

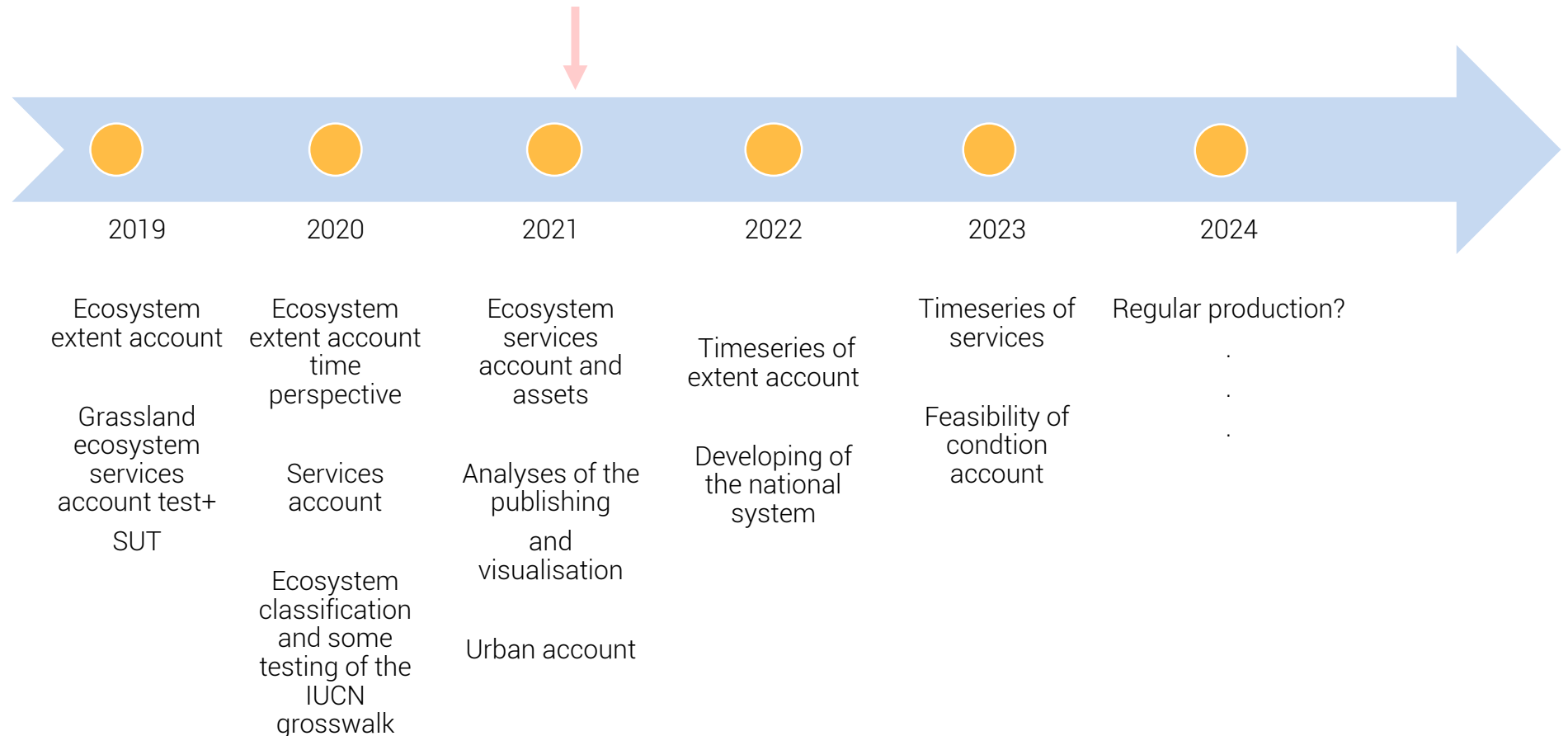
SEEA ECOSYSTEM ACCOUNTS (SEEA-EA) AND ITS RELEVANCE IN POLICY  
AND DECISION MAKING

Estonia

6<sup>th</sup> Joint OECD/UNECE Seminar on Implementation of SEEA  
Online meeting  
9-11 March 2021  
#SEEAseminar2021

DAY 1 – Tuesday 9<sup>th</sup> March

## Timeline of the development SEEA ecosystem accounts in Estonia



### Main partners:

- Tallinn Technical University (who are in lead of environmental economics in Estonia)
- Environmental Ministry and Estonian Environmental Agency, MAES Implementation Team (Tartu University, Estonian University of life Sciences)
- Work is closely related and partly carried out under Eurostat grants 831254-2018-EE-ECOSYSTEMS and 881542 2019- EE- ENVECO on ecosystem accounts

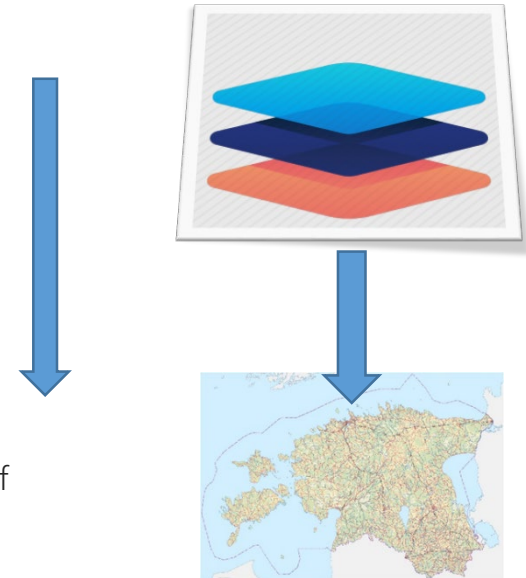
Results so far, some examples

# Ecosystem extent account, one deliverable: ecosystem map \*

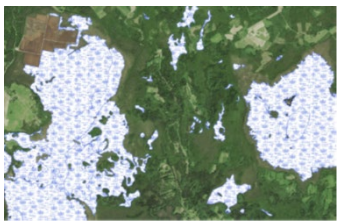
Merging different data layers into one layer  
Decision tree and priorities to overlay the map layers:

1. Agricultural land and semi-natural habitats
  2. Forests
  3. Wetlands
4. Semi-natural habitats (eligible for support)
  5. Natura 2000 habitats inventory
  6. Meadows database
7. Estonian Topographic Database
  - gives 85% of EAA

For the remaining 15% of the area, Estonian Topographic Database was the only source of information we could use.

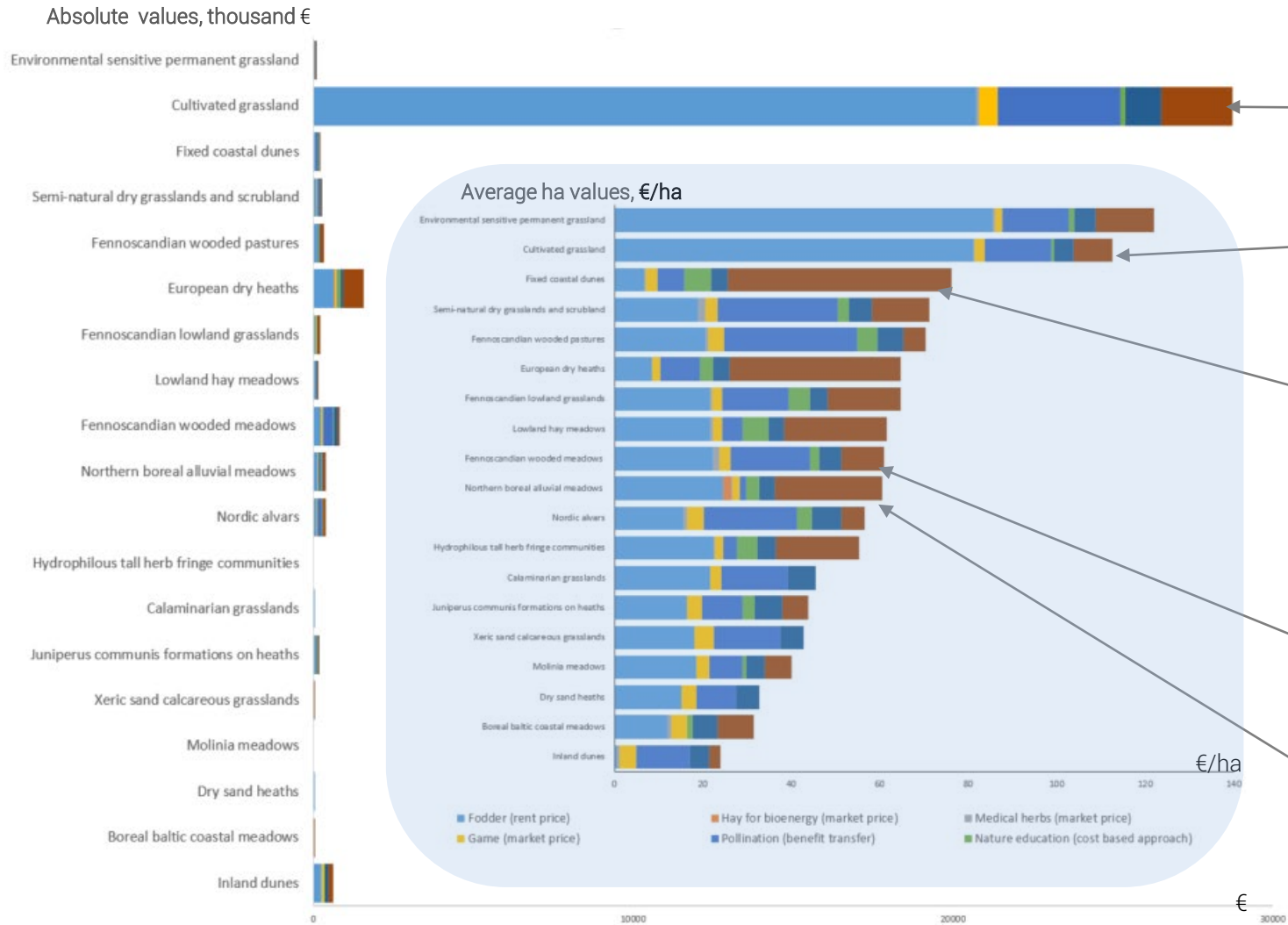


Ecosystem map:  
Altogether ~3.8 million polygons  
140 different mapping units  
Ecosystem typology: EUNIS,  
national (in progress),  
crosswalk to IUCN (in progress)



# Ecosystem services of grasslands \*

## 5 Examples of the deliverables: services profiles for grasslands ecosystems by types



Cultivated grasslands



Fixed coastal dunes with herbaceous vegetation (“grey dunes”)



Fennoscandian wooded meadows



Northern boreal alluvial meadows

Ecosystem accounts in policy and decision making  
Seminatural grasslands, some examples

## Seminatural grasslands: reaching of the targets



- Could the ecosystem extent account be of help for targeting of the measures for grassland management?
- Reaching of the goal set by Nature Conservation Development Plan (NCDP) needs targeted measures. →
- ← • Semi-natural grasslands exist if they are managed\*.
- Yes, ecosystem accounts could be of help: in order to design the measures, we need to know the owners of the land where valuable/managed ecosystem reside.
- Owners dimension was not readily available but could be and was created.

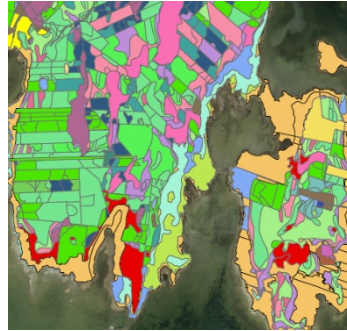
Area of managed semi-natural grasslands, target and progress, ha



\*- Semi-natural grasslands are heterogeneous biodiversity rich group of ecosystems which need conservation measures. In our latitude (natural conditions of temperate climate) they exist if managed regularly. Otherwise they will naturally convert into shrubberies and later into forest ecosystems. On the other hand semi-natural grasslands can be turned into intensively managed grasslands (including ploughing, sowing, monoculture creation, pesticide and fertilizer use) or arable land. Grasslands can also be converted into urban areas.

# Establishing the ownership dimension of Estonian ecosystem extent account

Ecosystem map



Land Cadastre



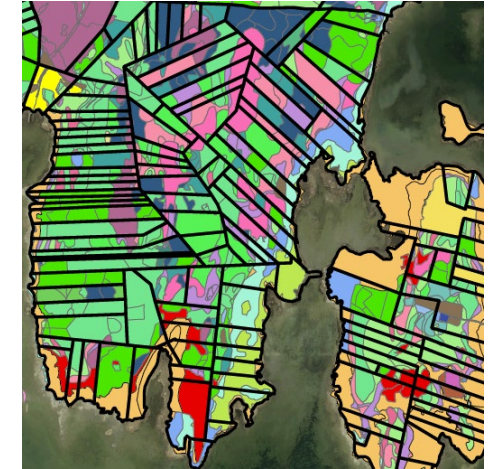
Statistical enterprise register



Ecosystem base map, Land Cadastre and statistical enterprise register data provided a basis for the creation of the ownership dimension in a merged dataset.



Merged dataset



Opening extent account 2019, EUNIS Habitat classes and institutional sectors, ha

Institutional sector/ EUNIS ecosystem classification	General government	Corporations	...of which State Forest Management Centre	Households	Rest of the world	Un- known	TOTAL
Coastal	632	1556	1 353	644	100	65	2 997
Constructed, industrial and other artificial habitats	55 190	25 558	8 794	80 072	2 498	3 259	176 577
Grasslands and lands dominated by forbs, mosses or lichens	29 224	67 413	29 091	110 059	3 805	2 058	212 556
Habitat complexes	5 739	4 900	1 926	9 343	457	178	20 618
Heathland, scrub and tundra	3 333	5 027	2 232	2 795	185	189	11 571
Inland surface waters	11 354	21 603	18 753	6 712	185	1 242	41 095
Inland vegetated or sparsely vegetated habitats	19 420	27 300	10 551	19 874	591	1 709	68 894
Marine	2 439	7 576	1 100	1 197	1 197	132	10 507
Mires, bogs and fens	17 413	208 592	201 043	15 606	536	19 281	261 428
Regularly or recently cultivated agricultural, horticultural habitats	103 232	323 761	6 393	661 207	8 377	5 706	1 102 284
Woodland, forest and other wooded land	113 178	152 812	1 049 105	680 055	15 654	81 392	2 419 091
NA	202	464	303	357	15	23	1 062
<b>TOTAL</b>	<b>361 356</b>	<b>223 252</b>	<b>1 334 720</b>	<b>1 603 376</b>	<b>33 954</b>	<b>115 232</b>	<b>4 346 480</b>

More detailed levels  
are available in both  
dimensions



# Seminatural grasslands management: example of the analyses table, 2019\*

Ecosystem type	Code	AREA, ha	Management status, ha			Ownership, ha								
			To be managed according to the target	Managed	Additional need	Financial corporations	General government	Households	Households as physical persons	Non financial corporations	NPI&H	Rest of the world	State Forest Management Centre	Unknown
Grassland		<b>498 505</b>	n.t.	n.r.	n.r.	<b>263</b>	63 176	<b>176 876</b>	114 272	91 933	1 576	<b>7 780</b>	<b>39 261</b>	<b>3 369</b>
Semi-natural grassland		241 953	n.t.	n.r.	n.r.	166	32 102	89 241	36 284	39 707	1 015	5 382	35 830	2 225
Semi-natural grassland, NATURA classification		<b>97 044</b>	43100	37500	8930	<b>62</b>	<b>8 950</b>	<b>29 419</b>	<b>13 646</b>	<b>11 140</b>	<b>430</b>	<b>3 104</b>	<b>29 402</b>	<b>892</b>
Boreal baltic coastal meadows	1630	19 946	10800	11891	a	19	2 339	6 384	2 681	1 901	121	1 191	5 195	116
Fixed coastal dunes	2130	397	n.t.	n.r.	n.r.		45	76	15	29	1	9	221	2
Dry sand heaths	2320	43	n.t.	n.r.	n.r.		8	18	7	3	0	6	1	0
Inland dunes	2330	27	n.t.	n.r.	n.r.		1	0	0	2	0		24	0
European dry heaths	<b>4030</b>	<b>561</b>	<b>290</b>	<b>57</b>	<b>233</b>		<b>208</b>	124	37	32	0	6	<b>154</b>	1
Juniperus communis formations on heaths	<b>5130</b>	<b>3 837</b>	<b>500</b>	<b>473</b>	<b>27</b>	7	151	<b>1 898</b>	657	346	26	249	471	32
Xeric sand calcareous grasslands	6120	32	n.t.	n.r.	n.r.		1	19	3	0	0	9		0
Calaminarian grasslands	6130	0	n.t.	n.r.	n.r.		0	0	0	0	0			0
Semi-natural dry grasslands and scrubland	6210	5 381	2420	2487	a	9	419	1 968	998	715	27	241	974	29
Fennoscandian lowland grasslands	<b>6270</b>	<b>6 175</b>	<b>1880</b>	<b>1534</b>	<b>346</b>	4	440	<b>2 320</b>	1 303	808	28	155	1 055	63
Nordic alvars	<b>6280</b>	<b>14 616</b>	<b>7700</b>	<b>5161</b>	<b>2539</b>	10	<b>955</b>	<b>5 826</b>	2 035	2 257	63	711	2 712	48
Molinia meadows	6410	3 693	650	710	a	0	154	895	366	504	5	113	1 636	19
Hydrophilous tall herb fringe communities	6430	3 641	370	1214	a	2	455	944	470	565	19	32	1 135	19
Northern boreal alluvial meadows	<b>6450</b>	<b>25 811</b>	<b>12200</b>	<b>8975</b>	<b>3225</b>	2	<b>2 321</b>	<b>4 250</b>	<b>2 275</b>	<b>2 570</b>	<b>74</b>	<b>122</b>	<b>13 735</b>	462
Lowland hay meadows	6510	5 348	1340	2587	a	7	877	1 896	915	706	47	80	750	70
Fennoscandian wooded meadows	<b>6530</b>	<b>4 569</b>	<b>3300</b>	<b>1169</b>	<b>2131</b>	0	<b>433</b>	<b>1 685</b>	916	509	16	118	872	20
Fennoscandian wooded pastures	<b>9070</b>	<b>2 965</b>	<b>1650</b>	<b>1221</b>	<b>429</b>	1	144	<b>1 117</b>	<b>969</b>	192	3	63	466	11
Other natural grassland		<b>144 908</b>	n.t.	n.r.		105	23 152	59 822	22 638	28 567	586	2 278	6 428	1 333
Cultivated grassland		256 552	n.t.	n.r.		97	31 074	87 634	77 988	52 226	561	2 398	3 431	1 144
Permanent grassland		256 552	n.t.	n.r.		97	31 074	87 634	77 988	52 226	561	2 398	3 431	1 144
Environmental non-sensitive permanent grassland		<b>255 998</b>	n.t.	n.r.		97	31 016	87 471	77 813	52 141	561	2 385	3 371	1 144
Environmental sensitive permanent grassland		<b>554</b>	n.t.	n.r.			58	163	175	86	0	12	59	0

## AREA OF GRASSLANDS BY ECOSYSTEM TYPES.

Semi-natural grassland ecosystem types (NATURA) are highlighted with green shading

\*-It should be noted that data on grassland ecosystem extent account are still in revision

## MANAGEMENT STATUS: „TO BE MANAGED BY 2030

„Managed“ - currently managed  
„Additional need“ - area of semi-natural grasslands still to be managed: for wooded meadows, alluvial meadows and Nordic alvars area to be managed is remarkable.

## „OWNERSHIP, HA“, arrows indicate the biggest ownership categories

Dry heaths (marked with lilac arrow) are owned in majority by government  
Big share of wooded meadows and alvars (marked with blue arrows) are owned by households.  
Alluvial meadows (marked with brown arrow) are managed by State Forest Management Centre (SFMC) in large

## Semi-natural grasslands, lessons learned: ownership statistics on ecosystem type level

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- Ecosystem extent account by ownership types is a new achievement
- Our suggestions on most relevant and feasible aggregation levels for ecosystems and economy (ownership) from the viewpoint of targeting the measures:
  - Ecosystem detailed type is important as grasslands are heterogeneous and are featuring distinctive services
  - Private / public ownership + the rest of the world
  - Split between households and enterprise sector would be desirable
  - Specific status enterprises like State Forest Management Centre in Estonia needs to be singled out
  - It seems that other corporations sector does not need a detailed breakdown as they possess just a small share of land where ecosystems of interest are situated on.
- Distinction between the owner and the economic actor would be important in future
- We compile a second year in order to provide more functionality and record the changes as well

# Linking the information on services values, ecosystem types and ownership (wooded meadows)

Estonian grassland ecosystem types by activity sectors and economic activities, ha

Activity sector	Economic activity	Area (ha)
01	011	12345
01	012	6789
01	013	1011
01	014	1213
01	015	1415
01	016	1617
01	017	1819
01	018	2021
01	019	2223
01	020	2425
01	021	2627
01	022	2829
01	023	3031
01	024	3233
01	025	3435
01	026	3637
01	027	3839
01	028	4041
01	029	4243
01	030	4445
01	031	4647
01	032	4849
01	033	5051
01	034	5253
01	035	5455
01	036	5657
01	037	5859
01	038	6061
01	039	6263
01	040	6465
01	041	6667
01	042	6869
01	043	7071
01	044	7273
01	045	7475
01	046	7677
01	047	7879
01	048	8081
01	049	8283
01	050	8485
01	051	8687
01	052	8889
01	053	9091
01	054	9293
01	055	9495
01	056	9697
01	057	9899
01	058	100101
01	059	102103
01	060	104105
01	061	106107
01	062	108109
01	063	110111
01	064	112113
01	065	114115
01	066	116117
01	067	118119
01	068	120121
01	069	122123
01	070	124125
01	071	126127
01	072	128129
01	073	130131
01	074	132133
01	075	134135
01	076	136137
01	077	138139
01	078	140141
01	079	142143
01	080	144145
01	081	146147
01	082	148149
01	083	150151
01	084	152153
01	085	154155
01	086	156157
01	087	158159
01	088	160161
01	089	162163
01	090	164165
01	091	166167
01	092	168169
01	093	170171
01	094	172173
01	095	174175
01	096	176177
01	097	178179
01	098	180181
01	099	182183
01	100	184185
01	101	186187
01	102	188189
01	103	190191
01	104	192193
01	105	194195
01	106	196197
01	107	198199
01	108	200201
01	109	202203
01	110	204205
01	111	206207
01	112	208209
01	113	210211
01	114	212213
01	115	214215
01	116	216217
01	117	218219
01	118	220221
01	119	222223
01	120	224225
01	121	226227
01	122	228229
01	123	230231
01	124	232233
01	125	234235
01	126	236237
01	127	238239
01	128	240241
01	129	242243
01	130	244245
01	131	246247
01	132	248249
01	133	250251
01	134	252253
01	135	254255
01	136	256257
01	137	258259
01	138	260261
01	139	262263
01	140	264265
01	141	266267
01	142	268269
01	143	270271
01	144	272273
01	145	274275
01	146	276277
01	147	278279
01	148	280281
01	149	282283
01	150	284285
01	151	286287
01	152	288289
01	153	290291
01	154	292293
01	155	294295
01	156	296297
01	157	298299
01	158	300301
01	159	302303
01	160	304305
01	161	306307
01	162	308309
01	163	310311
01	164	312313
01	165	314315
01	166	316317
01	167	318319
01	168	320321
01	169	322323
01	170	324325
01	171	326327
01	172	328329
01	173	330331
01	174	332333
01	175	334335
01	176	336337
01	177	338339
01	178	340341
01	179	342343
01	180	344345
01	181	346347
01	182	348349
01	183	350351
01	184	352353
01	185	354355
01	186	356357
01	187	358359
01	188	360361
01	189	362363
01	190	364365
01	191	366367
01	192	368369
01	193	370371
01	194	372373
01	195	374375
01	196	376377
01	197	378379
01	198	380381
01	199	382383
01	200	384385
01	201	386387
01	202	388389
01	203	390391
01	204	392393
01	205	394395
01	206	396397
01	207	398399
01	208	400401
01	209	402403
01	210	404405
01	211	406407
01	212	408409
01	213	410411
01	214	412413
01	215	414415
01	216	416417
01	217	418419
01	218	420421
01	219	422423
01	220	424425
01	221	426427
01	222	428429
01	223	430431
01	224	432433
01	225	434435
01	226	436437
01	227	438439
01	228	440441
01	229	442443
01	230	444445
01	231	446447
01	232	448449
01	233	450451
01	234	452453
01	235	454455
01	236	456457
01	237	458459
01	238	460461
01	239	462463
01	240	464465
01	241	466467
01	242	468469
01	243	470471
01	244	472473
01	245	474475
01	246	476477
01	247	478479
01	248	480481
01	249	482483
01	250	484485
01	251	486487
01	252	488489
01	253	490491
01	254	492493
01	255	494495
01	256	496497
01	257	498499
01	258	500501
01	259	502503
01	260	504505
01	261	506507
01	262	508509
01	263	510511
01	264	512513
01	265	514515
01	266	516517
01	267	518519
01	268	520521
01	269	522523
01	270	524525
01	271	526527
01	272	528529
01	273	530531
01	274	532533
01	275	534535
01	276	536537
01	277	538539
01	278	540541
01	279	542543
01	280	544545
01	281	546547
01	282	548549
01	283	550551
01	284	552553
01	285	554555
01	286	556557
01	287	558559
01	288	560561
01	289	562563
01	290	564565
01	291	566567
01	292	568569
01	293	570571
01	294	572573
01	295	574575
01	296	576577
01	297	578579
01	298	580581
01	299	582583
01	300	584585
01	301	586587
01	302	588589
01	303	590591
01	304	592593
01	305	594595
01	306	596597
01	307	598599
01	308	600601
01	309	602603
01	310	604605
01	311	606607
01	312	608609
01	313	610611
01	314	612613
01	315	614615
01	316	616617
01	317	618619
01	318	620621
01	319	622623
01	320	624625
01	321	626627
01	322	628629
01	323	630631
01	324	632633
01	325	634635
01	326	636637
01	327	638639
01	328	640641
01	329	642643
01	330	644645
01	331	646647
01	332	648649
01	333	650651
01	334	652653
01	335	654655
01	336	656657
01	337	658659
01	338	660661
01	339	662663
01	340	664665
01	341	666667
01	342	668669
01	343	670671
01	344	672673
01	345	674675
01	346	676677
01	347	678679
01	348	680681
01	349	682683
01	350	684685
01	351	686687
01	352	688689
01		



## Lessons learned: linking the information on services values, ecosystem types and ownership

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- Ecosystem services profiles can complement the extent account and increase the potential to provide a bases for planning and monitoring.
- Ecosystem services profiles could be important for landowners and everyone who decides on the purpose of the cadastral unit.
- We hope that with more services mapped and valued the ecosystem services profiles could be used to analyse alternative uses of different types of land (ecosystems).



WORK IN PROGRESS

## Further use of the results of derived statistics: linking of the subsidies data

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- We made an attempt to link the figures on financial support to the grassland ecosystem types
- We compared the estimated value of services provided, expenditures made and subsidies received.
- We questioned if the financial support for the management, restoration and conservation of semi-natural grasslands is adequate considering the scope and magnitude of the services provided by these ecosystems.



WORK IN PROGRESS







## Lessons learned: linking of the ecosystem services and subsidies

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It cannot be said yet if the financial support for the management, restoration and conservation of semi-natural grasslands is adequate considering the scope and magnitude of the services provided by these ecosystems.

Bottlenecks currently:

- figures on financial support for grassland ecosystem management could not be directly linked to the ecosystems types
- provisioning services dominate and the selection of the services is narrow
- The non-inclusion of non-market services (services which do not have a monetary equivalent directly or indirectly in the market) in the accounts threatens with the underestimation of the value of ecosystem services



Ecosystem accounts in policy and decision making...further thoughts

## Under discussion currently: accounting for market and non-market ecosystem services

Example of three ecosystem services benefits: good dinner, walk in a forest and existence of biological species.



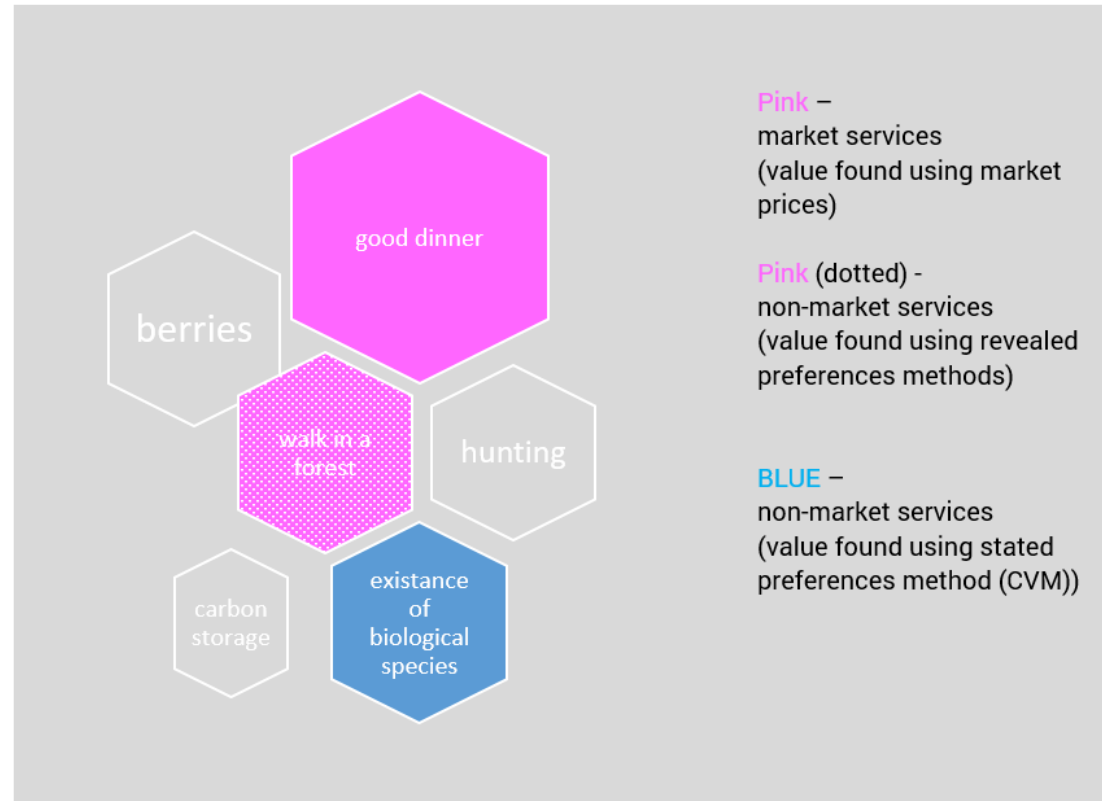
We question:

Are market and non-market values (without direct output having market price) comparable and what unites them?

Answer:

Yes, comparable.  
All ecosystem services increase individual's welfare regardless of their participation in the market.

No, distinctive, valuation methods differ



## Final thoughts...

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### Ecosystem accounts in policy and decisionmaking in Estonia

- Extent account together with an ownership dimension, ➡ useful
- Ecosystem services accounts, ➡ potential (links to national accounts) is recognized
  - ➡ promising as ideally the value of land should reflect the value of services
  - ➡ we widen the scope of the services accounts to all ecosystems and to wide range of services (stakeholders view).
- Evaluation of potential linkages between subsidies paid and services provided by ecosystems, ➡ needs further efforts



Thank you!

Read more:

[Chance for Better Policy: Can Ecosystem Account Provide a Missing Link between the Services Provided by Ecosystems and the Land Owners](#); UN London Group on Environmental Accounting, 2020; Kaia Oras (Statistics Estonia), Üllas Ehrlich (prof., Tallinn University of Technology), Kätlin Aun; (Statistics Estonia); Grete Luukas (Statistics Estonia)

[Two Languages or Two Narratives: Comparison of the Selected Market Price and Revealed Preferences Valuation Methods to the Stated Preferences Method](#); UN London Group on Environmental Accounting, 2020; Kaia Oras (Statistics Estonia), Üllas Ehrlich (prof., Tallinn University of Technology), Kätlin Aun; (Statistics Estonia); Grete Luukas (Statistics Estonia)

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