

DUTCH SPATIAL AND TRANSPORTATION POLICIES USEFUL IN SOUTH AFRICA?

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Abstract

A shortage of space forced Dutch planners and policy makers to develop and implement advanced and coherent spatial and transportation policies. These policies include topics such as the allocation of land, liveability and safety.

Of course South Africa has much more space. Nevertheless limited funds also force South Africa to develop and implement land-use policies and it appears that the goals are not so different from the Dutch ones. The paper looks at whether and how Dutch policies might help solving the local problems.

The latest policies (the corridor-approach) show that South Africa moves toward integrated settlement and transport planning. The Dutch integrated spatial and transportation policies are very promising. First results are positive. Although implementation of these policies might be more difficult in SA (The power of local governments is much larger in SA) the expected results of these policies are so high that it is worth a try.

Nevertheless, integration of new policies in common practice, need time. After ten years the Netherlands only have the first results. South African should keep this in mind while implementing

Spatial and transportation planning: A historical overview

During the second half of the 19th and the first half of the 20th century the population growth in Europe was tremendous. The historical cities got over-populated and the original borders (city walls) were expanded. The over-population and badly planned new areas resulted in a lack of hygienic water, drains etc. An outbreak of epidemics and diseases was the result.

Initiated by the fear of strikes and hygienic problems, Paris was the first city to deal with the chaotic explosion of the city. The policy was to divide the working class areas and the rich and monumental areas. Large boulevards were created, which also would be helpful to move military forces if necessary. It was the first indication for the need of a planned urban transport system. A lot of other cities copied these ideas, and created similar structures [3].

At the end of the 19th century some planners realised that chaotic growth and over dimensioned boulevards (in some areas) resulted in poor liveability. In Britain, Germany and the Netherlands the idea of 'garden villages' was born. Working and living areas should be close to avoid the need for transport. Moreover the new settlements should permit enough air, open space etc.

In practice it appeared that the ‘garden villages’ could not fulfill these promises. The philosophy only works when the village is self-supporting or situated very close to the original city. Nevertheless, the philosophy that working and living areas have to be close, remains. Planning became a trade off between the need to connect the working and living areas and the knowledge that living next to a heavy industry is not considered acceptable.

Spatial and transportation policies in the Netherlands

The need for interaction between and within cities caused more and more traffic. With it, it brought the introduction of the car and growth of individual mobility in the sixties, traffic problems became a common occurrence.

The lack of space increased traffic problems in the Netherlands much quicker than elsewhere in Europe and the government soon realised that integrated policies and studies were needed to relieve the pressure. On all governmental levels (municipalities, provinces and national) long term zoning plans, traffic and transport plans were implemented.

For the last decade of the last century, the main policies (required road capacities, road safety etc.), procedures and planning process on a **national level** were described in the ‘(Second) National Transport Structure Plan’ (SVV–II, 1989). This document includes public and freight transport and also gives direction to the structure of the national roads (existing and required). The Structure Plan is followed by the National Road Plan. The National Road Plan describes the relationship with other national plans and gives a more detailed description of the structure of national roads. A similar more detailed plan is formulated in connection with public transport.

In the Structure Plan the main policies were:

1. Minimisation of travel distance.
2. Reduction of the use of private cars (especially if it affects liveability).
3. Provision of facilities for bicycles and public transport.

Based on the national policies, the provinces and municipalities have a similar planning structure. For the **municipalities** it is necessary to go into much more detail. Municipalities also have to submit a zoning plan. Subsequently a Traffic Circulation Plan (TCP) is conducted. The TCP supplies an integrated vision for all traffic (cars, public transport, bicycles and pedestrians). Moreover the vision is based upon planning ideas that guarantee the liveability in the cities.

Important policy elements of a TCP are:

- Categorisation of roads (the design of the road meets the main purpose of the area; in a living area no main roads).
- Avoidance of inappropriate use of roads in living areas.
- Speed reduction in living areas.
- Limiting the number of parking spaces in the inner cities.
- Maintaining the circulation of traffic on main roads.
- Minimising waiting time at traffic lights.
- Realising safe cycle and direct routes (separate paths if need be).
- Realising traffic safety for pedestrians (low speeds in living areas, road crossing facilities etc.).
- Stimulating the use of Public Transport (PT needs to be a fast and safe alternative for the car; creating park and ride facilities, separate bus-lanes etc.).
- Restricting access time for lorries in inner cities.

Integrated Land-use and Transportation policies

Although the national policies were demand orientated, the municipalities still focussed on the supply side. By limiting the supply, governments hoped that a reduction in the demand for the private car (less car km), would be achieved.

Over the years it has been proven that the supply approach is not very successful. The TCP was able to reorganise traffic flows. Traffic in urban areas became better organised and safer. Unfortunately mobility growth was not reduced. Therefore the national government decided to go further. The goal was to limit mobility growth. The focus was on the use of private cars. Several policies have been implemented since the early nineties.

One of the main goals of recent Dutch transport policy was to reduce the growth in car traffic. In 1991 the Dutch government started with a financial incentive. The VAT on petrol was increased by 25 cents (an increase of about 15%¹). Statistics showed that mobility growth was reduced in the short run. Unfortunately the mobility levels were back to normal after about one year.

The ABC location-planning policy

Realising that financial incentives only have a short-term impact, the government investigated more long-term measures. A different approach in land-use planning is needed. A promising way to achieve this is to encourage use of public transport through a better coordination between the planning of transportation facilities and land-use, in particular of employment. Industrial plants, public facilities, offices for business or government all generate mobility of persons and goods. The amount of mobility generated and the use of different transport modes depends heavily on the characteristics of these companies and their locations. It is well known that by locating employment near railway stations and other public transport facilities, public transport use is enhanced. Many examples can be found which demonstrate the influence of the location of a company on the mode choice of commuters.

TNO Inro explored the possibilities of mobility limitation by settlement restrictions for companies [8]. A promising and innovative land use strategy, they found, exploits the differences between companies as to the mobility they generate. Attention should therefore be paid to the large variation between companies with respect to their potential use of public transport and the role of the car in business travel and freight transport. Because space near public transport nodes is limited, and because some companies depend heavily on road facilities, locations with excellent public transport facilities should be reserved mainly for companies with high public transport potentials. Companies with low public transport potential, that are heavily dependent on road transport and business travel by car, can better be located near motorway exits.

In order to establish optimal locations for each type of company, several types of locations are distinguished. In the first concept of the planning instrument, the classification identified three basic location types:

- A-locations; locations that are highly accessible by public transport. Examples of A-locations are major public transport nodes such as central stations in the larger urban areas.
- B-locations; locations that are reasonably accessible both by public transport and by car.
- C-locations; locations that are defined as typical car-oriented locations. Examples can be found near motorway exits in fringe areas having poor public transport access.

¹ It has to be mentioned that the total increase of variable car costs was only 5%.

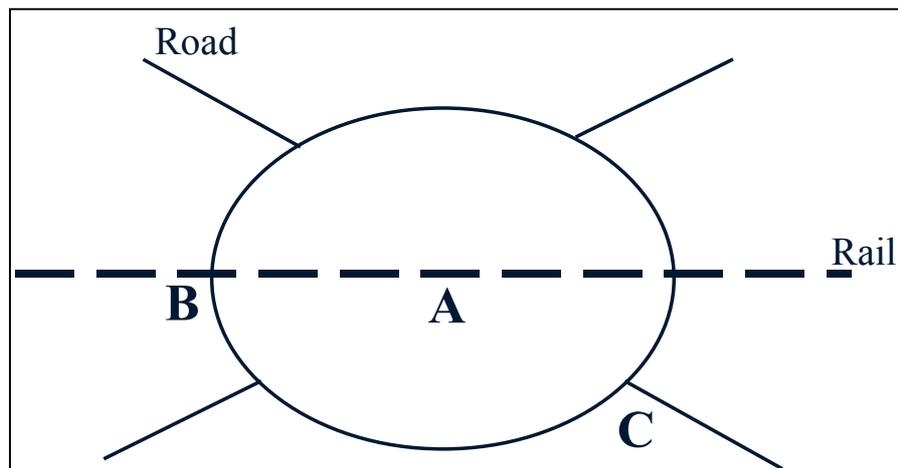


Figure 1: Illustration of ABC-locations

In view of the policy goals of the ABC location-planning instrument, the main concern was to describe the accessibility by public transport and by car. Slow modes were not taken into account explicitly in this study. TNO Inro found that the distinction in A-, B- and C-locations was too limited to give a meaningful and exhaustive categorisation of all employment locations. Therefore, two additional location types were added to the typology: AI (A-local) locations, that are defined as locations reasonably accessible by public transport and poorly accessible by car, and R-locations, that are considered to be poorly accessible both by public transport and by car. The resulting typology of locations by accessibility profile is summarised in table 1.

Table 1: Typology of locations by their accessibility profile

Accessibility by car:	Accessibility by Public Transport:		
	Well	Reasonable	Poor
Well	A-type	B-type	C-type
Poor	A-type	AI-type	R-type

Source: Verroen et al. (1990)

Given the mobility profiles of companies and the accessibility profiles of locations, we are now facing the question what type of company should ideally be located at what type of location, given the policy goals to be achieved. Which strategy will yield a maximum reduction of 'avoidable' car travel and will guarantee the accessibility by car for companies that depend heavily on business travel by car and/or road freight transport? Several simulations and multi-criteria approaches resulted [8] in eleven main company types and their preferable location type (see table 2).

Table 2: Preferable location types for the 11 main company types

Company type:	Preferable location type:	
	First Priority	Second priority
1. Ind. Plants, low density	C	-
2. Agricultural firms	C	R
3. Trade companies	B	C
4. Transport companies	C	-
5. Business offices, high car dependent	B	-
6. Ind. Plants, high density	B	A1
7. Business offices, low car dependent	A	A1/B
8. Governmental offices	A	A1
9. social services	B	A1
10. Public facilities	A	A1
11. Medical facilities	B	A1
A/A1: Well accessible by PT B: Reasonable accessible by PT and car C: Well accessible by car R: Poor accessible by both PT and car		

Source: Verroen et al. (1990)

Given the goals of the ABC-location policy, there are two possible measures:

Infrastructure planning: Improve the accessibility of companies at their current location and

Land-use planning: Regulation of location choice for new or relocating companies.

It is important to mention that these policies were implemented by the National government. The optimal areas for companies with different characteristics were defined and local governments are 'forced' to work within this fixed framework.

An extensive exercise for the city of The Hague proved that both the improvement of (public) transport supply and land use control can be effective. Unfortunately there are no practical results available yet. At the moment the Dutch government is investigating the effects achieved by implementing ABC-location policies over the last eight to ten years.

Mobility Friendly Urbanisation

The awareness that infrastructure, mobility and spatial planning are interconnected is, of course, nothing new. For years now, research has been carried out into the way in which urbanisation features affect traffic patterns at various levels and the utilisation of the infrastructure in urban areas [1, 2]. The TNO-Inro studies focussed mainly on the influence of the urban form on the daily patterns of activity of inhabitants of urban areas in the Netherlands ('Daily Urban Space'), and on the emanating traffic flows. As statistics show that more than 90% of daily movements cover a distance less than 30 km, the effects of location selection in urban areas with a radius up to 30 km were studied. Less attention was paid to relationships at a larger scale, and aspects of spatial organisation at the smallest scale of suburbs and neighbourhoods.

The most important determinative factors were selected from the abundant supply of recent literature on the subject of urbanisation and mobility. The three dimensions (urban form, daily patterns and traffic flows) led to eight promising urbanisation options as shown in Table 3 and Figure 2 which are all based on single or multi-core proximity and the location of expansions near high-quality public transport.

Table 3: Tested promising urbanisation options

Clustering principle:	Mixing principle:	Orientation:	
		Single-core	Multi-core
Clustering	Separate functions	1. Compact City 'seperated' (VINEX line)	5. New Cities (along axes) 'seperated'
	Mixed functions	2. Compact City 'mixed'	6. New Cities (along axes) 'mixed'
Dispersing	Separate functions	3. Incremental City 'seperated'	7. Belt Cities 'seperated'
	Mixed functions	4. Incremental City 'mixed'	8. Belt Cities 'mixed'

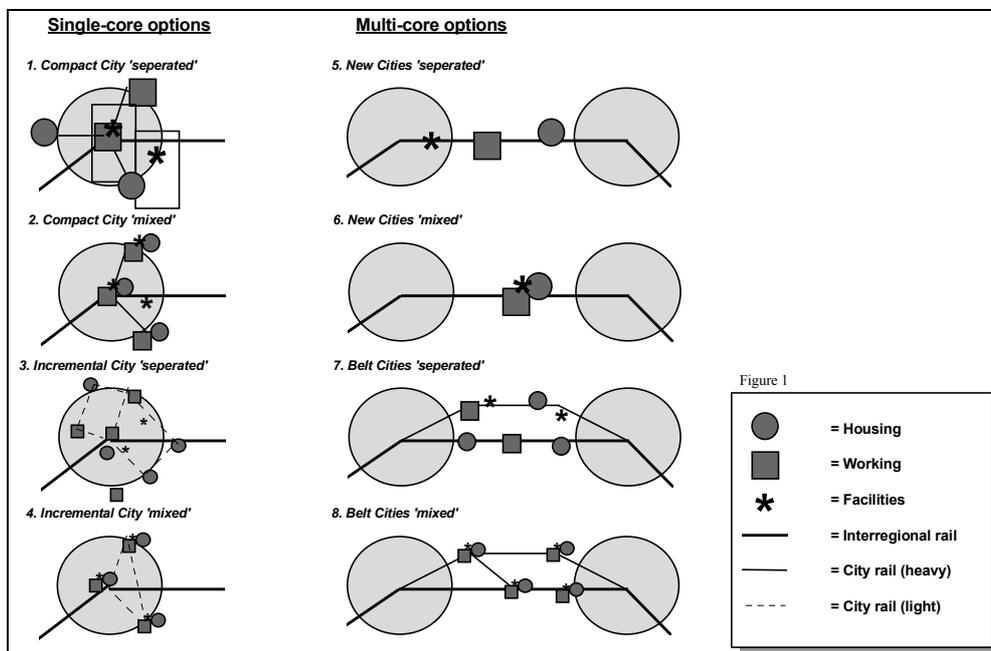


Figure 2: Spatial perspective and characteristics of public transport infrastructure for the eight promising urbanisation options

In the case of desired long-term urbanisation from the point of view of mobility, preferences are not clear cut and depend on mobility indicators being taken into consideration. If especially, the reduction in car traffic and the reduced loads on the motorway network are examined², it can be said that urbanisation with a good *mixture of functions* and (to a lesser extent) *clustered in larger spatial units as close as possible to or in between the existing metropolitan districts* and with *good connections to high-quality public transport* have the most favourable effect on mobility. The preference is less clear cut when it comes to choosing between single-core locations close to a single conurbation and multi-core locations on the axes between such conurbations. Locations that are favourable from a mobility point of view are located close to the centre of a conurbation or on the axes between conurbations.

² The examination was carried out using simulation- and multi-criteria techniques.

Such locations:

- lead to relatively smaller movement distances;
- are linked effectively to the main infrastructure and
- offer more opportunities for the realisation of high-quality public transport access.

The study showed that different preferred courses for single or multi-core locations per region are required. If the locations are further away from the centres and are not well linked to the inter-local main infrastructure, the mobility features are unfavourable. This is shown in Figure 3.

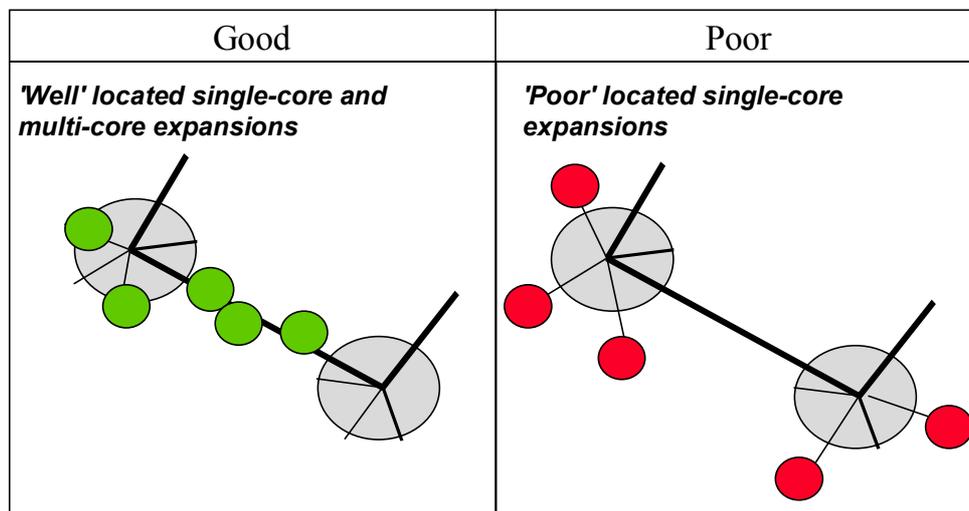


Figure 3: The essence of good and poor single and multi-core locations

Dutch traffic and transport policies in the 21st century

On the 16th of October 2000 the Minister of Transport and Public Works, Ms. Tienke Netelenbosch, presented the draft of the new 'National Traffic and Transport Plan' (NVVP). This plan introduces a shift emphasis vis-à-vis the policy of the eighties and nineties. Policies and measures are no longer based on the assumption that volume and direction of traffic flows can and must be **regulated** by the government. Mobility is accepted as a self-evident phenomenon in modern society. It must be noted however, that, without any arrangements to the present policy, traffic and transport on the roads will face long delays due to congestion in 2020. Without new measures the improvement in the area of safety and liveable environment will also stagnate. Therefore a policy has been formulated which sketches a new perspective for traffic, transport and the accompanying infrastructure in the Netherlands up to 2020 [6].

The new policy can be characterised as follow:

- Putting the citizen's needs at the centre: the choices of citizen's and companies will be respected, but users will have to pay for what they choose.
- A business like approach: instruments will be deployed according to their effectiveness.
- Infrastructure will be the carrier of area planning economic development.
- There will be space for public-private partnership in the construction and operation of infrastructure.

- Decentralise what can be decentralised, centralise what must be centralised; Regional mobility funds will be created.
- Flexibility to give the dynamism in society its due. Therefore the National government policy agenda will be revised every two years.

A revision of the policy agenda every two years is a large improvement. Moreover, it is stated that Dynamic Traffic Management will help to achieve the aimed regulation by the government.

South Africa's spatial and transportation policy

Traffic development in South Africa was very different to the Dutch experience. Because of the history of South Africa (apartheid regime), only a small portion of the population could afford a private car. Therefore traffic capacity problems appeared more slowly. Moreover the historical layout of a city in South Africa is very typical (townships were not considered part of the city although a lot of commuters lived in these area's). In the former white settlements, the American approach was copied (widespread settlements based on the use of the private car).

South Africa has experienced major policy changes since the ANC came into power in 1994. Mobility for all people must be supported. In 1996 the Department of Transport developed two important documents to state the approach of the government on supporting the mobility needs of the total population:

- The Green paper on National Transport Policy and
- The White paper on National Transport Policy.

By means of these documents the Government identified the current transportation problems and indicated ways of solving them. The government succeeded to have a broad view on the problems and looked at the problems as such as well as at the way to implemented (role of the government, institutional principles etc) them. Analysing the different documents it can be concluded that the approach of the South African government was similar to the approach of European/Dutch governments in the eighties.

On the 13th of May 1999 the Minister of Transport, Mr. M. Maharaj, presented a more detailed document: 'Moving South Africa, the action Agenda'. Within the Action Agenda the Minister indicates the need to define transport corridors. Creating corridors and focussing investment and resources on them is the key component of the urban passenger strategy, since dispersed land use is the biggest driver of poor public transport performance. The densities created by corridors enhancement lower system cost, not just for transport but also for other infrastructure. Corridor-based public transport also improves the level of service offered to customers and speeds and frequencies increase [4].

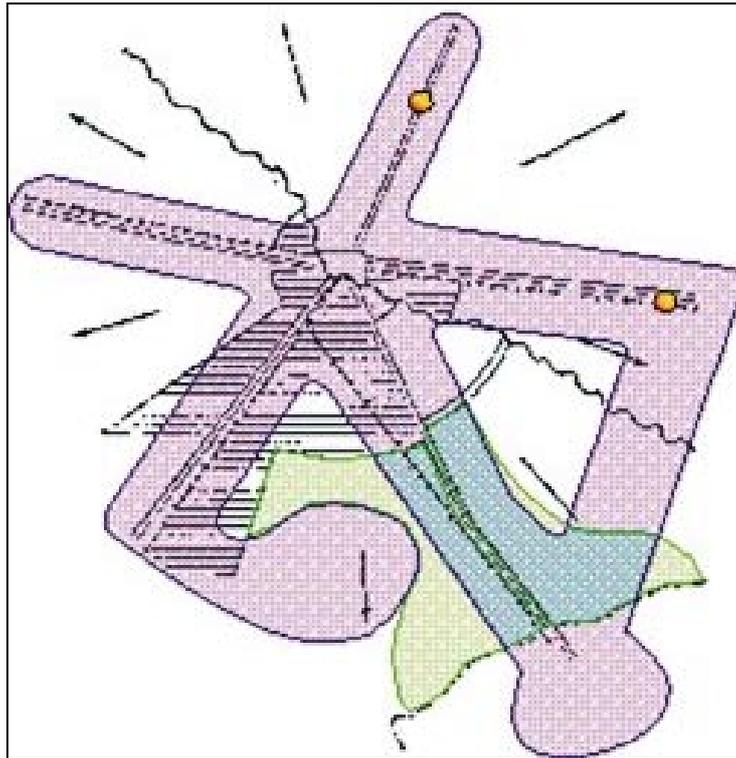


Figure 4: Example of a South African corridor

South Africa in practice

The corridor-approach shows that South Africa aims for an integrated land use and transportation planning. Nevertheless, in practice there is a problem with implementing the newly established policies.

Firstly, there are not enough funds available to implement all policies within the whole country at once. Choices have to be made.

Secondly, the implementers of the new policy have to 'get used' to the new situation. The focus is no longer on supply of infrastructure for private cars in particular areas. Very different solutions are needed.

Thirdly, because the view got broader (also supply for informal settlements, rural area's etc.), more planners, engineers and workforce are needed to implement the new policies in practice. Nevertheless, the need for people should not decrease the standard of knowledge; a decrease of the employment requirements will benefit nobody in the end.

Moreover the development of settlements in South Africa during the last decades, created a situation which makes an integrated land use and transportation planning difficult to realise. If we look at Cape Town for example, the population grew from 265,881 in 1904 to about 3,000,000 in 2000. The density on the other hand decreased from 115 persons/ha to 39 persons/ha. Unfortunately transport systems are much more efficient in compact high-density cities. Figure 5 illustrates the development of Cape Town.

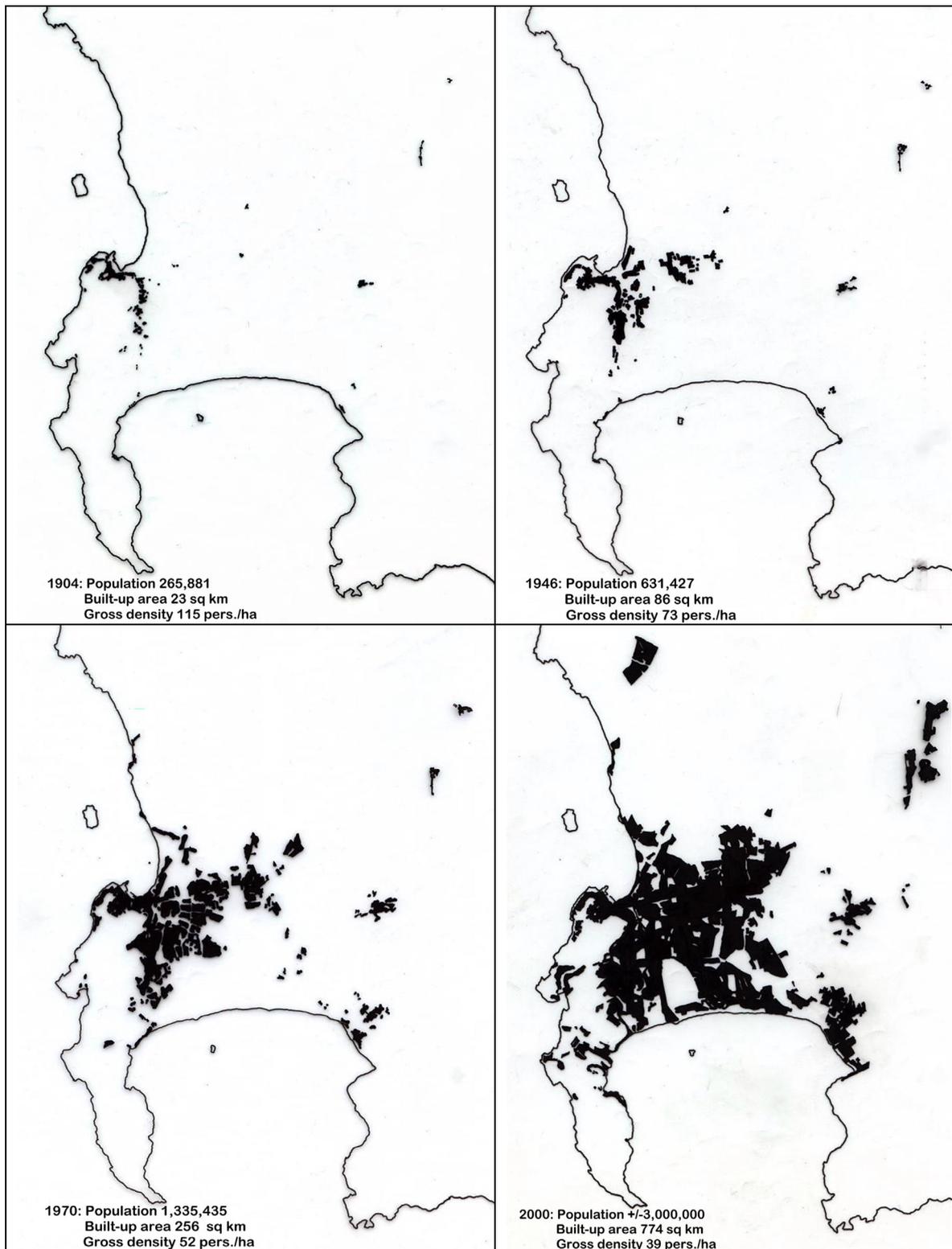


Figure 5: Growth of Cape Town 1904-2000 (source: Gasson, 2000, unpublished)

Conclusions

The situation in Europe during the second half of the 19th century and the first half of the 20th century show that settlement planning is needed. South Africa is far ahead of Europe in those days. Nevertheless, informal settlements share a lot of characteristics (i.e. health and water supply problems) with the settlement growth in Europe during the mentioned period. With regards to informal settlements South Africa should try to get ahead and plan in stead of following the demand.

As expected, South African policies are not that different from the Dutch once. Even though the reasons are very different (shortage of space versus a shortage of funding and a historical 'load') liveable settlements, traffic safety and better public transport are mentioned by both governments. Nevertheless, the Netherlands gained more experience with these policies and managed to 'take them further (i.e. ABC-policy).

The latest policies (the corridor-approach) show that South Africa moves toward integrated settlement and transport planning. The Dutch integrated spatial and transportation policies are very promising. First results are positive. Although implementation of these policies might be more difficult in SA (The power of local governments is much larger in SA) the expected results of these policies are so high that it is worth a try.

Nevertheless, integration of new policies in common practice, need time. After ten years the Netherlands only have the first results. South African should keep this in mind while implementing the new policies.

Last but not least the situation in the Netherlands has shown that even integrated settlement and transportation planning is not enough. The new National Traffic and Transport Plan indicated that we have to go further in the integration of planning. More efficient infrastructure is one important issue. The Dutch implement integrated demand and supply management using technology: Dynamic Traffic Management (DTM) measures and Intelligent Transport Systems (ITS). The question for South Africa is if these types of measures are useful in our situation as they might be more (cost) efficient than the traditional measures.

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