



Planbureau voor de Leefomgeving

# Duurzame verdichting bij internationale verstedelijking

Historische veranderingen in landgebruik in de stedelijke omgeving

Frank van Rijn



# Inleiding

- > Inleiding
- > Resultaten
- > Conclusie
- > Beperkingen



# PBL ROL/TUD/VU research project 2024-2028

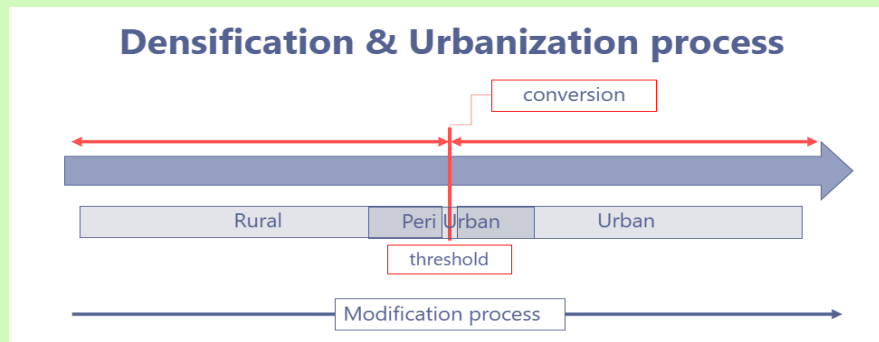
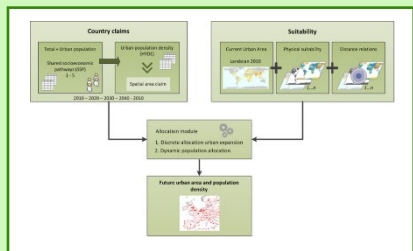
## > QUANTITATIVE APPROACH

## > QUALITATIVE APPROACH

> 2up model

> Formal and informal morphologies

- > Scenario research
- > Design research



Urbanisation dynamics

Sustainable Urbanisation and Sustainable Densification

Planning consequences





# Vraagstelling

- > Mondiaal groeien de steden, maar ten koste van wat?  
Wat was het landgebruik van de groei-locaties van steden?



# Gebruikte data

## > GHSL Settlement data van JRC

- Eenduidige definitie van Stedelijk gebied (met beperkingen)

[Global Human Settlement - Degree of Urbanisation definitions - European Commission](#)

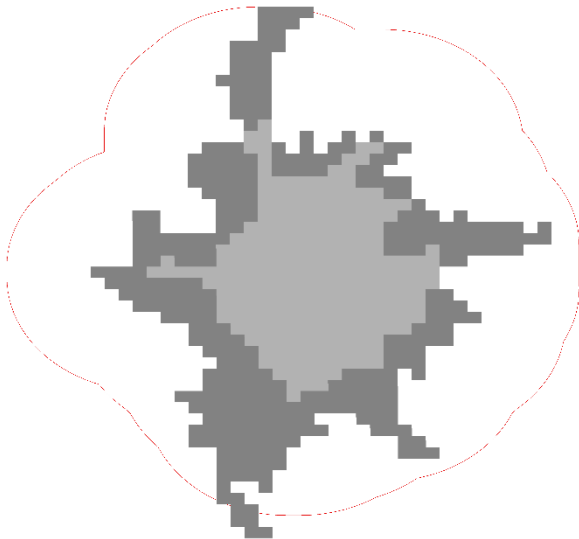
- Mondiaal 13.000 steden/stedelijke gebieden

## > ESA landuse/landcover

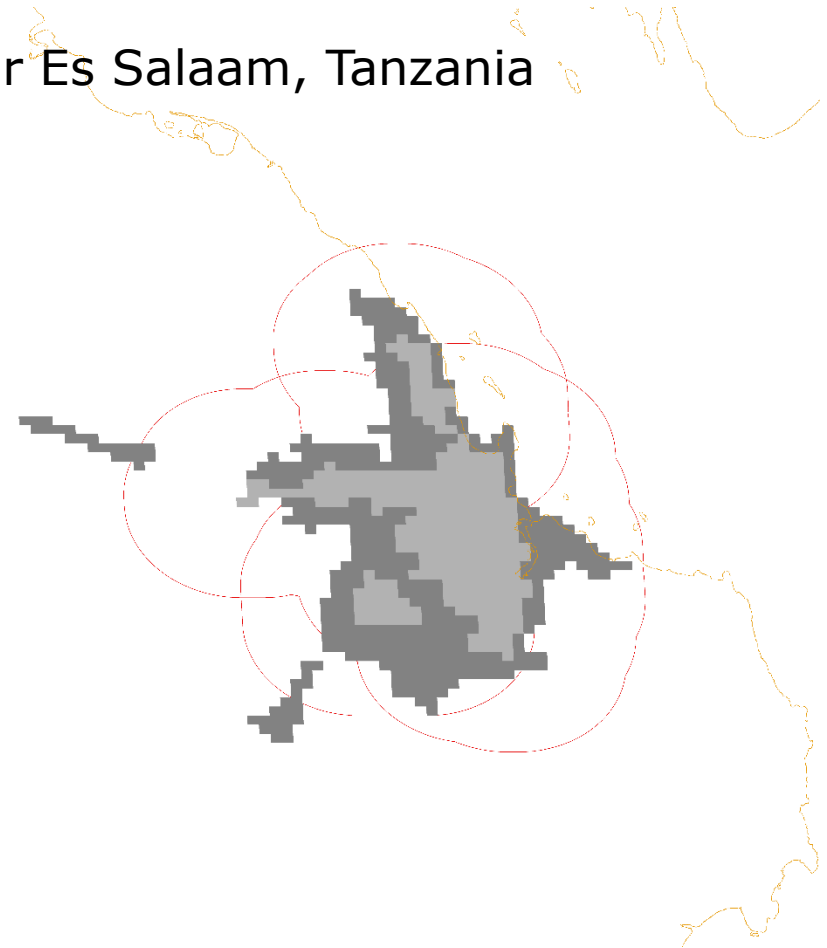
[ESA/CCI viewer](#) (300m raster; 1992-2020)

# Voorbeelden van gebruikte data

Kumasi, Ghana



Dar Es Salaam, Tanzania





# De cijfers

Urban	2015-1990									
Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Canada	15.69	-9.12	-0.48	-0.20	-0.83	-1.86	-2.79	-0.22	-0.09	-0.11
USA	14.28	-4.74	-0.45	-1.40	-1.12	-3.09	-3.31	-0.03	-0.09	-0.05
Central America	24.34	-5.93	-2.27	-1.58	-0.90	-0.80	-12.49	-0.12	-0.20	-0.06
South America	20.26	-7.01	-2.50	-1.26	-0.65	-1.43	-5.50	-1.59	-0.25	-0.06
Northern Africa	17.86	-8.91	-1.37	0.00	-0.04	-0.11	-0.93	-2.02	-4.25	-0.23
Western Africa	24.70	-8.28	-6.96	-2.32	-2.01	-1.36	-3.43	-0.04	-0.16	-0.15
Eastern Africa	25.53	-3.52	-4.80	-7.51	-0.22	-4.23	-2.74	-0.16	-1.78	-0.58
Southern Africa	28.45	-0.69	-2.22	-2.52	-4.05	-12.90	-5.26	-0.07	-0.61	-0.13
Western Europe	14.95	-6.73	-2.29	-1.51	-1.37	-0.64	-0.22	-0.48	-1.41	-0.30
Eastern Europe	14.77	-9.76	-2.01	-0.26	-1.80	-0.14	-0.03	-0.07	-0.55	-0.16
Former USSR	23.18	-12.60	-3.65	-3.42	-1.16	-0.25	-0.05	-0.61	-1.48	0.04
Middle East	26.94	-6.10	-0.81	-0.46	-0.49	-0.12	-0.50	-1.90	-16.37	-0.18
South Asia	24.10	-17.83	-2.58	-1.26	-1.14	0.01	-0.81	-0.14	-0.17	-0.18
East Asia	29.91	-17.52	-2.83	-6.18	-1.38	-0.31	-0.39	-0.36	-0.54	-0.40
South East Asia	17.45	-13.78	-1.69	-0.06	-0.71	-0.04	-0.19	-0.48	0.00	-0.49
Oceania	15.83	-0.97	-3.11	-0.85	-2.14	-2.91	-5.41	-0.15	-0.19	-0.11
Japan	25.58	-22.05	-0.62	-0.27	-1.81	-0.03	-0.02	-0.24	-0.07	-0.48



# De cijfers

Surroundings		2015-1990								
Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Canada	7.06	-3.64	-0.54	-0.11	-1.08	-0.59	-0.95	-0.14	-0.04	0.01
USA	11.15	-3.46	-0.64	-1.66	-1.87	-2.10	-1.32	-0.02	-0.03	-0.06
Central America	4.69	-0.42	-2.16	0.00	0.55	0.13	-2.80	0.00	-0.04	0.06
South America	3.99	-1.03	-1.11	-0.18	-0.98	0.51	-1.05	-0.33	0.01	0.16
Northern Africa	3.49	0.01	-0.45	0.00	-0.04	0.02	-0.27	-1.35	-1.29	-0.12
Western Africa	2.54	1.35	-0.36	-0.60	0.27	-0.06	-3.25	0.03	-0.02	0.11
Eastern Africa	1.41	0.91	-0.29	-0.46	0.81	-0.11	-1.91	0.06	-0.30	-0.12
Southern Africa	4.40	2.28	-0.57	-0.55	-3.71	-1.43	-0.32	0.00	0.02	-0.12
Western Europe	5.72	-2.74	-1.19	-0.54	-0.82	0.19	-0.06	-0.12	-0.38	-0.07
Eastern Europe	4.08	-3.02	-1.80	0.05	0.27	0.51	-0.02	-0.02	-0.07	0.01
Former USSR	5.14	-3.43	-1.04	-0.63	0.49	0.09	0.01	-0.39	-0.36	0.13
Middle East	4.29	0.16	-0.43	0.00	-0.61	0.40	-0.07	-1.67	-1.68	-0.39
South Asia	1.57	-0.65	-0.08	-0.18	-0.31	0.16	-0.46	-0.01	-0.04	-0.02
East Asia	6.30	-3.40	-0.11	-0.91	-1.29	0.05	-0.26	-0.09	-0.15	-0.15
South East Asia	3.17	-2.01	-0.73	-0.01	0.33	0.05	-0.50	-0.03	0.00	-0.28
Oceania	7.81	-0.74	-0.64	-0.16	-2.46	-1.18	-2.38	-0.02	-0.06	-0.17
Japan	8.76	-6.94	-0.27	-0.07	-1.45	0.13	0.01	-0.05	-0.01	-0.11



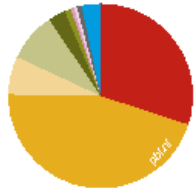


# De cijfers

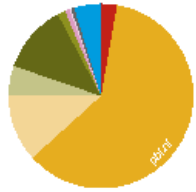
BigSurroundings		2015-1990								
Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Canada	3.76	-1.60	-0.58	-0.06	-0.74	-0.34	-0.40	-0.06	-0.01	0.04
USA	6.36	-1.74	-0.39	-0.83	-1.57	-1.21	-0.58	-0.01	0.01	-0.04
Central America	1.89	0.54	-1.93	0.31	0.58	0.18	-1.61	0.00	-0.02	0.07
South America	1.57	-0.13	-0.70	0.04	-0.92	0.63	-0.47	-0.19	0.04	0.14
Northern Africa	1.85	1.09	-0.47	0.00	0.01	0.13	-0.24	-1.35	-0.99	-0.02
Western Africa	0.95	2.18	0.11	-0.47	0.73	0.02	-3.63	0.04	-0.01	0.08
Eastern Africa	0.45	1.02	-0.18	-0.19	1.24	0.07	-2.19	0.10	-0.25	-0.07
Southern Africa	1.57	2.62	-0.23	-0.42	-3.10	-0.34	0.19	0.00	0.07	-0.37
Western Europe	3.76	-1.62	-0.93	-0.34	-0.78	0.25	-0.02	-0.07	-0.22	-0.04
Eastern Europe	2.30	-1.45	-1.76	0.08	0.28	0.52	0.00	0.00	-0.03	0.07
Former USSR	2.63	-1.57	-0.77	-0.37	0.69	0.14	0.03	-0.49	-0.28	0.00
Middle East	1.68	0.82	-0.42	0.09	-0.50	0.40	-0.03	-1.72	-0.22	-0.10
South Asia	0.89	-0.23	0.01	-0.14	-0.20	0.19	-0.44	0.00	-0.03	-0.04
East Asia	3.93	-1.97	0.15	-0.45	-1.21	0.10	-0.24	-0.05	-0.16	-0.10
South East Asia	1.69	-0.78	-0.61	-0.01	0.28	0.11	-0.60	0.02	0.00	-0.09
Oceania	3.81	-0.30	-0.02	0.00	-2.19	-0.51	-0.73	0.07	-0.02	-0.10
Japan	5.27	-3.80	-0.11	-0.04	-1.40	0.14	0.02	-0.02	-0.01	-0.05



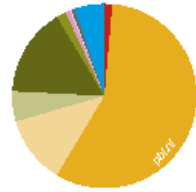
East Asia  
1990: Stad



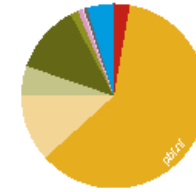
Ommeland (+10km)



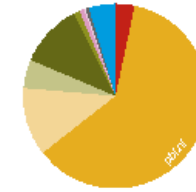
Groot Ommeland (+25km)



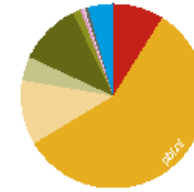
East Asia  
Ommeland (+10km): 1990



2000

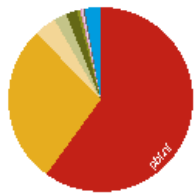


2015

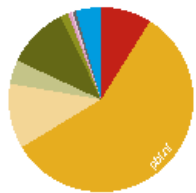


	Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Urban	East Asia	29.91	-17.52	-2.83	-6.18	-1.38	-0.31	-0.39	-0.36	-0.54	-0.40
Surroundings	East Asia	6.30	-3.40	-0.11	-0.91	-1.29	0.05	-0.26	-0.09	-0.15	-0.15
BigSurroundings	East Asia	3.93	-1.97	0.15	-0.45	-1.21	0.10	-0.24	-0.05	-0.16	-0.10

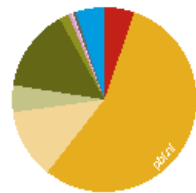
2015: Stad



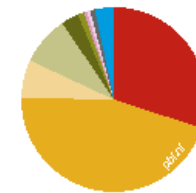
Ommeland (+10km)



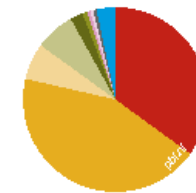
Groot Ommeland (+25km)



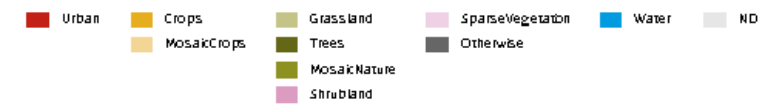
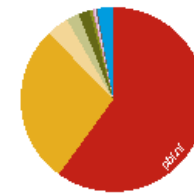
Stad: 1990



2000

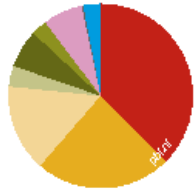


2015

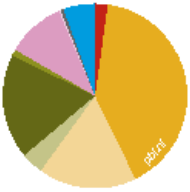




Western Africa  
1990: Stad



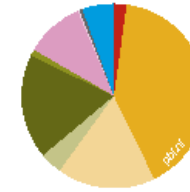
Ommeland (+10km)



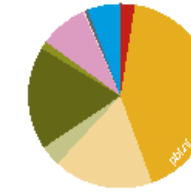
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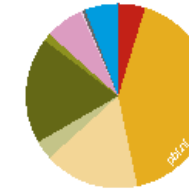
Western Africa  
Ommeland (+10km): 1990



2000

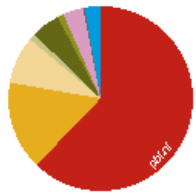


2015

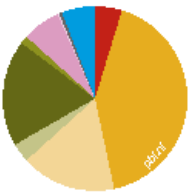


	Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Urban	Western Africa	24.70	-8.28	-6.96	-2.32	-2.01	-1.36	-3.43	-0.04	-0.16	-0.15
Surroundings	Western Africa	2.54	1.35	-0.36	-0.60	0.27	-0.06	-3.25	0.03	-0.02	0.11
BigSurroundings	Western Africa	0.95	2.18	0.11	-0.47	0.73	0.02	-3.63	0.04	-0.01	0.08

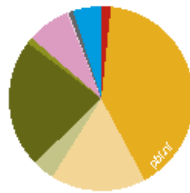
2015: Stad



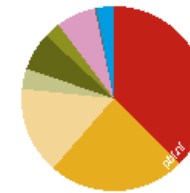
Ommeland (+10km)



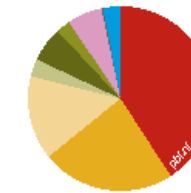
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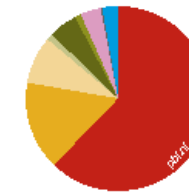
Stad: 1990



2000

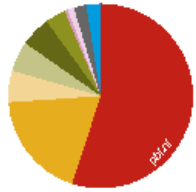


2015





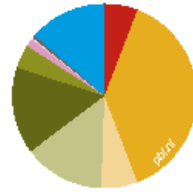
Western Europe  
1990: Stad



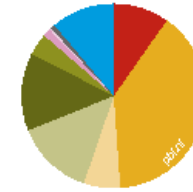
Ommeland (+10km)



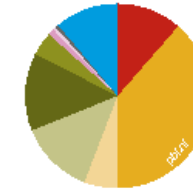
Groot Ommeland (+25km)



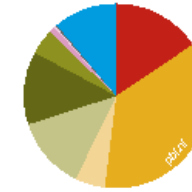
Western Europe  
Ommeland (+10km): 1990



2000

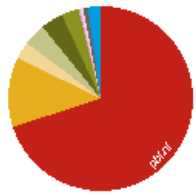


2015



	Wereldregio	Urban	Crops	MosaicCrops	Grassland	Trees	MosaicNature	Shrubland	SparseVegetation	Otherwise	Water
Urban	Western Europe	14.95	-6.73	-2.29	-1.51	-1.37	-0.64	-0.22	-0.48	-1.41	-0.30
Surroundings	Western Europe	5.72	-2.74	-1.19	-0.54	-0.82	0.19	-0.06	-0.12	-0.38	-0.07
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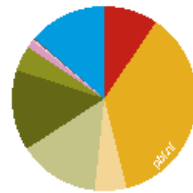
2015: Stad



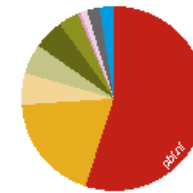
Ommeland (+10km)



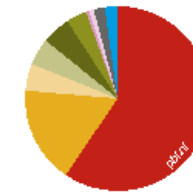
Groot Ommeland (+25km)



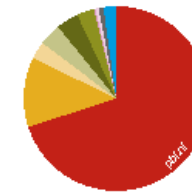
Stad: 1990



2000



2015





# Conclusie

- > In de meeste regio's geldt (Afrika is een uitzondering):
  - Stedelijke ontwikkeling gaat dichtbij veelal ten koste van agrarisch gebied, maar verder weg ook van natuurlijk gebied
  - Verplaatsing van agrarisch gebied kan niet de groei van de stad bijhouden
  - Afstanden tussen voedselproductie en -consumptie nemen toe
  
  - (Stedelijke groei >> grotere populatie >> meer vraag naar voedsel)

# Consequentie

- > Agrarische productie moet toenemen om de vraag naar producten aan te kunnen

