NÁRODNÉ POĽNOHOSPODÁRSKE A POTRAVINÁRSKE CENTRUM

VÝSKUMNÝ ÚSTAV PÔDOZNALECTVA A OCHRANY PÔDY

Impact of alternative cultivation methods on soil structure

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Principles of sustainable development

together 17 goals

- **Goal 1** End poverty in all its forms everywhere
- **Goal 2** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- **Goal 3** Ensure healthy lives and promote well-being for all at all ages
- Goal 4, Goal 5, Goal 6...
- **Goal 12** Ensure sustainable consumption and production patterns
- **Goal 13** Take urgent action to combat climate change and its impacts
- **Goal 14** Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- **Goal 15** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- **Goal 17** Strengthen the means of implementation and revitalize the global partnership for sustainable development

Main principles of Agrokruh- agrocircle
alternative cultivation method for vegetables production

There is a way:

-to grow healthy crops ***without heavy machinery*** and ***chemicals***

-to live healthily in harmony with nature

- to give your life and business sense

- long-term investing to tasty food is better than financing in virtual financial bubbles

How Agrokruh works

- The circle as the basic shape used in the production of bio-vegetables - an optimal and natural shape.
- Based on principles of specialized machinery for organic farming - gantry technology.
- It has significant patented improvements.
- The gantry is attached at one end to a fixed joint and at the other has an electromotor propelling a wheel. The spanning arm can be equipped with almost a complete set of equipments used in vegetable production. Thanks to the rotation of the arm, the equipments move on a spiral from the outer side of the circle towards its centre. Its operation is very simple and highly effective. The crop rows are in a spiral.
- The centre of every circle is supplied by electricity for drive wheel which rotates the frame around its centre and water for drop irrigation.
- The soil is not ploughed - a spading machine is used without turning the soil resulting in rich soil bacteria environment.
- Used fertilizers - a vermi-compost and extracts of sapropel (fresh water pool silt)

Agrokruh design

Agrokruh in praxis

Positive effects of Agrokruh

- ***Nutrient quality of vegetables***
  - growing without chemicals
  - better taste
  - The accessibility of fresh and tasty vegetables can change gastronomic habits towards increased consumption of vegetables.
- ***Social influences***
  - The equipment is always at the same place following the same traces, the surrounding can be used for recreation purposes – new added value of farms
- ***Environmental influences***
  - no negative effects of ploughing
  - no soil degradation
  - increase of soil water capacity
  - improvement of soil structure

Evaluation of soil properties

- Soil in Agrokruh
- Conventional tillage
- Grassland - control

Soil texture

Agrokruh	depth (cm)		
	0 – 20	**20 – 40**	**40 – 60**
<0,002 mm	10,65	12,76	20,36
<0,01 mm	39,72	45,17	62,32
0,01 - 0,05 mm	37,6	37,24	30,77
0,05 - 0,1 mm	15,59	14,73	6,19
0,1 - 2 mm	7,09	2,87	0,73
Texture	**loamy**	**clay-loamy**	**clayey**

Grassland	depth (m)		
	0 – 0,20	**0,20 – 0,40**	**0,40 – 0,60**
<0,002 mm	12,93	13,52	16,35
<0,01 mm	43,9	48,09	52,67
0,01 - 0,05 mm	40,09	38,93	38,3
0,05 - 0,1 mm	13,1	10,87	8,21
0,1 - 2 mm	2,9	2,11	0,82
Texture	**loamy**	**clay-loamy**	**clay-loamy**

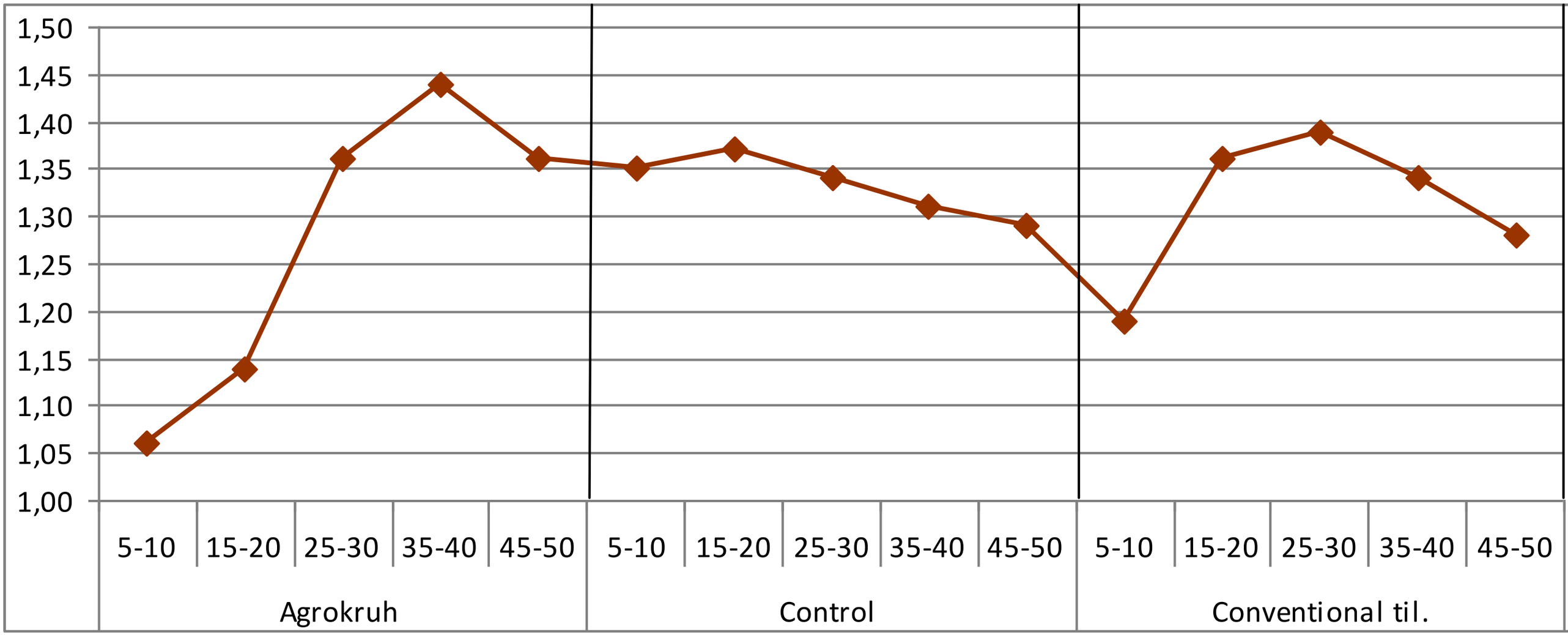
Conventional tillage	Hĺbka (m)		
	0 – 0,20	**0,20 – 0,40**	**0,40 – 0,60**
<0,002 mm	9,03	9,01	3,26
<0,01 mm	30,63	28,95	8,81
0,01 - 0,05 mm	33,84	31,52	20,27
0,05 - 0,1 mm	16,65	23,42	24,57
0,1 - 2 mm	18,88	16,1	46,35
Texture	**loamy**	**clay-loamy**	**clay-loamy**

pH and amount of nutrients in soils

Lokalita	pH	Nt(%)	Cox / humus(%)	P(mg/kg)	K(mg/kg)	Mg(mg/kg)	$CaCO_3$(%)
Kruh 0-20	7,66	0,243	2,49 / 4,29	55,3	209	379	23,0
Kruh20-40	7,85	0,174	1,79 / 3,09	9,14	107	266	25,0
Kruh40-60	7,90	0,121	0,967 / 1,67	<1	55,1	294	31,0
Kontrola0-20	7,74	0,236	2,06 / 3,55	3,82	231	292	28,0
Kontrola20-40	7,86	0,175	1,66 / 2,86	<1	58,0	272	28,0
Kontrola40-60	8,00	0,092	0,916 / 1,58	<1	39,5	392	32,0
Konv. obr. 0-20	8,00	0,198	2,00 / 3,45	19,6	90,4	205	24,0
Konv. obr. 20-40	7,97	0,147	1,70 / 2,93	8,90	81,0	193	24,0
Konv. obr. 40-60	8,37	0,038	1,11 / 1,92	<1	42,2	141	20,0

Amount of nutrients even without fertilizing is in Agrokruh sufficient.
There is high amount of P – positive amount of organic matter together with MO influence release of soluble P

Bulk density (g.cm^{-3})



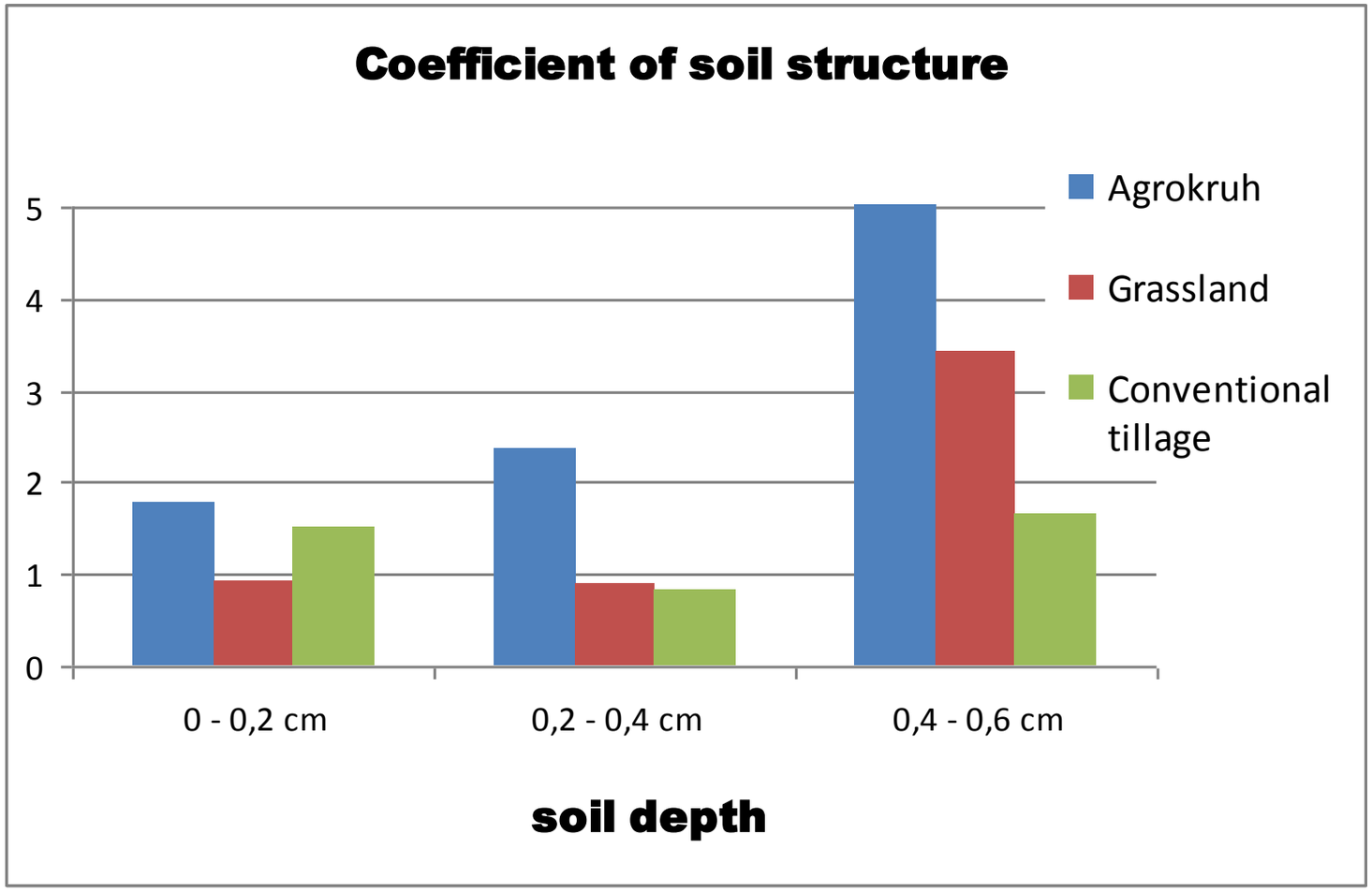
Evaluation of soil structure

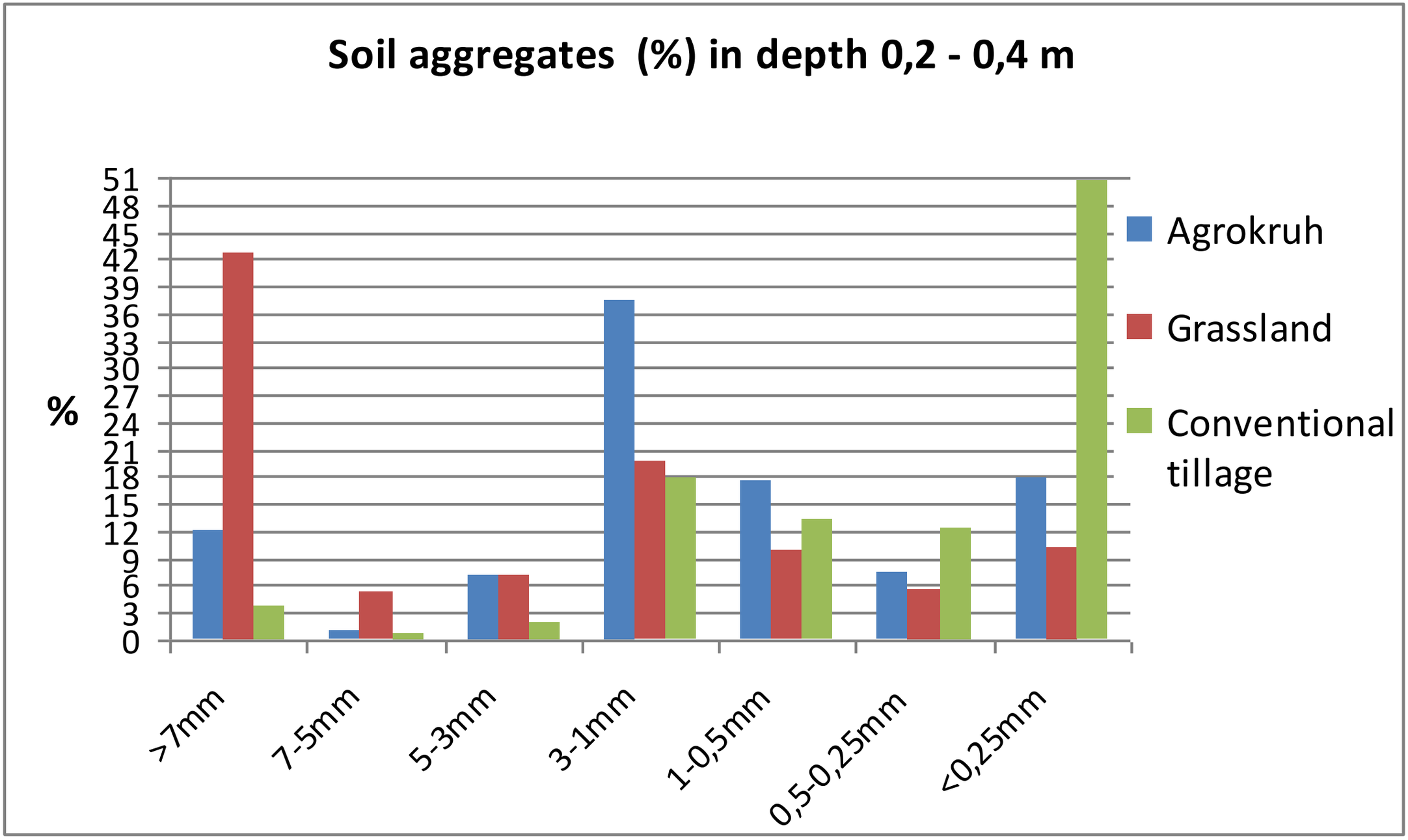
Coefficient of soil structure – proportion of water – stable aggregates to clods (aggregates >7mm) and microaggregates (aggregates <0,25mm)

$$K_{st} = a/(b+c)$$

where:

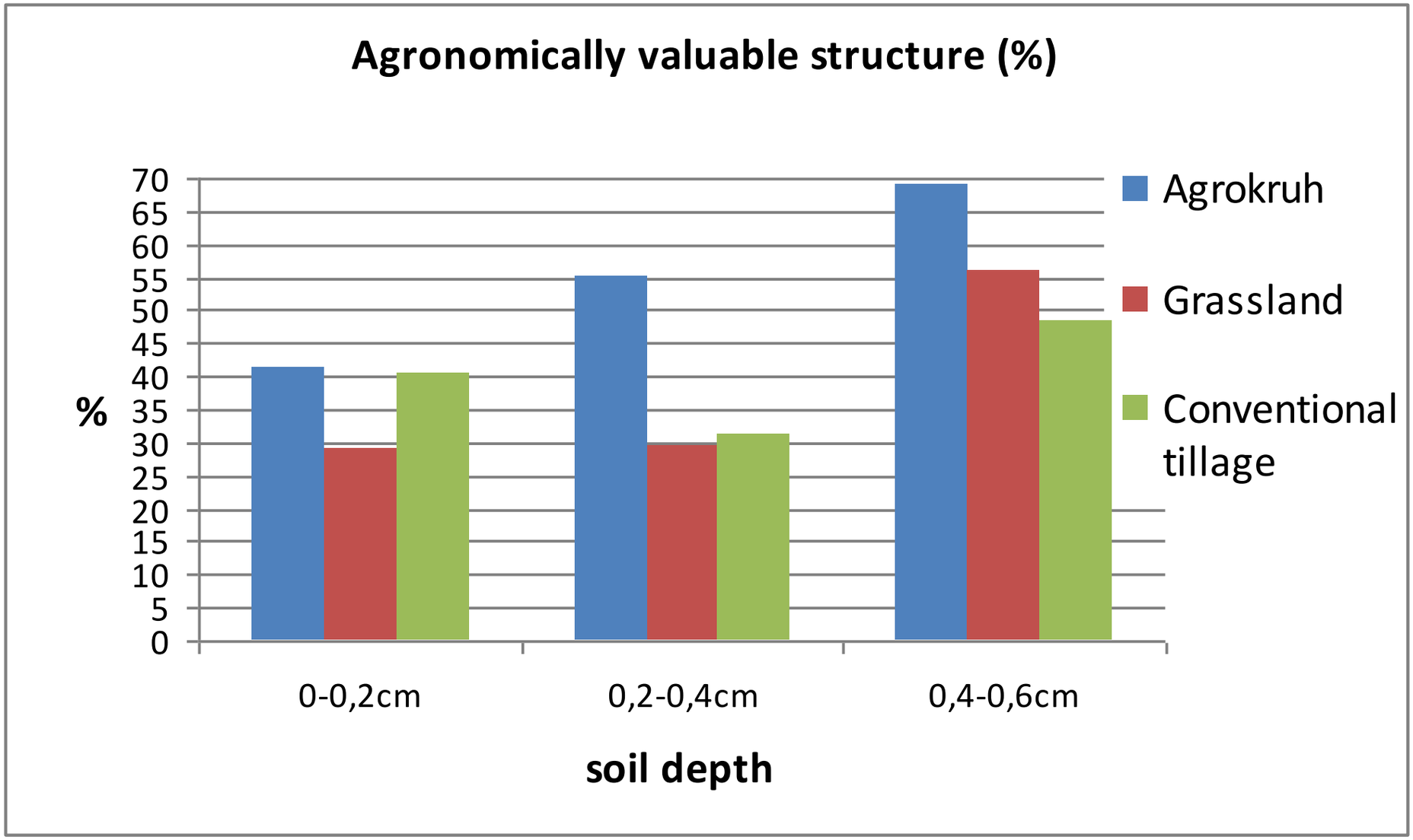
a - 0,25-7mm, b - >7mm, c - <0,25mm





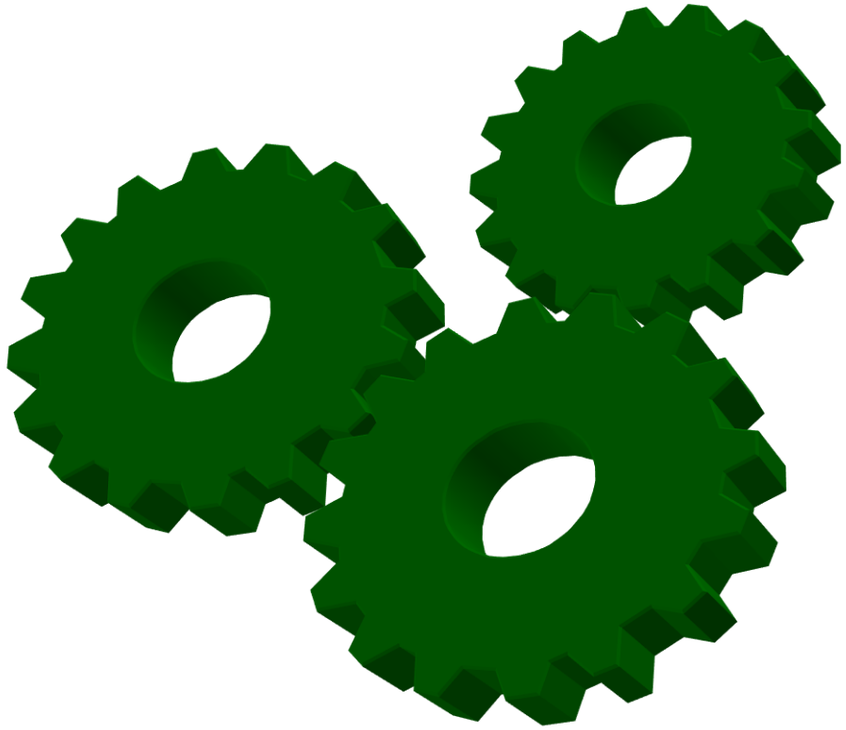
Soil with conventional tillage has the highest amount of microaggregates.- possible ploughing effect

Agronomically valuable structure AVS (0,5 – 3 mm) direct possitive effect of alternative cultivation



Agrokruh has in every depth the highest amount of AVS: 40% – 55% – 70% respectively due to ***positive effect of alternative cultivation***

Our world works in a spiral.
Raw materials, unbalanced inputs, outputs, waste, senseless growth and looting have no place in it.
Important are the cycles, e.g. substance cycle, balances (environmental, social…), understanding nature and its laws.



Citation for Agrokruh info:

- Agrokruh - nový spôsob pestovania zeleniny. http://www.nezavisle.sk/nezavisle-sk/0/0/2/54
- AgroKruh. http://www.agrokruh.sk/

Thank you for your attention