LIFE IP CleanEST experience with involvement of agricultural stakeholders

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Estonian Chamber of Agriculture and Commerce

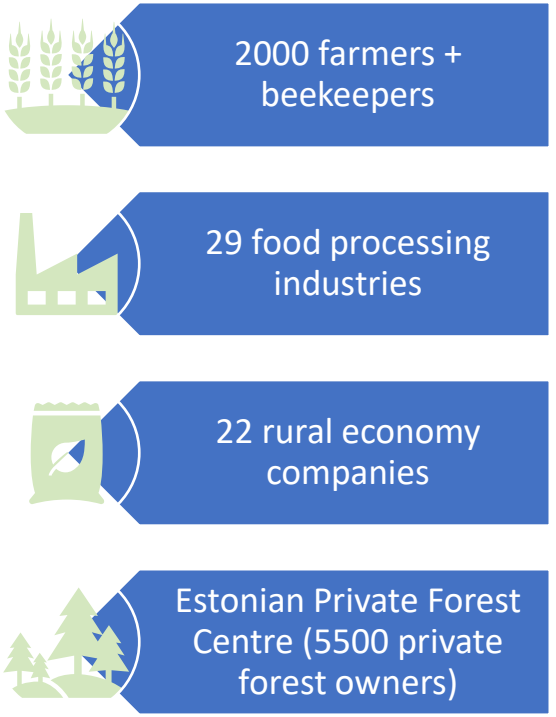
27 May 2022

Põllumajanduskoda

Estonian Chamber of Agriculture and Commerce

Estonian Chamber of Agriculture and Commerce (ECAC)

- Estonian Chamber of Agriculture and Commerce is an association of agricultural producers and processors, established 28 June 1996
- ECAC is a non-governmental organization with voluntary membership
- Our members are:
    - Estonian farmers, their co-operatives and sectorial organizations
    - Estonian food processing industries
    - Estonian rural economy companies (incl agribusiness companies)
    - Estonian forest owners co-operatives
- Activities: representing, supporting and protecting its members interests in policy-making, assistance in finding business partners, exchange of market information, organization of forums and seminars, arranging the members participation in both Estonian and foreign trade fairs, marketing support for domestic food products (Swallow Badge)
- Since 2002 the ECAC has been representing Estonian farmers, cooperatives, private forest owners and the food Industry at the EU level (COPA-COGECA, EDA, Ecolait)



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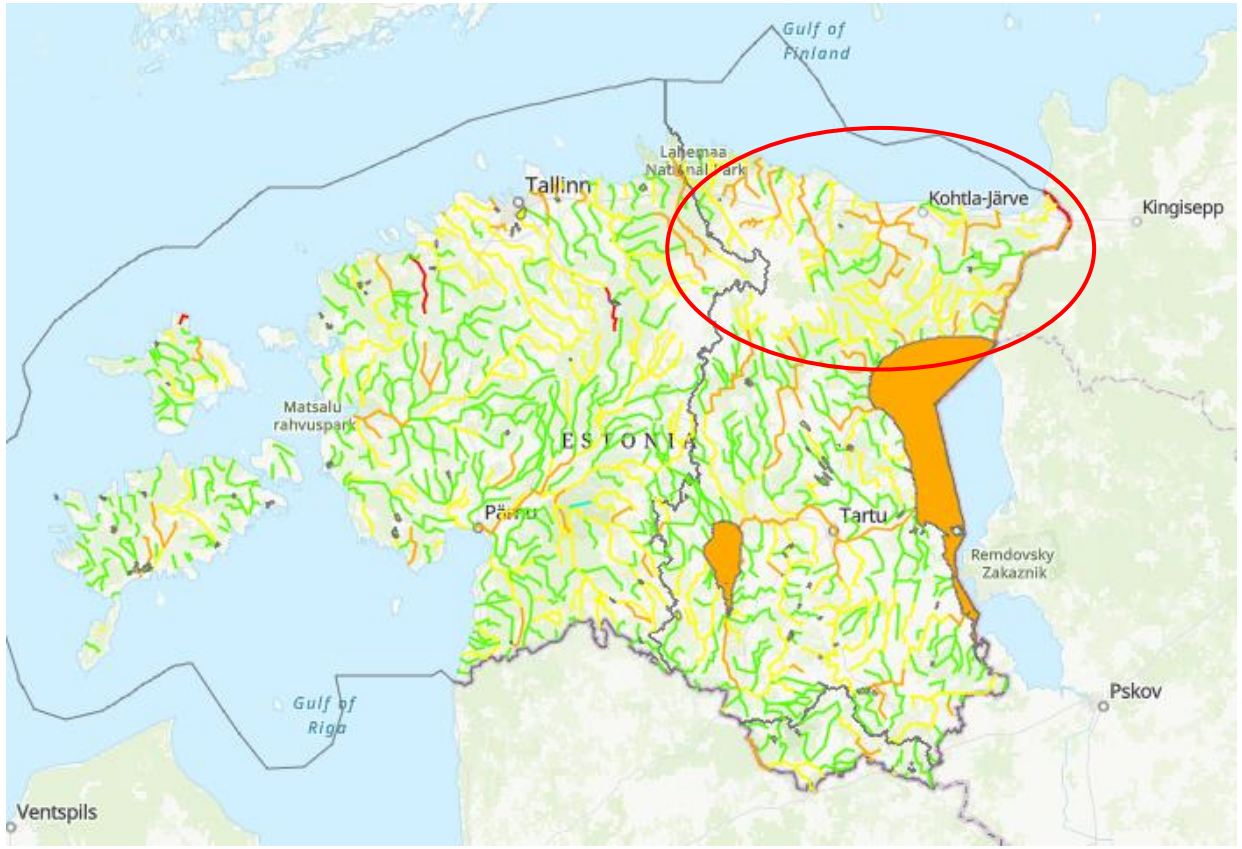
Agricultural actions in the CleanEST project

- Sub-activity C 10.1 – A study of the environmental impact of agricultural holdings
- Sub-activity C 10.2 – Preparation of two instruction materials on environmentally sustainable production and preparation of nutrient balance
- Sub-activity C 10.3 – Preparation of counselling training programme
- Sub-activity E 3.3 – Counselling and training agricultural producers

ECAC role:

- Representing and involving local agricultural stakeholders
- Information exchange between project and local farmers
- Counselling and training local farmers
- Actions:
  - C.10 (involving agricultural producers)
  - C.10.2 (preparation of instruction manuals on environmentally sustainable production)
  - C.10.3 (preparation of counselling and training programme)
  - E.3.3 (carrying out the training programme)



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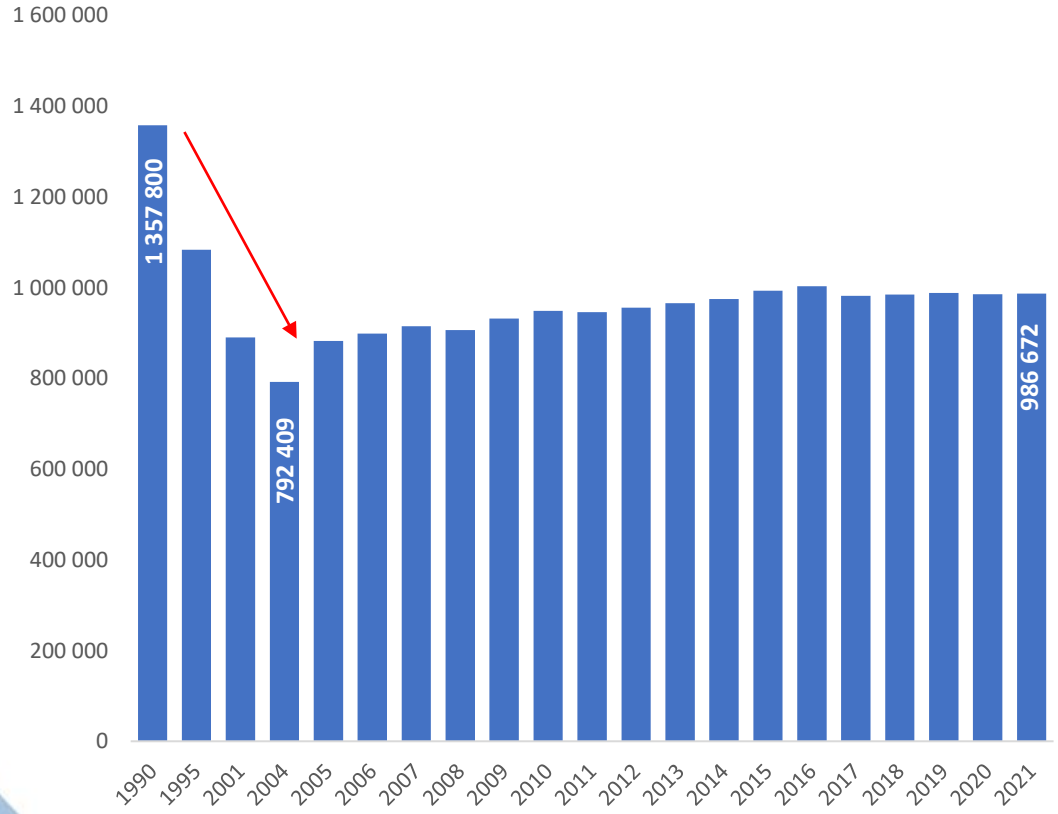
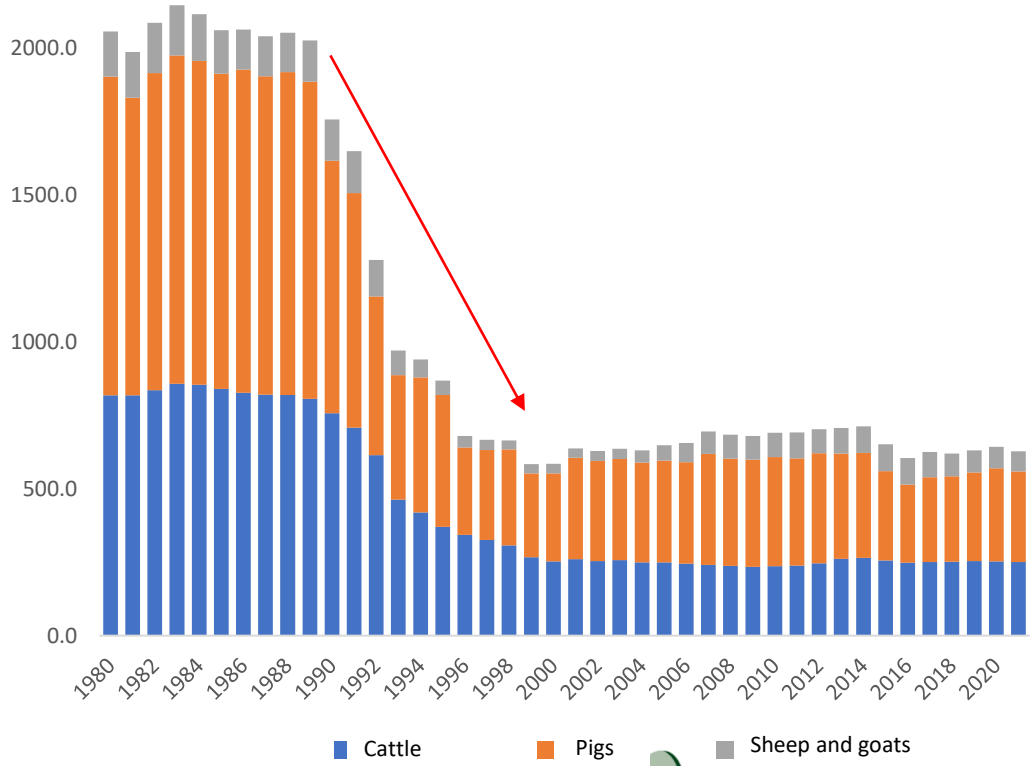
Changes in Estonian agriculture

Utilized agricultural area in Estonia, ha



Livestock numbers in Estonia, thousand



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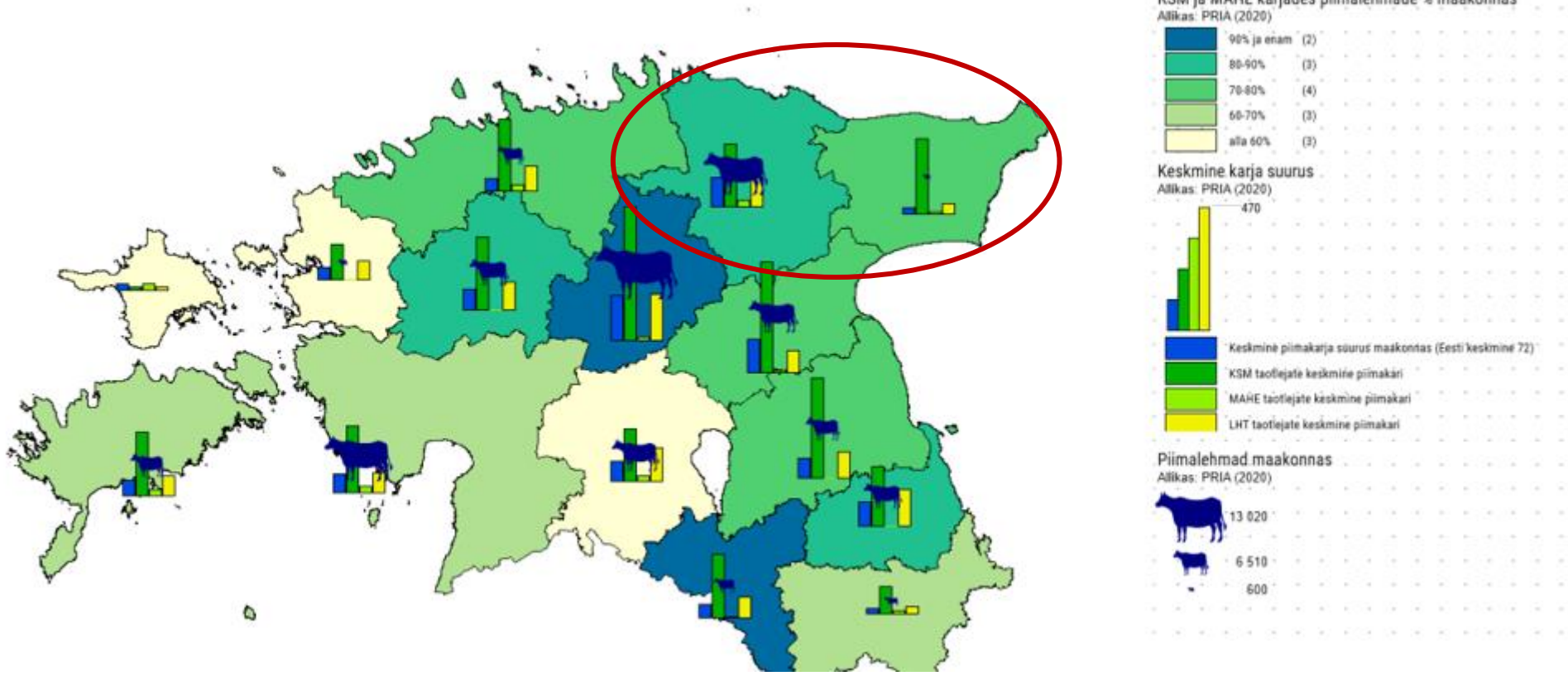
Dairy Production



- The average dairy herd size in Estonia is 72 dairy cows (23 dairy cows for persons not applying for the CAP)
  - 260 for EFM applicants. 17 for ORGANIC applicants. 90 for AWF applicants
- In Järva, Lääne-Viru and Pärnu counties, 40% of Estonian dairy cows are registered

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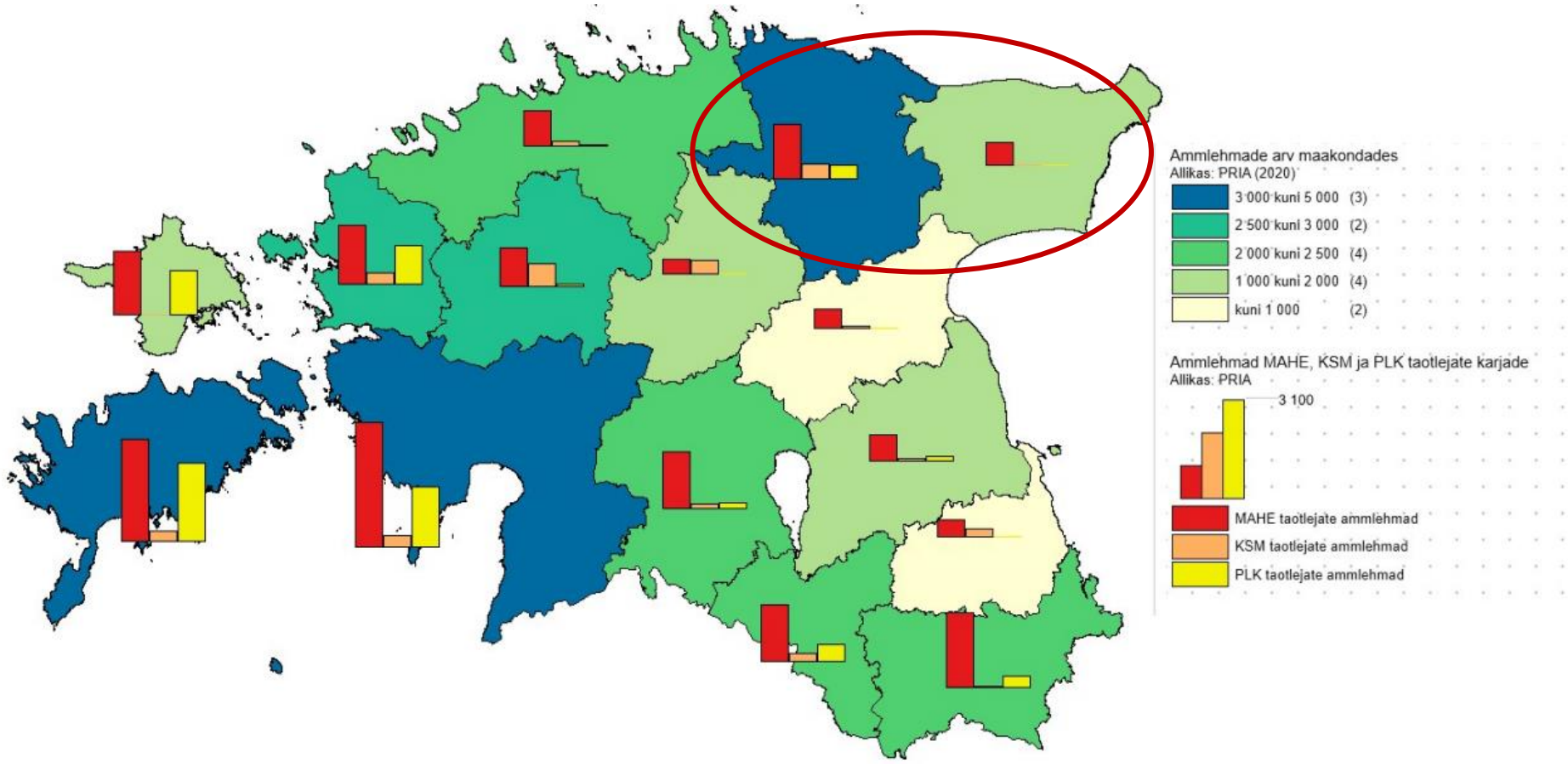
Beef Production



- The average beef cattle herd size in Estonia 20, largest over 300
- 23% of animals in herds over 100

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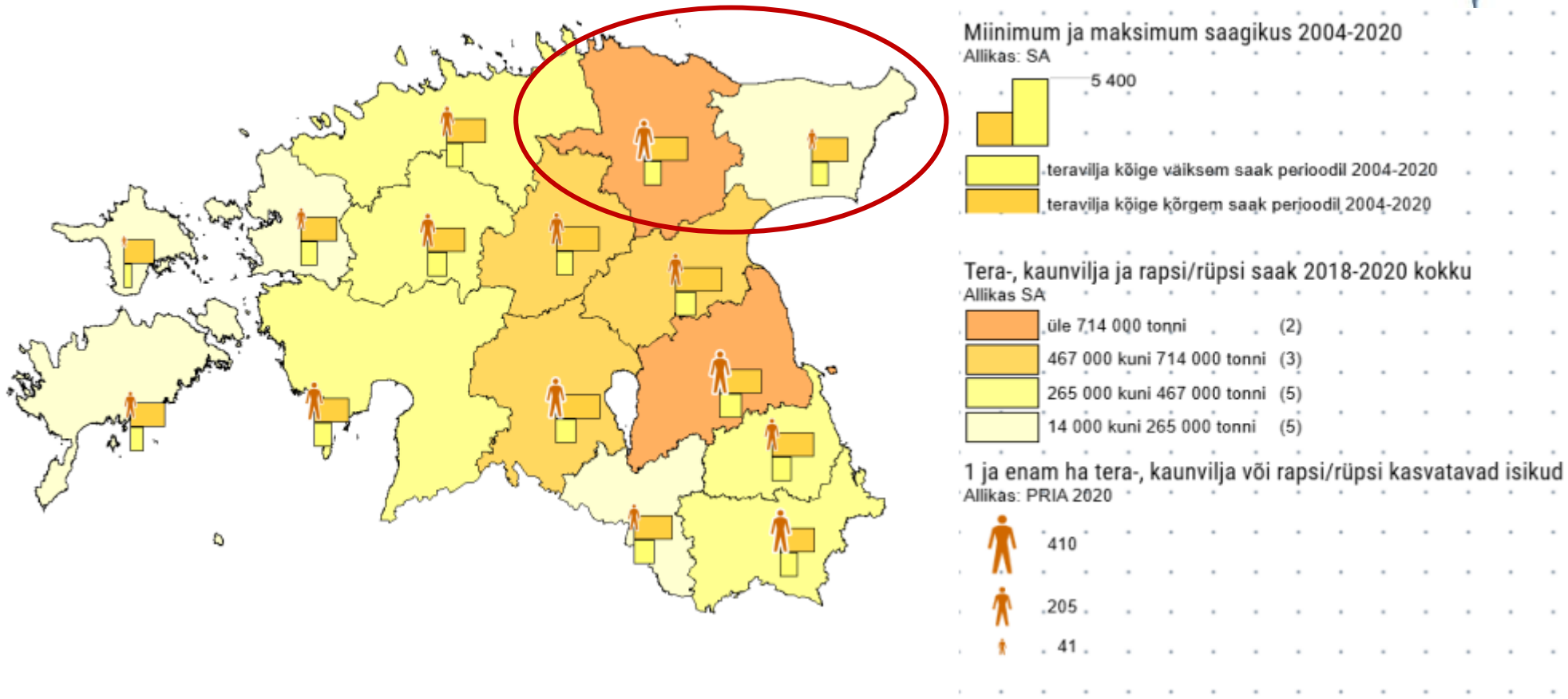
Crop Production



- 59% is produced in 5 counties, where 43% of growers
- 44% of the land is owned by producers (235) who have 500 or more hectares of these crops

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C 10.2 Guidance materials for sustainable agricultural production

- Manuals on the Field scale and Farm Gate Nutrient Balance calculation – **how to calculate and interpretate the results with examples**
- Guidance material on how to use **Farm Gate Nutrient Balance Calculator** developed by the University of Life Sciences – **based on country specific emission factors**
- Materials will be finalized in June 2022

- We offer a free testing of a calculator including advisory service (fertilization, nutrient and carbon balance in the field)

What is the motivation of a farmer?

- The Nitrogen nutrient balance calculation is planned **as a mandatory measure in EFM** in the CAP 2023-2027

- The aim is to provide farmers with a tool to assess their nutrient use efficiency and how to be more economically sustainable and environmentally friendly
- Result interpretation is individual – one fits all approach doesn't work!

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Farm Gate Nutrient Balance Calculator

Input

- Mineral fertilizers
- Organic fertilizers
- Cereal seeds
- N-fixiation from air

Output

- Removal with yield
  - Grain
  - Straw
  - Biomass trough mowing
  - Biomass trough grazing

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Example 1 – mixed farming, liquid manure

www.emu.ee
Eesti Maaülikool
EMÜ Estonian University of Life Sciences

																	Keskmine					
																	54	10	17			
Arvuta rida		Lisa	Kustuta	Puhasta rida			Saak			Mineraalväetiste NPK sisend			Sisendid kokku (kg/ha)			Eemaldamine kokku (kg/ha)			Bilanss (kg/ha)			Hinnangud bilansi tulemusele	
Põllu number	Põllu nimi	Põllu-massiiv	Kultuur	Pind (ha)	Aasta	Saagikus (kg/ha)	Koristatav saagiosa	Proteiini % kuivaines	N (kg/ha)	P (kg/ha)	K (kg/ha)	N	P	K	N	P	K	N	P	K	N	P
Teraviljad																						
			talinisu	20,5	2016	5800	terad	14,7	144	0	0	291,3	37,5	123,9	117,2	20,9	27,3	174	17	97	Keskmise N-tarbega mullal suur N üleküllus. Vedelsõnniku ja/või mineraalse N kasutamisel võib suureneda leostumine.	Väga suure P-sisaldusega mullal positiivne bilanss. Lõigne P-väetiste kasutus nii keskkonna kui ka tasuvuse vaates.
			suvioder	20,5	2018	3800	terad	13,2	50	3	0	54,5	3,9	1,3	68,8	13,3	19,0	-14	-9	-18	Lämmastikuga hästi varustatud mullal negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.
			suvinisu	20,5	2019	3500	terad	14,7	39	0	0	44,1	0,9	1,2	70,7	12,6	16,5	-27	-12	-15	Keskmise N-tarbega mullal tugevasti negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.
Muud																						
			taliraps	20,5	2015	4400	terad	24,1	157	23	0	299,3	59,6	122,7	154,4	31,7	34,3	145	28	88	Keskmise N-tarbega mullal suur N üleküllus. Vedelsõnniku ja/või mineraalse N kasutamisel võib suureneda leostumine.	Väga suure P-sisaldusega mullal positiivne bilanss. Lõigne P-väetiste kasutus nii keskkonna kui ka tasuvuse vaates.
			mais	20,5	2017	50000	haljasmass		46	27	0	188,2	63,8	122,9	195,0	35,0	190,0	-7	29	-67	Keskmise N-tarbega mullal tasakaalus bilanss. Oled jätkusuutlik.	Väga suure P-sisaldusega mullal positiivne bilanss. Lõigne P-väetiste kasutus nii keskkonna kui ka tasuvuse vaates.

- Years 2015-2019. Crop rotation: winter oilseed rape – winter wheat – maize – summer barley – summer wheat
- The cereal straw was incorporated into the soil
- Liquid manure of 30 m3/ha was used on fields of winter oilseed rape, winter wheat and maize
- Winter oilseed rape and winter wheat fields a significant amount of N was also applied with mineral fertilizers
- Soil data: Corg 2,9%, P 227 mg/kg; K 534 mg/kg, sand clay soils
- Results: In this example on average all the elements are positive. N-balance remained significantly in surplus, which may have increased the risk of losses. As the soil is well supplied with nutrients then it could be considered to reduce the use of mineral fertilizers during the years of liquid manure use.

Example 2 – mixed farming, liquid manure

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Eesti Maaülikool
Estonian University of Life Sciences

																		Keskmine				
																		22	-3	24		
Arvuta rida		Lisa	Kustuta	Puhasta rida			Saak			Mineraalväetiste NPK sisend			Sisendid kokku (kg/ha)			Eemaldamine kokku (kg/ha)			Bilanss (kg/ha)			Hinnangud bilansi tulemusele	
Põllu number	Põllu nimi	Põllu-massiiv	Kultuur	Pind (ha)	Aasta	Saagikus (kg/ha)	Koristatav saagiosa	Proteiini % kuiv-aines	N (kg/ha)	P (kg/ha)	K (kg/ha)	N	P	K	N	P	K	N	P	K	N	P
Teraviljad																						
			talinisu	10,66	2015	5500	terad	14,7	127	0	0	130,8	0,7	0,9	111,1	19,8	25,9	20	-19	-25	Suure N-tarbega mullal tasakaalus bilanss. Oled jätkusuutlik.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.
			suvioder	10,66	2016	4600	terad	13,2	117	9	30	120,4	9,7	31,0	83,3	16,1	23,0	37	-6	8	Suure N-tarbega mullal positiivne bilanss. Vedelsõnniku ja/või mineraalse N kasutamine peab olema sünkroonis taime vajadusega, vastasel juhul mõõdukas leostumise suurenemise oht.	Väga suure P-sisaldusega mullal negatiivne bilanss. Akstsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.
			talinisu	10,66	2017	5800	terad	14,7	75	0	0	173,2	25,0	82,6	117,2	20,9	27,3	56	4	55	Suure N-tarbega mullal positiivne bilanss. Vedelsõnniku ja/või mineraalse N kasutamine peab olema sünkroonis taime vajadusega, vastasel juhul mõõdukas leostumise suurenemise oht.	Väga suure P-sisaldusega mullal tasakaalulline bilanss. Tõenäoliselt suudad hoida head seisundit. P-väetiste kasutmine ei pruugi olla tasuv.
			talinisu	10,66	2020	7400	terad	14,7	91	17	50	165,5	35,9	112,1	149,5	26,6	34,8	16	9	77	Suure N-tarbega mullal tasakaalus bilanss. Oled jätkusuutlik.	Väga suure P-sisaldusega mullal tasakaalulline bilanss. Tõenäoliselt suudad hoida head seisundit. P-väetiste kasutmine ei pruugi olla tasuv.
Muud																						
			taliraps	10,66	2019	2390	terad	24,1	105	26	75	105,1	26,0	75,0	83,9	17,2	18,6	21	9	56	Suure N-tarbega mullal tasakaalus bilanss. Oled jätkusuutlik.	Väga suure P-sisaldusega mullal positiivne bilanss. Liigne P-väetiste kasutus nii keskkonna kui ka tasuvuse vaates.
Kaunviljad																						
			hernes	10,66	2018	3060	terad	25,8	0	0	0	89,8	0,9	2,2	108,6	13,2	32,7	-19	-12	-30	Suure N-tarbega mullal negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.

- Years 2015-2020. Crop rotation: winter wheat – summer barley – winter wheat – field beans – winter oilseed rape – winter wheat
- The cereal straw was incorporated into the soil
- Liquid manure of 20 m3/ha in 2017 and 15 m3/ha in 2020 was used on fields of winter wheat
- Farmer has consciously reduced the amount of N given with mineral fertilizers while using liquid manure
- Soil data: Corg 2,0%, P 156 mg/kg; K 179 mg/kg, clay sand soils
- Results: In this example on average the N balance was moderately positive (+22 kg N/ha) and the risk of nutrient leaching can be considered also low in the fields that received liquid manure. The P-balance was in small deficit which is acceptable given the high level of P content in the soul.

Example 3 – organic farming

www.emu.ee
Eesti Maaülikool
Estonian University of Life Sciences

																		Keskmine					
																		-43	-8	-11			
Arvuta rida		Lisa	Kustuta	Puhasta rida			Saak			Mineraalväetiste NPK sisend			Sisendid kokku (kg/ha)			Eemaldamine kokku (kg/ha)			Bilanss (kg/ha)			Hinnangud bilansi tulemusele		
Põllu number	Põllu nimi	Põllu-massiiv	Kultuur	Pind (ha)	Aasta	Saagikus (kg/ha)	Koristatav saagiosa	Proteiini % kuiv-aines	N (kg/ha)	P (kg/ha)	K (kg/ha)	N	P	K	N	P	K	N	P	K	N	P	
Teraviljad																							
			rukis	24,21	2016	2200	terad	12,6	0	0	0	3,0	0,6	0,8	38,3	7,5	10,3	-35	-7	-10	Keskmise N-tarbega mullal tugevasti negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.	Suure K-sisaldusega mu Pikaajaliselt pole jätkus
			kaer	24,12	2017	2200	terad	14,0	0	0	0	3,1	0,6	0,8	42,4	7,7	10,3	-39	-7	-10	Keskmise N-tarbega mullal tugevasti negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.	Suure K-sisaldusega mu Pikaajaliselt pole jätkus
			suvinisu	24,12	2019	4300	terad	14,7	0	0	0	5,1	0,9	1,2	86,9	15,5	20,2	-82	-15	-19	Keskmise N-tarbega mullal tugevasti negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.	Suure K-sisaldusega mu Pikaajaliselt pole jätkus
Muud																							
			taliraps	24,12	2015	500	terad	24,1	0	0	0	0,1	0,0	0,0	17,6	3,6	3,9	-17	-4	-4	Keskmise N-tarbega mullal tugevasti negatiivne bilanss. Saagi moodustumine mulla orgaanilise aine N arvelt.	Väga suure P-sisaldusega mullal tugevasti negatiivne bilanss. Lühiajaliselt aktsepteeritav, pikemas perspektiivis mulla P-varu vähenemine.	Suure K-sisaldusega mu Pikaajaliselt pole jätkus
Kaunviljad																							
												0,0	0,0	0,0	0,0	0,0	0,0	0	0	0			
Heintaimed																							
												0,0	0,0	0,0	0,0	0,0	0,0	0	0	0			
Köögiviljad																							
												0,0	0,0	0,0	0,0	0,0	0,0	0	0	0			
Haljasväetis liblikõielistega																							
			keskmine biomass	24,12	2018				0	0	0	107,6	0,0	0,0	0	0	0	108	0	0	Keskmise N-tarbega mullal suur N üleküllus. Vedelsõnniku ja/või mineraalse N kasutamisel võib suureneda leostumine.		

- Years 2015-2019. Crop rotation: winter rape – rye – oat (under-sown) – red clover (N-fertilizing) – summer wheat
- The straw was incorporated into the soil
- Soil data: Corg 2,6%, P 194,4 mg/kg; K 193 mg/kg, clay sand soils
- Results: In this example on average all the elements were in deficit. Clover was used as N fertilizer in the crop rotation, this reduced the N-balance deficit and ensured a better yield level of the following summer wheat (4,4 t/ha). As no other fertilizers were used the yield of other cereals (2,2 t/ha) was probably limited by the availability of N. The farmer should consider the use of fertilizers accepted for organic production.

Action E.3.3 (2020-2021)

Milestone	Training seminar	Location	Date	Participants		
				SUM	Farmers	Agricultural holdings
PHASE 1 (2019-2020)						
The first 4 training seminars have been organized for agricultural enterprises (31.12.2021)	Seminar for farmers - introduction of the project (incl. action C.10)	Online	18 November 2020	15	9	7
	PHASE 2 (2021-2022)					
	Seminar for farmers – nutrient balance calculator	Online	28 January 2021	10	5	5
	Seminar for farmers – nutrient balance calculator	EPA2021 Tartu	13 October 2021	20	13	12
	Seminar for farmers – nutrient balance calculator	EPA2021 Tartu	14 October 2021	17	8	8
First training seminar for agricultural advisers/consultants and unions has been organized (31.12.2021)	Seminar for agricultural advisers/consultants and unions	Online	01 December 2021	36	9	9

Action E.3.3 (2022)

Milestone	Training seminar	Location	Date	Participants
PHASE 2 (2021-2022)				
The 4 training seminars have been organized for agricultural enterprises	Seminar for designers of land amelioration systems	Online	28 February 2022	108
	Seminar for farmers	In-person field day	Q3	
	Seminar for farmers	EPA2022 Tartu	12 October 2022	
	Seminar for farmers	EPA2022 Tartu	13 October 2022	
The second training seminar for advisers/consultants has been organized (30.11.2022)	Seminar for agricultural advisers/consultants and unions	Preferably in-person	Q4	

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Additional actions

- Project working group meetings
- 21 September 2020 TV show Osoon. Clean the waters of Virumaa
  - Participants: farmers Olav Kreen and Jaak Läänemets
- 22 December 2020 Radio broadcast in Reporteritund on reducing the environmental impact of agri-environment
  - Participants: farmer Margus Lepp, professor at the Estonian University of Life Sciences Alar Astover and project manager of the Agricultural Research Center Urmas Visse
- 08 June 2021 participation at the East-Estonia Farmers meeting and introducing the LIFE IP CleanEST project
- June 2021 an article on importance of nutrient balance calculation by Alar Astover (EMU) published in farmers magazine Põllumehe Teataja
- September 2021 farm visits
- 29 November 2021 and 21 December 2021 presentation by Alar Astover on calculating nutrient balance at the EPKK seminars „Responsibilities and needs for water protection“

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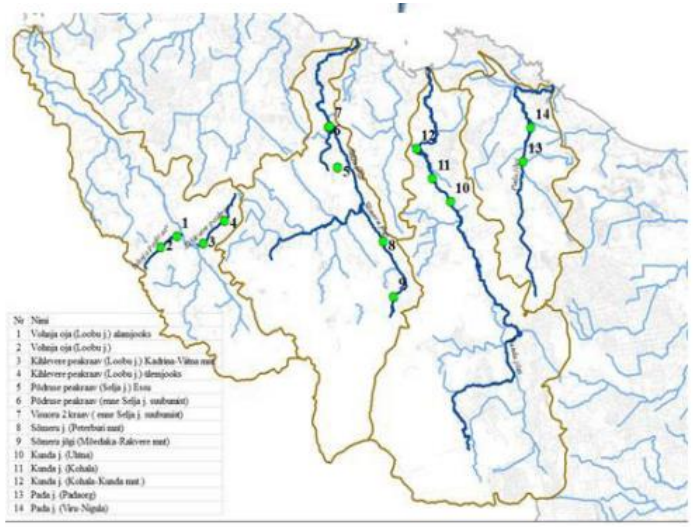
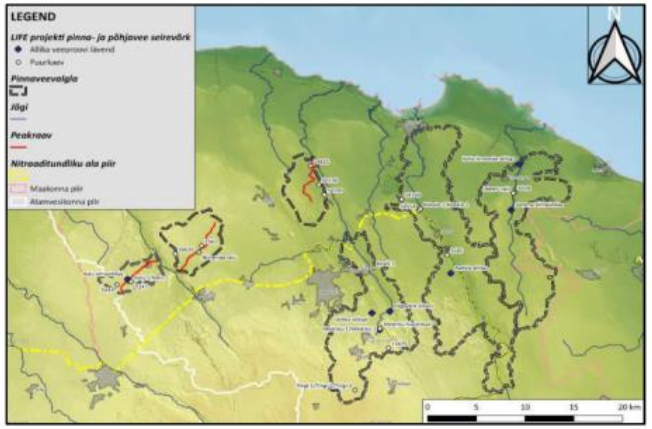
Ilus ja elus!

Beautiful and alive!

Study on agricultural diffuse pollution





- The impact of agriculture on water quality
  - Responsible: TalTech, EGT, EKUK
- Monitoring period 2019–2022
- 14 monitoring points
- 6 streams
- Monthly stream water chemistry monitoring
- Ground water chemistry and quantity monitoring (12 times a year in 4 locations)
- Monitoring of hazardous substances (4 times a year in 6 locations)
- Monitoring of agricultural pharmaceuticals (2 times a year in 6 locations)
- Final report in September 2022

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Agri-environmental measures

- RBMP 2021-2027 – public consultations ongoing
- Nitrates Action Program (NAP) for Nitrate Vulnerable Zone (NVZ)

<u>Measures planned in RBMP</u>

- Key measures: requirements from legislation
  - Water Act
  - Industrial Emissions Act
- Additional measures
  - measures from CAP
  - awareness raising
  - trainings, etc.