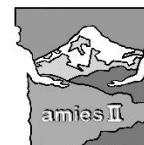


AMIES II - Final Meeting

Tbilisi in September 2017



Scenario Development for Sustainable Land Use
in the Greater Caucasus, Georgia

Joint Results and the Definition of Scenario Logics

Prof. Dr. J. Aurbacher
Tim Theissen, M.Sc.



Center for
International
Development and
Environmental Research



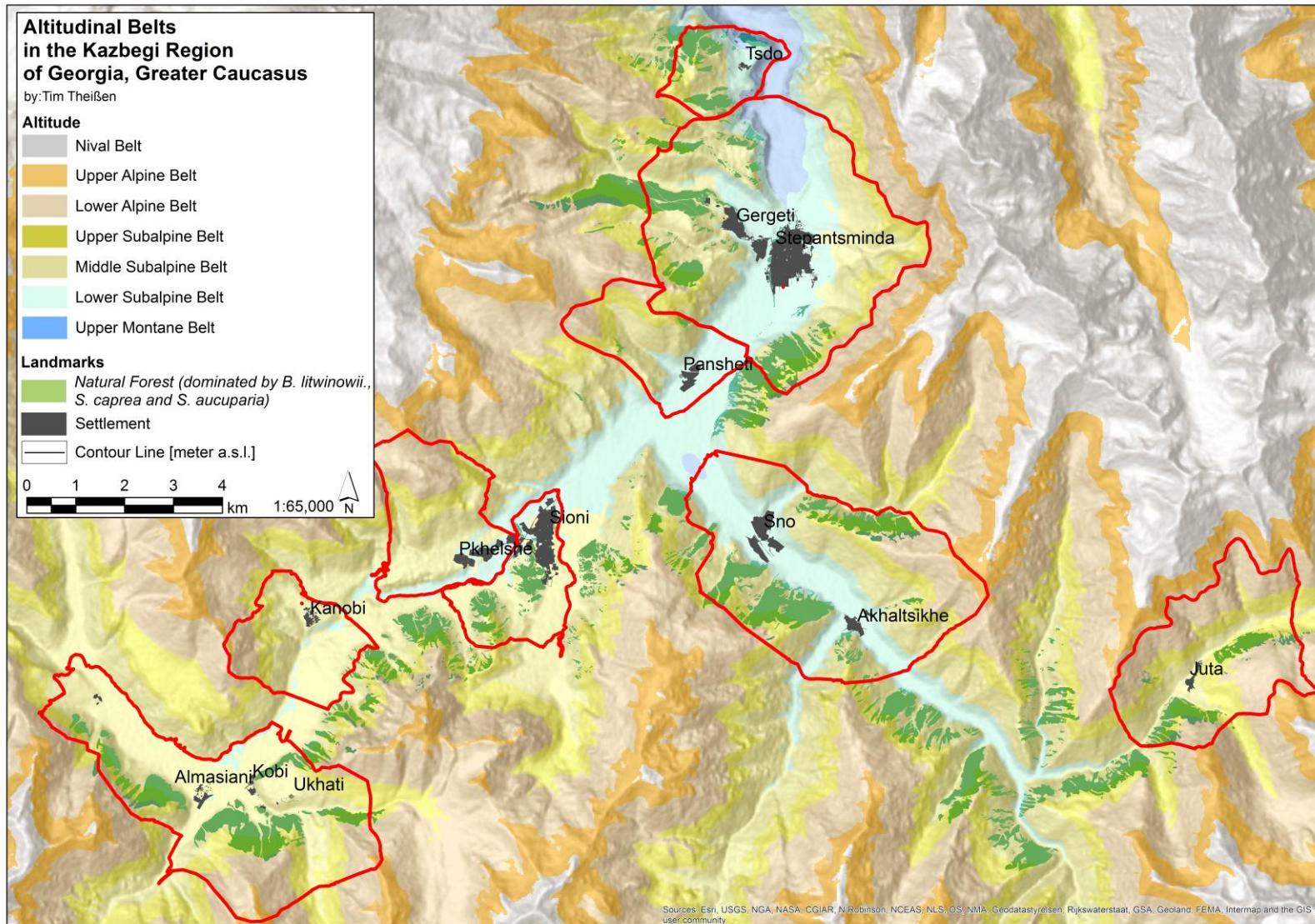
Ivane Javakhishvili
Tbilisi State
University

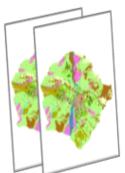


Ilia State
University



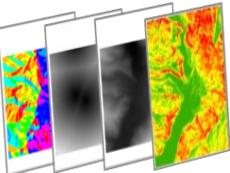
Agricultural
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Current agricultural land use and land cover

Physical parameters:

- Distance to settlement
 - Elevation
 - Aspect
 - Slope
 - Curvature
 - Climatic data
- 



Disciplinary result (B + C)

Thematic maps, spatially explicit

- ➔ Determination of productivity/ carrying capacity of the landscape
 - + Agricultural economic data (Disciplinary result D)
(household-level ,‘micro-economic unit’ to regional level)
 - + Marketing structures (Disciplinary result D)
- ➔ Develop sustainable land use scenarios
- ➔ Visualization of the scenarios

		Ecological limits	
		strong protection	moderate limits
Cattle	maximum cattle	PROT-MAX	LIM-MAX
	regionally oriented cattle	PROT-REG	

1. Limit in:

→ Grazing area



2. Further arable land:

→ Additional feeding and winter fodder



Alfalfa (*Medicago sativa*) cultivation as one rule/ assumption for the scenarios

- used for additional feeding
- cultivated on pot. arable land
- Addition and substitute for needed hay biomass

Challenge/ problem: cultivation under high mountain conditions

Basic assumptions are 3 or 4 t * ha⁻¹ * a⁻¹



Scenario I ,Ecological Protection & Regional Orientation':

- Land use on slopes $\leq 30^\circ$ inclination
- Arable land on locations with SQR ≥ 40 and inclination $\leq 7^\circ$
- Winter fodder from hay meadows (meadow area from 2014) and alfalfa cultivation



Scenario II 'Ecological Protection & Maximum Cattle':

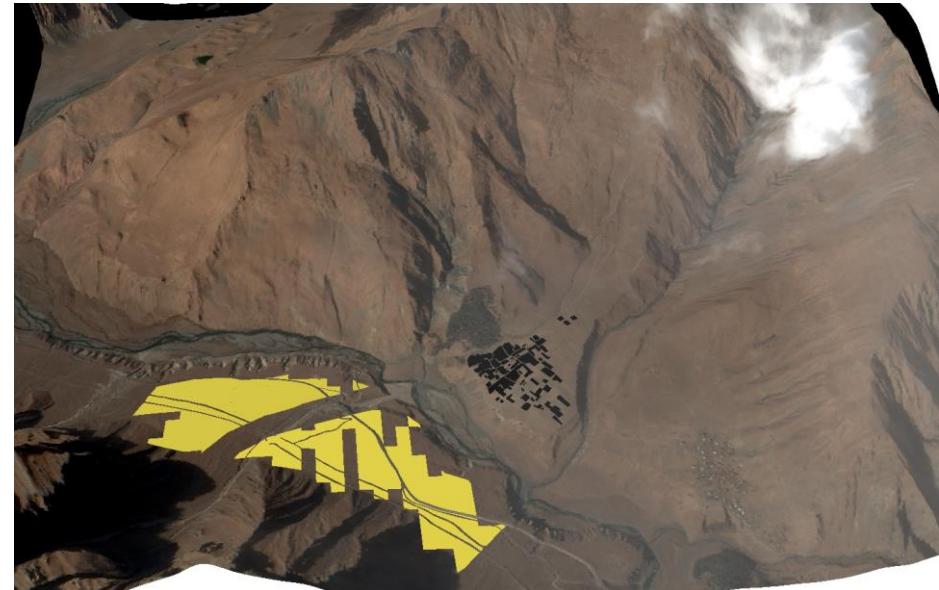
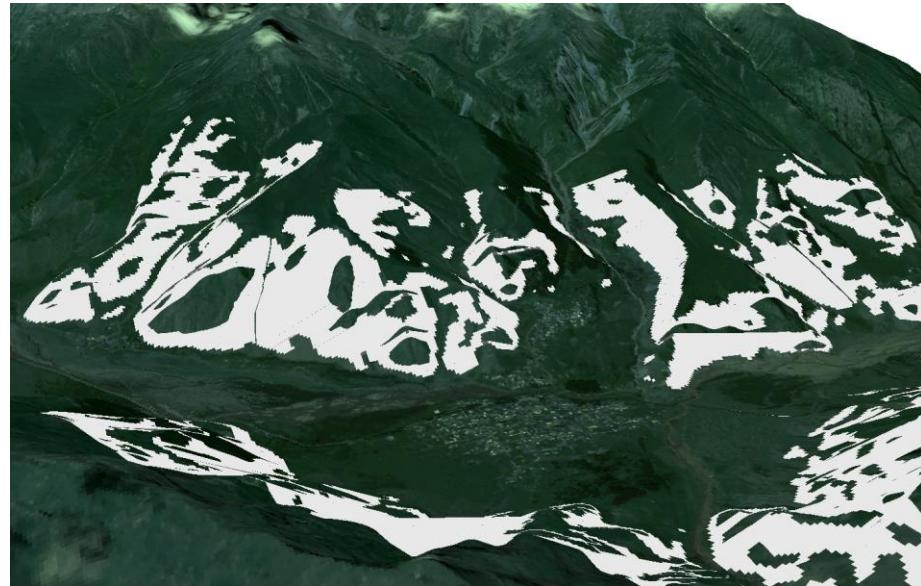
- Land use on slopes $\leq 30^\circ$ inclination
- Arable land on locations with SQR ≥ 40 and inclination $\leq 7^\circ$
- Winter fodder from hay meadows (meadow area from 2014) and alfalfa cultivation



Scenario III 'Ecological Limits & Maximum Cattle':

- Land use on slopes $\leq 40^\circ$ inclination
- Arable land on locations with SQR ≥ 20 and inclination $\leq 17^\circ$
- Winter fodder from alfalfa cultivation





Scenario I ,Ecological Protection & Regional Orientation':

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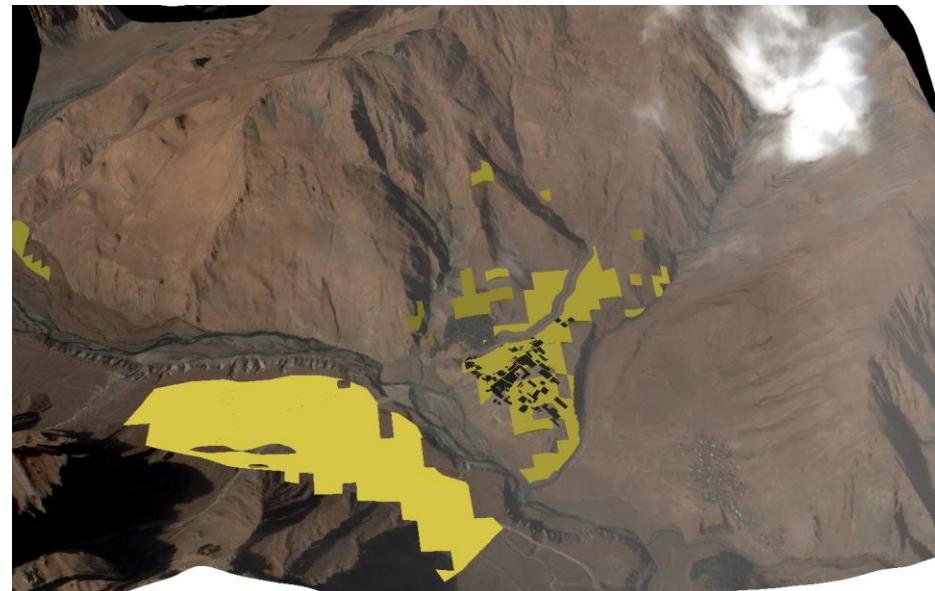
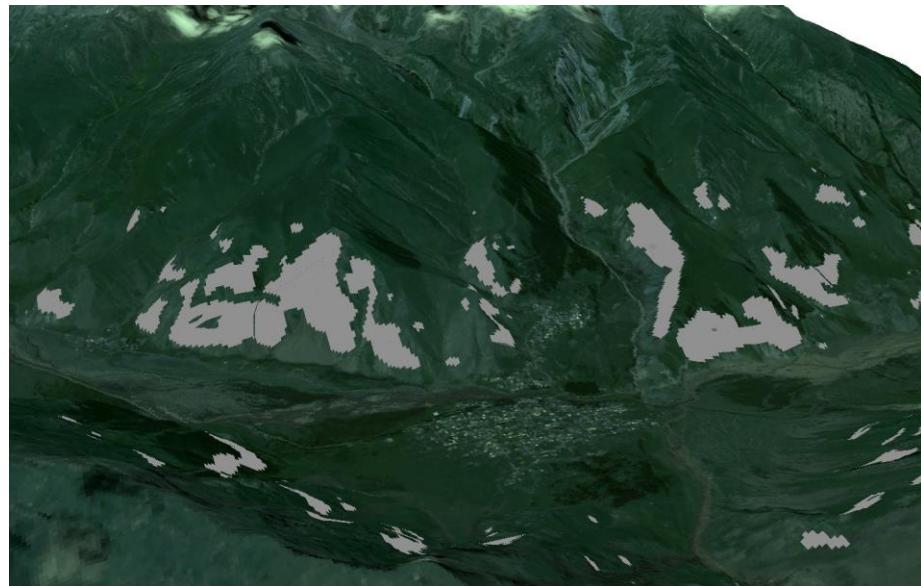


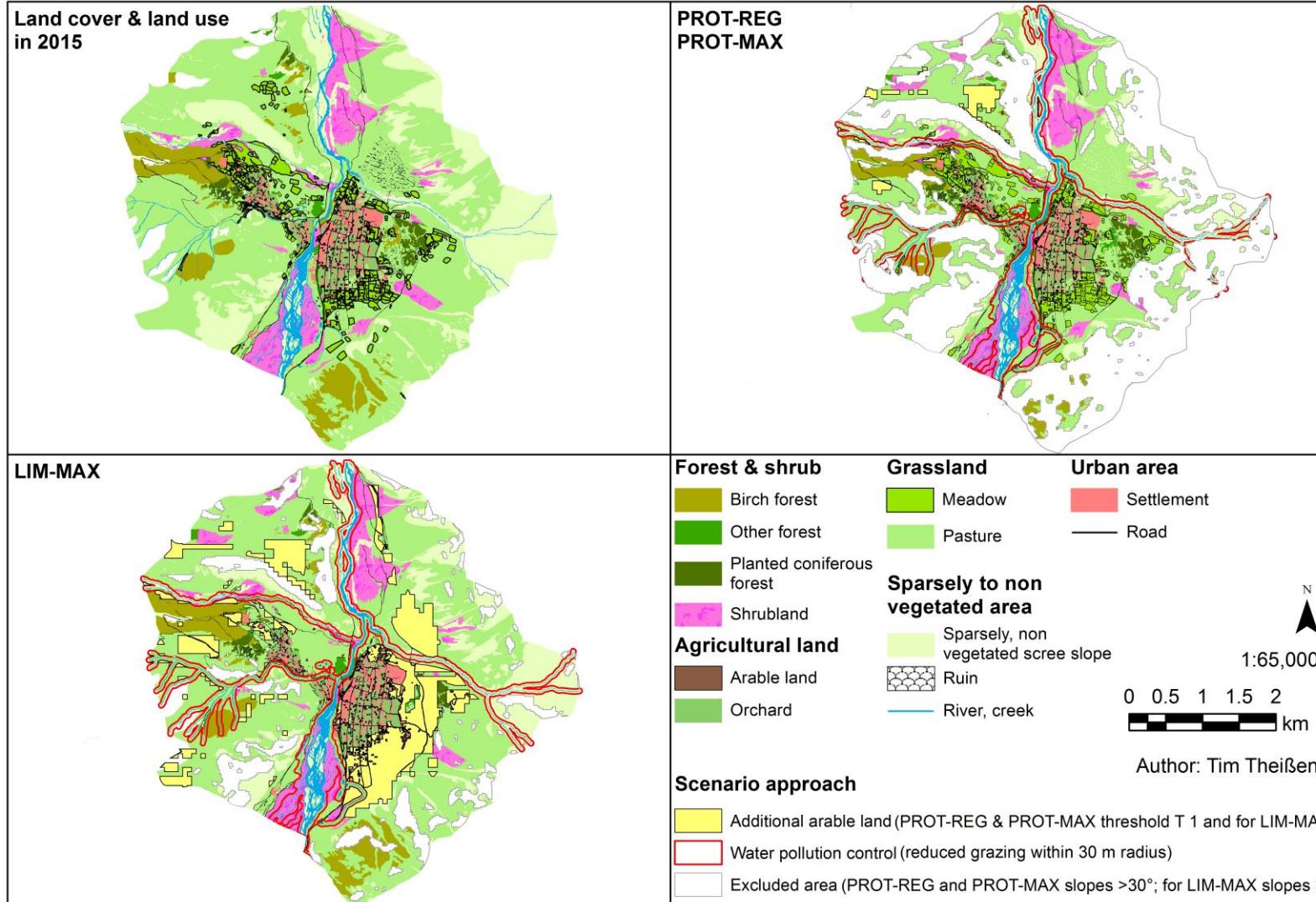
Scenario III 'Ecological Limits & Maximum Cattle':

- Land use on slopes $\leq 40^\circ$ inclination
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Scenario restrictions: arable land







Land use and land cover: area sizes

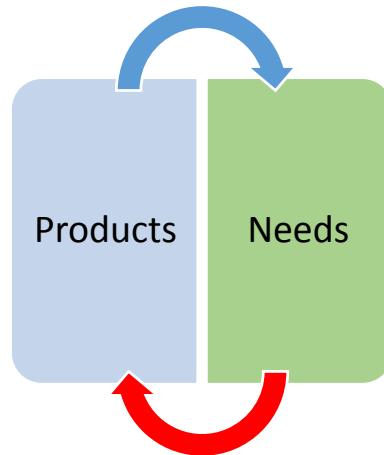
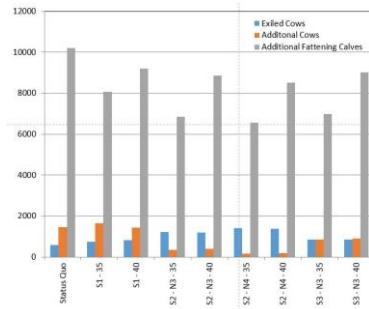


VolkswagenStiftung

		Settlement										Total
Land cover & land use		Gergeti, Stepantsminda	Pansheti	Koseli, Sno, Akhalsikhe	Tsdo	Sioni, Vardisubani	Pkhelshe, Goristsikhe	Kanobi	Kobi ⁺ , Almasiani ⁺ , Nogkau ⁺ , Ukhati*	Juta		
Altitude [m a.s.l.]		1,765	1,770	1,770	1,780	1,875	1,900	1,985	2,010 ⁺ ; 2,190*	2,160		
Situation 2015	Area [ha] Forest & shrubland	371	2	239	80	43	16	8	262	128	1149	
	Arable land	10	1	4	1	4	5	4	18	1	48	
	Orchard	48	10	31	2	49	17	4	7	4	172	
	Meadow	114	20	138	31	91	113	92	69	103	771	
	Pasture	1214	348	955	172	187	414	302	1064	719	5375	
	Sparsely to non vegetated	400	132	408	33	60	102	82	183	73	1473	
	Settlement	117	12	42	2	58	28	6	12	6	284	
	Road	34	3	18	4	15	3	9	20	3	109	
	Total	2308	528	1835	325	507	698	507	1635	1037	9381	
	Soil with SQR-score < 40 [#]	2241	516	1835	297	463	586	428	1573	1037	8976	
Scenario I & II	Soil with SQR-score > 40	67	12	0	28	44	112	79	62	0	404	
	Area [ha] Alfalfa (SQR ≥ 40, ≤ 7°)	21	0	0	9	17	68	57	12	0	184	
	Meadow (< 30°)	106	20	127	24	89	54	77	56	46	599	
	Pasture (< 30°)	614	178	379	118	127	223	123	643	308	2713	
	Total	741	198	506	151	233	345	257	711	354	3496	
	Biomass Alfalfa (3t)	63	0	0	27	51	204	171	36	0	552	
	[t DM * a ⁻¹] Meadow	336	75	416	102	280	200	271	145	142	1967	
	Pasture	1661	437	1041	385	315	576	299	1721	874	7309	
	Total	2060	512	1457	514	646	980	741	1902	1016	9828	
	Area [ha] Alfalfa (SQR ≥ 20, ≤ 17°)	265	31	40	25	121	137	119	67	41	846	
Scenario III	Pasture (< 40°)	960	328	965	170	160	358	257	958	688	4844	
	Total	1225	359	1005	195	281	495	376	1025	729	5690	
	Biomass Alfalfa (3t)	795	93	120	75	363	411	357	201	123	2538	
	[t DM * a ⁻¹] Pasture	2904	861	2837	567	442	972	792	2749	1932	14056	
	Total	3699	954	2957	642	805	1383	1149	2950	2055	16594	

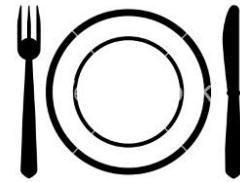
Comparison

Livestock production/ food production (scenario based)



Consumption needs of population & tourists

Based on recommendations on consumption of milk, dairy products & meat (DGE)





Thank you for your attention