIME PENTRU APLICAREA NUTRIENTILOR cu N, P si K (Kg/ha)

Pentru evaluarea cantitatii maxime de ingrasaminte minerale cu N, P si K care se pot aplica pentru o fertilizare echilibrata scadeti din valorile corespunzatoare cazului Dvs definit prin :

- cultura insamintata
- cultura premergatoare
- clasa de calitate a terenului

aportul de N, P si K furnizat prin ingrasamintele organice calculat pe baza numarului de animale din ferma / exploatare agricola in fisierul <<Calculator Doze NPK gunoi de grajd.xls>>

ATENTIE! - Cantitatea de azot din surse organice nu poate depasi
170 Kg N / ha

LOCALITATEA : BONTIDA JUDET : CLUJ Cod SIRSUP : 56210

-> GRAU DE TOAMNA dupa:

GRAU DE TOAMNA

Clasa	N	P	K	P205	K20
1	218	49	111	112	133
2	187	42	95	96	114
3	39	8	20	18	24
4	87	19	44	43	53
5	45	10	23	22	27

ORZ DE TOAMNA

Clasa	N	P	K	P205	K20
1	219	49	112	112	134
2	187	42	95	96	114
3	39	8	20	18	24
4	88	19	45	43	54
5	45	10	23	22	27

PORUMB

Clasa	N	P	K	P205	K20
1	219	49	112	112	134
2	188	42	96	96	115
3	39	8	20	18	24
4	88	19	45	43	54
5	45	10	23	22	27

SFECLA DE ZAHAR

Clasa	N	P	K	P205	K20
1	231	51	118	116	142
2	198	44	101	100	121
3	39	8	20	18	24
4	98	22	50	50	60
5	55	12	28	27	33

CARTOFI

Clasa	N	P	K	P205	K20
1	224	50	114	114	137
2	191	42	97	96	116
3	39	8	20	18	24
4	90	20	46	45	55
5	46	10	23	22	27

FLOAREA SOARELUI

Clasa	N	P	K	P205	K20
1	218	49	111	112	133
2	187	42	95	96	114
3	39	8	20	18	24
4	87	19	44	43	53

- This is total Nitrogen (mineral + organic)
- Calculator for nitrogen content in manure considering animal species and management system gives the organic nitrogen available for application in farm
- Maximum organic nitrogen rate is the minimum value between $170 \text{ kg}_N \text{ ha}^{-1}$ and maximum nutrient application rate

**Recommendations for establishing Action Programmes
under Directive 91/676/EEC concerning the protection of
waters
against pollution caused by nitrates from agricultural sources**

Contract number N°07 0307/2010/580551/ETU/B1

Consortium

DLO-Alterra Wageningen UR

DLO-Plant research International Wageningen UR

NEIKER, Derio, Spain

Institute of Technology and Life Sciences (ITP), Warsaw, Poland

Swedish Institute of Agricultural and Environmental Engineering (JTI), Uppsala

Environmental stratification (pedo-climatic zones)

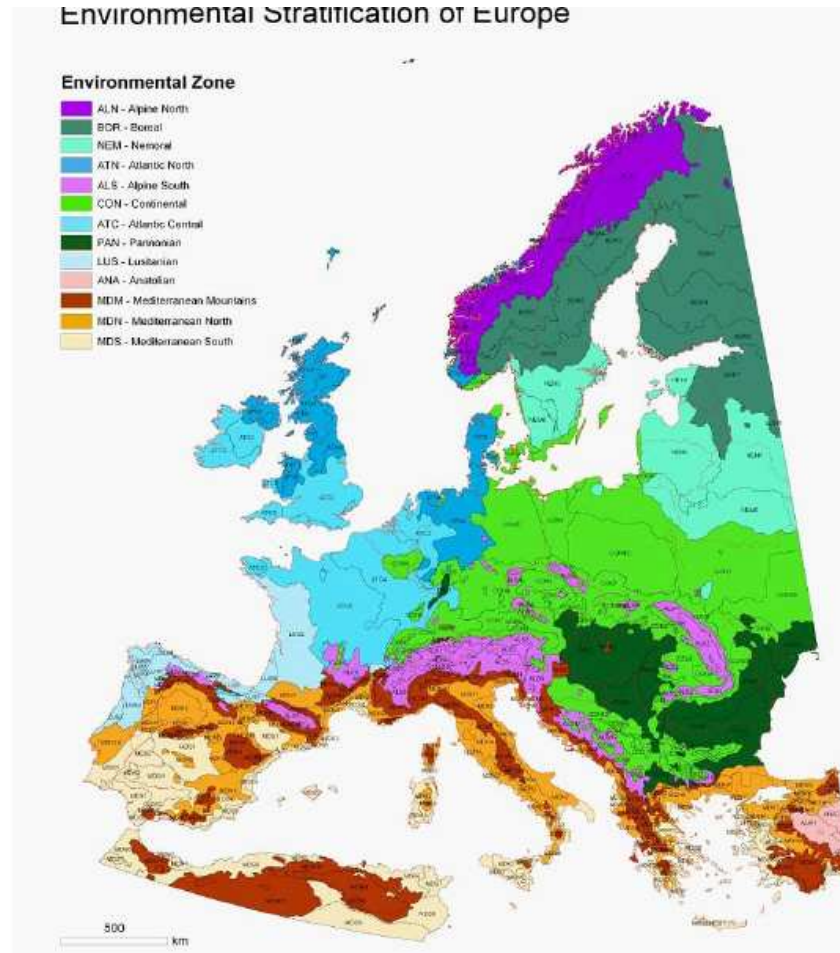



Table 5. Indicative* N recommendations (kg N per ha per year) for major crop species per environmental zone, as related to the risks of leaching and run-off. These recommendations are based on statistical records of crops yields. Various crops are irrigated and N deriving from irrigation water should be accounted for.

EnZs	Risk	Crop:											
		Wheat	Grain maize	Other cereals	Rape seed	Sun flower	Potatoes	Sugar beets	Vegetables	Grassland **	Silage maize	Citrus	Olives
ALN	Low	60-90	80-140	60-100	50-80	50-80	80-130	80-150	60-100	50-80	140-200		
	Medium	30-40	50-80	40-60	30-40	30-50	40-70	80-130	30-50	30-50	80-140		
	High	20-40	30-50	20-40	20-30	20-30	30-50	50-90	20-30	20-30	60-100		
ALS	Low	80-140	100-170	60-100	80-140	40-60	70-120	120-160	110-180	60-100	190-250	190-310	50-150
	Medium	50-80	60-100	40-60	50-90	20-40	40-70	90-150	60-110	40-60	120-200	60-90	50-100
	High	40-60	40-70	20-40	40-60	10-20	20-40	70-110	40-70	20-40	80-140	0-10	0-50
ATN	Low	140-230	140-240	90-150	100-170		200-250	130-200	140-230	160-270	190-250		
	Medium	80-130	80-130	50-80	50-90		120-200	110-180	80-130	90-150	120-190		
	High	50-80	50-80	30-40	30-50		80-130	70-120	50-80	60-90	80-130		
ATC	Low	130-220	140-230	100-170	100-160	50-80	200-250	130-200	130-210	150-250	150-250	140-230	0-150
	Medium	80-130	80-130	50-90	50-90	20-30	120-200	130-200	70-110	140-230	90-150	40-60	0-100
	High	50-80	50-80	30-50	30-50	0-10	80-130	90-150	40-70	100-170	60-90	0-10	0-50
BOR	Low	50-80		40-70	20-40		80-130	90-150	100-160	60-90	130-210		
	Medium	30-50		20-40	10-20		50-80	60-100	60-100	30-60	80-130		
	High	20-30		20-30	0-10		30-50	40-70	40-60	20-40	60-90		
CON	Low	90-150	80-130	50-80	90-150	40-60	90-150	130-200	100-170	80-140	200-250	130-220	0-100
	Medium	60-90	50-80	30-50	60-100	20-30	50-90	100-160	60-100	50-80	120-200	40-60	0-75
	High	40-60	30-50	20-30	40-70	10-20	30-60	70-120	40-70	30-60	90-140	0-10	0-50
LUS	Low	120-200	130-220	70-120	110-180	50-90	100-170	130-200	120-210	70-110	150-240	140-240	0-100
	Medium	70-120	80-130	40-60	60-100	30-40	60-100	130-200	70-120	40-60	90-140	40-70	0-75
	High	50-80	50-80	20-40	40-70	10-20	40-60	100-170	40-70	20-30	60-90	0-10	0-50

		Crop:											
EnZs	Risk	Wheat	Grain maize	Other cereals	Rape seed	Sun flower	Potatoes	Sugar beets	Vegetables	Grassland **	Silage maize	Citrus	Olives
MDN	Low	40-150	160-260	30-40	90-160	20-40	100-160	130-200	170-280	40-200	220-250	190-310	0-100
	Medium	30-40	100-160	10-20	60-100	10-20	60-100	100-170	110-180	20-40	140-230	50-90	0-75
	High	20-30	70-120	10-20	40-70	5-15	40-70	80-130	70-120	10-20	100-170	0-10	0-50
MDM	Low	50-90	150-250	30-50	90-150	30-50	100-170	130-200	160-260	30-60	230-250	190-320	0-100
	Medium	30-50	90-150	10-20	50-90	20-30	60-100	90-150	100-160	20-30	150-240	60-90	0-75
	High	20-30	60-100	0-20	40-60	5-15	40-70	60-110	70-110	0-20	100-170	0-10	0-50
MDS	Low	30-50	170-280	20-30	40-70		100-170	130-200	180-300	30-50	220-250	190-310	0-100
	Medium	20-30	110-180	10-20	30-50		60-100	130-200	120-190	20-30	140-230	60-90	0-75
	High	20-30	80-130	10-20	20-30		40-70	100-170	80-140	10-20	100-170	0-10	0-50
NEM	Low	70-120	90-140	40-60	50-80		60-90	110-190	70-120	60-100	150-250		
	Medium	50-80	50-90	20-40	30-50		30-60	80-130	40-70	40-70	100-160		
	High	40-60	40-60	20-30	20-40		20-40	60-90	30-50	30-50	70-110		
PAN	Low	50-80	70-110	40-60	50-90	40-60	70-120	130-200	60-100	30-50	130-210	180-310	0-100
	Medium	30-60	40-70	30-50	40-60	30-40	40-70	110-180	40-60	20-30	80-140	50-90	0-75
	High	30-40	30-50	20-40	30-50	20-30	30-50	80-130	30-40	10-20	60-100	0-10	0-50

*Expressed in fertilizer N equivalents. Recommendation have to be tuned to local records concerning N export, soil N recovery, N harvest index and N supply from atmospheric deposition, irrigation water and the mineralization of crop residues and manure residues

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• $187 \text{ kg}_N \text{ ha}^{-1}$  $60 - 90 \text{ kg}_N \text{ ha}^{-1}$

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Interdiction periods for applying manure

Recommendations for establishing Action Programmes

Table 4. Minimum manure storage capacity (months of manure production) per environmental zone (ENZ) based on the probability of a precipitation surplus, periods of drought and frost and unforeseeable weather extremes

Nr	ENZs	Type of crops grown	
		100% Arable	100% Grassland
1	ALN – alpine north	>10	>9
2	ALS – alpine south	>9	>6
3	ATN – Atlantic north	>8	>7
4	ATC – Atlantic central	>7	>3
5	BOR – boreal	>8	>7
6	CON – continental	>7	>4
7	LUS – Lusitanian	>8	>4
8	MDN – Mediterranean north	>5	>2
9	MDM – Mediterranean mountains	>8	>3
10	MDS – Mediterranean South	>3	>3
11	NEM – Nemoral	>7	>5
12	PAN – Pannonian	>6	>3
13	ANA – Anatolian	>6	>2

Using national climatic data for the
evaluation of time interval with
temperatures below 5⁰

EVN		Interval de intinerare pentru aplicarea impozitului	Interval de timp pentru stabilirea capacității de stocare (luni)
1	Prut Superior	12 Noiembrie - 24 Martie	5
2	Prut Inferior	17 Noiembrie - 18 Martie	5
3	Siret Superior	8 Noiembrie - 29 Martie	6
4	Siret Inferior 1	17 Noiembrie - 17 Martie	5
5	Siret Inferior 2	19 Noiembrie - 15 Martie	5
6	Lunca Dornii 1	24 Noiembrie - 12 Martie	5
7	Ialomița Inferioară	18 Noiembrie - 15 Martie	5
8	Ialomița Superioară	23 Octombrie - 19 Aprilie	7
9	Lunca Dornii 2	24 Noiembrie - 12 Martie	5
10	Valea	20 Noiembrie - 14 Martie	5
11	Calușeni	20 Noiembrie - 13 Martie	5
12	Morțișoaia	22 Noiembrie - 12 Martie	5
13	Arges Superior	11 Noiembrie - 25 Martie	5
14	Arges Inferior	20 Noiembrie - 14 Martie	5
15	Neajlov	20 Noiembrie - 15 Martie	5
16	Colt Superior	1 Noiembrie - 4 Aprilie	6
17	Bucseu	29 Octombrie - 10 Aprilie	6
18	Făgăraș	7 Noiembrie - 28 Martie	6
19	Colt	17 Noiembrie - 14 Martie	5
20	Colt Inferior	21 Noiembrie - 13 Martie	5
21	Lunca Dornii 3	24 Noiembrie - 11 Martie	5
22	Jiu Superior	15 Noiembrie - 19 Martie	5
23	Dorneni - Jiu	22 Noiembrie - 11 Martie	5
24	Lunca Dornii 4	24 Noiembrie - 9 Martie	4
25	Jiu Inferior	20 Noiembrie - 13 Martie	5
26	Neza - Ialomița Superior	13 Noiembrie - 22 Martie	5
27	Begea	22 Noiembrie - 8 Martie	5
28	Podul Transilvaniei	11 Noiembrie - 20 Martie	5
29	Muresul Superior	29 Octombrie - 7 Aprilie	6
30	Siret - Arges	9 Noiembrie - 28 Martie	6
31	Mures Inferior	21 Noiembrie - 10 Martie	5
32	Campa de Vest - Crișana	20 Noiembrie - 13 Martie	5
33	Izvoarele raurilor Crișana	13 Noiembrie - 23 Martie	5
34	Dealurile de Vest - Crișana	18 Noiembrie - 17 Martie	5
35	Podul Transilvaniei 2	10 Noiembrie - 21 Martie	5
36	Somes Inferior	13 Noiembrie - 18 Martie	5
37	Isa	4 Noiembrie - 31 Martie	6
38	Somes Superior	1 Noiembrie - 4 Aprilie	6
39	Mareș	21 Noiembrie - 18 Martie	5
40	De lașca Sud	28 Noiembrie - 14 Martie	5
41	Lunca Dornii 5	23 Noiembrie - 14 Martie	5
42	Podul De lașca	29 Noiembrie - 14 Martie	5

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Storage capacity:



> 7

5 months