Water governance and spatial planning

Integrated water resource management trainings cycle 2023

Stg. Water forum Suriname

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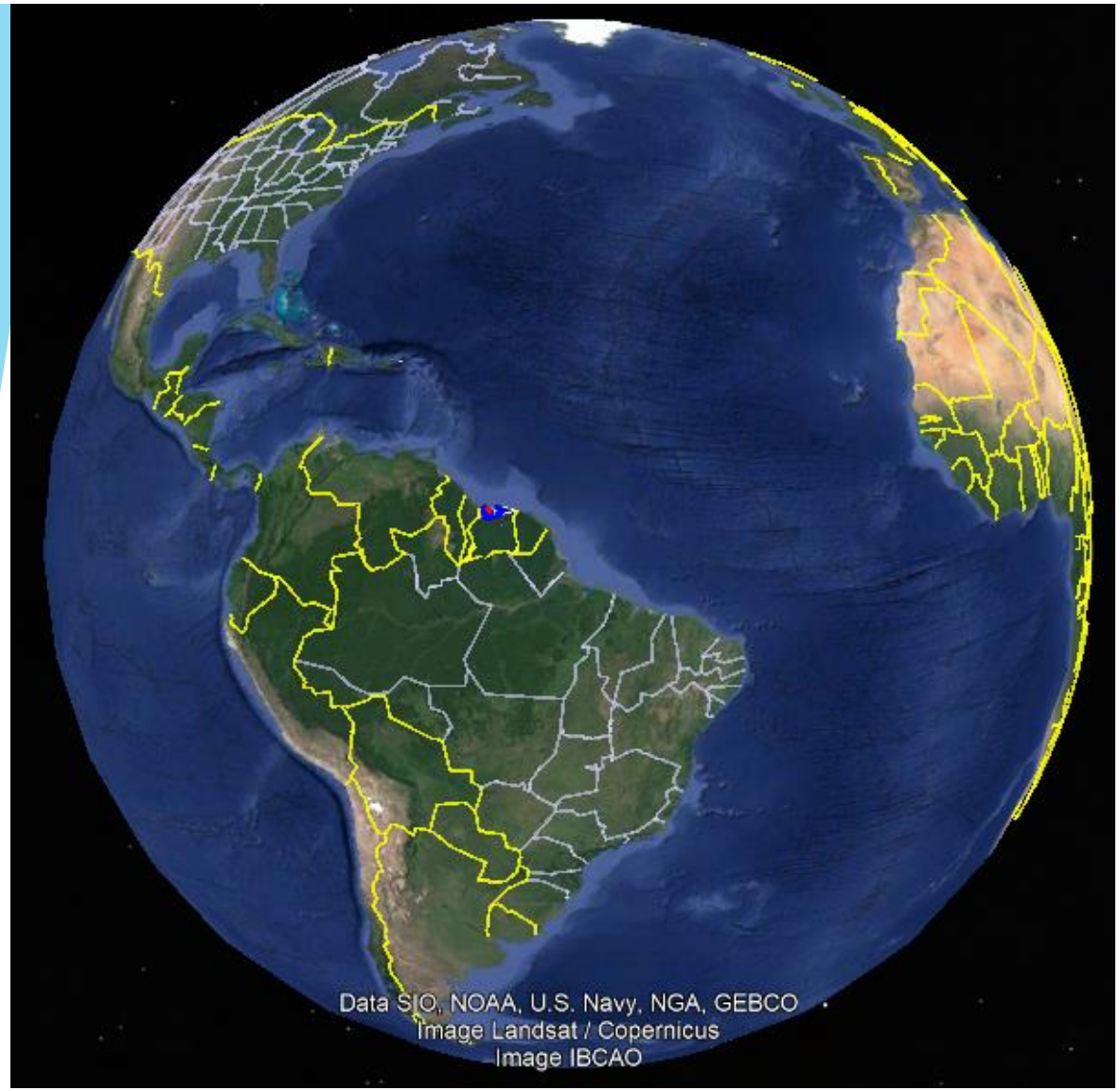
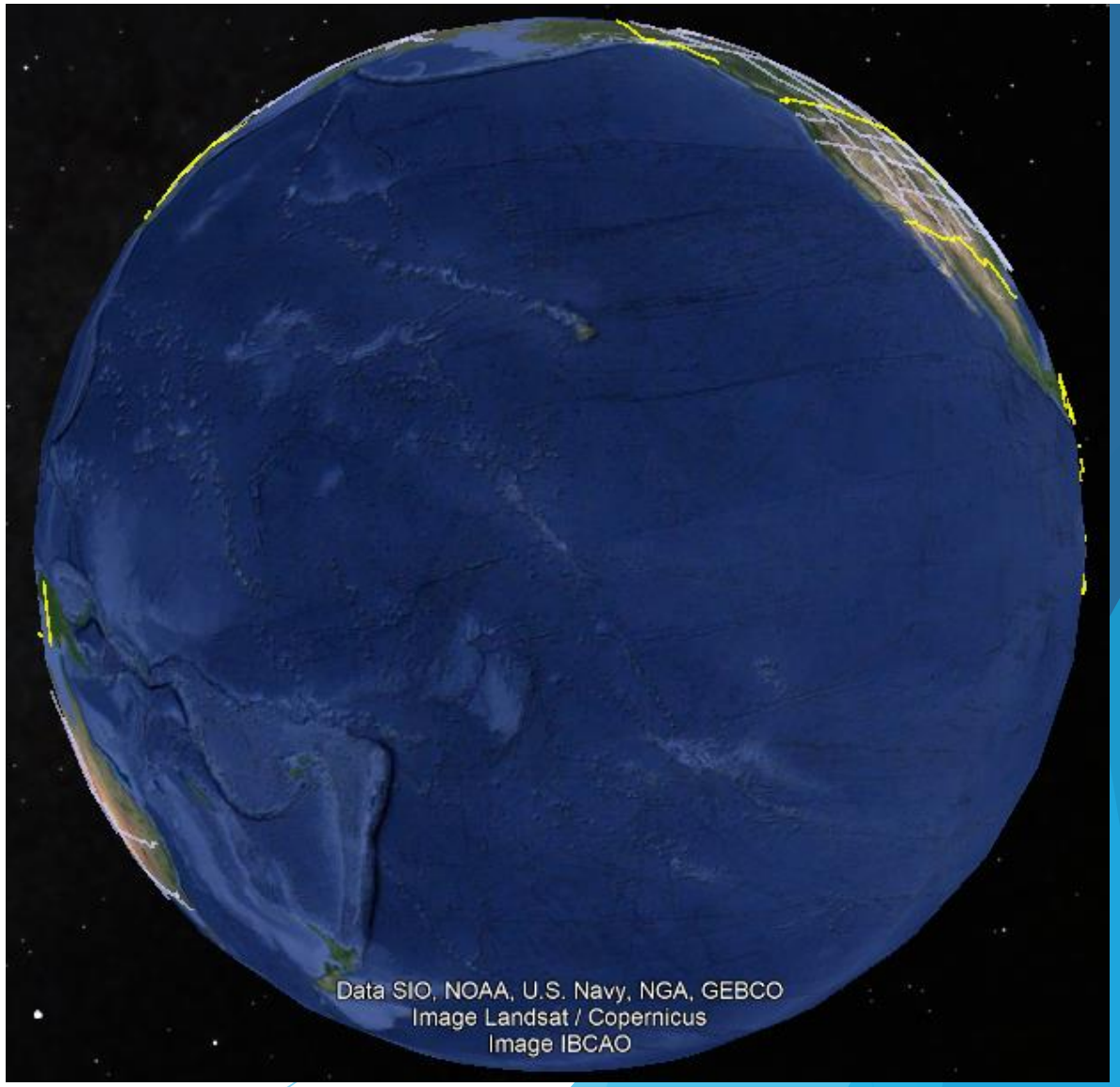
02 august 2023

KERNWOORD 1: WATER

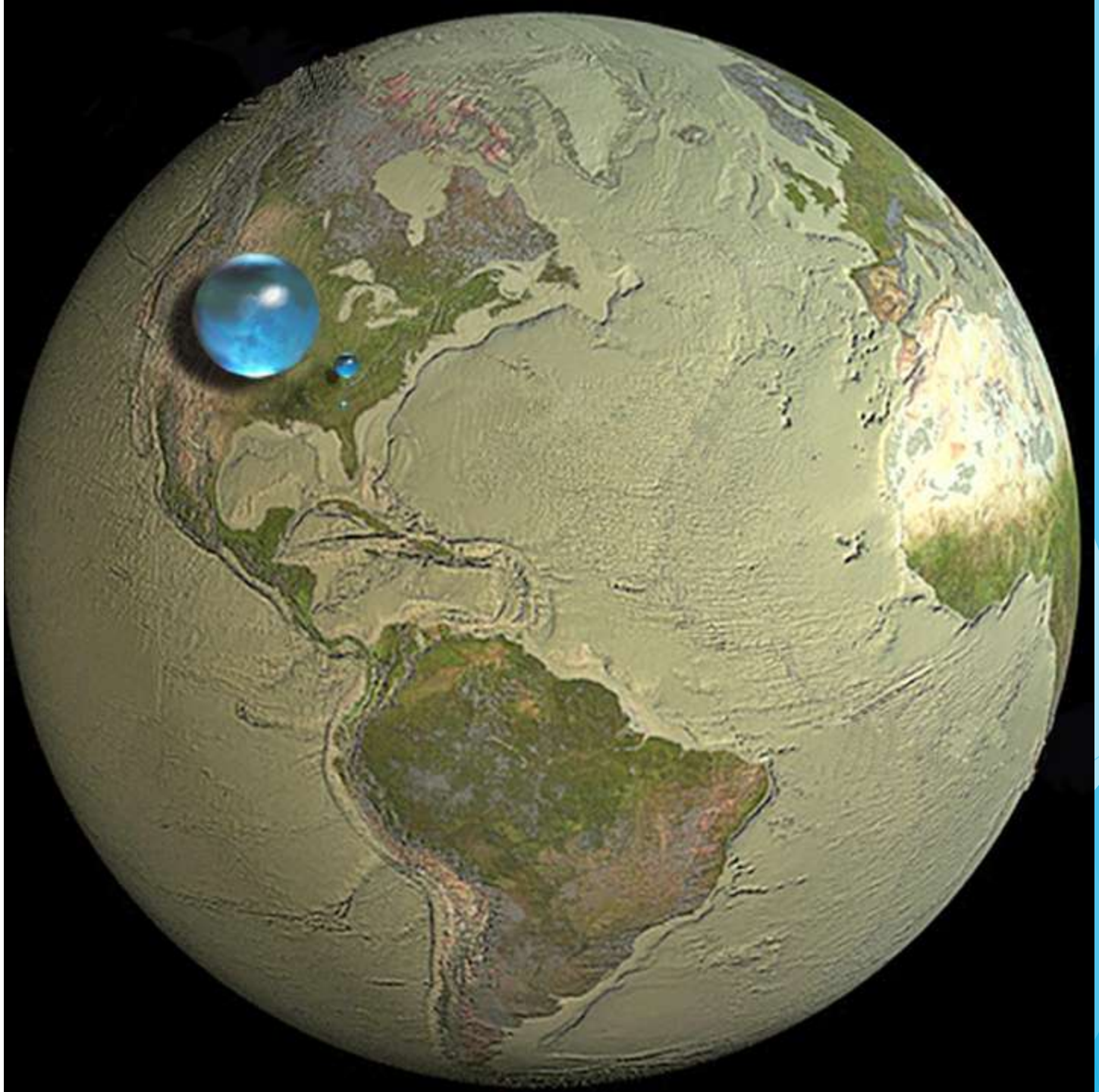
Google Earth Satellite Image of the Earth – **Openingsvraag 1: FULL OF WATER?**





Perspectief

Openings Question:
(STILL)
FULL OF WATER?



HOW MUCH WATER in the World

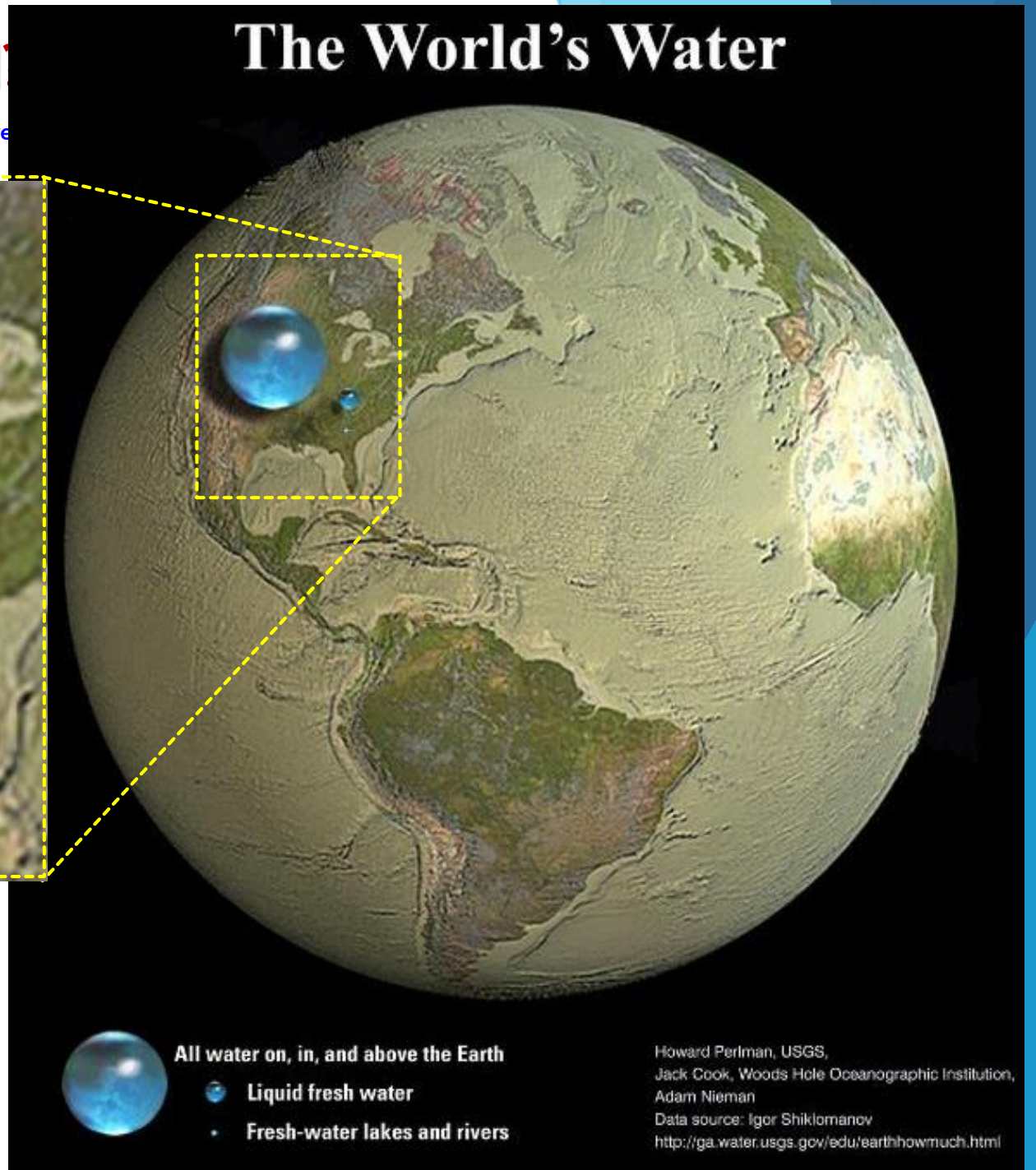
https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there
earth?qt-science_center_objects=0#qt-science_center_objects

Spheres showing:

(1) All water (largest sphere
over western U.S., 860 miles
(1,385 kilometers) in diamete

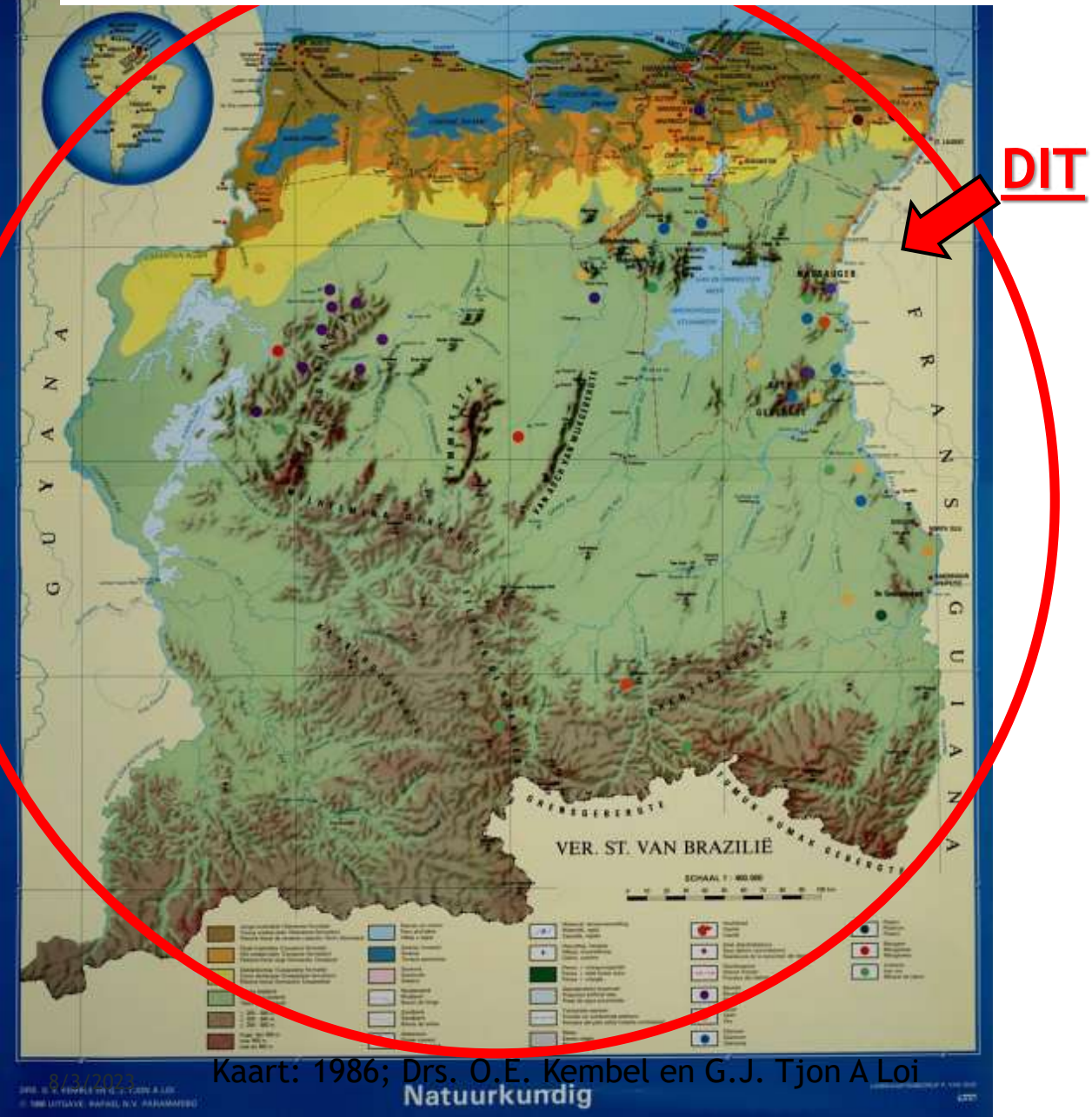
(2) Fresh liquid water in the
ground, lakes, swamps, and
rivers (mid-sized sphere over
Kentucky, 169.5 miles (272.8
kilometers) in diameter), and

(3) Fresh-water lakes and riv
(smallest sphere over Georgi
34.9 miles (56.2 kilometers)
diameter).



(Credit: Howard Perlman, USGS; globe illustration by Jack Cook, Woods Hole Oceanographic Institution (©); and Adam Nieman.)

KERNWOORD 1: RUIMTE Openings Question 2: WELKE RUIMTE?



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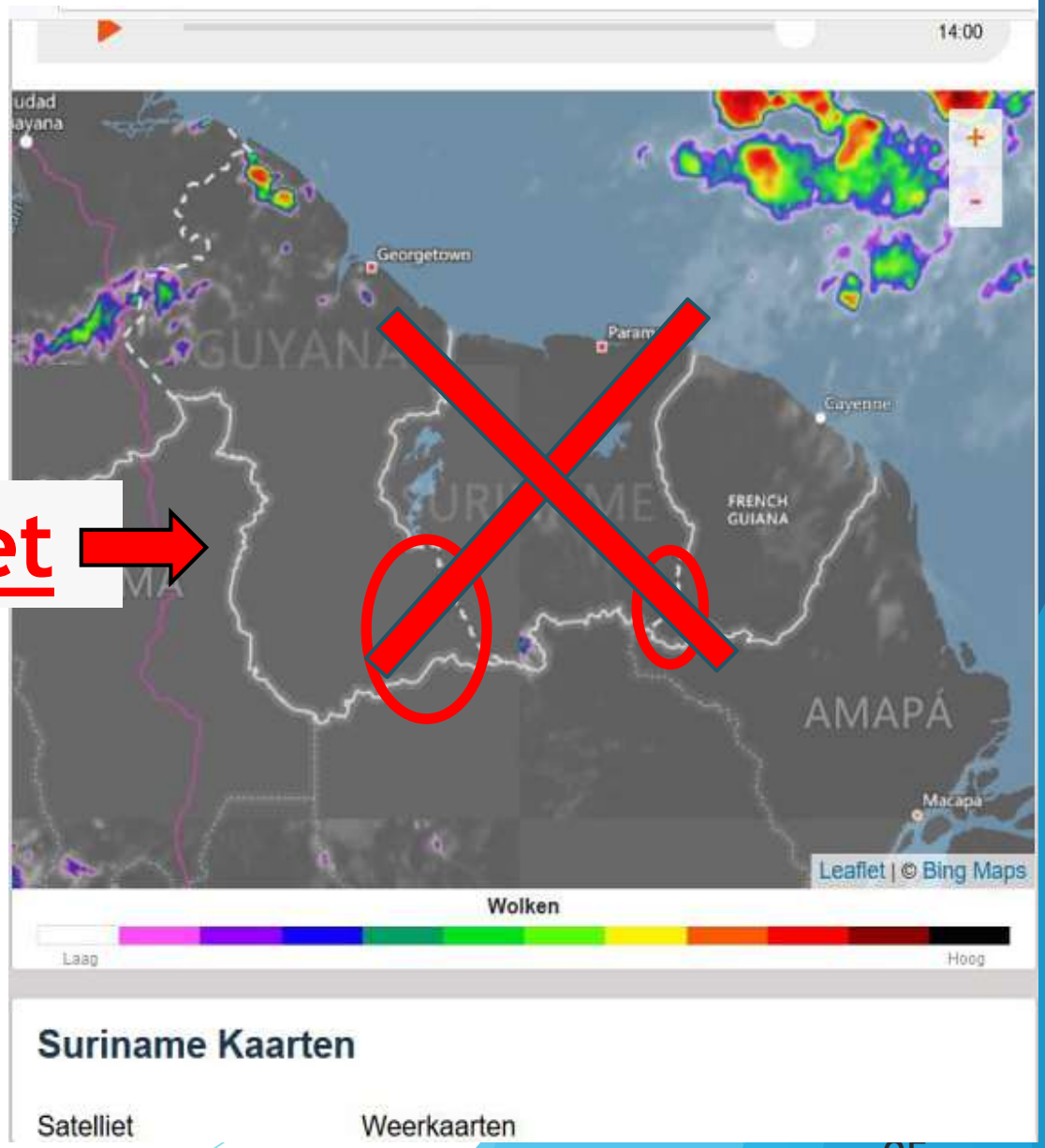


Kaart: 1986; Drs. O.E. Kembel en G.J. Tjon A Loi

Water Management - https://en.wikipedia.org/wiki/Category:Water_management

- Water management is the activity of
- Planning,
- Developing,
- Distributing and
- Optimum use of Water Resources
- under defined Water Polices and Regulations.
- It includes: management of water treatment of drinking water, industrial water, sewage or wastewater, management of water resources, management of flood protection, management of irrigation, and management of the water table.

DEFINITION OF SPATIAL PLANNING (FW)

"The Coordination of practices and policies affecting the spatial organization of an area, land or region"

Spatial planning is an holistic exercise whereby the organization of space is centered around the functionality of the space for human activities through sustainable planning of livable spaces where a healthy balance exists between human activities and protection of the natural environment.

SDG 11: SUSTAINABLE CITIES AND COMMUNITIES (FW)

Although Sustainable spatial planning pertains to most all SDG's, in particular SDG6 till SDG15, SDG 11 is the one that especially focuses on sustainable spatial planning, where the development of land, thus the creation of livable spaces for human activities, where humans can safely live, work, recreate, raise and educate their children is very much dependent on sound spatial planning, guaranteeing sustainable and resilient cities and communities.

HISTORIC OVERVIEW OF SPATIAL PLANNING IN SURINAME (FW)

The Periods of Development in Suriname:

1. 17th - early end of 19th century—early 20th century: Development of Plantations mostly along the coast of the Suriname river and the Commewijne river;
2. End 19th century and beginning 20th century: Immigration laborers in Suriname were imported to try to save the plantation econommy, expansion of Paramaribo to the North and South, to accommodate people moving from the plantations to the city, Freeman Gron, Beekhuizen and Kwatta;
3. First half of 20th century 1920'- 1960's: Bauxite period:

- Development of Industrial zone like Paranam and Moengo;
- Afobakka Dam and the establishment of the distrikt Brokopondo;
- Introduction of Kabaleboproject and development of Apoera in the West;
- further expansion of Paramaribo, development of areas like Zorg en Hoop, Uitvlucht in the South, and Maretraitte, Rainville en Blauwgrond in the North;
- New agriculture developments: Rice and Banana, in the west the development of New Nickerie and Wageningen due to the rice sector, and Saramacca, SURLAND due to the banana sector;

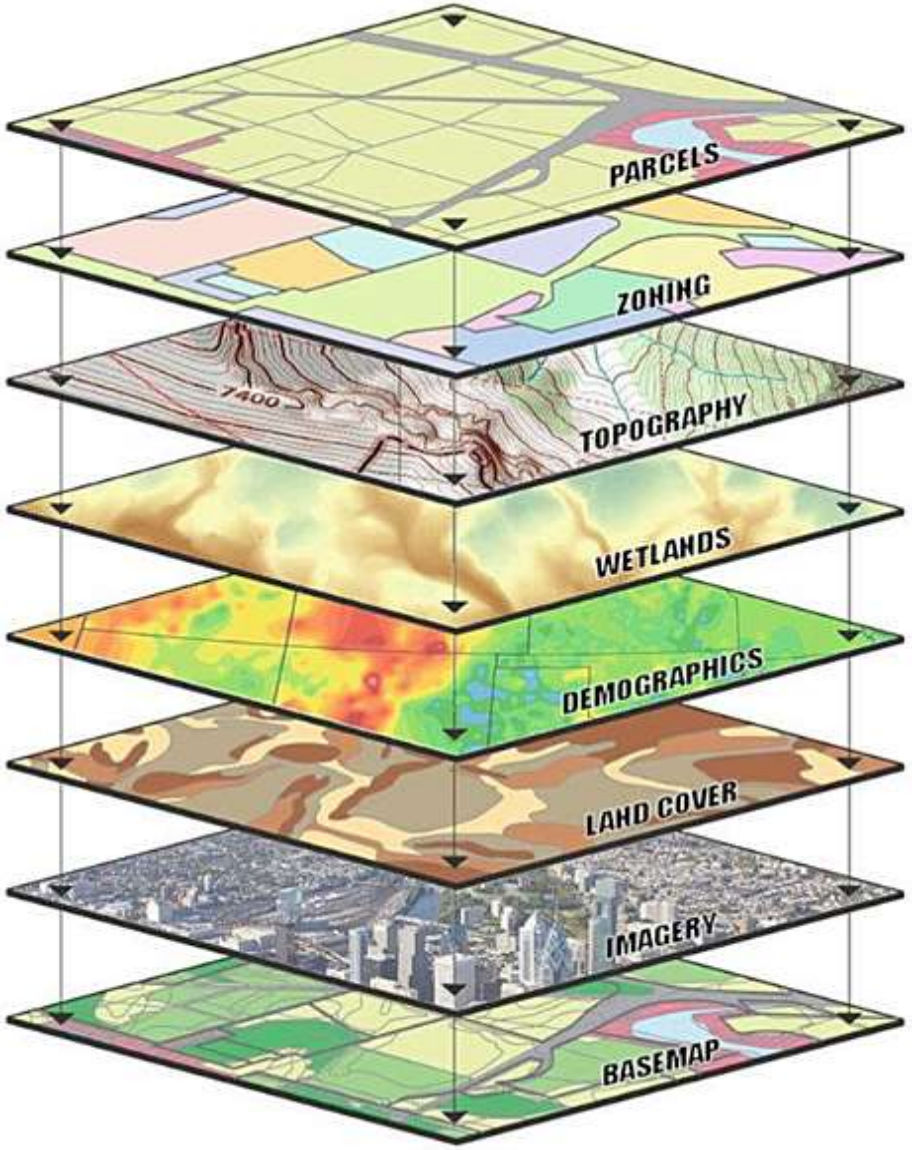
4. Second half of the 20th Century: Development of the Oil Sector, development Industrial areas along the Suriname river and in Saramacca, development of the State Oil company of Suriname;
5. 21st Century: Development of the Gold and Oil sector, I am Gold and Rosebell Goldmines were operating in the South interior of Suriname, Gold fever brought about illegal gold miners from Brazil and also locally, establishment of small gold settlements, unplanned settlements in the interior; Two major infrastructure works, the Wijdenbosch bridge over the Suriname river and the bridge over the Coppenameriver, to open up the interior and create better access to the interior from Paramaribo;

GOALS AND OBJECTIVES STANDARDS AND STRATEGIES SPATIAL PLANNING (FW)

- Protection of the land against urbanization issues where land that was zoned for agricultural purposes is converted to other uses:
- Protection of the natural capital against urban and peri-urban activities;
- Protection of the land against issues concerning sea-level rises like salt water infiltration as a result of climate change;
- Adaptation and protection against climate change and protect the human settlements and the build heritage;
- Protection and conservation of the biodiversity and ecosystems and the quality of freshwater and groundwater reserves;
- Protection of the hydrological regime and the quality of water, minimizing erosion by introducing innovative urban design practices when designing the storm water management systems;
- Minimize pollution form agricultural practices, mining, industrial development, and other human activities;
- Place proper buffer zones between urbanized areas and coastal- and river mouth areas and forested and rural areas;
- Management and protection of the hydrology and storm water systems through flood plain management and the use of environmentally designs for storm water management systems tot guarantee water quality;
- Minimize the removal of vegetation during the development of land;
- Protection of the livable spaces against destruction and fragmentation;
- Create less car-centric residential areas through smart and innovative planning by encouraging public transportation use, create compact city's, through better access of facilities and designing human friendly neighborhoods;
- Control activities along the coast through adaptive and smart planning

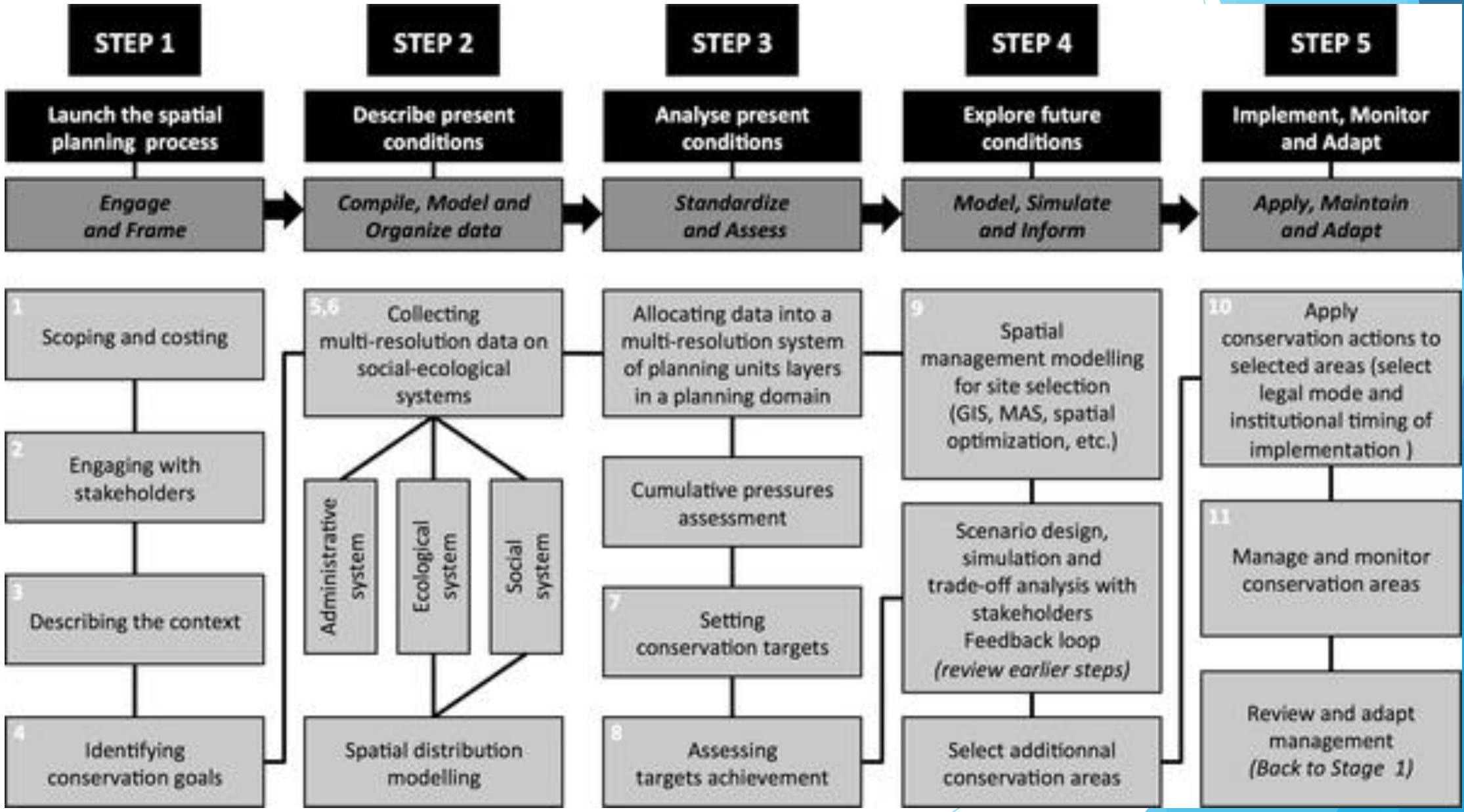
(FW)

LAYERS OF LAND USE PLANNING SYSTEMS



LAYERS OF URBAN DEVELOPMENT

5 SYTEPS OF THE PLANNINGS PROCESS (FW)



THE WAY FORWARD:
COMBINING SPATIAL PLANNING AND THE ENVIRONMENT (FW)

- In 2020 the Ministry of Spatial Planning and Environment was established, the goal was to finally combine the Spatial Planning and environment, so that issues pertaining both spatial planning and the environment can be structurally looked at, where the need to develop sustainable and resilient living spaces through sound planning, dealing in a proper way with the issues of Climate change and other social and economical issues.

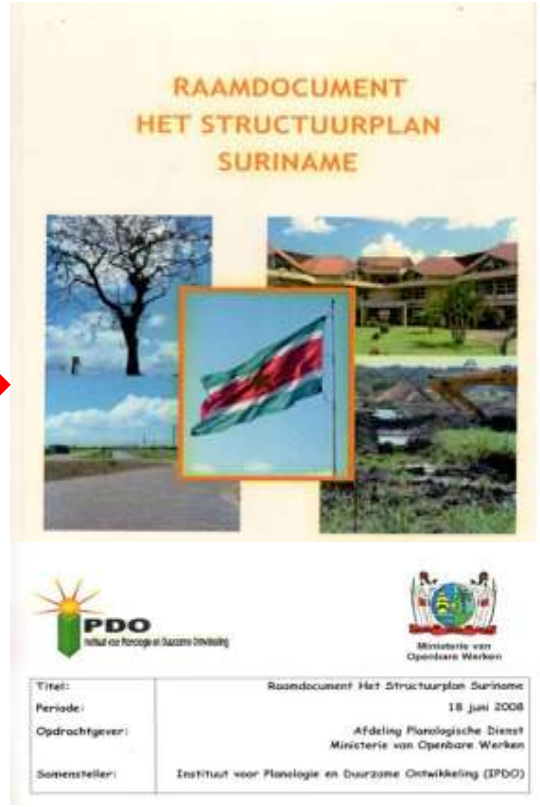
- The Ministry has taken it upon itself to rectify the Environmental Act and to start the process for developing the Spatial planning act.

- A draft vision for Spatial planning development was presented in a white paper. Further the ministry as produced the policy document standards and guidelines towards sustainable spatial planning.

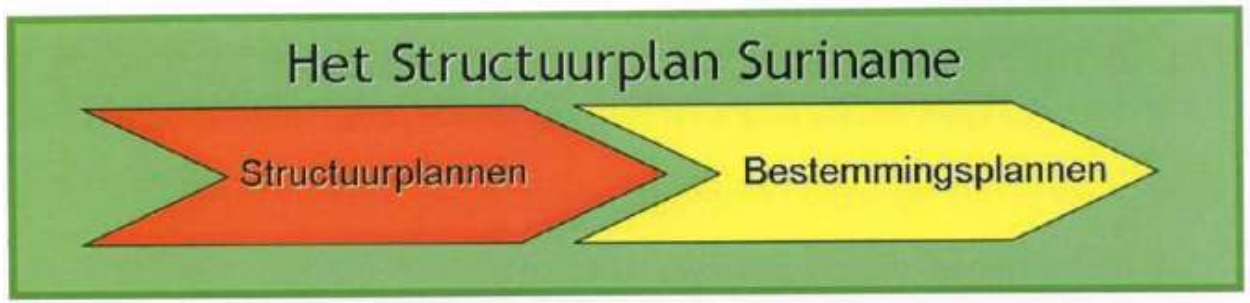
COMPILATIE UIT DIVERSE BRONNEN: (RW)

SPATIAL PLANNING

Ontwikkelingsplan → Struktuurplan → Bestemmingsplan



Raamdocument "Het Structuurplan Suriname" IPDO 2008



Figuur 5 Structuurplannen en de daaruit voortkomende bestemmingsplannen vormen samen het structuurplan voor geheel Suriname, HSS (bron: IPDO).

SPATIAL PLANNING

TWEE VOORBEELDEN

Figuur 10 Projectie gemaakt met GIS en Remote Sensing van landgebruik in Nederland in 2040, uitgaande van een bepaalde trendmatige groei van economie en bevolking (bron: Nederland Later - Tweede Duurzaamheidsverkenning).

Foto 14 Voorbeeld (2) van verschillende soorten, geplande landschappen in Nederland (bron Nederland Later - Tweede Duurzaamheidsverkenning).

Foto 34 Autospuiterij in een woonwijk (bron: IPDO).

Ontwikkelingsplan → Struktuurplan → Bestemmingspla

4.5 Planologische kernkwaliteiten va

Surina[illegible] wordt gekenmerkt door een zeer groot a

Fot[illegible]

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eff
ker
wa

Hoofdstuk VII: R

VII.1. Integratie van

Regionale planning is de pl
economische ontwikkeling
kenmerken en potentie van
in elk onderscheiden gebie
4. ontwikkeling benut en gesp
van elke regio op zich. Reg

Alle ruimtelijke structuren die te vinde
landschapselementen zijn in de loop v
termijn, gevormd door elementen in h
zich en het spreekt ook voor zich dat e
die geschapen worden door deze stru
hoogte. Structuurplannen kunnen tot
bijvoorbeeld in de vorm van wegen
elementen worden, maar er zijn beper
aan elementen die al aanwezig zijn
bergketens, rivieren of bodemlagen.

VII.2. Planning van Groeipolen (Urbane Centra)

Het historisch gegroeid nederzettingspatroon in Suriname is een uitdaging voor een snelle en evenwichtig gespreide regionale ontwikkeling. De ontwikkelingen in de afgelopen twee decennia laten zien dat de economische activiteiten op zich onvoldoende in staat zijn de gewenste urbane concentraties, vooral verder landinwaarts, te drijven[49]. Het plannen van lokale economieën en de rol van de Overheid in de voorziening van essentiële sociale en fysieke infrastructuur, waaronder ook begrepen dienstverlening en transportfaciliteiten, is een voorwaarde voor een gezonde en succesvolle vorming van urbane centra.

In deze planperiode zullen op basis van een participatief model en gebruikmakend van de moderne plantechnieken de strategische plannen voor vier urbane centra in Suriname en de daaruit voortvloeiende vijfjaren actieplannen opgesteld worden.
Voor de precieze locatie van deze urbane concentraties zal onderzoek en consultatie moeten plaatsvinden, maar op basis van de beschikbare informatie kan nu reeds gezegd worden dat het bevolkingsconcentraties betreft in de volgende regio's:

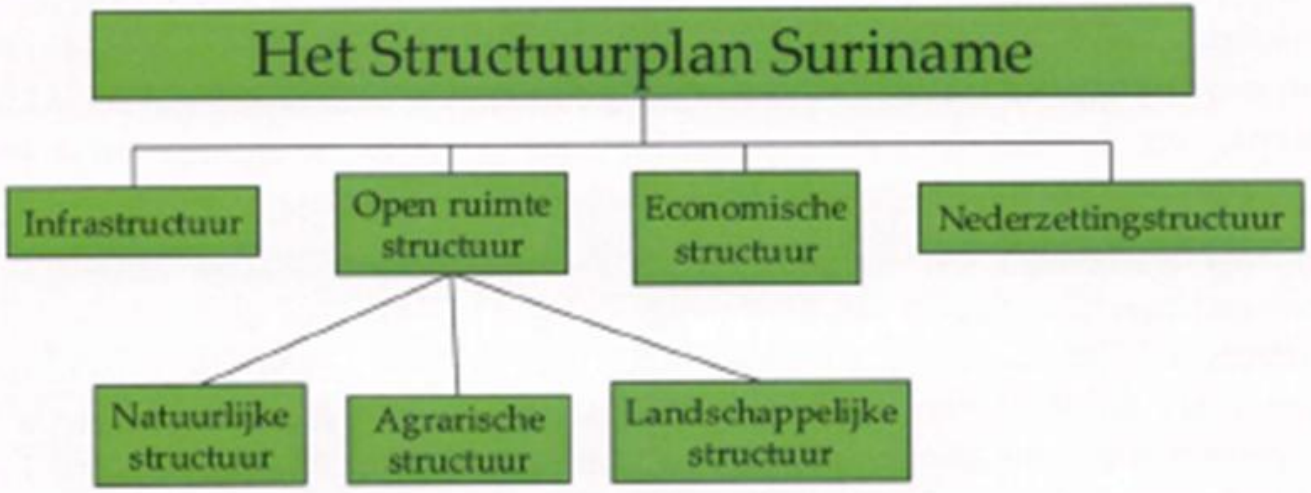
- het Brokopondogebied, waarbij zwaar geleund wordt op de economische activiteiten in de minerale sector;
- het Marowijnegebied, waarbij zwaar geleund wordt op de economische activiteiten in de minerale en transportsector;
- het Paranamgebied, waarbij zwaar geleund wordt op een breed scala van economische activiteiten waaronder: industrie, dienstverlening, handel, transport en opslag en energieopwekking en
- het Nickeriegebied, waarbij zwaar geleund wordt op de economische activiteiten in de landbouw, industrie, handel, transport en opslag.

VII.3. Plannen voor Lokale Economieën

Ontwikkelingsplan → Struktuurplan → Bestemmingspla

5.1 Waarom een structuurplan voor Suriname?

Planologie in Suriname heeft nog niet geresulteerd tot een nationaal structuurplan en daaruit voortvloeiende bestemmingsplannen. Ondertussen heeft de ontwikkeling van de ruimtelijke problematiek in Suriname niet stil gestaan en is men nu op het punt beland waar, om die ruimtelijke problematiek beheer(s)baar te houden, een structuurplan een absoluut essentiële noodzakelijkheid is. Inzake planologie moet de overheid weer de



Figuur 31 Ruimtelijke indeling per deelstructuur (bron: IPDO).

6.2.1.4 Indeling naar thema

6.2 Het Structuurplan Suriname (HSS)

In hoofdstuk 5 (sectie 5.2) is een overkoepelende, ruimtelijke indeling gepresenteerd die meer dan alleen HSS omvat. Deze sectie echter, betreft ruimtelijke indelingen die specifiek zijn voor HSS.

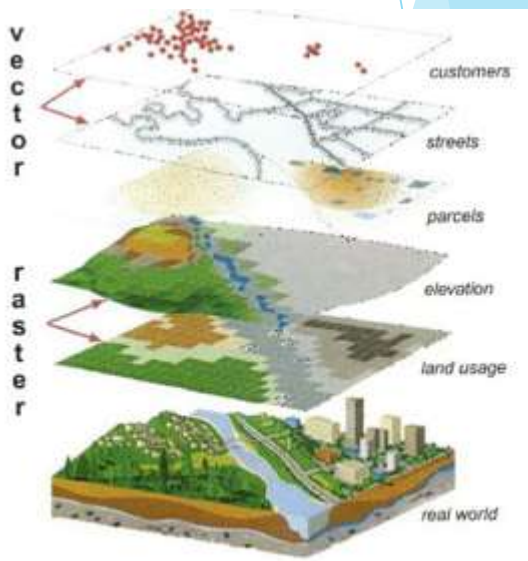
6.2.1 Ruimtelijke indelingen

Omdat HSS zo een groot terrein, letterlijk en figuurlijk, bestrijkt, wordt planologie c.q. structuurplanning op drie niveaus benaderd, namelijk:

1) planning op landsniveau (nationaal) in de vorm van HSS;

2) planning op stads- en hoofdplaatsniveau (urbaan) in de vorm van stadsplanning;

3) planning op ressortniveau (lokaal en regionaal) in de vorm van ressortplanning.



Figuur 35 Het verschil van benadering en systeem tussen vector en raster

Ontwikkelingsplan → Structuurplan → Bestemmingsplan

4. Rechtsbeschermingfunctie

Tot slot, omdat een bestemmingsplan een juridisch document is kunnen rechten worden ontleend aan zekere clausules in het bestemmingsplan en daarmee hebben bestemmingsplannen, in tegenstelling tot structuurplannen, een rechtsbeschermingfunctie.

Een aantal voorbeelden van aspecten of zaken die veel voorkomen in bestemmingsplannen zijn de volgende:

- Een beschrijving van het beleid van overheid, districten, ressorten en overige actoren (bijvoorbeeld waterschappen).
- Geluidgevoelige objecten zoals scholen, ziekenhuizen en woningen mogen niet te veel hinder ondervinden van verkeer, (lucht)havens en industrie.
- De bodemkwaliteit moet passen bij het gebruik van de grond (en omgeving).
- De richtlijnen met betrekking tot rekening houden met flora en fauna in en naast het plangebied en sommige belangrijke gebieden (vogelrichtlijn en habitatrichtlijn).
- De manier waarop functies gemengd worden zoals centrum, horeca, wonen, bedrijven (bijvoorbeeld hinder van bezoekers, geurhinder, trillingen, risicoaspecten van de ene functie op de andere functie).
- De ontsluiting van gebieden met wegen en verkeersdrukte
- De manier waarop omgegaan wordt met water.
- Cultuurhistorie zoals monumenten en historische panden, waardevolle straatbeelden maar ook de historie die in de grond zit (archeologie).
- De financiële, technologische en maatschappelijke haalbaarheid van het plan.
- De geldende bouwvoorschriften.
- De bestemming(en) die bepaalde gebieden hebben en eventueel dienen te krijgen.

6.3 Bestemmingsplannen

Bestemmingsplannen zullen, in tegenstelling tot structuurplannen, bestaan uit drie hoofdonderdelen:

1) de plankaarten,

2) de toelichtingdocumenten en

3) de voorschriften.

6.3.1 Plankaarten

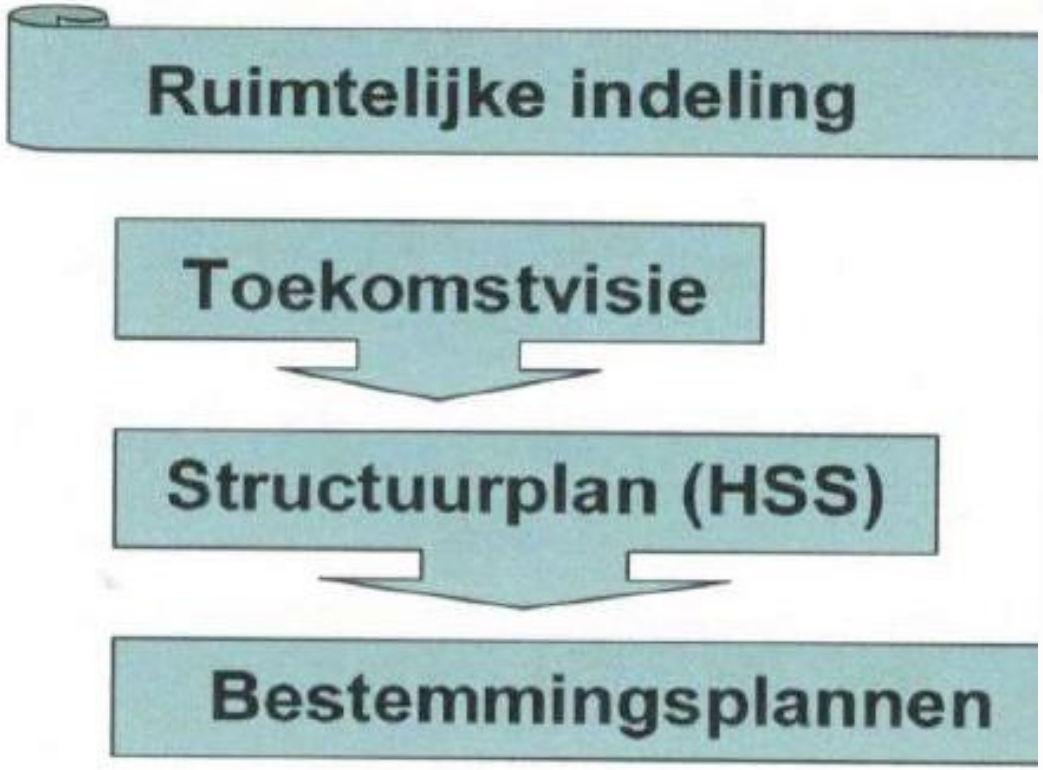
Net als bij structuurplannen zijn is een plankaart een soort landkaart van het desbetreffende gebied waarop de verschillende bestemmingen binnen het plangebied zijn aangegeven.

6.3.2 Voorschriften

De voorschriften zijn een relatief korte, juridische beschrijving van wat voor soort bebouwing er mag plaatsvinden en hoe er gebouwd mag worden. Ze vormen het wezenlijke verschil tussen structuur- en bestemmingsplannen. Alle andere documenten zijn van strategische, adviserende en beschrijvende aard; deze documenten zijn van bindende aard. De maximale hoogte of breedte van bouwwerken per bestemming wordt hierin beschreven, de manier waarop de grond en de opstallen gebruikt mogen worden, maar ook andere condities of voorwaarden voor ver- en bebouwing. Vaak is het aanleggen van werken geregeld via een aanlegvergunning en dit wordt in de voorschriften ook vermeld. De verschillende gehanteerde begrippen in de voorschriften staan omschreven in de "inleidende voorschriften" en daar staat ook de wijze van meten omschreven. Naast de concrete voorschriften per bestemming zijn er ook nog "Algemene voorschriften". Hieronder zijn ondermeer opgenomen algemene gebruiksbepalingen, algemene vrijstellings- en wijzigingsbevoegdheden, overgangs- en strafbepalingen.

6.3.3 Toelichtingdocumenten

RESUME



6.2.1.1 Verticale indeling

De verticale indeling is een hiërarchische indeling van grote naar kleine schaal waarvan in principe ieder lager niveau een onderdeel van het hogere is. Het begint met HSS, dat onder te verdelen is in 10 districtplannen, vervolgens in 63 ressort plannen en dan in talloze bestemmingsplannen, verkavelingsplannen en ga zo maar door. Het is als volgt figuurlijk te maken:

Figuur 29 Verticale ruimtelijke indeling van HSS tot Bouwplan (bron: IPDO).

RESUME (2)

Land use planning[38] is an iterative process which is carried out in a series of steps and, within a good governance framework, is based on dialogue and a *balance of interests* among all parties involved. This balance of interests has a very particular consequence. From experience with land use planning it is understood that the best Land Use Plans are those plans that all stakeholders grade with a 7 (on a scale from 1 to 10; 10 being excellent). To this description preference is made to add that land use planning supports good land management and vice versa. The Terms of Reference provides with a meaningful macro level dual structure of Suriname which is a good spatial frame of reference for the natural environment. In order to make the listing of useful definitions complete, a definition of spatial planning is given below.

Spatial planning[39] refers to the methods used by the public sector to influence the distribution of people and activities in spaces of various scales. Spatial planning includes all levels of land use planning including urban planning, regional planning, national spatial plans, and in the European Union international levels. There are numerous definitions of spatial planning. One of the earliest definitions comes from the European Regional/Spatial Planning Charter (often called the 'Torremolinos Charter'), adopted in 1983 by the

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38Rock, F.; MRC-GTZ Cooperation Programme Agriculture, Irrigation and Forestry Programme, Watershed Management Component; Working Paper 05: Comparative Study on Practices and Lessons in Land Use Planning and Land Allocation in Cambodia, Lao PDR, Thailand and Viet Nam, 2004.
39European Regional/Spatial Planning Charter (often called the 'Torremolinos Charter'), adopted in 1983 by the European Conference of Ministers responsible for Regional Planning (CEMAT).
39 Rock, F.; See above, Footnote 13.

European Conference of Ministers responsible for Regional Planning (CEMAT): "*Regional/spatial planning gives geographical expression to the economic, social, cultural and ecological policies of society. It is at the same time a scientific discipline, an administrative technique and a policy developed as an interdisciplinary and comprehensive approach directed towards a balanced regional development and the physical organisation of space according to an overall strategy*".

Finally, **land allocation**[40] is the process of assigning land use and property rights to individuals, groups, communities, private or public entities for improved land management.

RESUME – Thematische Info/Kaarten

Tabel 2 Themakaarten (bron: IPDO).

Nr.	Kaarttype	
A	Themakaarten: Infrastructuur	
1	*Droge infrastructuurkaart*	1
2	*Natte infrastructuurkaart*	2
B	Themakaarten: Geologie	
1	*Geologische kaart*	3
2	*Delfstoffenwinning kaart*	4
C	Themakaarten: Landbouw	
1	*Tuin- & akkerbouw kaart*	5
2	*Veeteelt kaart*	6
D	Themakaarten: Visserij	
1	*Zoet- & brakwater vis kaart*	7
2	*Zoutwatervis kaart*	8
E	Themakaart: Industrie	9
F	Themakaarten: Bosbouw	
1	*Houtkaart*	10
2	*Agroforestry producten*	11
G	Themakaarten: Natuur en milieubescherming	
1	*Klimaatverandering kaart*	12
2	*Biotopenkaart*	13
3	*Milieubescherming kaart*	14
4	*Natuurlijke hulpbronnen kaart*	15
5	*Duurzaamheidskaart*	16
H	Themakaarten: MOW diensten	
1	*Vuilophaal kaart*	17
2	*Meteorologische kaart*	18
3	*Verkavelingkaart*	19
4	*Bouw kaart*	20
5	*Overheidsgebouwen kaart*	21

Tabel 3 Themakaarten (vervolg Tabel 2) (bron: IPDO).

Nr.	Kaarttype	
I	Themakaarten: Sociaal-maatschappelijk	
1	*Huisvesting kaart*	22
2	*Demografie*	23
3	*Onderwijs*	24
4	*Arbeid*	25
5	*Criminaliteit*	26
6	*Culturen kaart*	27
7	*Onderwijs*	28
J	Themakaarten: Gezondheid	
1	*Drinkwater kaart*	29
2	*Gezondheidszorg kaart*	30
3	*Sport kaart*	31
K	Themakaarten: (Eco)toerisme en recreatie	
1	*Fiets- en wandelpaden kaart*	32
2	*Stadsgroen kaart*	33
3	*Ecotoerisme kaart*	34
4	*Cultuurhistorische toerisme*	35
5	*Kaarten met recreatie- & uitgaansvoorzieningen*	36
L	Themakaart: Economie	37
M	Themakaart: Elektriciteit	38
N	Themakaart: Radio, televisie, telecommunicatie en internet	39
O	Themakaart: (I)NGO's	40

Spatial Planning in relatie tot Water Managements

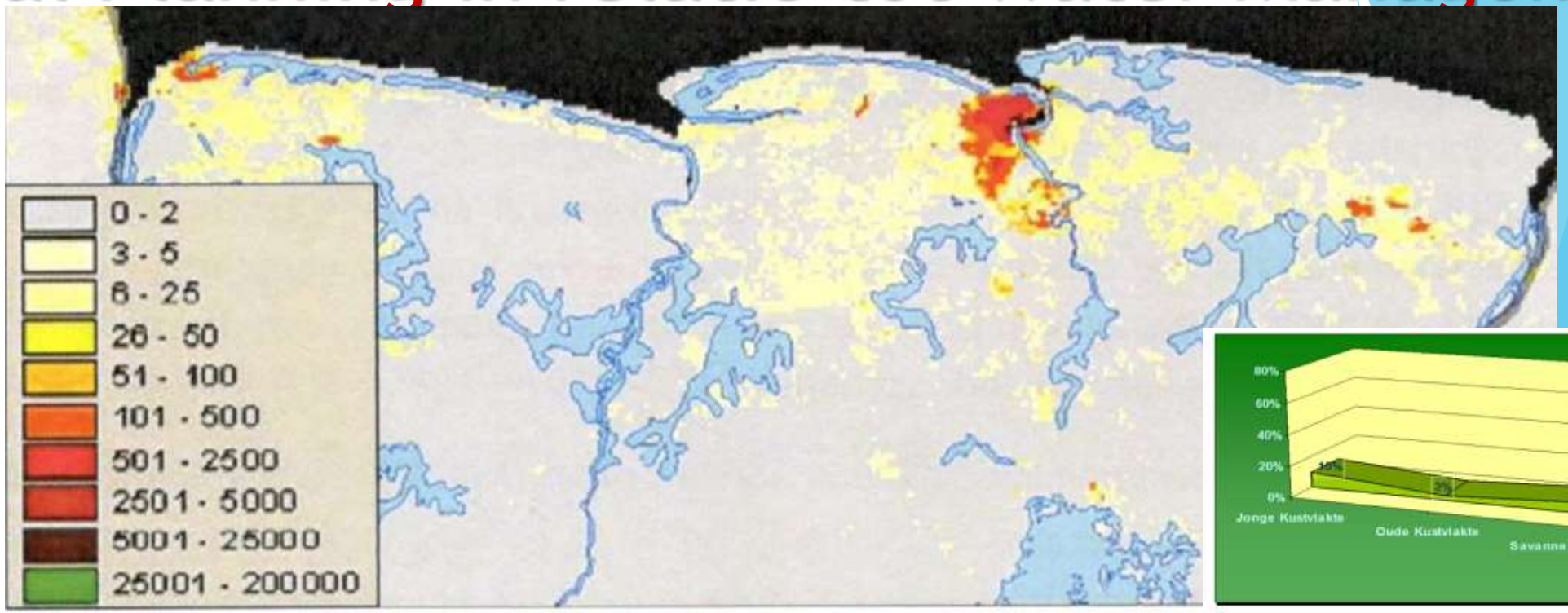
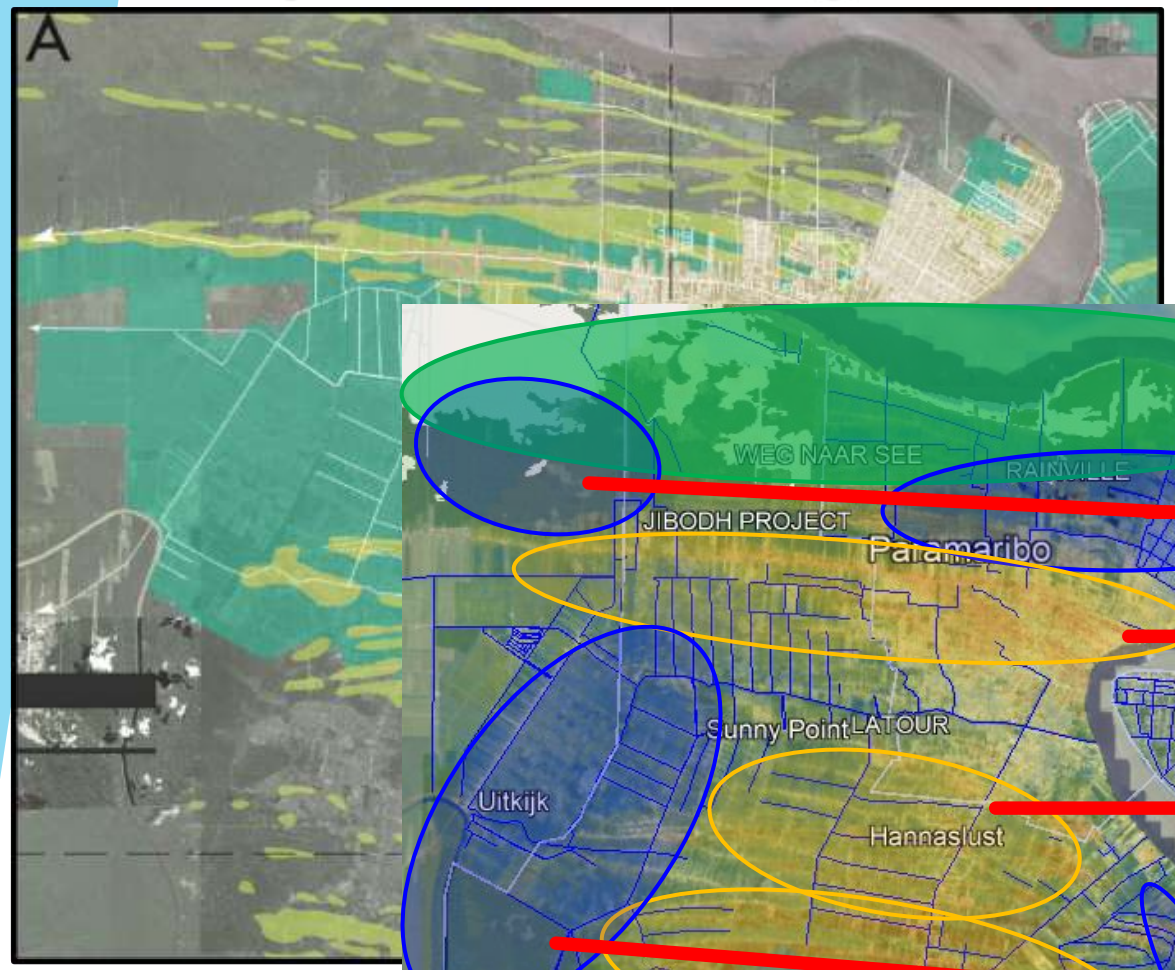
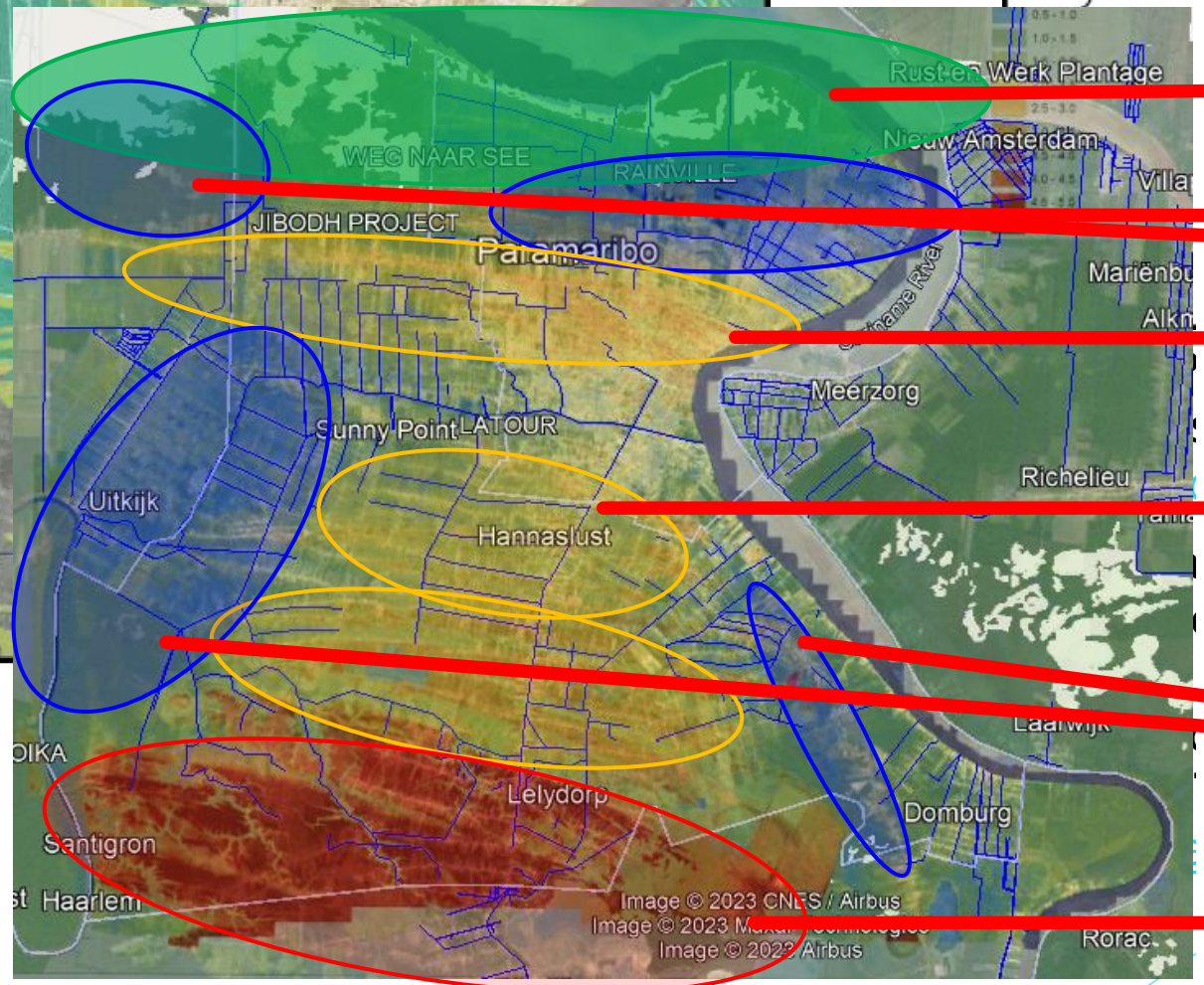


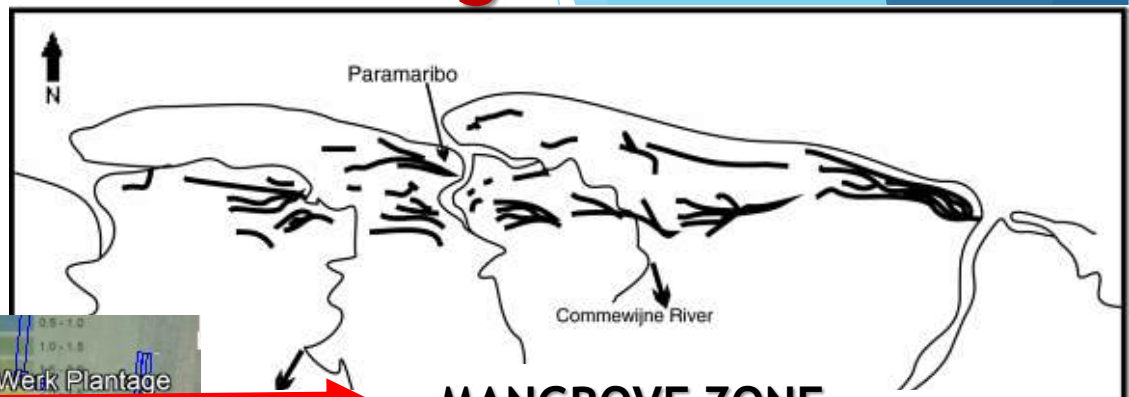
Figure 5 Main landscapes in percentages of the total surface of Suriname (left), 2008.44

Figuur 37 Landgebruikskaart (boven) en bevolkingsdichtheidskaart (onder) van Noord Surinar

Spatial Planning in relatie tot Water Managements 2







MANGROVE ZONE

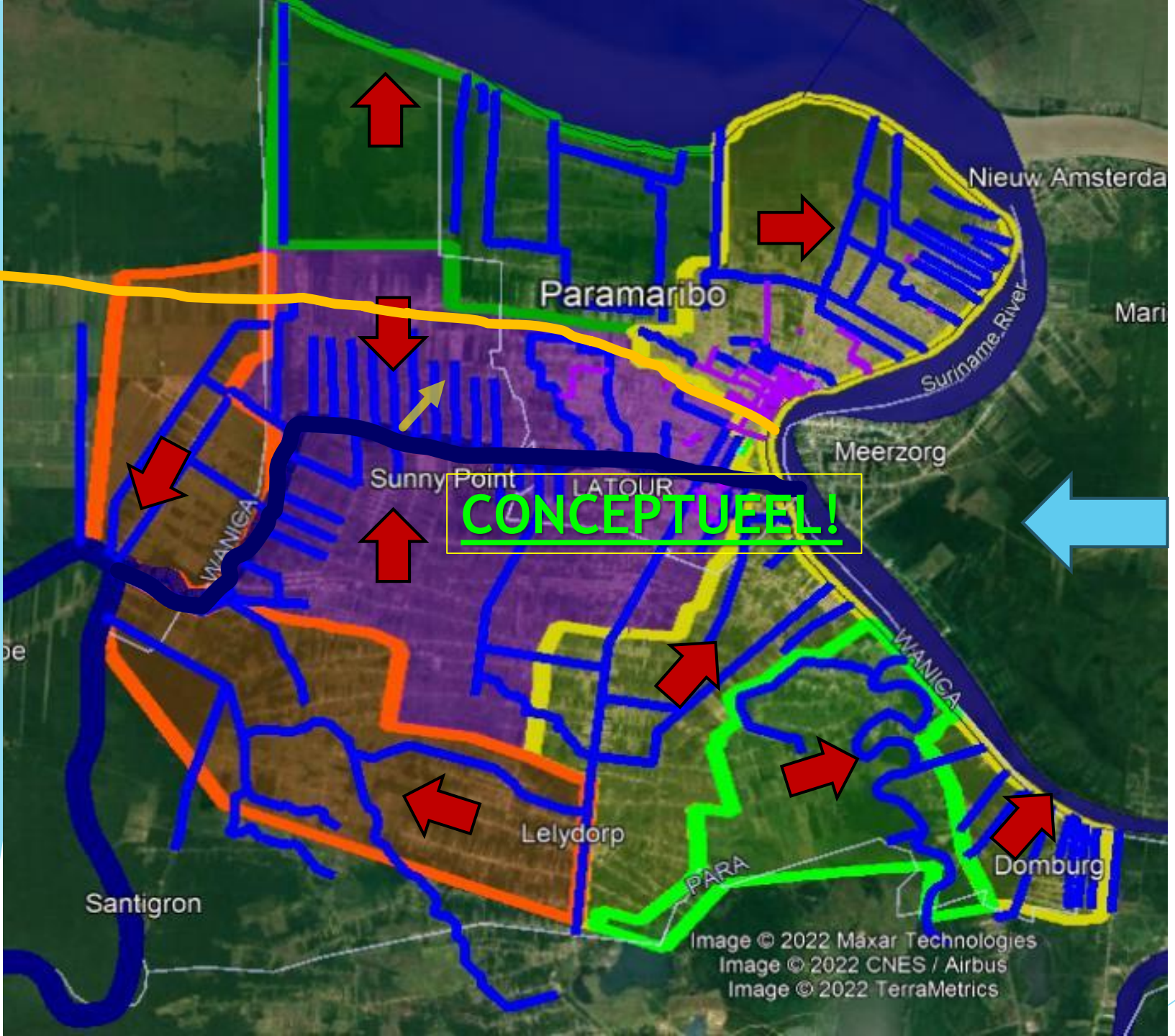
LAGE DELEN – BEBOUWD EN NIET BEBOUWD

HOGE RITS ZONE

RITSENBUNDELS

LAGE DELEN – AGRARISCH/RURAAL

OUDE KUSTVLAKTE RITSEN ZONE



MDDs VERDER VERDEELD IN CATCHMENTS

GLOBAL OVERVIEW OF THE DRAINAGE SYSTEM

- WATER RECEIVING BODIES
- MAIN WATER WAYS
- MAIN DRAINAGE DISTRICTS

2 INTERESTING FEATURES:

- Natural Drainage Barrier Kwattaweg ridge)
- Saramacca canal

Spatial Planning in relatie tot Water Managements 4

3.3 Social-spatial Structure: main processes and dynamics

The actual main social-spatial structure of Suriname has some peculiar characteristics which are not highly favourable to spatial-economic development. Sound land use planning could improve this main structure, though a new macro level approach would be required and possibly a relatively long way to go.

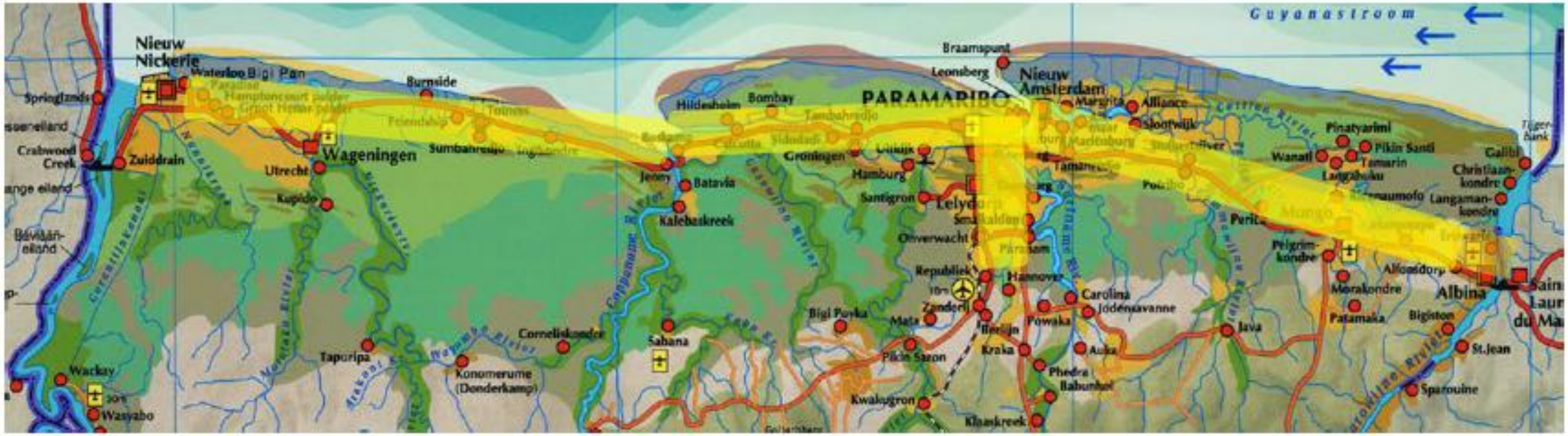


Figure 10 Main Road Infrastructure and related Social-Spatial Main Structure of the Coastal Plain (yellowish parts).

WATER OVERLAST - DRAINAGE STRUKTUUR

Foto 37 Wateroverlast (1): links is het straatbeeld na zware regenval, rechts is voor de regen (bron: IPDO).

Foto 38 Wateroverlast (2): links is het straatbeeld na zware regenval, rechts is voor de regen (bron: IPDO)

Foto 39 Wateroverlast (3): links is het straatbeeld na zware regenval, rechts is voor de regen (bron: IPDO)

Foto 47 Voorbeeld van een belangrijke trens in Nieuw-Nickerie waar in de planning en aanleg geen rekening is gehouden met de mogelijke verbreding/verdieping van de trens en het onderhoud daarvan. Bebouwing is hier aan weerszijden van de trens (bron: IPDO).

rekening is gehouden met de mogelijke verbreding/verdieping van de trens en het onderhoud daarvan. Bebouwing is hier aan weerszijden van de trens (bron: IPDO).

Foto 48 Voorbeeld van een belangrijk kanaal in Paramaribo waar onderhoud van het kanaal zeer hard nodig is, maar wordt belemmerd door bebouwing aan beide kanten van het te baggeren traject (bron: IPDO).

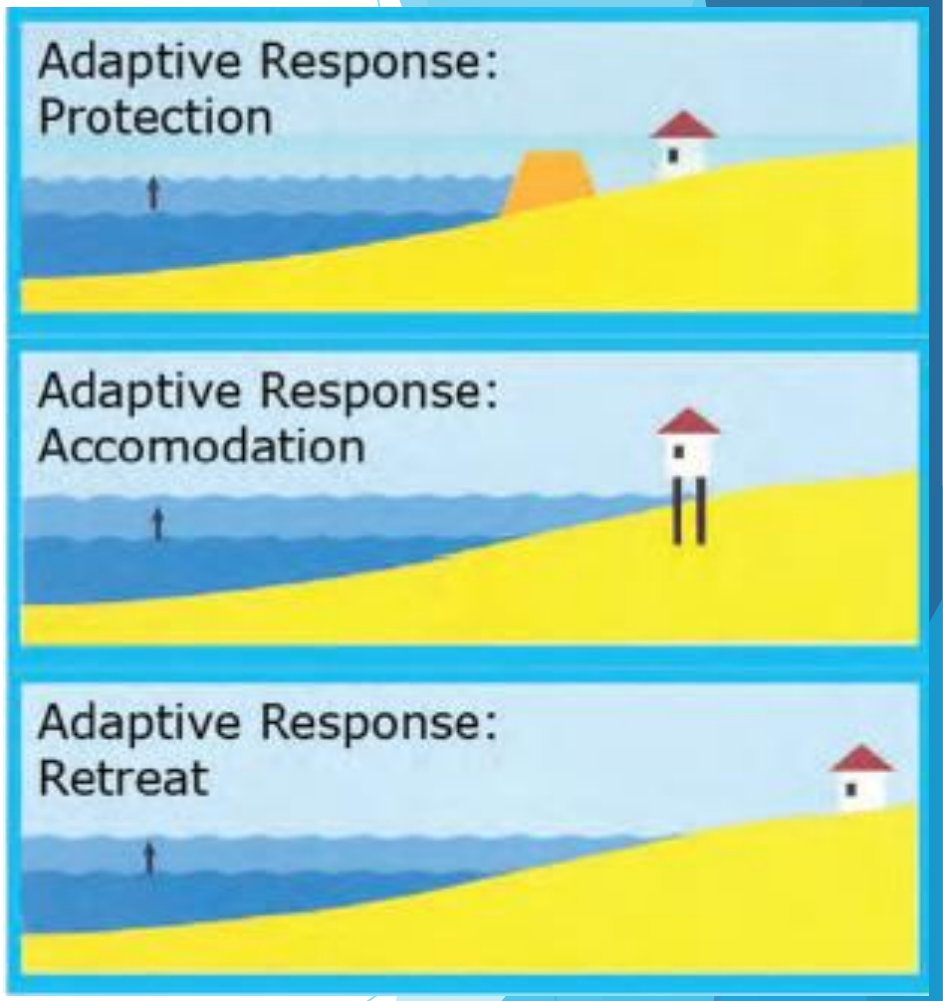
VOORBEELD Maatregelen verkavelingen e.d.: (micro & meso nivo)

CONCEPT

Ruimtelijke Ontwikkelingsstrategie woningbouw

Blz. 44.

- 8-10% waterbergingoppervlakte binnen bebouwd gebied / nieuwe ontwikkelingen
- max 25% van groenscheggen bebouwen, mits
- groene ader ononderbroken
- 15% recreatief gebruik binnen nieuwe
- ontwikkelingen



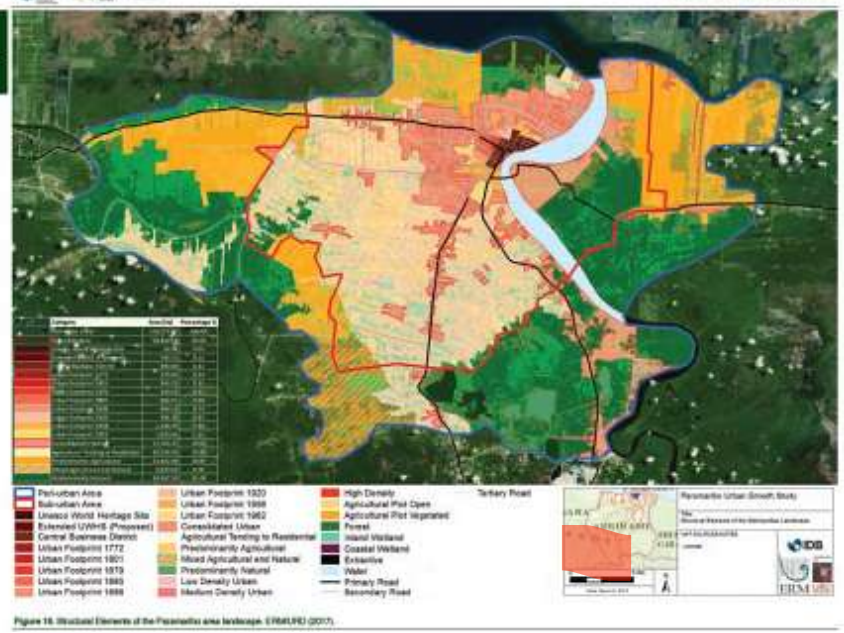
(In Amsterdam bevat het verplichte programma 16% van de grondoppervlak van het project. Blz 43.)

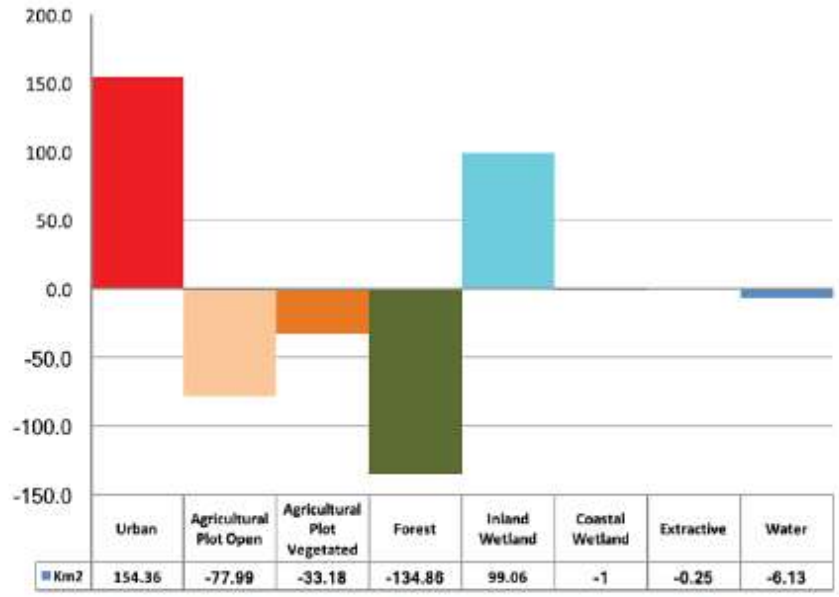
In opdracht van:
Grondontwikkelingsbedrijf (GOB), Ministerie van SoZaVo
Opstellers:
Ruwan Aluvihare, landschapsarchitect DRO, Gemeente Amsterdam; Inge Kok Postma, stedenbouwkundige DRO, Gemeente Amsterdam; Sandra ten Dam, assisentie; Rudy Loos, grafische vormgeving

Ontwikkelingsplan

Figuur 32 Voorbeeld van een verkavelingplan waarbij de donkergroene vlakken zijn gepland als natuur en de lichtgroene vlakken als cultuurbos. De grote blauwe vlakken zijn als meer gepland en de kleine blauwe vlakken als vijver (bron: IPDO).

Rekening houdend met ONTWIKKELINGEN GROEI RICHTINGEN VAN DE STAD





	Urban	Agricultural Plot Open	Agricultural Plot Vegetated	Forest	Inland Wetland	Coastal Wetland	Extractive	Water
Km2	154.36	-77.99	-33.18	-134.86	99.06	-1	-0.25	-6.13

Figure 74. Net gains or losses for each land cover during the period of analysis, in km². Source: LANDSAT

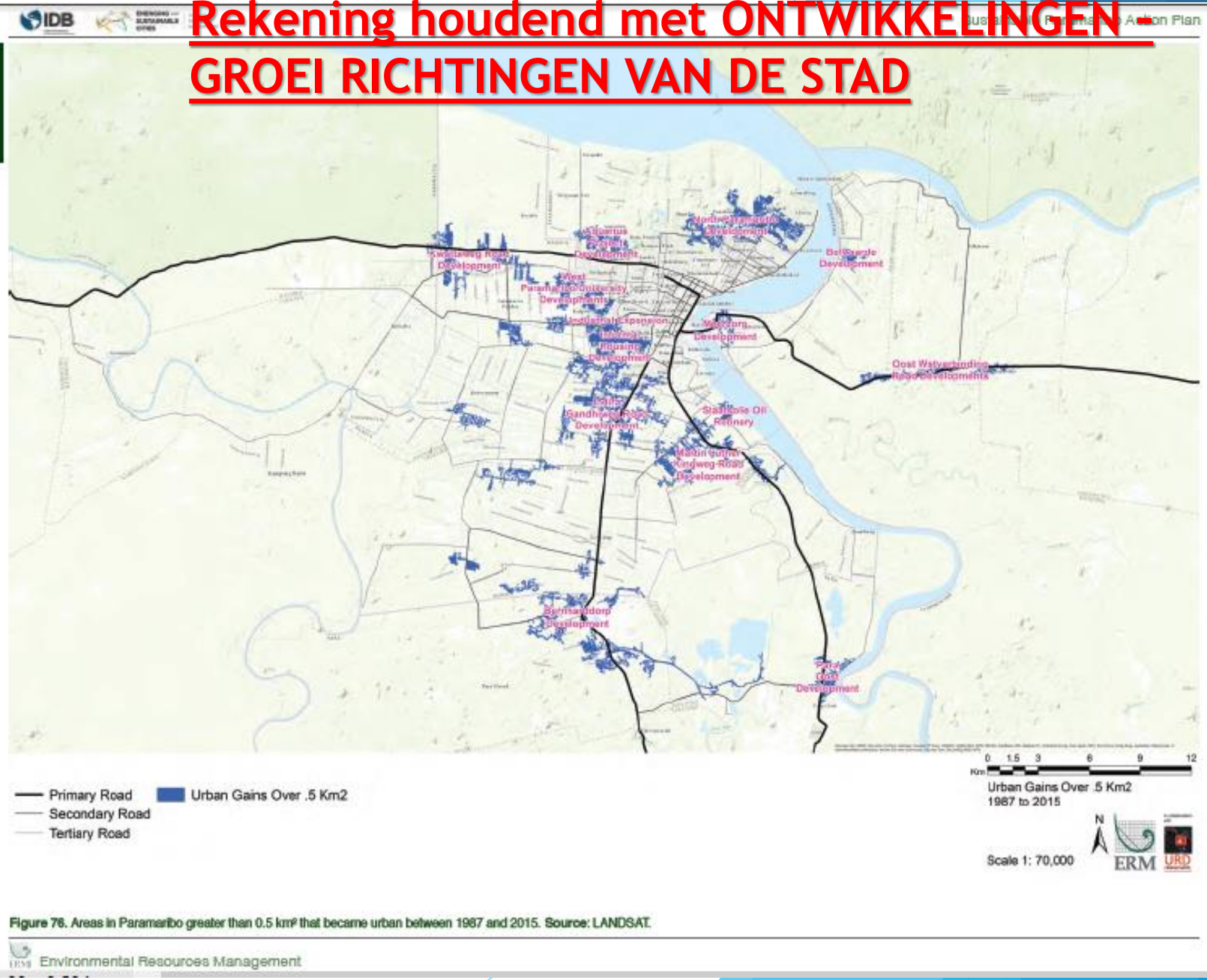


Figure 76. Areas in Paramaribo greater than 0.5 km² that became urban between 1987 and 2015. Source: LANDSAT.

Rekening houdend met ONTWIKKELINGEN - GROEI RICHTINGEN VAN DE STAD 2 (BUSINESS AS USUAL SCENARIO)

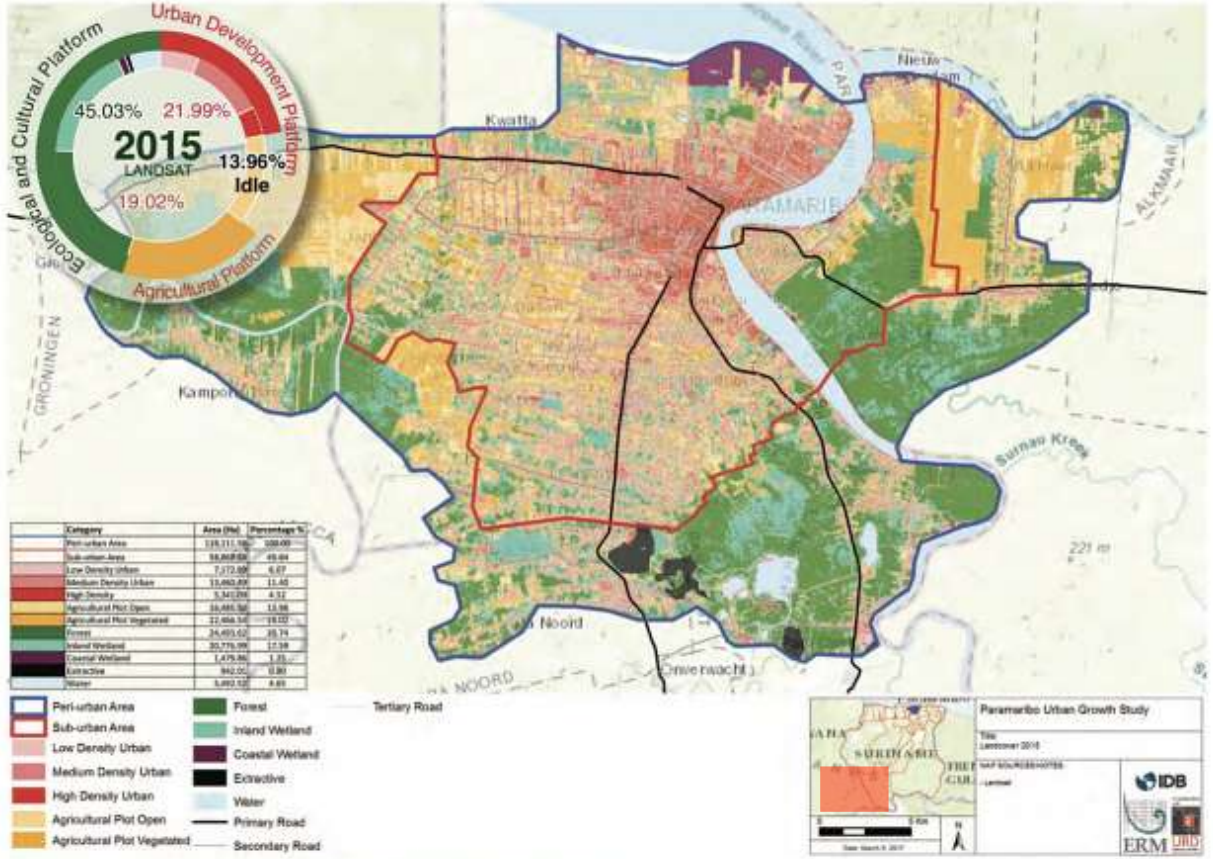


Figure 123. Baseline scenario based on land cover information derived from LANDSAT imagery. ERM/URD (2017).

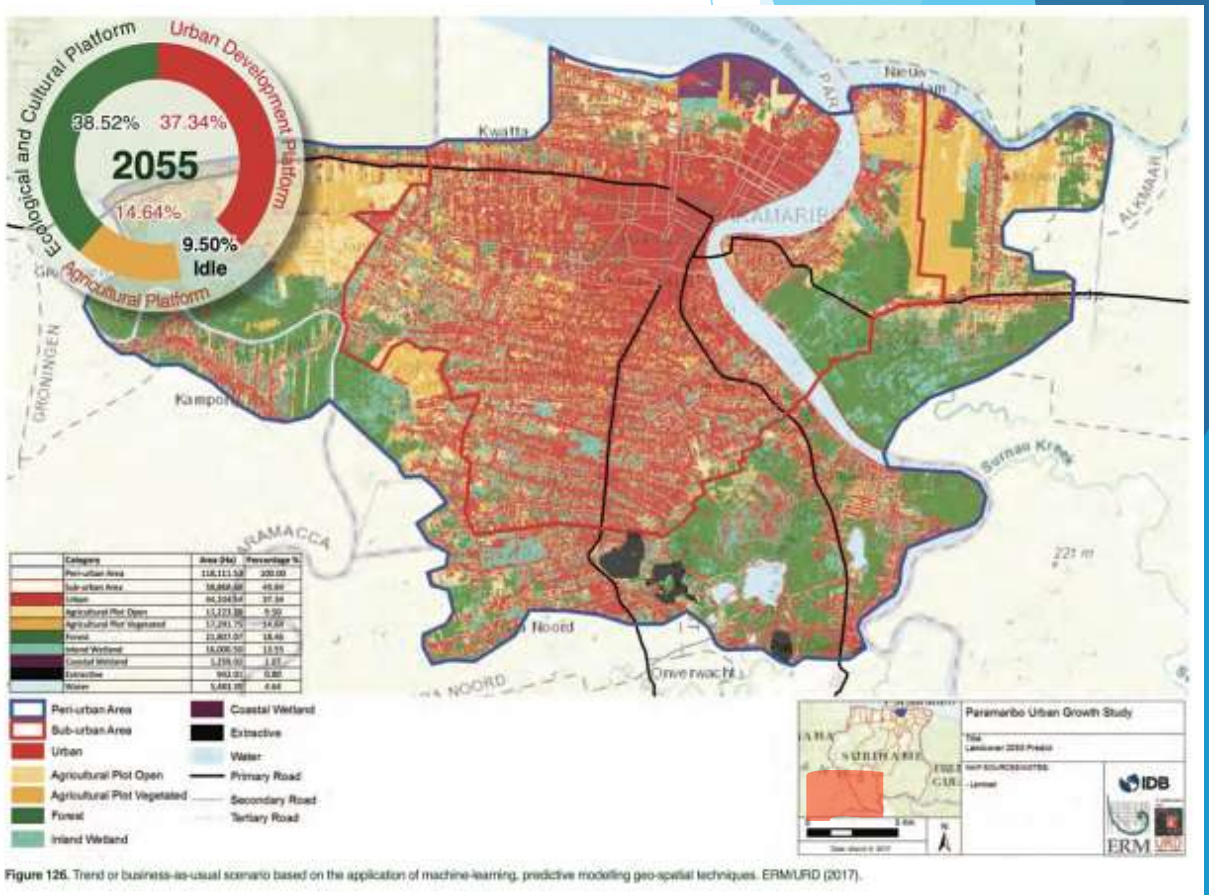


Figure 126. Trend or business-as-usual scenario based on the application of machine-learning, predictive modelling geo-spatial techniques. ERM/URD (2017).

SPATIAL PLANNING IS NIET ALLEEN STADS-, TOWN OF URBAN PLANNING, LANDINRICHTING IS EVEN BELANGRIJK

1.3.2. Hoofddoelstelling

De hoofddoelstelling van het landinrichtingsbeleid is:
"Het binnen het kader van het totale overheidsbeleid inrichten van het landelijk gebied overeenkomstig de daaraan toegekende functies en hun onderlinge samenhang op een zodanige wijze, dat de maatschappelijke betekenis van dat gebied zo goed mogelijk tot zijn recht kan komen".

1.3.3. Doelstellingen

De hoofddoelstelling van het landinrichtingsbeleid is in het structuurschema nader uitgewerkt in veertien doelstellingen:

- de handhaving of verbetering van de concurrentiepositie van de land- en tuinbouw;
- het opheffen of verminderen van regionale inkomensachterstanden in de land- en tuinbouw;
- de verbetering van de werkomstandigheden in de land- en tuinbouw;
- het verruimen van de keuzemogelijkheden in het grondgebruik voor de land- en tuinbouw op langere termijn;
- de verbetering van de kwaliteit van het landschap;
- het tot stand brengen van een doelmatige en veilige ontsluiting in het landelijk gebied afgestemd op de te vervullen functies;
- de verbetering van de waterhuishouding in het landelijk gebied, gericht op samenhangend en doelmatig waterbeheer en afgestemd op de te vervullen functies passend binnen het algemeen beleid met betrekking tot de waterhuishouding;
- de verbetering van de verkavelingstoestand in het landelijk gebied gericht op een doelmatig gebruik van de grond voor de te vervullen functies;
- het leveren van een bijdrage aan de leefbaarheid van dorpen;
- het leveren van een bijdrage aan een zodanige inrichting van het landelijk gebied dat het verstedelijkingsbeleid wordt ondersteund;
- het leveren van een bijdrage aan de realisering van het beleid met betrekking tot de openluchtrecreatie;
- het leveren van een bijdrage aan de veiligstelling en ontwikkeling van natuurgebieden en cultuurhistorische elementen en van natuurwaarden en het scheppen van voorwaarden voor een doelmatig beheer;
- het leveren van een bijdrage aan de ontwikkeling van bestaande en de aanleg van nieuwe bossen en het scheppen van voorwaarden voor een doelmatig beheer;
- de onderlinge aanpassing van de aanleg en verbetering van infrastructurele voorzieningen en de inrichting van het landelijk gebied.

CULTUURTECHNISCH VADEMECUM, 1988

SPATIAL PLANNING IS NIET ALLEEN STADS-, TOWN OF URBAN PLANNING, LANDINRICHTING IS EVEN BELANGRIJK

Table of Contents

Executive Summary

Dit rapport presenteert de uitkomsten van een studie welke is gedaan om de overheid te ondersteunen in haar inspanningen om de uitdagingen van "Land Use Planning" het hoofd te bieden. Dit initiatief van het onder-Directoraat Ruimtelijke Planning van het Ministerie van Ruimtelijke Ordening, Grond- en Bosbeheer dat wordt ondersteund door het World Wildlife Fund beoogt een breed gedragen, geïnstitutionaliseerd platform te creëren voor *Sound Land Use Planning* (SLUP) in Suriname.

Bij *Sound Land Use Planning* gaat het om een participatieve, inclusieve, ruimtelijk en sectoraal geïntegreerde benadering met doelgerichte aandacht op het voorkomen van land degradatie en behoud van biodiversiteit. In de kern is het doel van grond gebruik planning om essentiële locatie behoeften van grondgebruiksactiviteiten te vervullen. Door een chronisch gemis aan gestructureerde, systematisch uitgevoerde planning zien de ruimtelijke patronen van actief grondgebruik er somber uit; uitgifte van overlappende mijn- en bosbouw concessies , dubbele uitgifte van Domein land , gebrek aan structuur -, en bestemmingsplannen , en zelfs landdegradatie in beschermde gebieden illustreren dit. In hoofdzaak zijn er twee belangrijke achterliggende redenen die daaraan significant bijdragen. Deze betreffen enerzijds de reeds gedurende decennia voorkomende ongebreidelde grond allocaties, waardoor waarschijnlijk een heel groot deel van het Kustgebied niet planmatig is uitgegeven. Anderzijds zijn het de ook decennia lang uitgevoerde, verkavelingen in een grote variëteit aan soorten en maten. Daardoor is de planruimte beperkt en wordt het mogelijk een moeilijke opgave om grond gebruik planning de gebruikelijke, significante faciliteerder voor economische ontwikkeling te doen zijn. Gegeven het aantal rechtszaken tegen de Staat, blijkt dat deze situatie alleen maar verergerd[1]. De regering is zich ervan bewust dat deze situatie stremmend werkt op de duurzame ontwikkeling van het land.

Dit rapport is opgesteld middels een analyse van informatie verkregen uit van desk research, overleg en

- the Forest Management Act, by designating different types of forest, which should be in conformity with national and regional plans
- the Mining Act, by designating areas for small scale mining
- the Hindrance Act, by designating streets, neighbourhoods, towns and cities where facilities are not allowed to be established or where no hindrance permit is required. This designation should not be in conflict with a zoning plan under the Urban Planning Act.

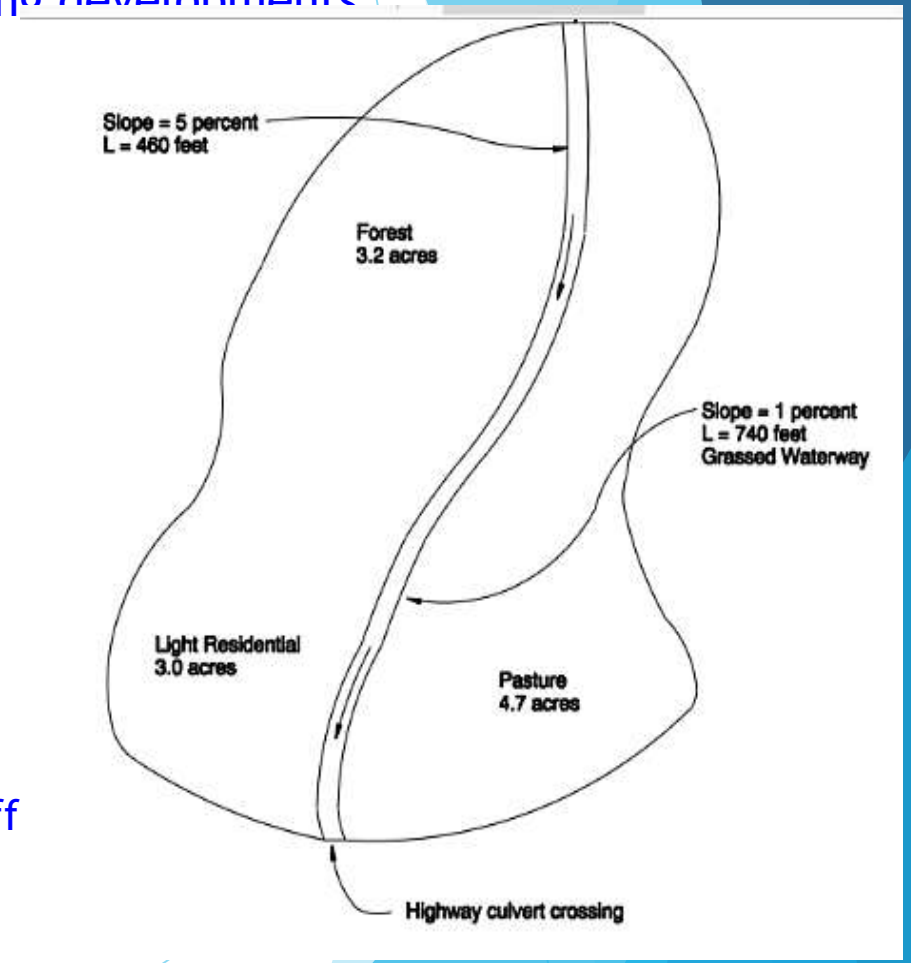
It is noteworthy mentioning that the protected area legislation establishing nature reserves and designating special management areas (MUMA's) provides for designating land for protection purposes, but does not even refer to national or regional land use plans. This may, cause conflicts of interest when actually developing land use plans.

LEGAL FRAMEWORK:

- THE PLANNING ACT
- URBAN PLANNING ACT (STEDEBOUWKUNDIGE WET)
- LAND USE PLANNING ACT
- THE BUILDING ACT
- THE ACT ON REGIONAL BODIES

Hydrology 7-F-1 APPENDIX F - RATIONAL METHOD

One of the most commonly used procedures for calculating peak flows from small drainages less than 200 acres is the Rational Method. This method is most accurate for runoff estimates from small drainages with large amounts of impervious area. Examples are housing developments, industrial areas, parking lots, etc.



The Rational Method (or Rational Formula) is:

Q = Cf C i A (Equation 1)

Where:

Q = Peak flow in cubic feet per second (cfs)

Cf = Runoff coefficient adjustment factor to account for reduction of infiltration and otherlosses during high intensity storms

C = Runoff coefficient to reflect the ratio of rainfall to surface runoff

i = Rainfall intensity in inches per hour (in/hr)

A = Drainage area in acres (ac)

Limitations and assumptions in the Rational Method are as follows:

- The drainage area should not be larger than 200 acres.
- The peak flow is assumed to occur when the entire watershed is contributing runoff
- The rainfall intensity is assumed to be uniform over a time duration equal to or greater than the **time of concentration, Tc.**
- The peak flow recurrence interval is assumed to be equal to the rainfall intensity recurrence interval. In other words, the 10-year rainfall intensity is assumed to produce the 10-year flood.

Voorbeeld uitwerking Rationele Methode

(Inleiding_watermanagement_Dictaat_Waterbeheer.pdf; TU-Delft, Prof. Robert Brouwer & Prof. Nick van de Giesen, augustus 2008)

Opgave

Een afwateringskanaal voor een areaal van 100 ha moet worden gedimensioneerd. Gegeven is bovenstaande regenval-intensiteitskromme met een stochastische kans van 1:5 jaar. In het gebied is 75% van het oppervlak verhard. De lengte van de langste waterloop is 2880 m. De geschatte stroomsnelheid in deze waterloop is 0,4 m/s.

Uitwerking

De kritieke buiduur is 2 uur:

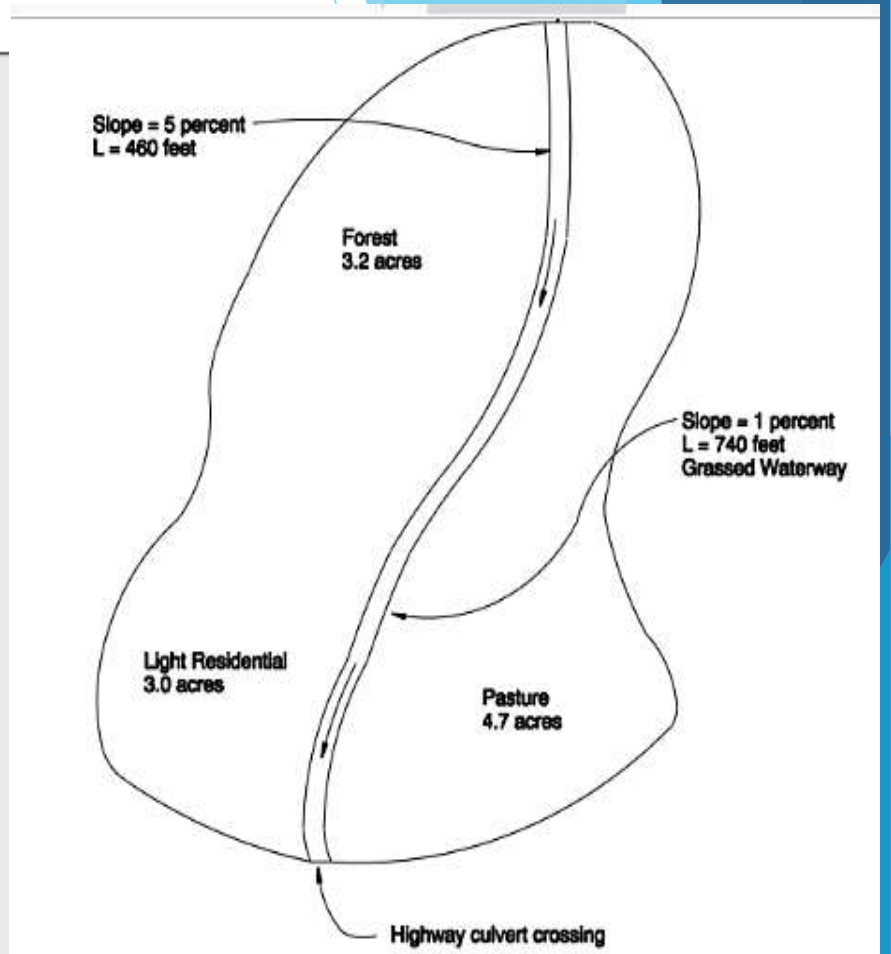
$$t_c = \frac{L}{v} = \frac{2880}{0{,}4} * \frac{1}{3600} = 2\ uur$$

Uit de neerslag-intensiteitslijn kan worden afgelezen dat de ontwerpneerslagintensiteit (herhalingstijd 5 jaar; duur 2 uur) 6,2 mm/uur is (let op dubbele logschaal).

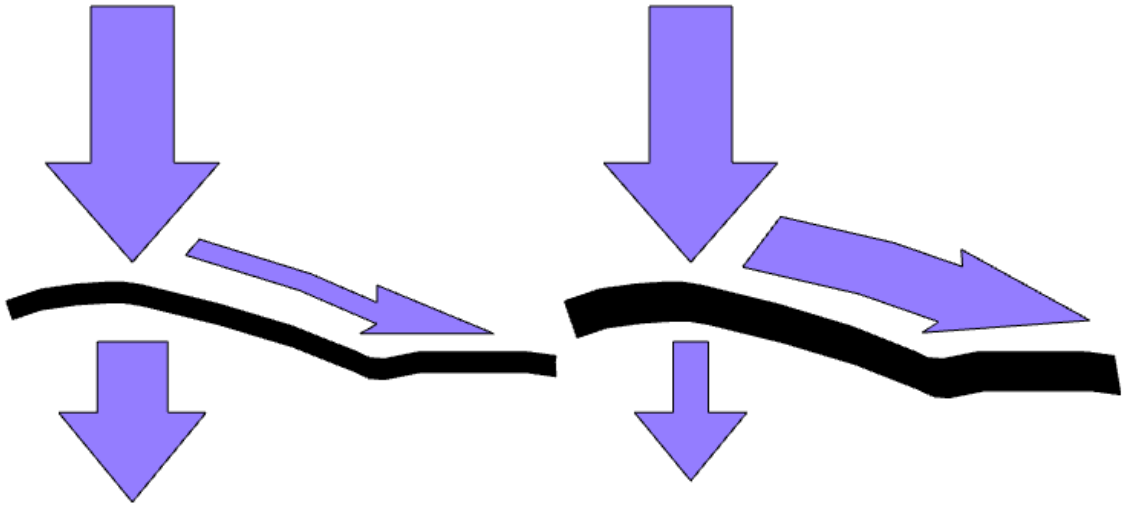
De afvoercoëfficiënt is: $C = 0{,}75*1 + 0{,}25*0{,}1 = 0{,}78$

De combinatie van ontwerpneerslagintensiteit, afvoercoëfficiënt en oppervlakte levert een ontwerpafvoer van 1,34 m3/s op voor het afvoerend areaal.

$$Q = C*i*A*\frac{10}{3600} = 0{,}78*6{,}2*100*\frac{10}{3600} = 1{,}34 \quad m^3/s$$



RATIONAL METHOD
- IMPACT OF RUN-OFF COEFFICIENT



Rational Equation Calculator | Compute peak discharge from a drainage basin using the Rational Equation Method

Click to Calculate

Rational runoff coefficient, c:	0.4	
Rainfall intensity, i:	40	mm/hour
Drainage area, A:	10	hectare
Peak discharge, Q:	0.44077135	m3/s

© 2013 LMNO Engineering, Research, and Software, Ltd. http://www.LMNOeng.com

To: LMNO Engineering home page (more calculations)

Related calculations:
Time of Concentration
SCS TR-55 Peak Discharge
Detention Storage Calculator
Water Quality Volume
Unit Conversions
Register

Units in Rational Equation calculation: ft³=cubic foot, m³=cubic meter, mm=millimeter, s=second

Rational Method Equation

The Rational equation is the simplest method to determine peak discharge from drainage basin runoff. It is not as sophisticated as the SCS TR-55 method, but is the most common method used for sizing sewer systems.

Rational Equation: Q=ciA
The Rational equation requires the following units:
Q = Peak discharge, cfs
c = Rational method runoff coefficient
i = Rainfall intensity, inch/hour
A = Drainage area, acre

Note that our calculation allows you to use a variety of units.

The Rational method runoff coefficient (c) is a function of the soil type and drainage basin slope. A simplified table is shown below. See the references at the bottom of the page for more complete tables including impact of slope.

The Rainfall intensity (i) is typically found from Intensity/Duration/Frequency curves for rainfall events in the geographical region of interest. The duration is usually equivalent to the time of concentration of the drainage area. The storm frequency is typically stated by local authorities depending on the impact of the development. A 10-yr, 25-yr, 50-yr, or even 100-yr storm frequency may be specified.

Simplified Table of Rational Method Runoff Coefficients (see references below)

https://www.lmnoeng.com/Hydrology/rational.php

Click to Calculate

Rational runoff coefficient, c:	0.4	
Rainfall intensity, i:	40	mm/hour
Drainage area, A:	10	hectare
Peak discharge, Q:	0.44077135	m3/s

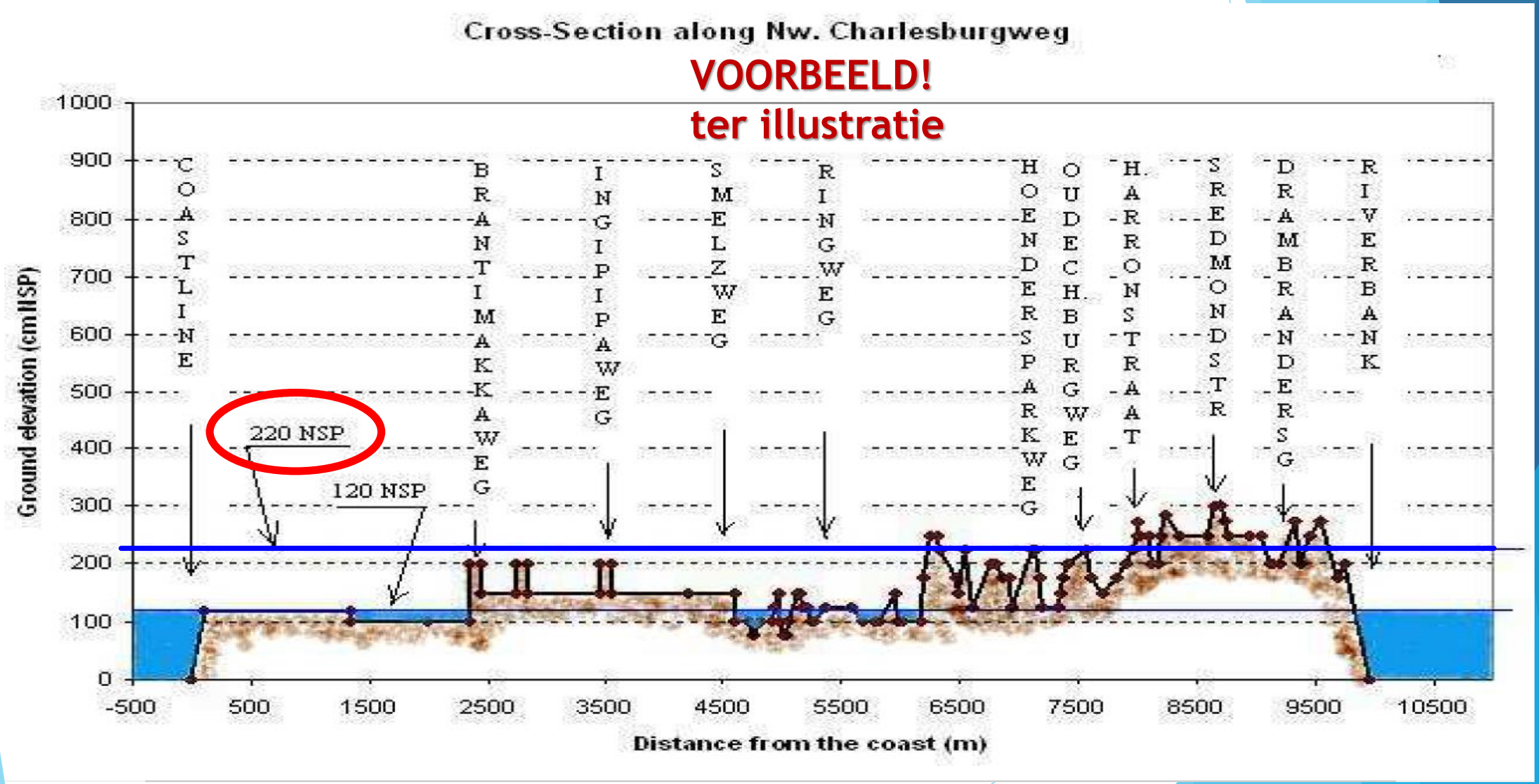
© 2013 LMNO Engineering, Research, and Software, Ltd. http://www.LMNOeng.com

Rational runoff coefficient, c:	0.5	
Rainfall intensity, i:	40	mm/hour
Drainage area, A:	10	hectare
Peak discharge, Q:	0.55096419	m3/s

Rational runoff coefficient, c:	0.95	
Rainfall intensity, i:	40	mm/hour
Drainage area, A:	10	hectare
Peak discharge, Q:	1.046832	m3/s

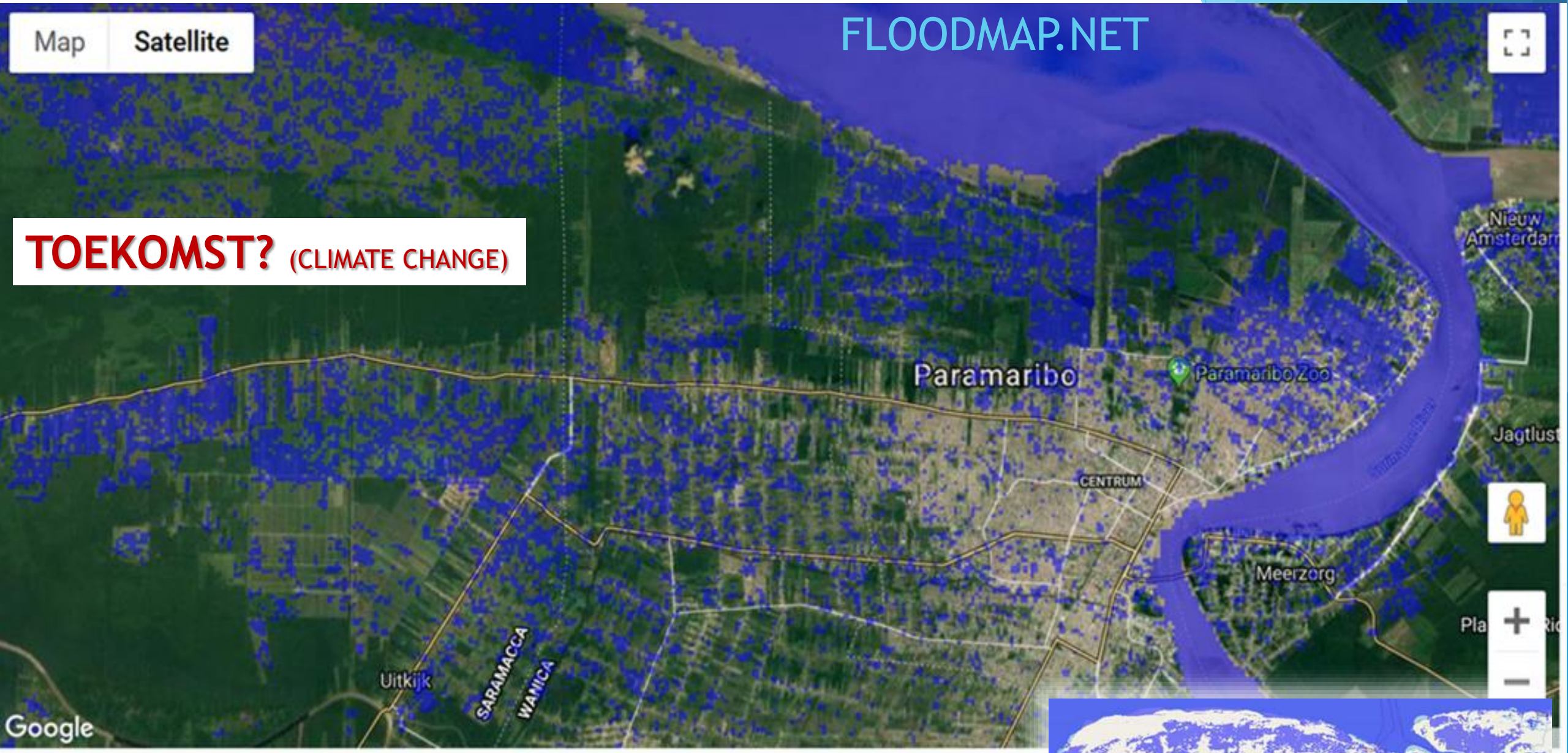
Rational runoff coefficient, c:	0.4	
Rainfall intensity, i:	95	mm/hour
Drainage area, A:	10	hectare
Peak discharge, Q:	1.046832	m3/s

M.b.t. verkavelingen de vraag: WONEN WE GOED?



TOEKOMST? (CLIMATE CHANGE)

FLOODMAP.NET



ISSUES include:
Flooding risk due to Climate Change (Sea Level Rise)
PREDICTED SCENARIO (20 - 30 YEARS) -
https://www.floodmap.net/?ct=SR

Erfenis? - Niet uniek: OOK TOEN!

StamboomSuriname.nl

Domineestraat onder water gelopen na een sibi busi in 1924. Foto genomen door de bekende fotografe Augusta Curiel voor haar fotostudio (zie naambord linksboven)

VROEGER FLORERENDE PLANTAGE CULTUUR - AFWATERING OP BASIS VAN SLUIZEN !

CONTINU PROCES DICHTSLIBBING EN DICHTGROEIEN

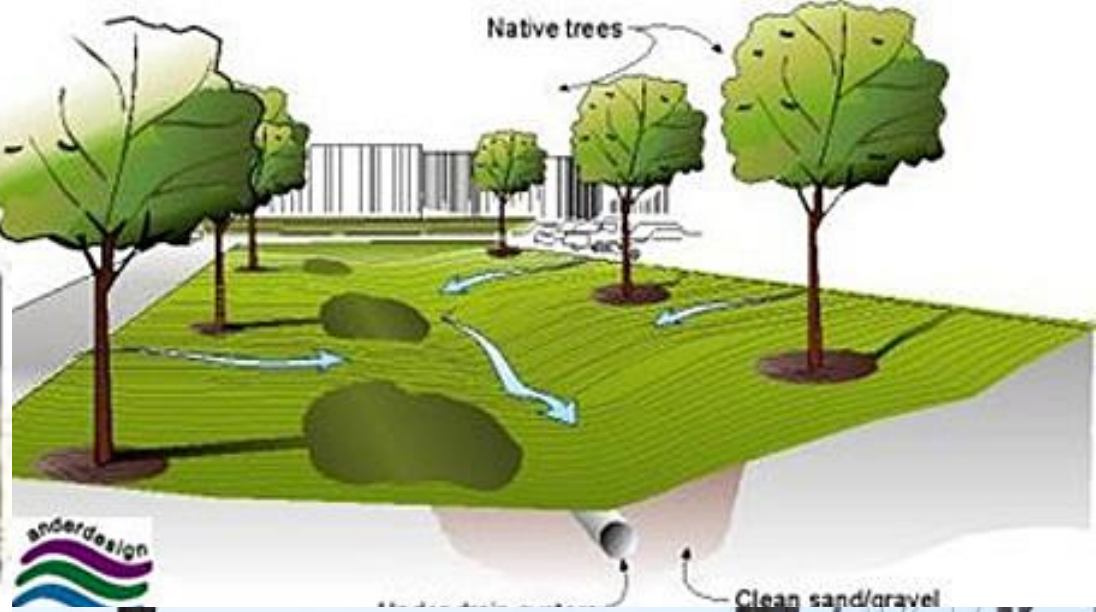
IMPACT:

Ø = V x A

Ø = V x A

WAT KUNNEN WIJ DOEN?

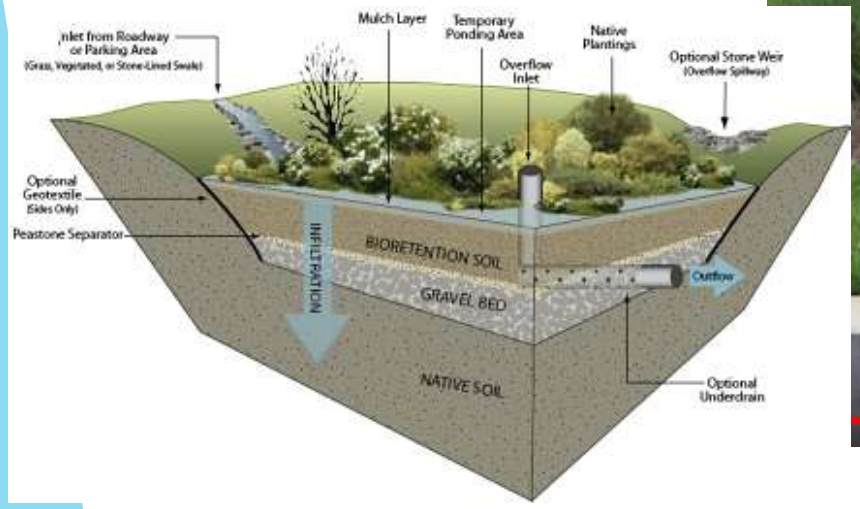
Green Infrastructure



Professor Sieuw Naipal bij een kwekerij van Mangroveplantjes. Op de achtergrond de restanten van weggespoeld land. NOS / HARMEN BOERBOOM

BACK TO NATURE!

WIN-WIN “SEXY” SOLLUTIONS:
“LID Controls”/ CONSTRUCTED WETLANDS
MIX:
- STORMWATER MANAGEMENT
+
- LANDSCAPING

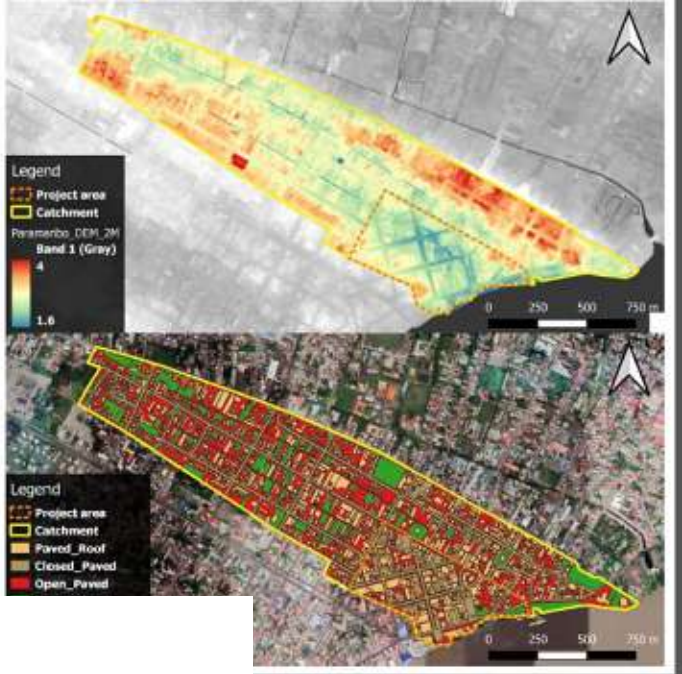


- SUCCES

Hoe werkt berging?

Binnenstad Afstroomgebied

- Bovenstroomse gebied watert af op het pilot gebied 'binnenstad'
- Water kan ook bovenstrooms op een verantwoorde manier worden vast gehouden om de 'Binnenstad' te ontlasten



M.Sc. STUDIE PERRIN KEESMAAT, 2023

Bergingsmogelijkheden Binnenstad

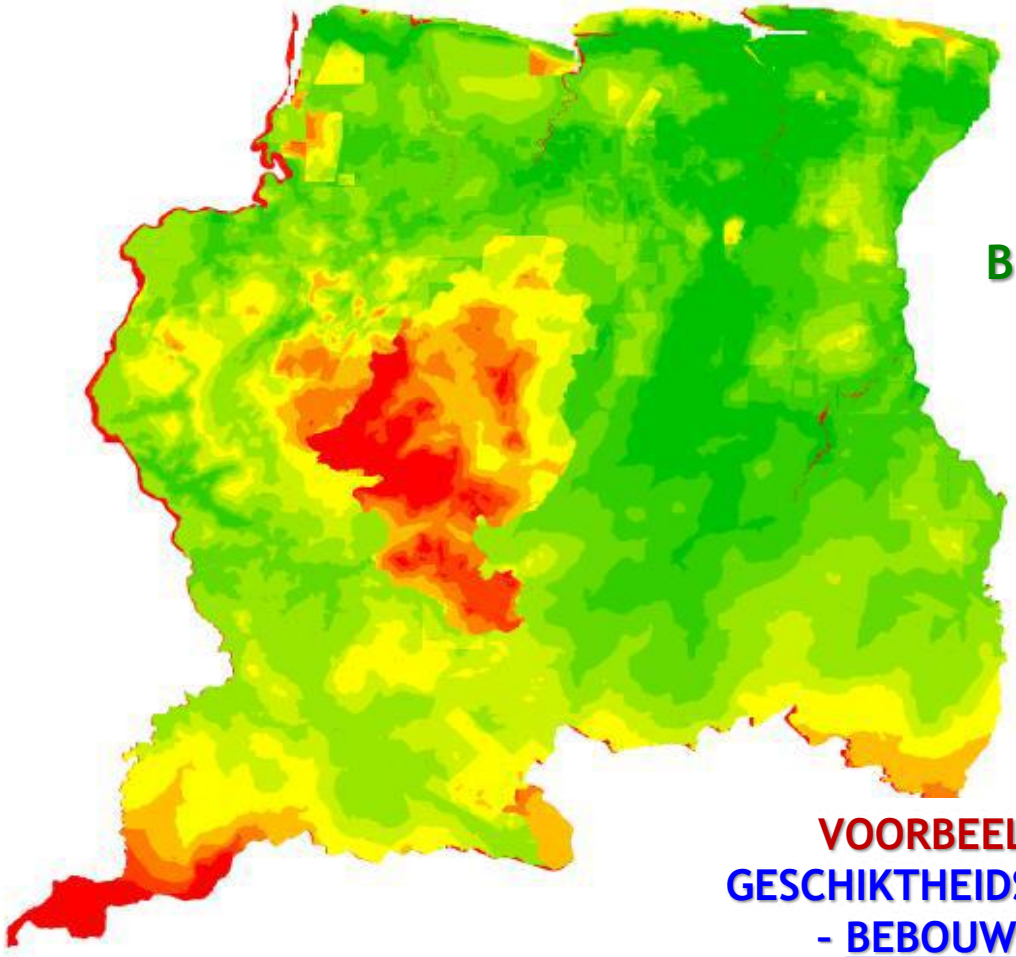
Parkeerplaatsen	Verlaten kavels	Brede straten	Grote daken
Poreus parkeren	Retentie vijvers	Infiltratiestroken	Water daken
			
Bio-retentie cell	Regentuinen	Wadi's	Groene daken
			

DISCUSSIE (?)

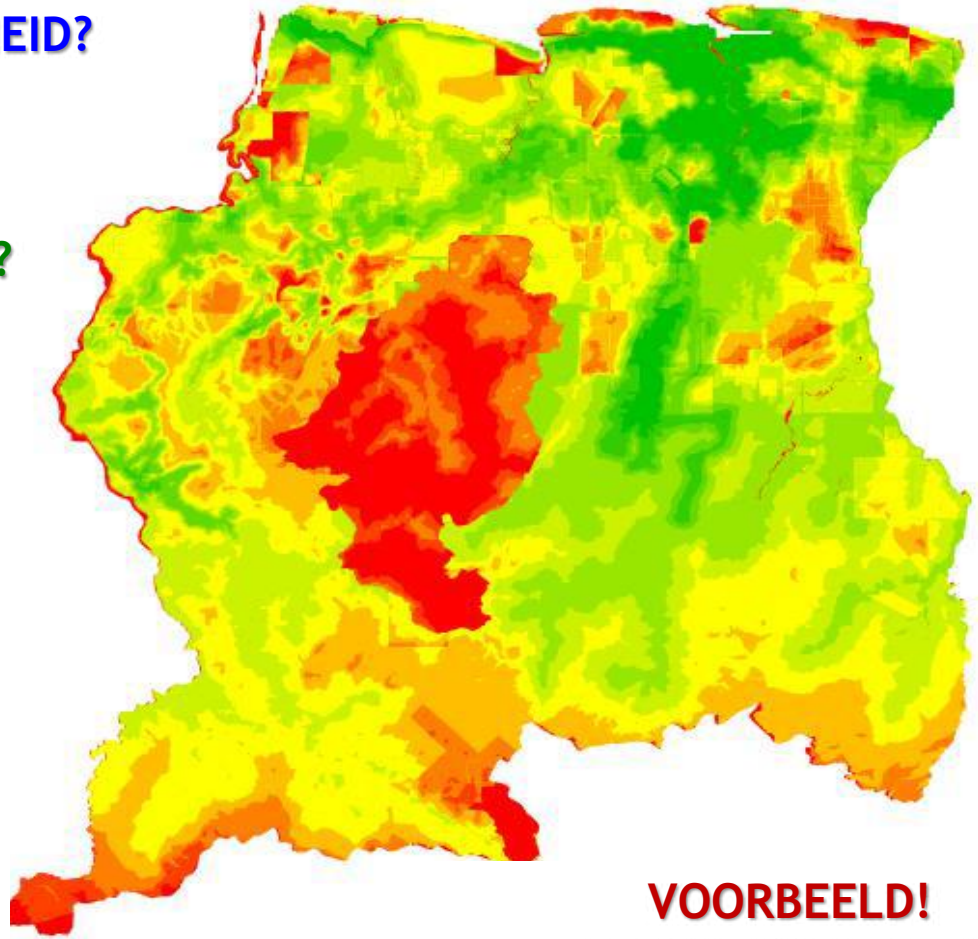
BETERE KEUZEN MAKEN - BESTEMMINGSKEUZEN O.B.V. GESCHIKTHEIDSCLASSIFICATIE ALS VOORWAARDE:

GESCHIKTHEID?

BETERE BESTEMMING?



VOORBEELD!
GESCHIKTHEIDSKAART
- BEBOUWING
HOE RODER HOE MINDER GESCHIKT



VOORBEELD!
GESCHIKTHEIDSKAART
- GROOTSCHALIGE LANDBOUW

Echt goed geschikt is beperkt (donkergroen).
Zijn daarom andere bestemmingen daar wel verstandig?

(Bron illustratie:
Ruimtegebruik Modelleren -
Een studie naar de impact van wegen in relatie tot verandering in de ruimte in Suriname.
C.A.G. Jolly 1707736 Vakcode: FALW 450254 Vrije Universiteit Amsterdam, juni 2010

Land Suitability classification

•*From Wikipedia, the free encyclopedia, 07/23*

The **Land Suitability Classification**: a soil evaluation method, developed by FAO. The fitness for a defined use
. Present condition or after improvements.

Structure

•I. Land Suitability Orders: reflecting kinds of suitability.
•II. Land Suitability Classes: reflecting degrees of suitability within Orders.
•III. Land Suitability Subclasses: reflecting kinds of limitation, or main kinds of improvement measures required, within Classes.
•IV. Land Suitability Units: reflecting minor differences in required management within Subclasses

Land Suitability Orders

•Order S: **Suitable**. - sustained use is expected to yield benefits which justify inputs, without risk of damage to land resources.
•Order N: **Not Suitable**. Not Suitable for a given use for a number of reasons.

3 Classes:
Class **S1** **Highly Suitable**: Land having no significant
Class **S2** **Moderately Suitable**: Land having limitations which in aggregate are moderately severe for sustained Application
Class **S3** **Marginally Suitable**: Land having limitations which in aggregate are severe for sustained application

Class **N1** **Currently Not Suitable**: Land having limitations which may be surmountable in time but which cannot be corrected
Class **N2** **Permanently Not Suitable**: Land having limitations which appear so severe as to preclude any possibilities

https://en.wikipedia.org/wiki/Land_Suitability_classification

UW MENING, GRAAG!

(IN RELATIE TOT IWRM)

BESTEMMING: **WAARDE:** **GESCH. SCORE:**

1. WOONFUNCTIE
    1. LAAGBOUW----------
    2. HOOGBOUW----------
2. WERKEN
    1. PRODUCTIE – PRIMAIRE----------
    2. PRODUCTIE – VERWERKING---------
    3. DIENSTVERLENING----------
    4. PUBLIEKELIJK (OVERHEID O.A.)----
3. RECREATIE
    1. DROOG/LEISURE----------
    2. NAT/NATUUR----------
    3. VIRTUEEL?----------
4. TRANSPORT
    1. DROOG----------
    2. NAT----------

BEDANKT!

WATER GOVERNANCE

Alwin Linger

07-08-2023

RELATED COURSES

- Water governance and law – F. Hausil
- Water governance and spatial planning – R. Wong Loi Sing

CONTENTS

- Water governance
- The 10 building blocks of water governance
- Water governance in Suriname (exercise)

- Water is the first principle of life;
- Water is related to climate, thirst, hunger, poverty, health, social & economical growth;
- Water is a source of conflict;
- Many of the most pressing challenges in the world are about water: too little, too much or too inferior. Such challenges can only be effectively addressed through adequate governance of available water resources (SIWI, Stockholm International Water Institute).

WHO (World Health Organization):

Sustainable Development Goal 6:

- Ensure availability and sustainable management of water and sanitation for all

Target 6.1:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Indicator 6.1.1:

- Proportion of population using safely managed drinking water services (drinking water from an improved water source that is located on premises, available when needed, and free from faecal and priority chemical contamination).

WATER: TOO LITTLE

WATER: TOO INFERIOR

WATER: TOO MUCH

WATER: TOO MUCH

WATER: TOO MUCH

WATER: TOO MUCH?

WATER GOVERNANCE

- How societies choose to govern their water resources and services has a profound impact on people's livelihoods and the sustainability of water resources (Stockholm International Water Institute);
- Well-managed water resources can be a significant driver for growth and can generate huge benefits for human health, the environment and the economy. On the other hand, badly governed water resources can significantly hinder growth, reduce opportunities for further development, put ecosystems at risk, cause societal disruption, create political instability and impose economic costs (Working Group II of the Intergovernmental Panel on Climate Change, 2007).

WATER GOVERNANCE

- Poor resource management, corruption, inappropriate institutional arrangements, bureaucratic inertia, insufficient human capacity, and lack of investment funds all undermine the effective governance of water;
- Moreover, the allocation of water is often determined by factors and actors outside of what is traditionally defined as the water sector. Agriculture, trade, energy, and environmental and industrialization policies all affect water allocation, but none of these are generally within the control of the water sector. This makes good water governance particularly challenging;

WATER GOVERNANCE

- The answer to such challenges is to establish clear roles and responsibilities for governments, civil society, and the private sector in relation to water resources. Each actor has an important part to play and water governance is about creating the foundation for them to do just that.

WATER GOVERNANCE: 10 BUILDING BLOCKS

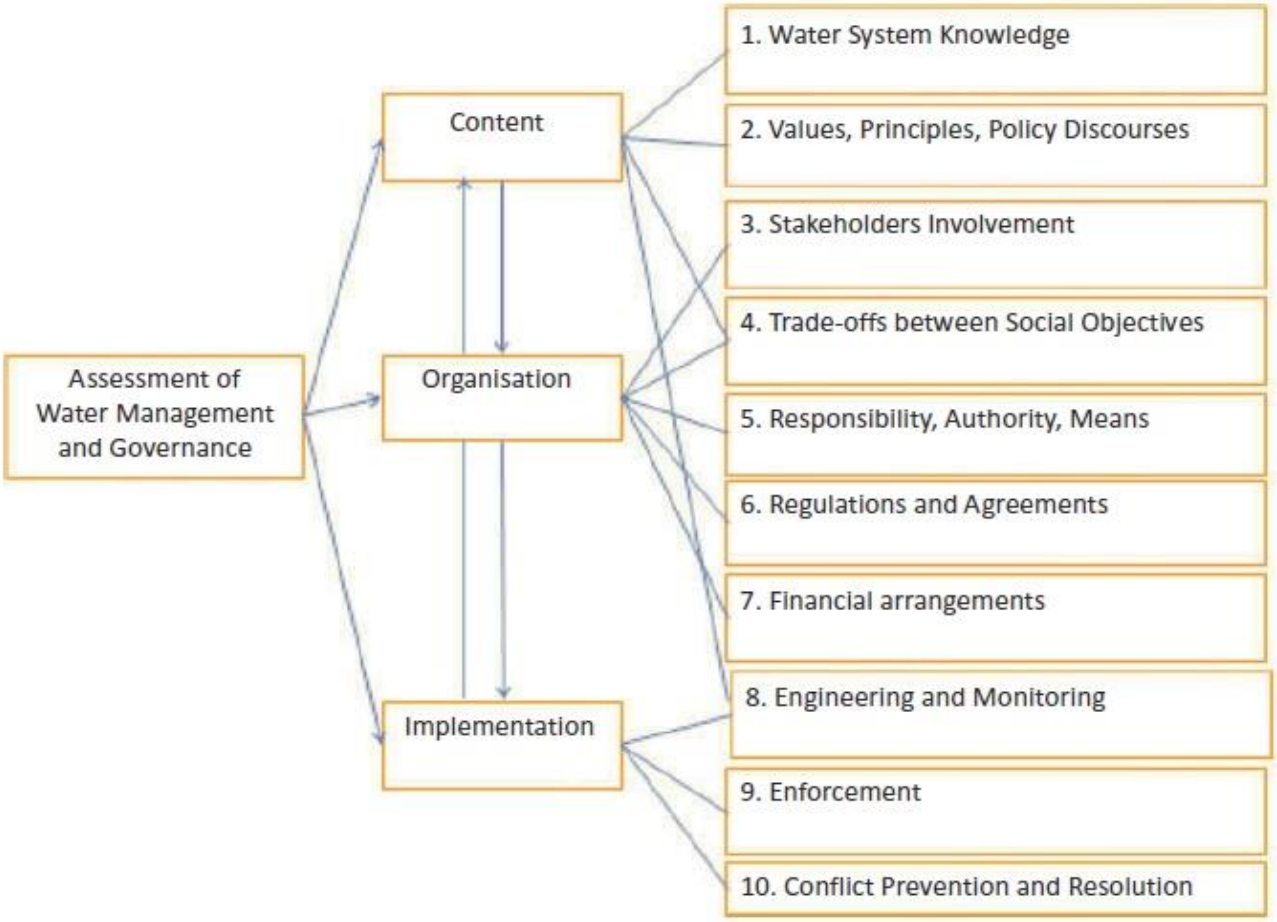


Figure 1. Multiple dimensions of water management and governance.

Marleen van Rijswick & Jurian Edelenbos & Petra Hellegers & Matthijs Kok & Stefan Kuks, 2014

WATER GOVERNANCE: 10 BUILDING BLOCKS

- The assumption is that water governance is sound when all three main dimensions and corresponding 10 building blocks are dealt with;
- The sequence and interdependence among these dimensions and elements have important implications. Sound water management and governance will only eventuate when there is congruence between these dimensions and corresponding elements. For example, implementation without attribution of responsibilities is, for instance, doomed to fail, and enforcement only can take place as regulations and mutual agreements are in place.

WATER SYSTEM KNOWLEDGE

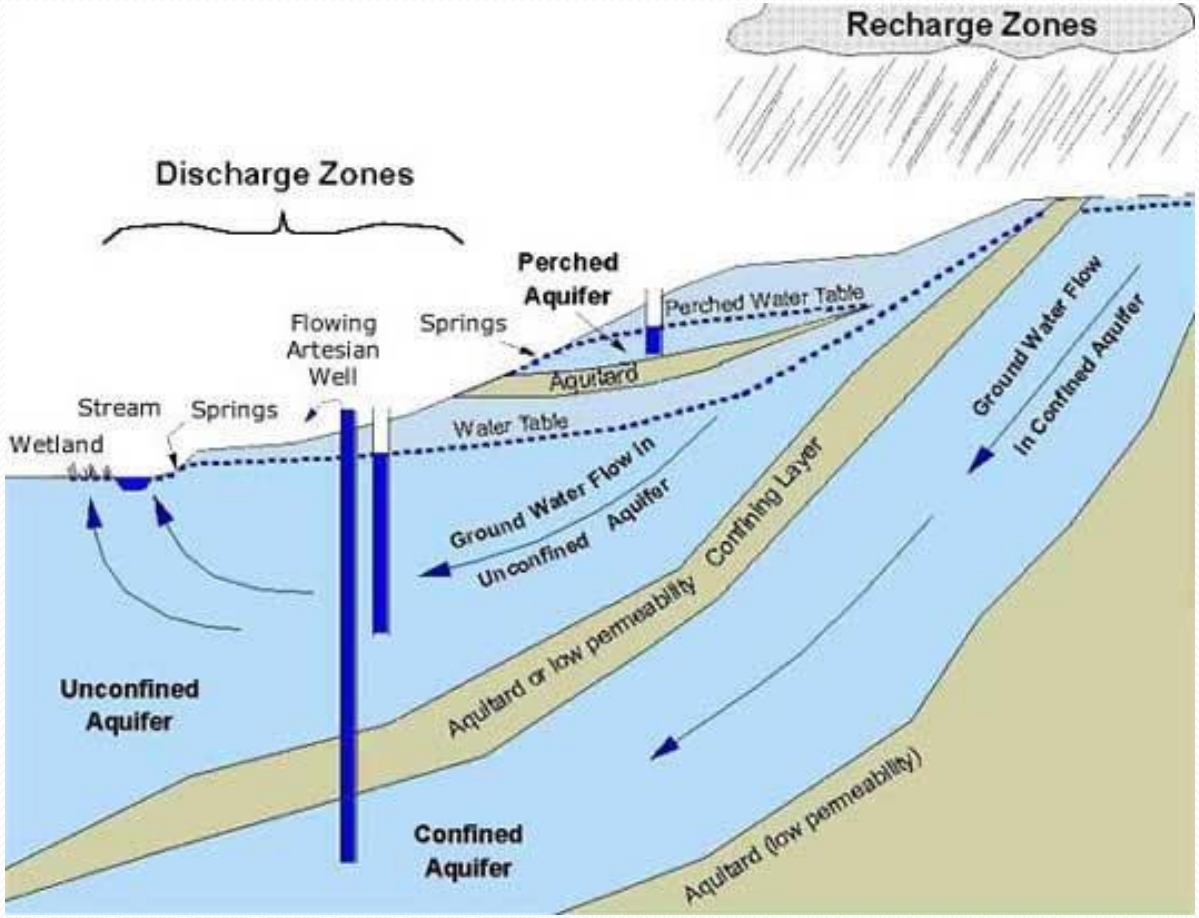
1. *Water system knowledge:*
   - The water system is defined as the combination of natural physical resources (such as rivers, rainfall, seas, lakes) and man-made infrastructure (such as canals, pumping stations, reservoirs, flood defences);
   - The system supports societal functions (domestic and industrial water use, irrigation, shipping, hydropower, safety, etc.), and includes the ecosystems related to water;
   - Knowledge of this system refers to knowledge of the natural processes, but also knowledge of the properties of the infrastructure;
   - In order to know the water system, it is essential to measure the important characteristics. For example, in order to assess the availability of water, the precipitation at several locations in the river basin has to be measured;
   - The necessary knowledge of the water system depends on its societal functions;

WATER SYSTEM KNOWLEDGE

1. *Water system knowledge:*
   - Water systems show a high natural variability;
   - Water resources involve the demand, supply and quality of fresh water;
   - Besides knowledge about the water system in time and space, insight is also required into the impact of investments in water resources development on water availability;
   - Flood risk involves the assessment of risk: the probability of failure and the consequences of failure (such as casualties and economic losses).

Assessment criteria: Is there sufficient knowledge of the existing water system in order to deliver the required service level of societal functions? If not, what are the gaps; is sufficient knowledge available to assess the impact on the water system because of changes in environment and societal functions?

WATER SYSTEM KNOWLEDGE



WATER SYSTEM KNOWLEDGE

Zeedijk Nickerie

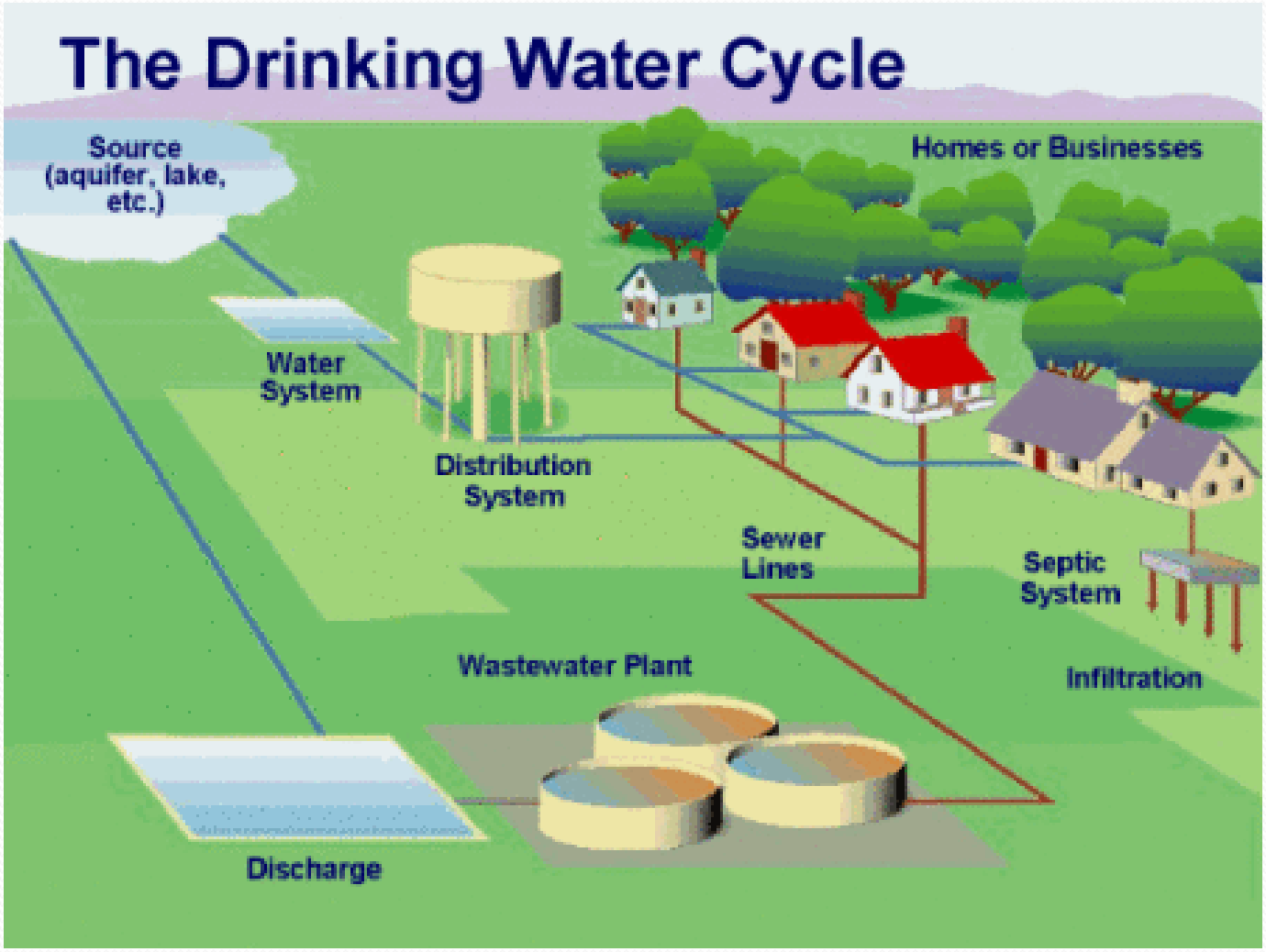
WATER SYSTEM KNOWLEDGE

Deltawerken Nederland

WATER SYSTEM KNOWLEDGE

Landbouw

WATER SYSTEM KNOWLEDGE



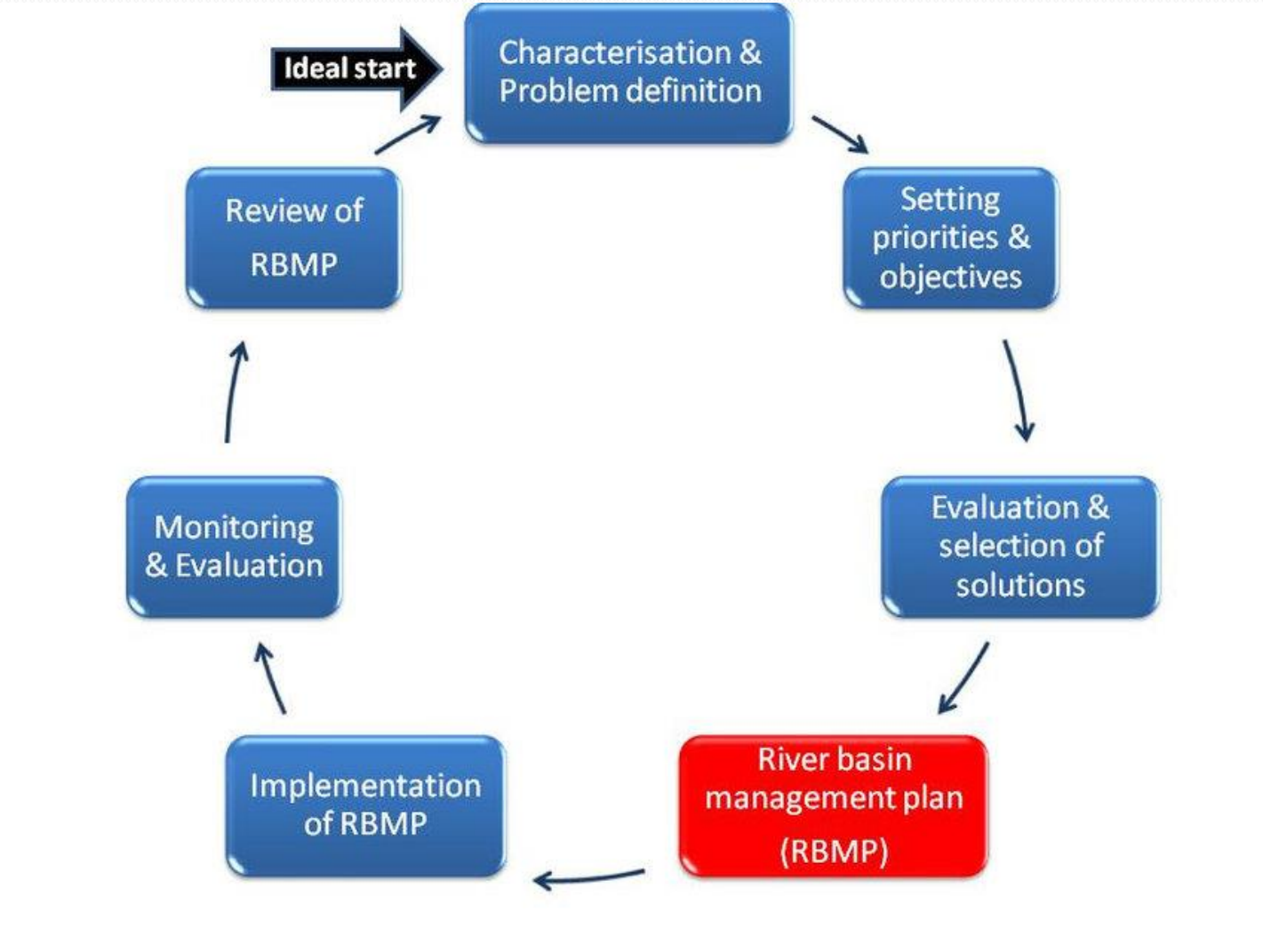
VALUES, PRINCIPLES AND POLICY DISCOURSES

2. Values, principles and policy discourses: Water issues touch upon different values, principles and narratives;
   - Values:
     - Values may differ per country or society, and depend strongly on historical, cultural, normative and political views;
     - Common interests may play a positive role in finding shared values;
     - Well-known values are the recognition of human rights, equity, human dignity, justice, trust and solidarity or self-determination;
     - Values can also be more specified for the water domain like flood protection for all against acceptable societal costs, or the availability of sufficient and clean (drinking) water, an equitable, sustainable and fair use of resources or the value that no significant harm should be done to others;

VALUES, PRINCIPLES AND POLICY DISCOURSES

2. Values, principles and policy discourses:
   - Principles: Values can be further elaborated in principles:
     a. institutional principles, among others decentralization, subsidiarity, river basin management (= stroomgebiedbeheer), or integration;
     b. principles of good governance, proportionality and public participation;
     c. specific environmental principles, e.g. the precautionary principle, the polluter-pays principle, the prevention principle, the principle that pollution should preferably be tackled at the source;
     d. technical principles, e.g. from global design to detailed design (see the eighth building block);

VALUES, PRINCIPLES AND POLICY DISCOURSES



VALUES, PRINCIPLES AND POLICY DISCOURSES

2. Values, principles and policy discourses:
   - Policy discourses:
     - The content of a water problem is shaped in different policy discourses. An example of two different and opposing policy discourses in the Netherlands is protection against extreme water events (dams, dikes) and living with water (providing more room for the river, for example) Suriname: Weg naar Zee?;
     - Discourses frame certain problems; that is to say, they distinguish some aspects of a situation rather than others;
     - In practice different discourse coalitions emerge that often fight with each other in order to becoming dominant (opposed to recessive) policy discourse coalitions in determining what the exact problem is sometimes ignoring the actual state of the water system and which type of solutions seem appropriate in handling water issues.

VALUES, PRINCIPLES AND POLICY DISCOURSES

2. Values, principles and policy discourses:

Assessment criteria: Is there sufficient knowledge of shared or conflicting values, viewpoints and principles (represented by different policy discourse coalitions) for water issues and their consequences for facing water management issues?

STAKEHOLDER INVOLVEMENT

3. Stakeholder involvement:
   - Water management and governance can be considered complex processes in which various actors with different and oftentimes opposing values, viewpoints and interests discuss, deliberate and negotiate problem analysis and solution-finding to water issues;
   - Water governance points at situations where decision-making and implementing take place in networks of public, private and semi-private actors and where governments increasingly use horizontal forms of steering to achieve results within these actor networks;
   - Governments are often dependent on many stakeholders with different resources (knowledge, money, etc.). In this context, governments sometimes deliberately, sometimes forced by circumstances, give more room to stakeholders to influence decision-making and implementation.

STAKEHOLDER INVOLVEMENT

Wetland vs landbouw

STAKEHOLDER INVOLVEMENT

3. Stakeholder involvement:
   - The assumption is that the involvement of stakeholders in general enhances the content of policy proposals (because more knowledge becomes available) and creates more support legitimacy for water policy measures;
   - Stakeholder involvement would improve the quality of decision-making by opening up the decision-making process and making better use of the information and knowledge that is available in society;
   - It would improve public understanding of the management issues at stake, make decision-making more transparent, and might stimulate the different government bodies involved to coordinate their actions more in order to provide serious follow-up to the inputs received. Water policy measures can become less controversial and implementation of decisions can be much smoother.

STAKEHOLDER INVOLVEMENT

3. Stakeholder involvement:
   - Width of participation: the degree to which each member of a community is offered the chance to participate in each phase of the (water) policy process;
   - Depth of participation: is determined by the degree to which stakeholders have the opportunity to determine the final outcome of the governance process.

Assessment criteria: Are all relevant stakeholders involved? Are their interests, concerns and values sufficiently balanced considered in the problem analysis, solution search process and decision-making?

TRADE-OFFS

4. Trade-offs between social objectives: service-level agreements
   - Allocation:
     - The economics of water management is about the allocation of scarce resources (water quantity, water quality, safety against flooding, etc.);
     - The water and safety allocation process is a political bargaining process (pros and cons of several sharing options between legitimate claimants at a specific time are weighted, and winners and losers make their case heard);
     - Insight is required into various social (potentially conflicting) objectives and into the trade-offs between the impacts on various objectives of alternative measures. What are, for instance, the foregone benefits or opportunity costs cost (*opofferingskosten = opbrengsten beste niet-gekozen alternatief minus opbrengsten gekozen optie*) of allocating water to ensure food self-sufficiency instead of allocating water in the most productive manner?

TRADE-OFFS

4. Trade-offs between social objectives: service-level agreements
   - Reallocation:
     - Many countries recognize the need for reforming their water allocation. The implementation of new water-allocation mechanisms will have various implications. For instance, changes in water allocation can have an impact on the competitiveness of some industries; their costs can be unevenly distributed across social groups. Such considerations can make the political economy of the reform of water policies complex;
     - In practice, the transition of existing service levels towards new agreed service levels will take place when the gains will outweigh the transaction costs of the reform and the difficulties related to challenging the beneficiaries of status quo.

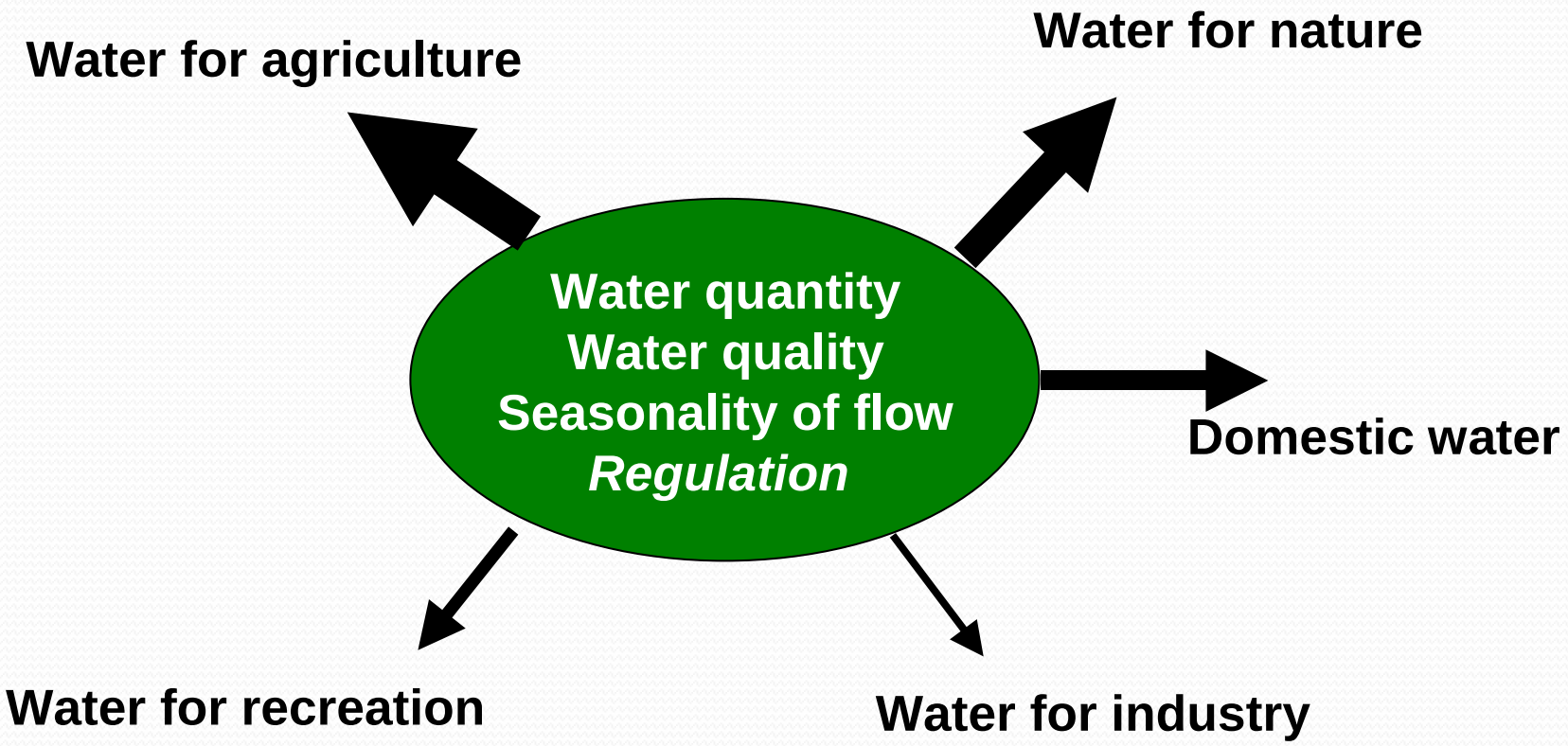
Service-level agreement (SLA) = een overeenkomst tussen een leverancier en een afnemer van een bepaalde dienst waarin voor beide partijen duidelijk wordt gemaakt wat kan worden verwacht van de diensten, hoe de diensten kunnen worden verbeterd en wat de kosten daarvan zijn.

TRADE-OFFS

4. Trade-offs between social objectives: service-level agreements
   - Allocation mechanisms:
     - The service-level agreements have to be translated into rules, regulations and procedures, such that the water service delivered to each user is specified under different hydrological circumstances;
     - The service-level agreements can be achieved by way of water-allocation mechanisms (e.g. rationing, pricing or markets), as well as by water quality and safety standards (e.g. norms) combined with the instruments needed to achieve these standards.

Assessment criteria: Are agreed service-level decisions based on trade-offs of costs, benefits and distributional effects of various alternatives?

TRADE-OFFS


Water for agriculture
Water for nature
Water quantity
Water quality
Seasonality of flow
Regulation
Domestic water
Water for recreation
Water for industry

RESPONSIBILITY, AUTHORITY AND RIGHTS

5. Responsibility, authority and means:
   - Property rights: The identification of responsibilities and authorities with respect to water starts with the determination of property rights. Property rights can be understood as social relations that define the titleholder with regard to water resources in relation to all others. Such rights only have an effect when there is some authority system that agrees to defend a rights holder's interest;

RESPONSIBILITY, AUTHORITY AND RIGHTS

5. Responsibility, authority and means:

- Four traditional types of ownership are identified in the literature:
  - private property (the exclusive property title is in the hands of private individuals or corporations);
  - common property (to be seen as the groups' private property, access by others can be excluded);
  - state (public) property (ownership and use control is in the hands of the state, individuals and groups may be able to make use of resources, but only at the forbearance of the state, public agencies have the right to determine use or access rules, individuals have a duty to observe these rules);
  - and no property (res nullius, the access to resources is not based on formally regulated property rights).

RESPONSIBILITY, AUTHORITY AND RIGHTS

5. Responsibility, authority and means:
   - Allocating authority and responsibilities: To restrict property rights, the public domain needs *authority* at various administrative levels (central/decentral), needs to assign *responsibilities* to public and non-public actors, and creates *means* to empower authority;
   - Means:
     - participative capacity (if all water users have an equal opportunity to become expressed and recognized);
     - integrative capacity: intra-policy coordination (i.e. the internal integration of the water policy field), to inter-policy coordination (i.e. the cross-sectoral integration of water policy with related policy fields), and to external coordination between water policy institutions and non-governmental actors, including consultations with target groups;

RESPONSIBILITY, AUTHORITY AND RIGHTS

5. Responsibility, authority and means:

Assessment criteria: Are authorities, responsibilities and means well-organized to deal with water issues at the appropriate administrative scale(s) in a participative and integrative way?

REGULATIONS AND AGREEMENTS

6. Regulations and agreements:
   - *Appropriateness:* The appropriateness of rules and agreements will depend on:
     - actual circumstances, depending on the cultural, political, institutional and economic circumstances (developing/developed countries, rural/urban areas, religion, political/philosophical traditions);
     - the legal traditions (common/civil law/traditional/indigenous law systems);
     - the governmental organization (centralized/decentralized/river basin management approach);
     - the parties that are involved (agreements between states, regulations of governments within a country to protect and develop public works, to protect ecosystems, to regulate private activities that have an impact on water systems, agreements between market parties, public–private partnerships, involvement of NGOs and citizens);
     - the leading values and principles upon which the bargaining is based;
     - the relevant and local water system characteristics;
     - the actual water problem that has to be solved;
     - and last but not least, the intention of the parties.

REGULATIONS AND AGREEMENTS

6. Regulations and agreements:
   - *Legitimacy*: The main assessment criterion of regulations and agreements is legitimacy:
     - Based on shared or agreed values and principles including those who refer to vulnerable values and groups in society to enhance effectiveness and to avoid conflicts;
     - In conformity with the rule of law;
     - Offering (legal) certainty with regard to rights, duties and accountability to provide a base for action;
     - Formulated in a way that they are enforceable and effective (able to achieve the intended goals);
     - Decision-making at the most appropriate level and based on transparent rules, sufficient and relevant information and taking all interests that are at stake into account (also vulnerable and minority interests);

REGULATIONS AND AGREEMENTS

6. Regulations and agreements:
    - Offering the right mix of public and private instruments for the objective at stake;
    - Taking distributional effects into account to avoid damage to the water system, other interests and policy fields, and in this way avoid conflicts;
- Legal certainty and adaptiveness: Regulations and agreements should be based on a right balance between adaptivity and flexibility on the one hand and legal certainty at the other.

Assessment criteria: Are regulations and agreements legitimate and adaptive, and if not, what are the main problems with regard to the above mentioned legitimacy aspects?

FINANCING WATER MANAGEMENT

7. Financing water management

- There are several ways to finance water management or principles upon which to base the financing system:
  - cost recovery through a solidarity principle, which means that the costs of water policy are recovered from the national budget or budgets of decentralized authorities;
  - cost recovery through a profit principle, which means that those who have an interest in water services and profit from it also pay for it;
  - finance system according to international agreed principles as, for example, the polluter pays principle?

Assessment criteria: Is the financial arrangement sustainable and equitable (=rechtvaardig)?

ENGINEERING AND MONITORING

8. Engineering and monitoring: The design and management of the existing infrastructure may not be suitable to fulfil the societal functions (the capacity of irrigation canals may be insufficient, flood defences may not be strong enough):
   - *Engineering*:
     - a ‘from global to detailed’ principle is often used: first a global design, then a detailed design and next the implementation;
   - *Monitoring:*
     - Monitoring of the water system is needed in order to assess whether the system meets the agreed SLAs;
     - Monitoring is not a goal in itself, but the data have to be used in order see whether the (water) system meets the requirements.

ENGINEERING AND MONITORING

Assessment criteria: Are SLAs sufficiently available (implicit or explicit) in order to redesign the existing infrastructure? Are the design and consequences of different alternatives sufficient available? Is there sufficient monitoring of the system and are the data analysed?

ENFORCEMENT

9. Enforcement:
   - In general, clear substantive norms and standards as well as clear process norms and standards regarding allocation of responsibilities and resources are useful when it comes to enforceability and in the end the effectiveness of water management;
   - The same applies in cases where vulnerable values (water and ecosystems and the rights of vulnerable groups) are at stake;
   - More procedural and open norms are often used when the interests at stake are hard to agree upon, or in case agreements are made with regard to long-term and more general formulated objectives or in cases of large uncertainties with regard to system knowledge or social, economic, technical or physical developments;
   - Depending on the regulations and agreements (public, private or a mix), enforcement can be undertaken by public or private parties. In general, private agreements and regulations will be enforced by private parties, but public regulations can be enforced by both public and private parties.

ENFORCEMENT

Assessment criteria: Are regulations and agreements enforceable by public and/or private parties, and are there appropriate remedies available?

CONFLICT PREVENTION AND RESOLUTION

10. Conflict prevention and resolution:
    - Conflict prevention:
        - 'water valuation for water dispute resolution': 'benefit-sharing' rather than 'watersharing';
        - thinking about water in terms of its value, rather than just in terms of its quantities, quality and ownership;
        - If disputants think about water allocation in a cooperative manner, then the risk of violent conflict about water can be considerably reduced;
        - conflicts can be prevented by clear norms, standards, responsibilities and enforceable rules, standards, instruments and agreements;
    - Conflict resolution:
        - In case conflicts do occur, parties need an independent mediator, arbiter or court to decide on the conflict and who is able to force parties to act in conformity with the final ruling.

CONFLICT PREVENTION AND RESOLUTION

- Conflicts can be prevented or solved in a proper way if stakeholders have formulated mutually accepted rules and procedures that prescribe how to handle or follow procedures in the case conflict of interests arise in water governance and management.

Assessment criteria: Are there sufficient conflict prevention and resolution mechanisms in place?

WATER GOVERNANCE: SURINAME

Exercise

WATER GOVERNANCE: SURINAME

Water system knowledge:

Assessment criteria: Is there sufficient knowledge of the existing water system in order to deliver the required service level of societal functions? If not, what are the gaps; is sufficient knowledge available to assess the impact on the water system because of changes in environment and societal functions?

Stakeholder involvement:

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WATER GOVERNANCE: SURINAME

Upgrading drinkwater en sanitaire voorzieningen OS Rahan


THE END