



# Social values and attitudes and multifunctional soil use

**SENIOR LECTURER,**

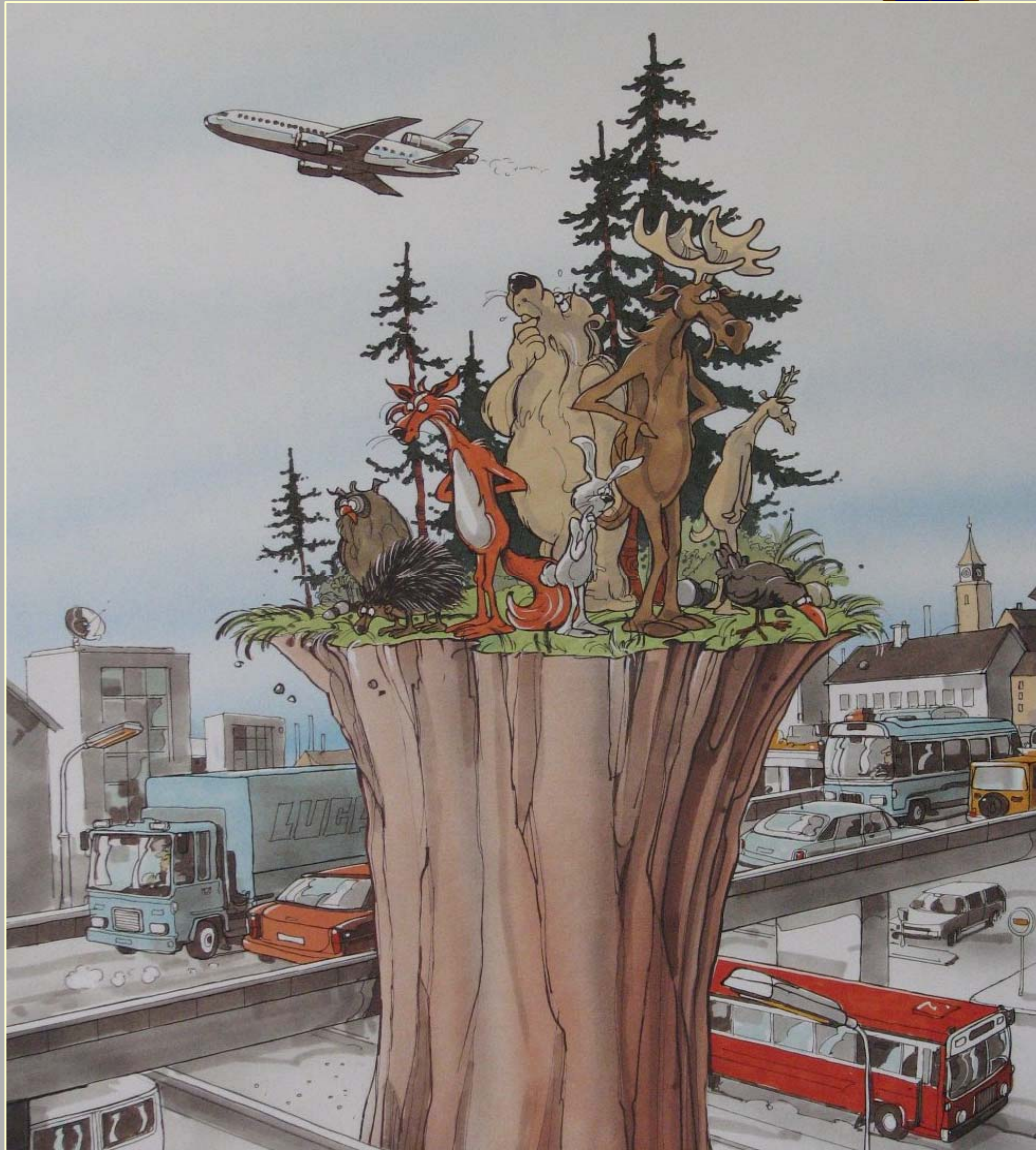
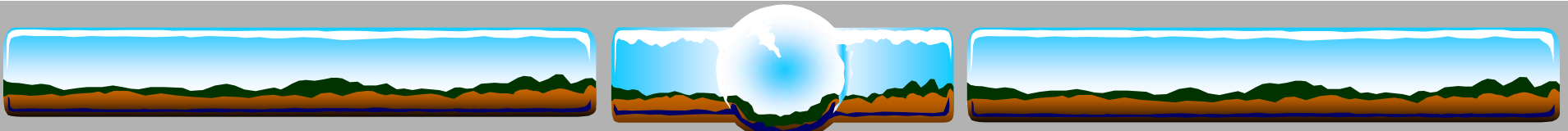
**Tomaž PRUS**

**University of Ljubljana, Biotechnical faculty**

**CENTER FOR SOIL AND**

**ENVIRONMENTAL SCIENCE**





The background illustration:

Swedish environmental protection agency, S-171 85 Solna, Sweden

Helming K., Wiggering H. (Eds.):

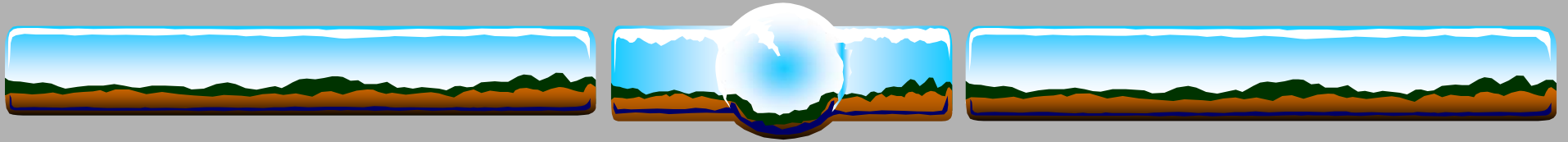
Sustainable development of Multifunctional Landscapes

Prus T. (Eds.):

Vrednotenje zemljisc kot podpora prostorskemu planiranju (Land evaluation as support to spatial planning)

Gore Al:

Earth in the Balance: Ecology and the Human Spirit



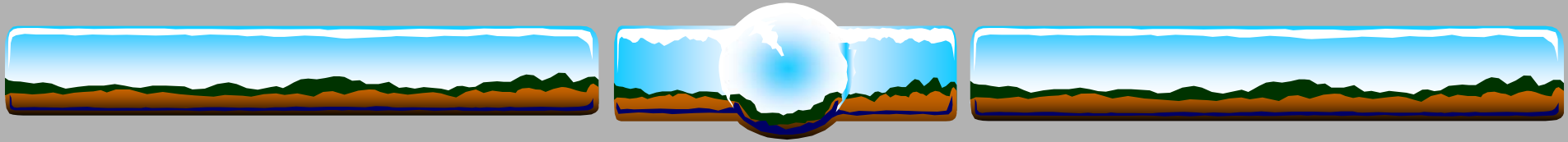
## **THE EFFECTS OF HUMAN SPECIES**

- Fast increasing of population
- Adaptation in physical sense
- Changing own environment

(human species : fusion (fermentation) fungus)

## **THE REAL POWER WOULD BE**

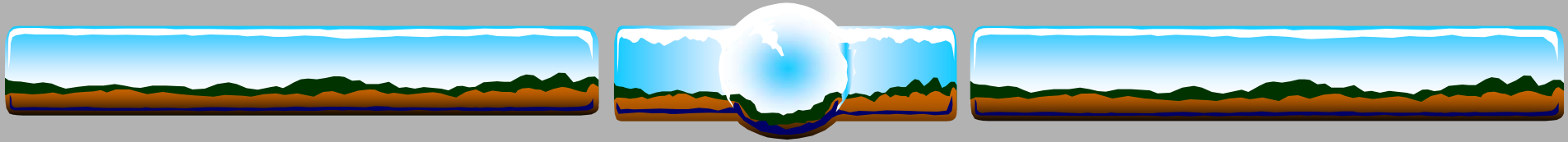
- ADAPTATION of mind
- REGULATING OWN ENVIRONMENT



## ECOLOGY / ENVIRONMENT

- **people dealing with environmental protection often call themselves ecologists**
- **Ecology is a (biological) discipline dealing with interrelations (including competition) between individuals of a species, different species and their relations to the environment.**
- **So most of ecological statements or principles are actually principles of (human) environmental protection**





## ECOSYSTEM / HABITAT

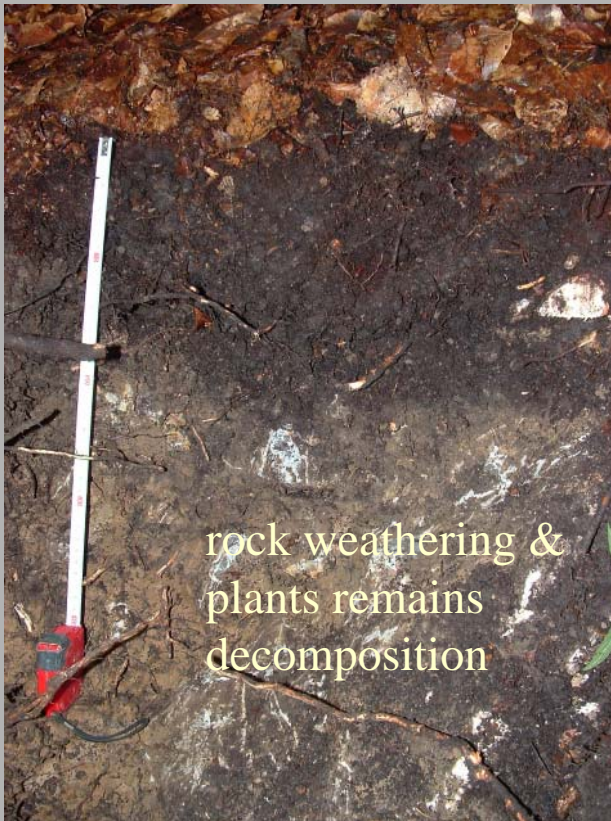
### ECOSYSTEM

### HABITAT

Living part

Not living part

SOIL



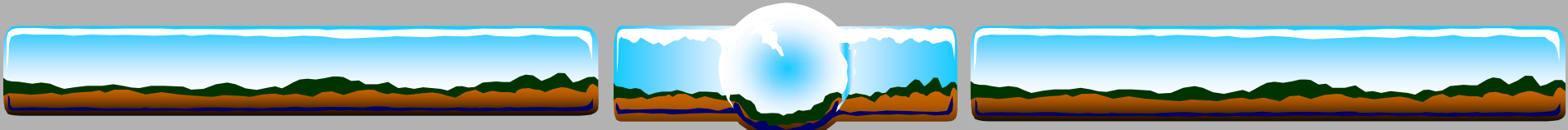
rock weathering &  
plants remains  
decomposition



small ponding area is the  
habitat for reed

We are usually not able to take the whole ecosystem into the consideration so habitat is more practical because of it's visualization



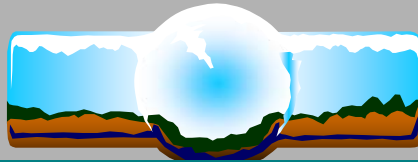


Cold-warm, wet-dry, low-high,  
cultural –urban (even dump  
areas)

## VARIOUS HUMAN HABITATS

HUMAN SPECIES HAS A  
GREAT ADAPTATION  
CAPACITY TO PHYSICAL  
CONDITIONS





# LAND AND SOIL



PARENT MATERIAL	relief	CLIMATE	WATER	PLANTS	ANIMALS & MICRO ORG.	HUMANS	TIME	WEATHERING	HUMIFICATION	MIGRATIONS	OTHER PROC.
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SOIL FORMING FACTORS

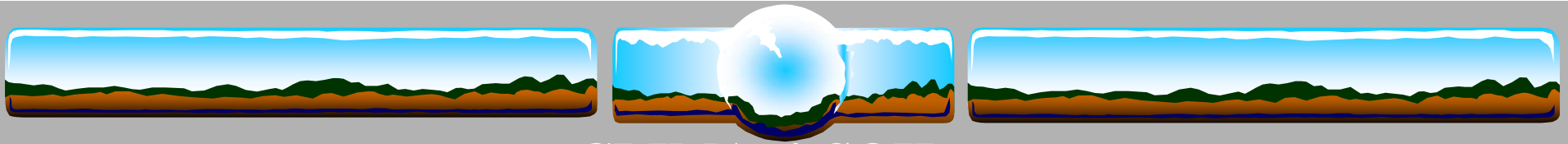
SOIL FORMING PROCESSES

FACTORS AND PROCESSES OF SOIL FORMATION

=

FACTORS AND PROCESSES OF LAND FORMATION, THOUGH LAND IS MORE THAN SOIL





CLIMA / SOIL



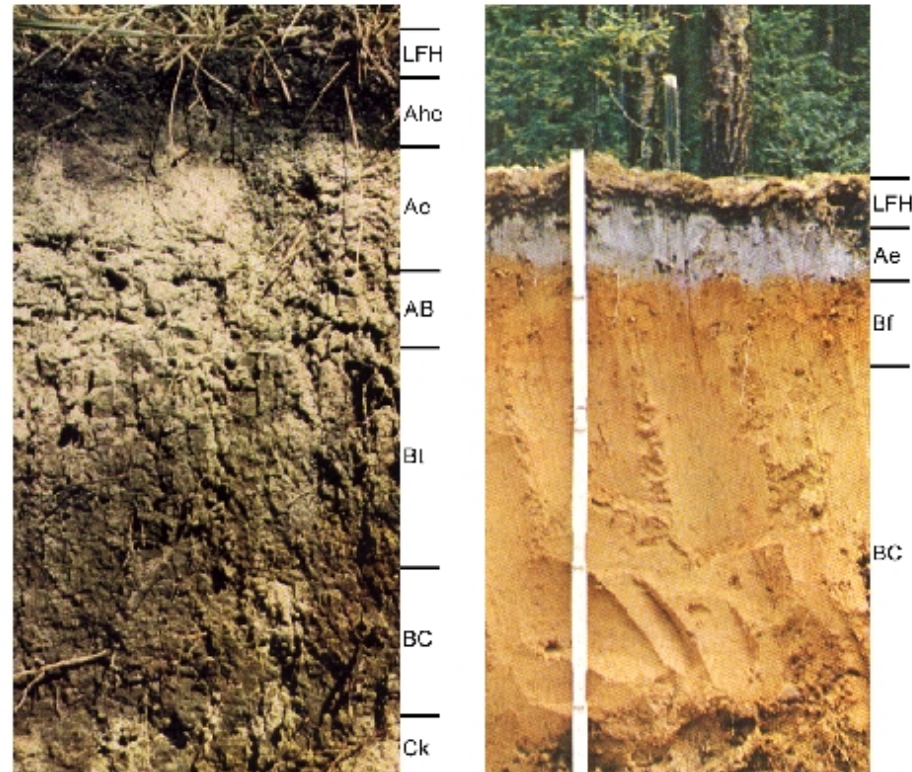
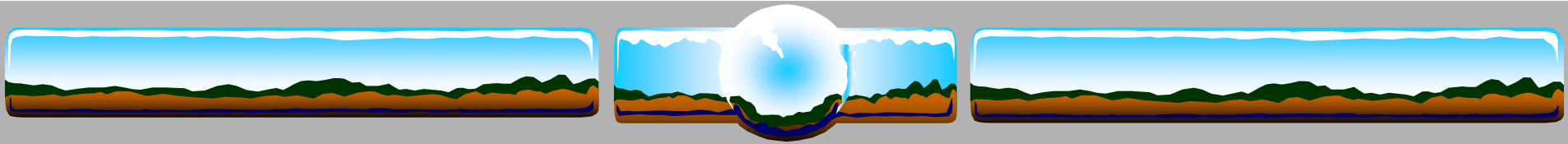
FUR = ATMOSPHERE

SKIN = SOILS



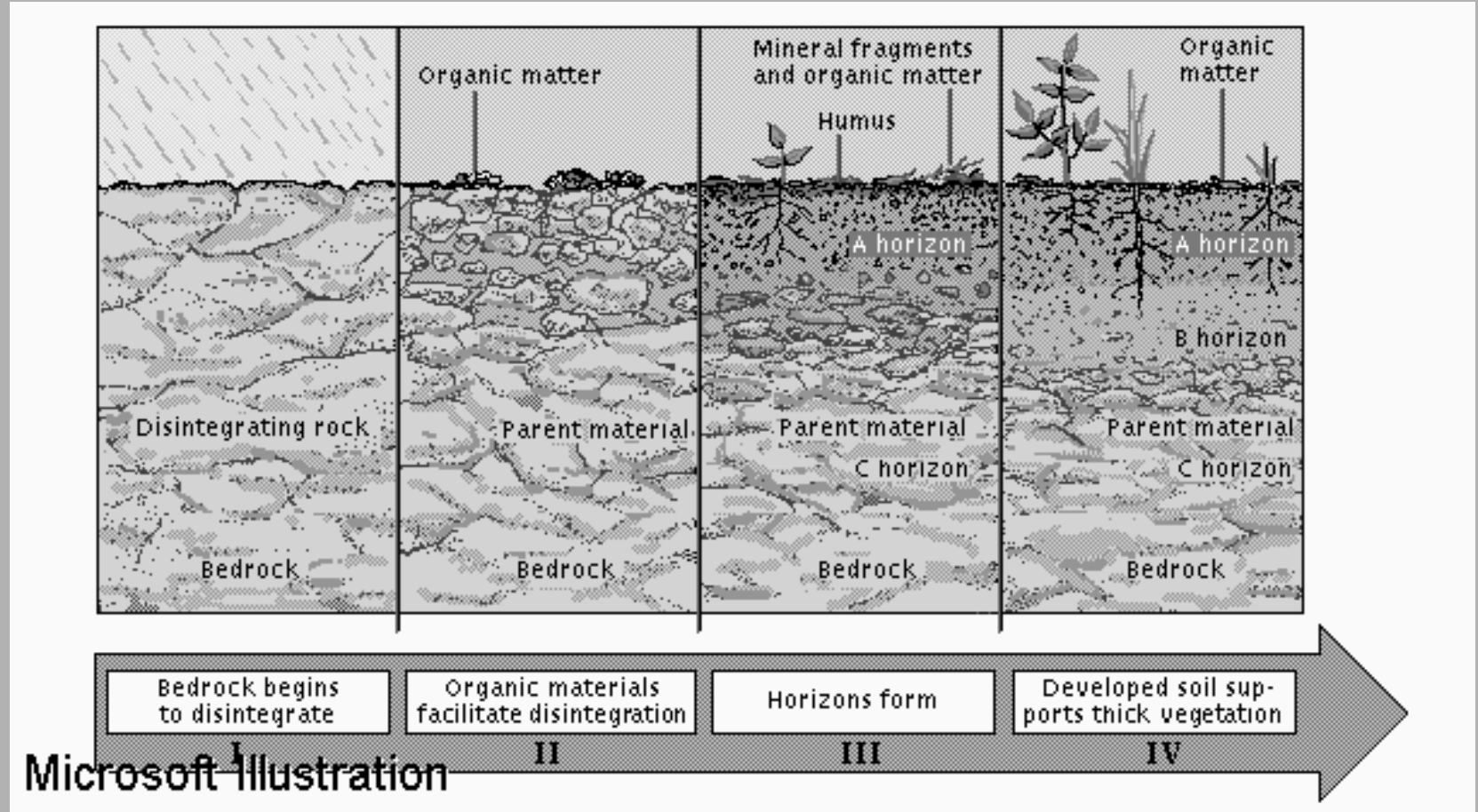
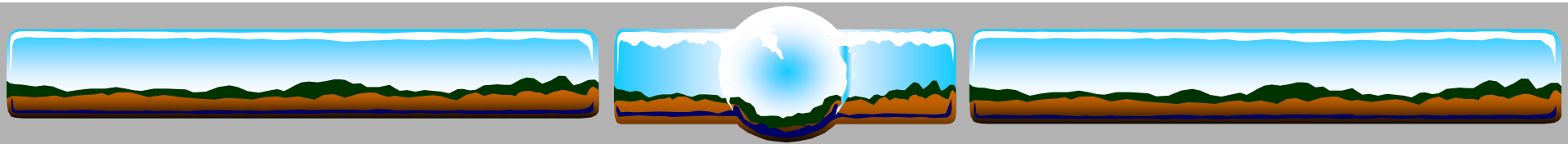
**BOTH ARE VERY THIN COMPARING WITH THE BODY VOLUME  
AS WELL AS VULNERABLE**





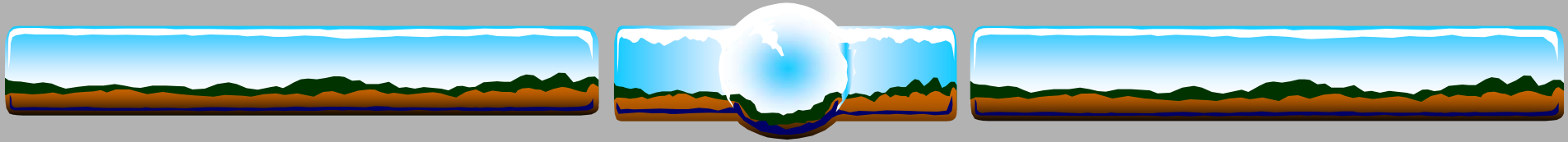
Credit: U of A Extension & [Pedosphere.com](http://Pedosphere.com)

Soils are the upper part of the Earth's surface, capable to support plants with nutrients, water and physical stability. They are a three dimensional phenomena visible only with energy input (digging or augering and walking (carrying field equipment))



Usually it is possible to distinguish certain stages of development  
 Soils are not just sediment or weathering products.





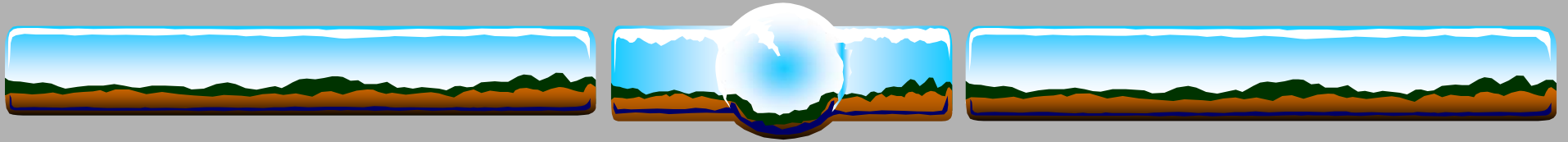
Soils properties were the basic criteria for different land use.

The primary differentiation of land use has been done between forests and agricultural/arable land. Further more and more land was needed for agriculture so the criteria drop. We have traces of cultivation also on very shallow and stony soils.

When the cities started to grow a new competition has been induced.

At the middle of 19. century Thomas Malthus presented a theory of discrepancy between food production and increasing human population.

That did not happen, but that does not mean that ancient, medieval and even new history passed without food shortage. Many reasons were for that but sudden climate changes were the reasons for that – mostly due to volcanic eruptions. The hunger period in Ireland for exp. Is a complex of climate change (small ice age 1550-1850) political decisions (the removal of people from Scotland to Ireland), social traditions (early marriages) and



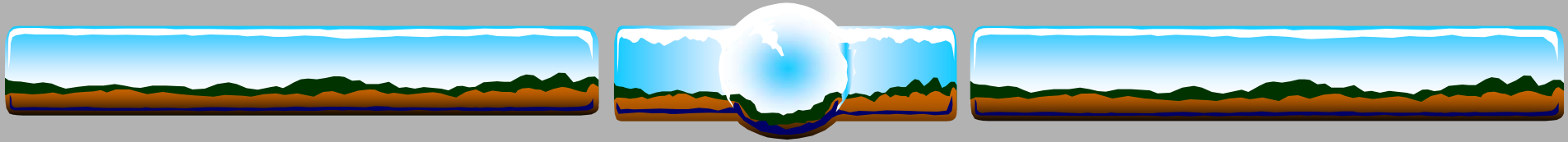
the dependence on one single crop – potato as well as on single variety of that crop. Due to relatively wet and warm summer Phytophthora strike with full power. In next few years died because of starvation and undernourishment one million of people.

More examples are cited in **Gore Al:**

**Earth in the Balance: Ecology and the Human Spirit**

chp 4: Climate and civilisation

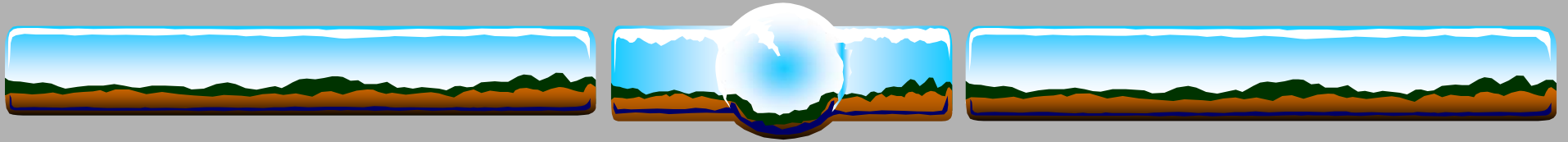




## Pressures to land use

- Changing importance of (classic) agricultural and forestry production (food /energy)
- Ecological goals related to land use and land use planning (exp. Wetland / ameliorated agricultural land)
- Climate change with increasing probabilities of extreme weather events (floods, droughts, storms)
- Changing public perception of land use (farmer as a nurser of land / farmer as a mass producer & land owner : land tenant; Lost credibility!!!!)

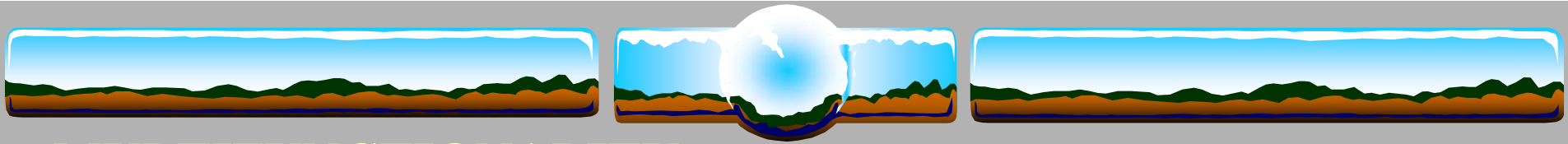
A new paradigm is needed!



## Sustainability

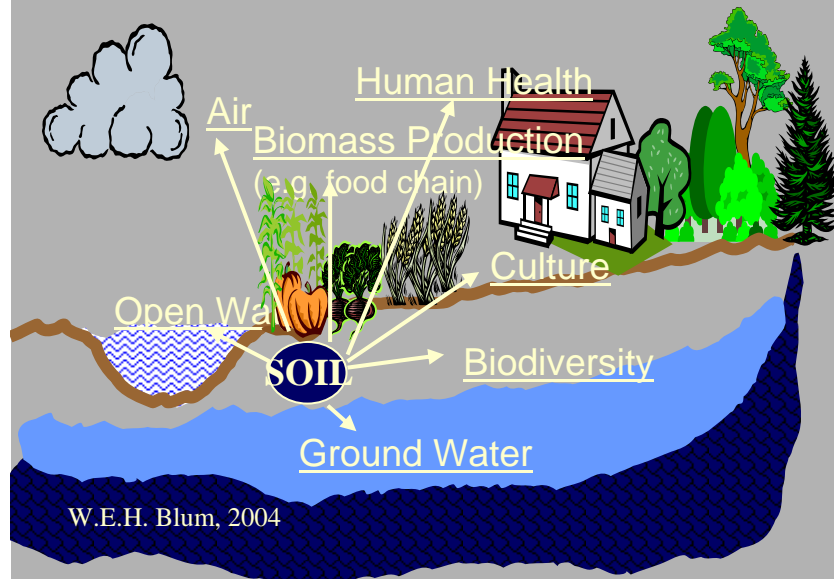
- The use of renewable resources may not exceed their regeneration rate
- The use of renewable resources may not exceed their substitution rate
- The release of harmful substances may not exceed the capacity of natural systems to absorb and compensate





## MULTIFUNCTIONALITY

- of soils as a vital media, part, resource etc.



- multifunctionality of land

OR

- multifunctionality of sectors for exp.:

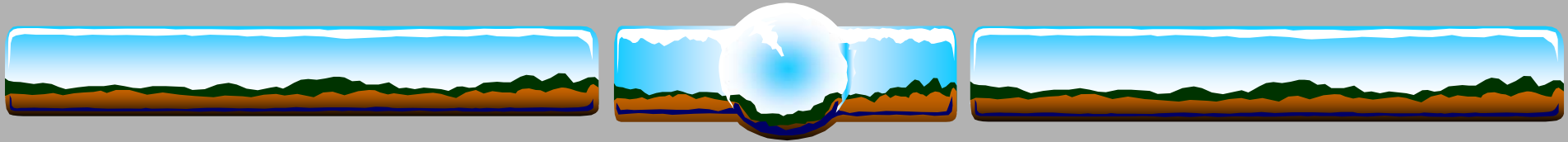
Agriculture ( agronomy)

Forests (forestry)

Urban areas (civil engineering)

CAN SECTORS BEHAVE  
MULTIFUNCTIONAL ???

( Think about periods of disturbance,  
repeating of disturbance, monocultures,....)



## THE VALUE OF LAND & SOIL

- Land as common good, given by God and is not transferable
- Land as finite recourse in extent has become an issue of competition – land is an economic asset like labour and capital

Land is a target and desire for ownership

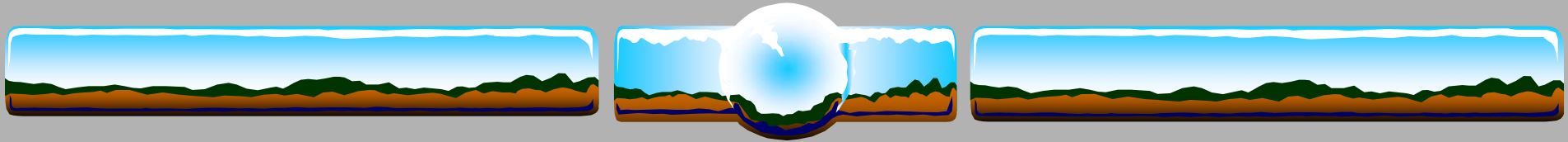
The property market is expanding - a biiiiig business

Investments in land as a speculative object

- Multifunctionality makes multiple values

Some of them are exchange or sales values, some are not  
(presence of pure air, no noise,...)

Price is the parameter to express the value of an object or a property



Price expressed in money is the generally accepted mean to compare values on the market.

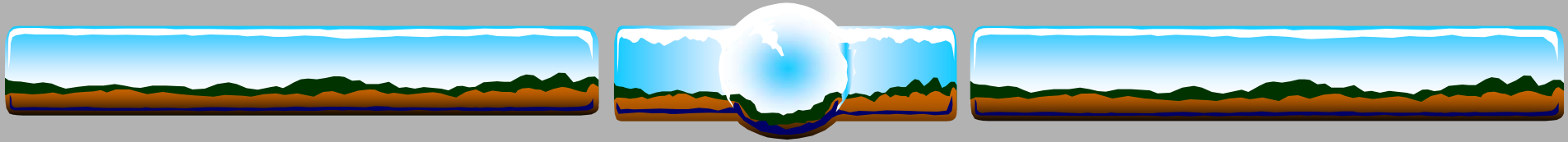
Market price designates what a property might be sold at a specific period in time

Value designates the land's intrinsic worth as compared to other parts of land

### **Factors affecting land value and price**

- Expected income
- Tradition, prestige, aesthetics, social and environmental importance
- Speculation value



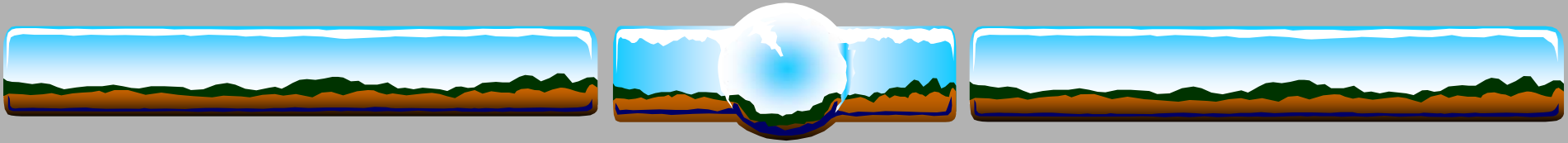


In the rural sector the value of land is determined by production potential of land (crops, timber, cattle raising,....)

Good soil (fertile, enough deep and in a flat level) can be used for different purposes, other have a limited choice of land use (vineyards on slope, asparagus on sandy soil,....)

Generally in rural areas the land prices remain low, and in urban and peri-urban are high. **The shift from agricultural to urban results in higher prices.**

This can result also in unlimited and uncontrolled construction so physical planning and zoning is a measure to avoid that process.

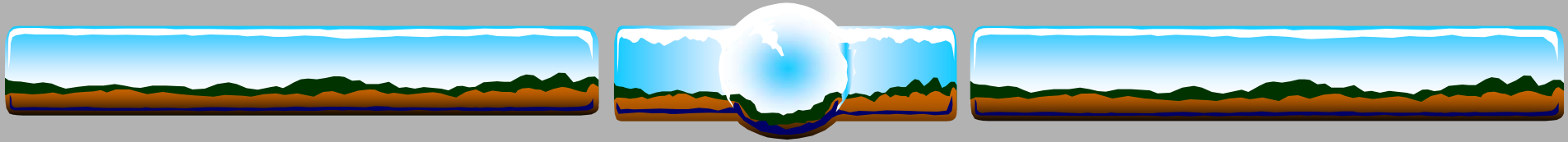


**PLAN (LAND USE PLAN) :**  
**urban, agricultural, protected, ....**

**(too) many criteria**

**visual effects / measurable data**

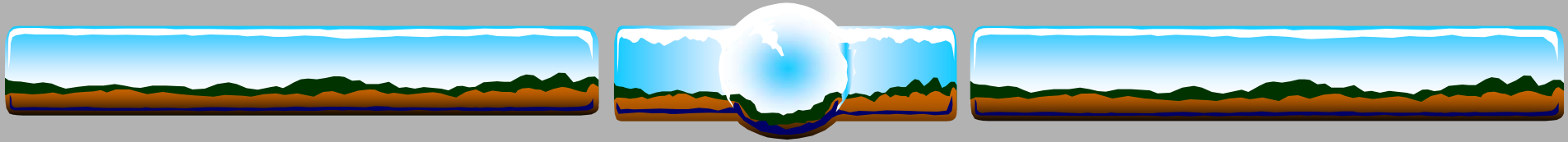




visual effects / measurable data  
emotional / rational







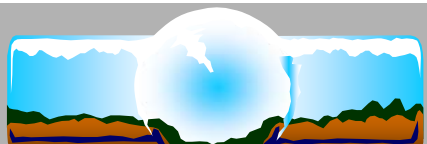
HOW GOOD /IMPORTANT ARE SOILS IN A CERTAIN AREA FOR PRIMARY LAND USE (NATURE COSERVATION, FORESTRY, AGRICULTURE) ?

Many possible approaches:

Land evaluation (crop oriented)

Land capability classification (zonation; yes/no)

“Bodenschätzung” (allows models development)



# Transformation of soil properties to points

by applying a common and well known method, which is slightly adapted from county to country.

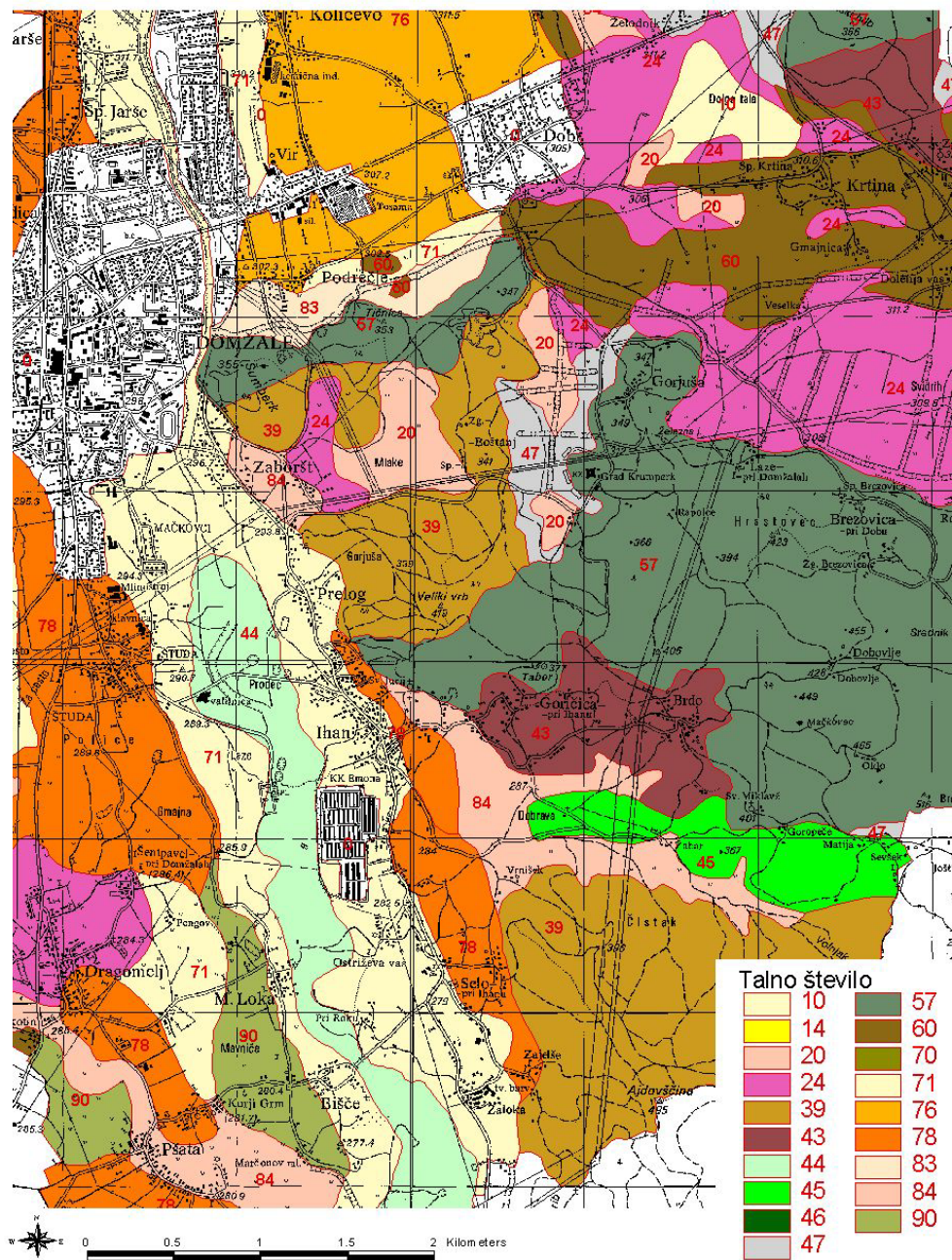
Bodenart	Entstehung	Zustandsstufe						
		1	2	3	4	5	6	7
S Sand	D		41-34	33-27	26-21	20-16	15-12	11-7
	Al		44-37	36-30	29-24	23-19	18-14	13-9
	V		41-34	33-27	26-21	20-16	15-12	11-7
Sl (S/IS) anlehmiger Sand	D		51-43	42-35	34-28	27-22	21-17	16-11
	Al		53-46	45-38	37-31	30-24	23-19	18-13
	V		49-43	42-36	35-29	28-23	22-18	17-12
IS lehmiger Sand	D	68-60	59-51	50-44	43-37	36-30	29-23	22-16
	Lö	71-63	62-54	53-46	45-39	38-32	31-25	24-18
	Al	71-63	62-54	53-46	45-39	38-32	31-25	24-18
	Vg		57-51	50-44	43-37	36-30	29-24	23-17
SL (IS/sL) stark lehmiger Sand	D	75-68	67-60	59-52	51-45	44-38	37-31	30-23
	Lö	81-73	72-64	63-55	54-47	46-40	39-33	32-25
	Al	80-72	71-63	62-55	54-47	46-40	39-33	32-25
	V	75-68	67-60	59-52	51-44	43-37	36-30	29-22
	Vg			55-48	47-40	39-32	31-24	23-16
sL sandiger Lehm	D	84-76	75-68	67-60	59-53	52-46	45-39	38-30
	Lö	92-83	82-74	73-65	64-56	55-48	47-41	40-32
	Al	90-81	80-72	71-64	63-56	55-48	47-41	40-32
	V	85-77	76-68	67-59	58-51	50-44	43-36	35-27
	Vg			64-55	54-45	44-36	35-27	26-18
L Lehm	D	90-82	81-74	73-66	65-58	57-50	49-43	42-34
	Lö	100-92	91-83	82-74	73-65	64-56	55-46	45-36
	Al	100-90	89-80	79-71	70-62	61-54	53-45	44-35
	V	91-83	82-74	73-65	64-56	55-47	46-39	38-30
	Vg			70-61	60-51	50-41	40-30	29-19
LT schwerer Lehm	D	87-79	78-70	69-62	61-54	53-46	45-38	37-28
	Al	91-83	82-74	73-65	64-57	56-49	48-40	39-29
	V	87-79	78-70	69-61	60-52	51-43	42-34	33-24
	Vg			67-58	57-48	47-38	37-28	27-17
T Ton	D		71-64	63-56	55-48	47-40	39-30	29-18
	Al		74-66	65-58	57-50	49-41	40-31	30-18
	V		71-63	62-54	53-45	44-36	35-26	25-14
	Vg			59-51	50-42	41-33	32-24	23-14
Mo Moor			54-46	45-37	36-29	28-22	21-16	15-10

Abbildung 1: Ackererschätzungsrahmen (Bodenkundliche Kartieranleitung, S. 308)



## Občina Domžale

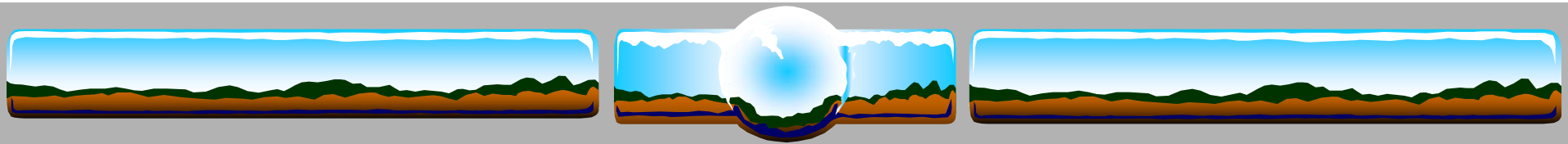
### Talno število



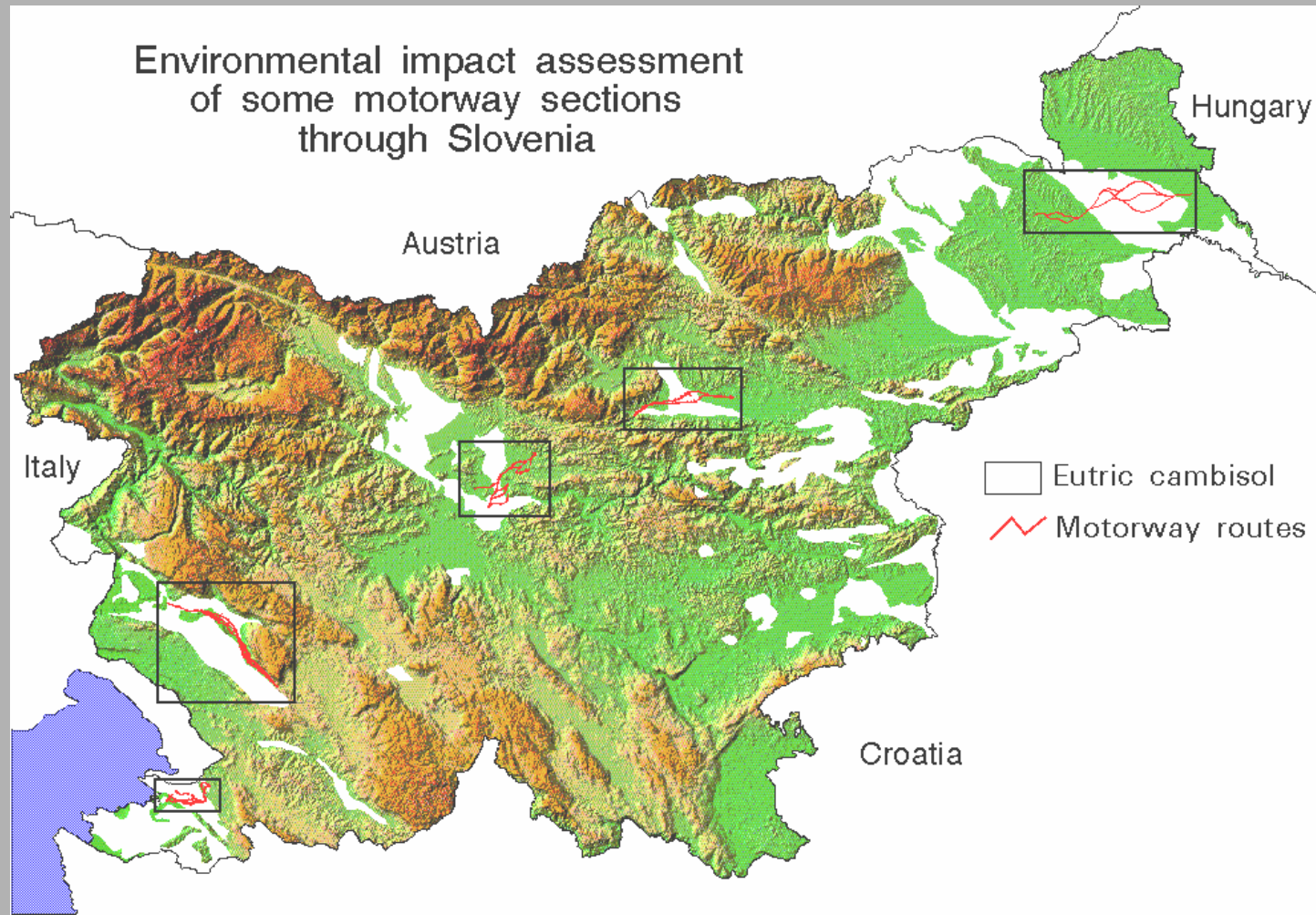
100 very good

7 low

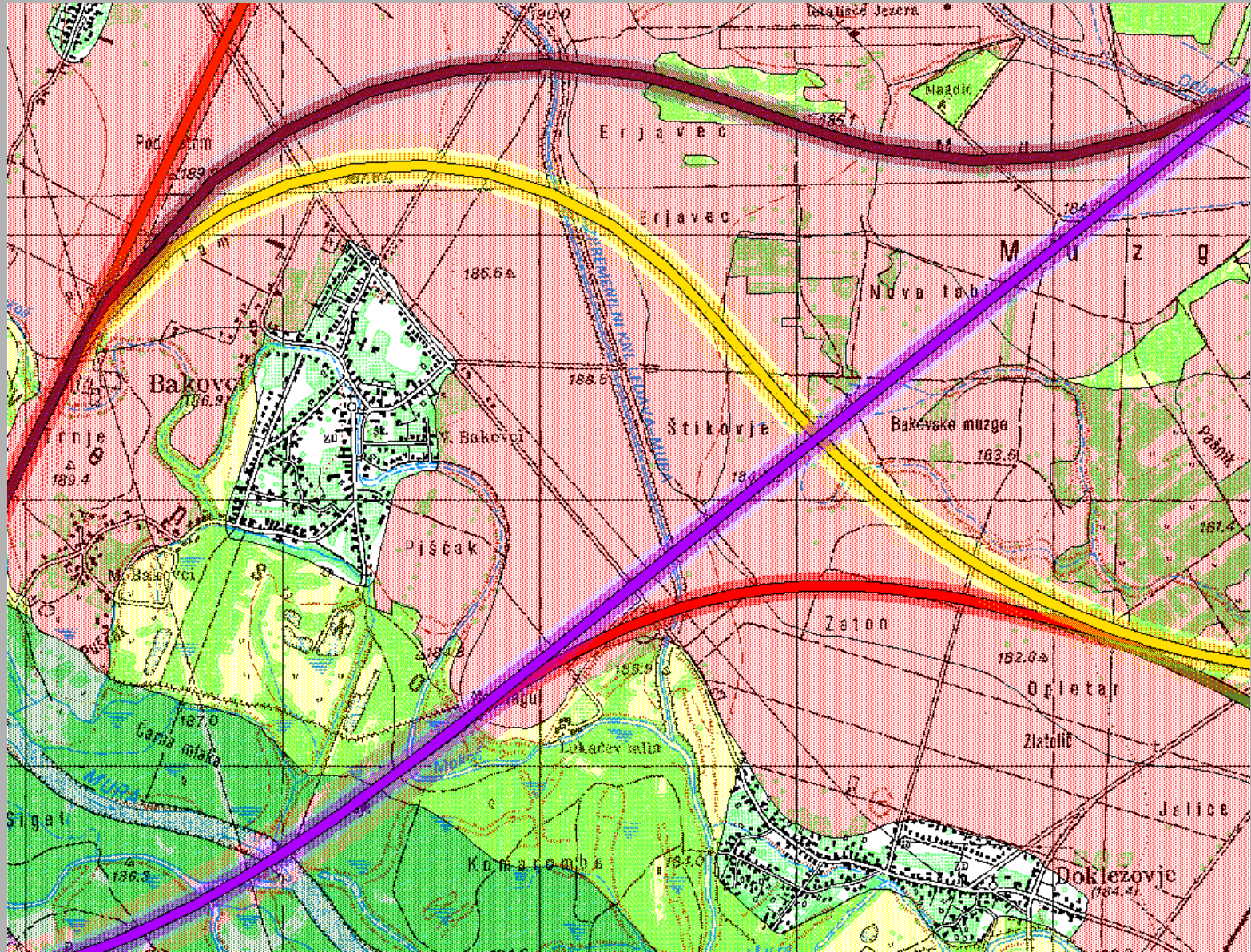
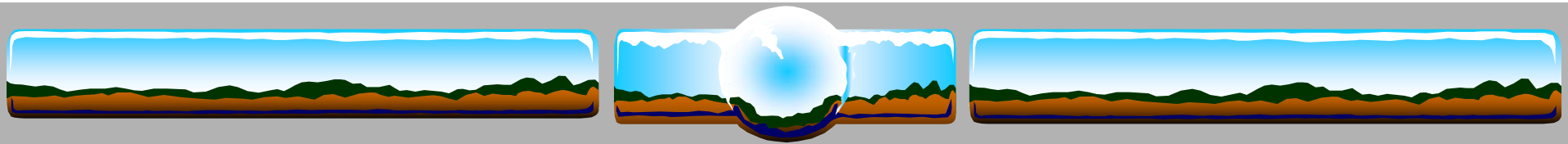




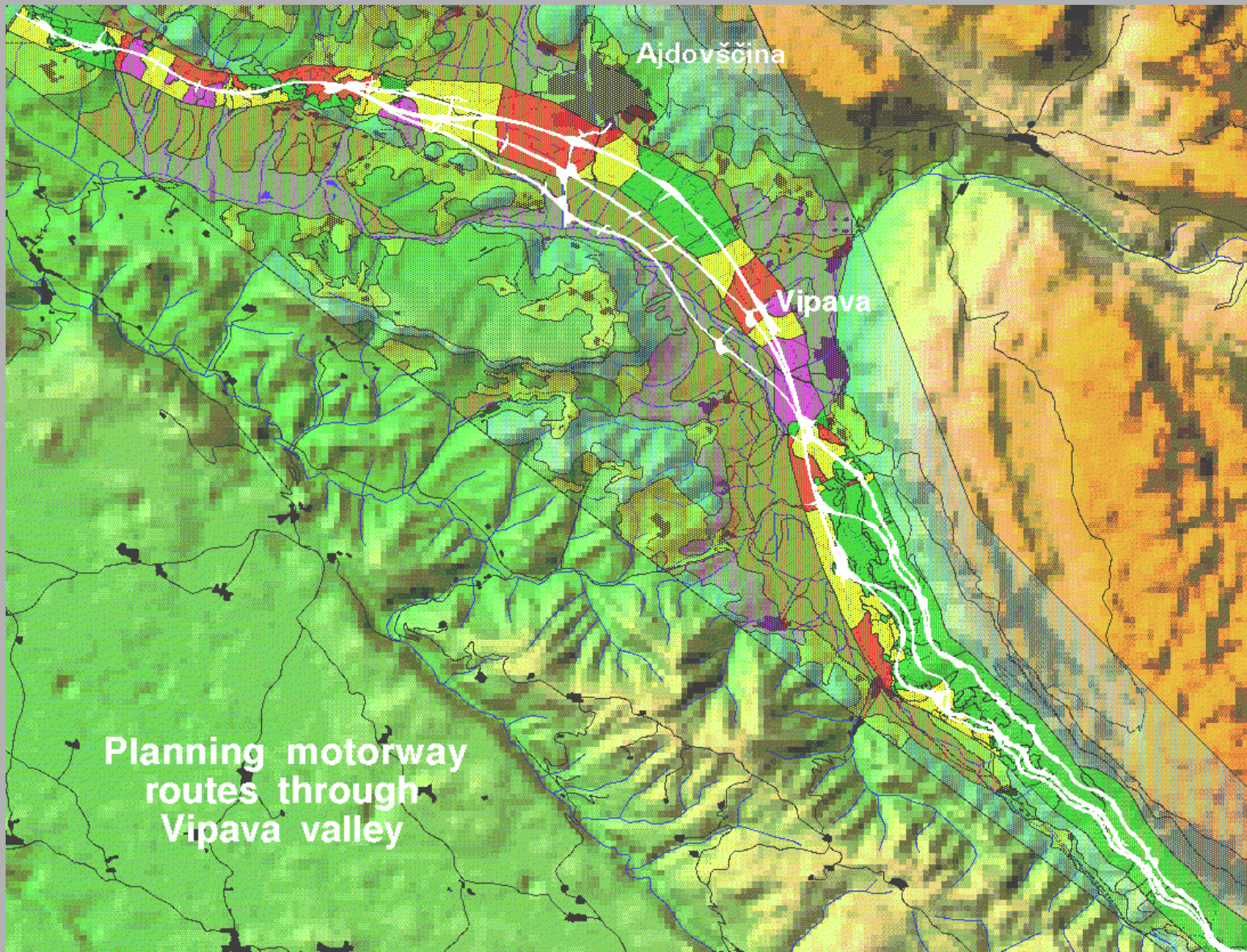
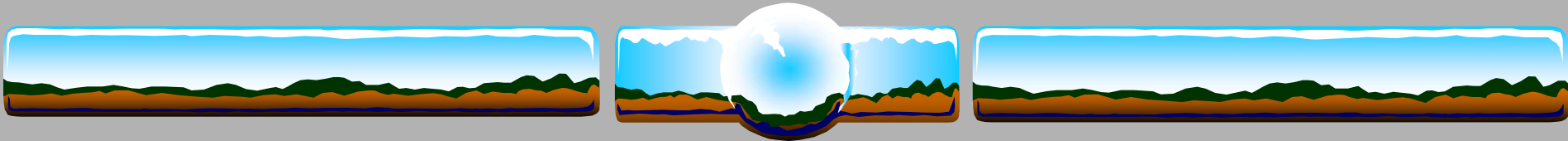
## Environmental impact assessment of some motorway sections through Slovenia





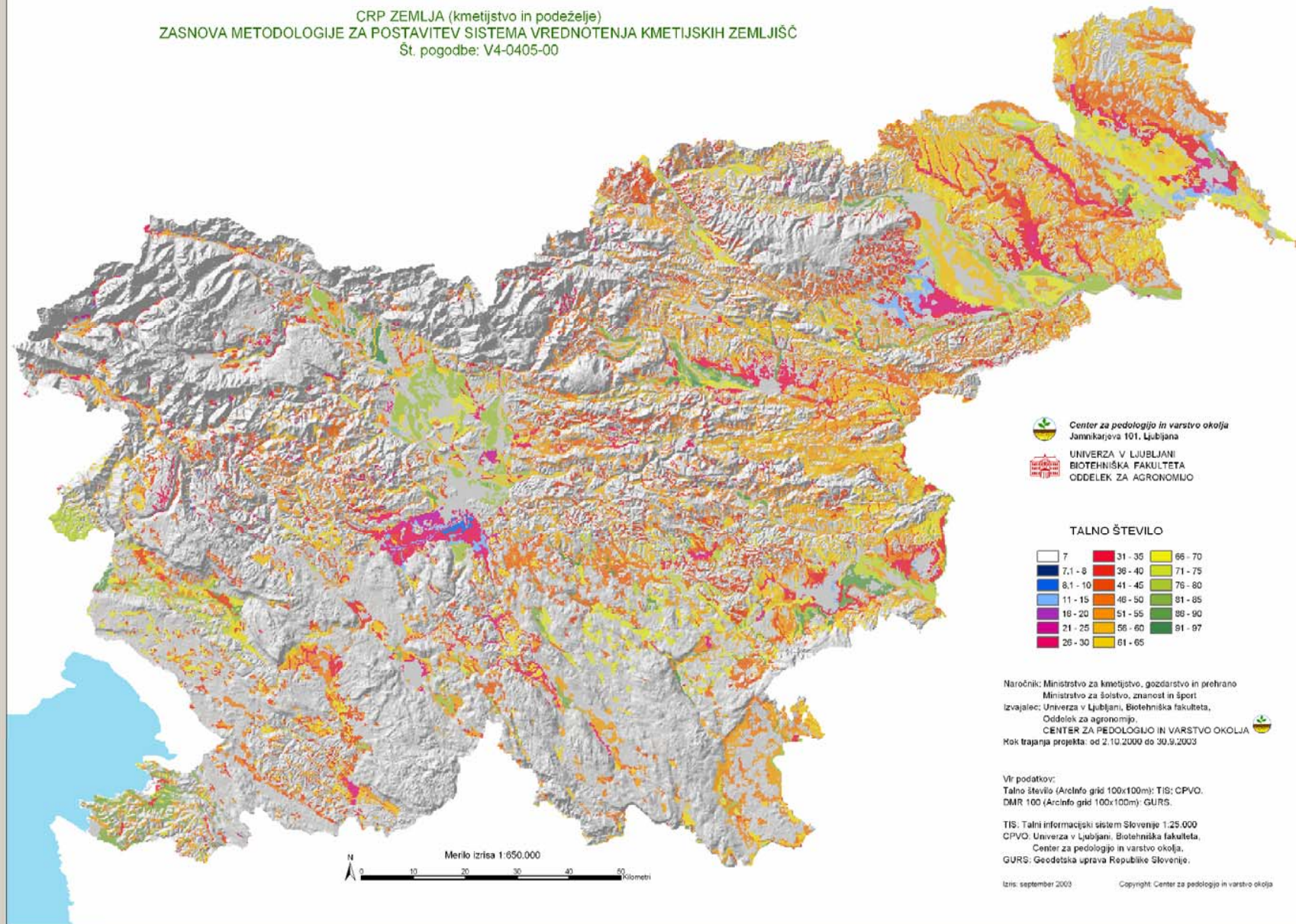










CRP ZEMLJA (kmetijstvo in podeželje)  
ZASNOVA METODOLOGIJE ZA POSTAVITEV SISTEMA VREDNOTENJA KMETIJSKIH ZEMLJIŠČ  
Št. pogodbe: V4-0405-00




 Center za pedologijo in varstvo okolja  
Jamnikarjeva 101, Ljubljana

 UNIVERZA V LJUBLJANI  
BIOTEHNIŠKA FAKULTETA  
ODDELEK ZA AGRONOMIJO

TALNO ŠTEVILO

7	31 - 35	66 - 70
7,1 - 8	36 - 40	71 - 75
8,1 - 10	41 - 45	76 - 80
11 - 15	46 - 50	81 - 85
16 - 20	51 - 55	86 - 90
21 - 25	56 - 60	91 - 97
26 - 30	61 - 65	

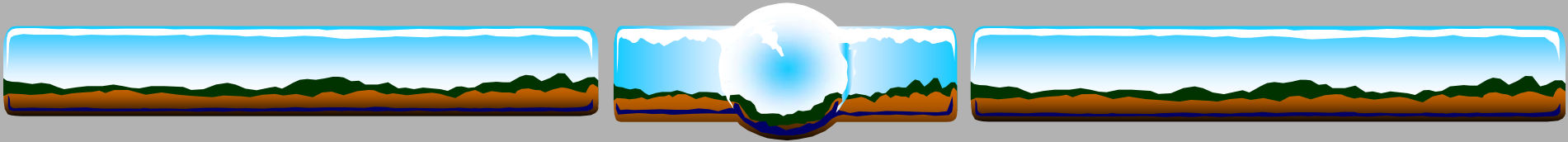
Naročnik: Ministrstvo za kmetijstvo, gozdarstvo in prehrano  
Ministrstvo za šolstvo, znanost in šport  
Izvajalec: Univerza v Ljubljani, Biotehniška fakulteta,  
Oddelek za agronomijo,   
CENTER ZA PEDOLOGIJO IN VARSTVO OKOLJA  
Mok trajanja projekta: od 2.10.2000 do 30.9.2003

Vir podatkov:  
Talno število (ArcInfo grid 100x100m): TIS; CPVO.  
DMR 100 (ArcInfo grid 100x100m): GURS.

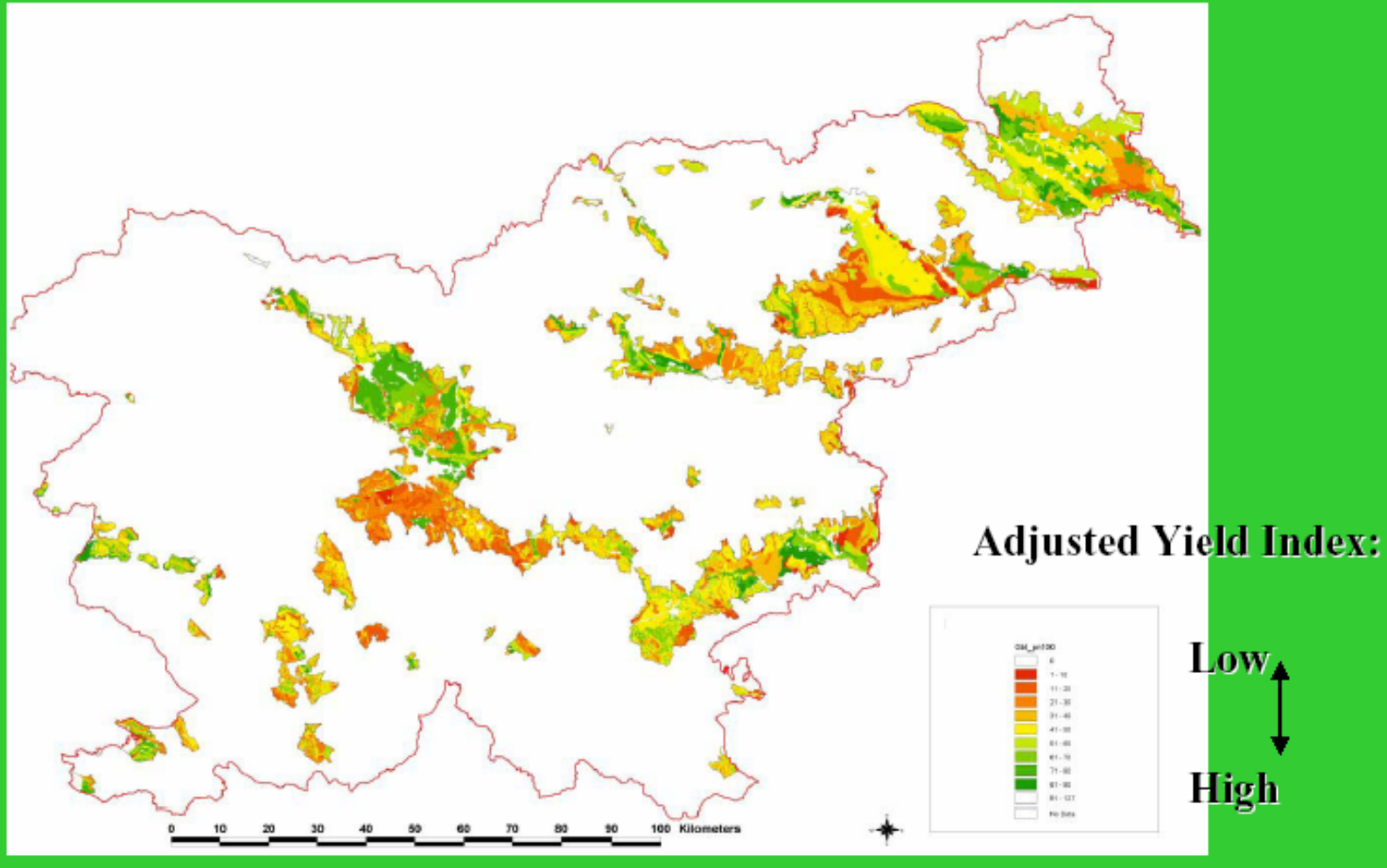
TIS: Talni informacijski sistem Slovenije 1:25.000  
CPVO: Univerza v Ljubljani, Biotehniška fakulteta,  
Center za pedologijo in varstvo okolja.  
GURS: Geodetska uprava Republike Slovenije.

Izis: september 2003 Copyright: Center za pedologijo in varstvo okolja

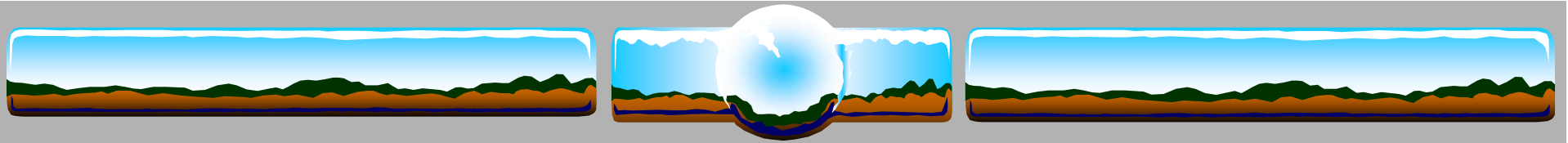




## AREAS WITH SPECIFIC NATURAL AND LEGAL LIMITATIONS FOR AGRICULTURAL ACTIVITY



Adjusted Yield Index (Bodenpunkte) (McRae and Burnham, 1981: Land Evaluation)



Deus ex machina ????