PREFERENCES FOR SOME ALTERNATIVES FOR THE SPATIAL STRUCTURE OF NEW NEIGHBOURHOODS IN PORT SUDAN

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The research in Port Sudan is aimed at analysing the effects that have resulted from applying the existing "Town Planning Regulations".

In answer to the request made by the Sudanese "Department of Town and Village Planning" this research was started in 1982. The first results were published in Workdocument 1. The second stage of the research was carried out in Port Sudan in the latter part of 1983. In this second part of the project a lot of attention was paid to the possibility to plan the spatial structure of new neighbourhoods in a different way.

All cooperation was given by the Sudanese national and regional planning authorities. We were able to count on the support of the members of the Town Council and the heads of several departments in Port Sudan.

We would like to thank especially Mr. Ali Mageit, Senior Officer of the Port Sudan Town Council, Mr. E. Heyder, Director of the Regional Planning Office, assisted by Mr. Mohamed Oushi.

It is our intention to present the preliminary results of this research first of all to a forum of Sudanese planning experts during a seminar about planning regulations in January, 1985.

After this the final report of this research project will be prepared.

Amsterdam, December 1984.

COEN BEEKER.
1. Introduction

The motivation for this research project in Port Sudan was formed by the question of whether it is desirable, in the case of spatial restructuring of spontaneously formed dwelling zones in cities, to come to planned neighbourhoods with different levels of infrastructure and services.

The aim of this research was, in the first place, to find out how far the actual settlement behaviour of the households corresponds with the aims of the regulations that are applied in Port Sudan. Secondly, it was attempted to compare various spatial alternatives that could possibly be more suitable for the planned restructuring of a "spontaneous" dwelling zone in this city. This project also hopes to be able to contribute to the international discussion about this subject by planners and directly concerned planning agencies as to what principles are to be maintained in the case of spatial restructuring of spontaneously formed dwelling zones in African cities.

During the second part of the research in Port Sudan in 1983 a choice was made for the following framework. With the help of four assistants, aided by translators, a household survey was carried out in which 237 households took part. The questions (1) were aimed at gaining insight into the actual present composition of the population of a number of dwelling blocks in different residential classes (2). In doing this we tried to determine the region of origin of the head of the household, the duration of settlement in the city in which the respondent had lived earlier, and what the reasons were for a possible moving of house. It was also attempted to gain as good as possible an impression of the spending level of the household in order to determine whether there is a definite correspondence between the residential class of the area and the spending level of the households.

In order to determine whether there is a definite correspondence between the residential class of the area and the spending level of the households.

After this an attempt was made, using simple demonstration material, to explain four alternatives. Every alternative showed a possible combination of households in a future dwelling block (20 households): these alternatives, A-B-C-D, had two central themes:

1. the spending level of the households;
2. the region of origin of the head of the household.

In alternatives A and B the spending level of the households was roughly equal; in alternative C and D there were differences in spending level between households in the new dwelling block. In alternatives A and C all heads of households came from the same region, (e.g. the North); in alternatives B and D the heads came from different regions of the country (Northern-Western/Central-Eastern-Southern).

(1) see appendix 1 - "Guidelines for an interview".
(2) in appendix 2, a further explanation is given of some of the terms that are used.
In addition to these interviews with households, I conducted several conversations with members of neighbourhood committees, city council and staff members of certain departments. In these conversations several spatial options were presented in order to allow the participant to form an opinion about the actual situation and about these spatial options. In this way a reasonable impression was gained about the limits within which adjustments to the present spatial policies can be realised.

2. Characteristics and preferences of the households

2.1. Characteristics of the households

In total 237 households were interviewed during the second fase of this research project. One out of every three households was questioned per dwelling block. During the interview questions were also asked about the region of origin of neighbours who lived to the right and left-side of those who were interviewed. Also the head of the household's opinion as to whether his neighbour had a higher, equal or lower level of spending than his own household was determined. However, one must be aware that the information concerning the spending levels of the households is often unreliable. Although the actual given level of spending is doubtful in many cases, the comparison with neighbours can give a more reliable impression.

The respondents usually appeared to have accurate knowledge of the region of origin of their neighbours. Forty seven dwelling blocks were analysed in this way, in the neighbourhoods Salabona, Abu Hashish, Stevedore-Area, Hai El Thawra, Deim El Nour, Deim Medina, El Azama, Secca Hadid, Korea and El Shati. One dwelling block (20 respondents) in El Taganum and one dwelling block (18 respondents) in the spontaneous neighbourhood of Oleih were also completely analysed.

A dwelling block that is homogeneous in income is one in which at least 60 percent of the households (in this dwelling block) can be considered to have the same spending level.

A homogeneous dwelling block in region of origin implies that at least 60 percent of the heads of the households have the same region of origin.

A low spending level (A) is considered to occur when a household spends less than £S. 250 per month on all expenses. A moderate spending level (B) includes the group of households that spends between £S. 250 and £S. 399; a high spending level (C) implies all households that spend £S. 400 or more per month (1).

In table 2-1 the households are grouped according to residential class and are categorised according to their spending level.

(1) 1$US was equal to £S. 1.80 in November 1983.
TABLE 2-1:

Residential class and spending level of the households.

<table>
<thead>
<tr>
<th>Class</th>
<th>Residential class</th>
<th>spending level</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>-</td>
<td>54</td>
<td>46</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>16</td>
<td>36</td>
<td>48</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>41</td>
<td>27</td>
<td>32</td>
<td></td>
<td>100</td>
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<td>5</td>
<td>18</td>
<td>39</td>
<td>44</td>
<td>17</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>225</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

NO INFORMATION: 12 households

In the 3rd and 4th class there is a large variety of households. The information about region of origin shows a different picture. Our research indicates that 64% of the households live in dwelling blocks that are homogeneous in region of origin.

These households (64%) can be grouped into two categories:

- Category 1: Consists of households that live in dwelling blocks that are homogeneous in spending level as well as region of origin: 15% of households.
- Category 2: Consists of households that live in dwelling blocks that are mixed in spending level but homogeneous in region of origin: 85%.

Of the remaining households (36% of the total number of households) that live in dwelling blocks with a mixed regional composition, it appears that 12 percent of these dwelling blocks are homogeneous in spending level and 88 percent have mixed spending levels.

The conclusion is that almost 2/3 of the households are homogeneous in region of origin, but the level of spending of the households shows a large variety within one dwelling block.

When analysed in detail, this relationship is stronger in dwelling blocks with a low level of spending; in these dwelling blocks the homogeneous character in region of origin is far more pronounced than in dwelling blocks with a high level of spending.

It was expected that the year of settlement in Port Sudan would have some influence on the homogeneous character of the dwelling blocks. This does not appear to be the case. Of the 237 heads of households, 142 (60%) have arrived in Port Sudan since 1971. These households didn't settle more in homogeneous dwelling blocks (according to their region of origin) and didn't show any significant differences with the households that were already living in this city before 1971.

2.2. Preferences of the households

During the interviews four alternatives concerning the possible composition of the dwelling blocks, were presented to the heads
of the households. As mentioned earlier, the first alternative (A) consisted of households that have the same level of spending and the same region of origin. The second alternative (B) concerns households which just as in (A) have the same spending level but who were born in different regions of the country. Alternative C represents people who have different spending levels but similar regions of origin. Alternative D represents people who have both different levels of spending and different regions of origin.

First of all the respondents were asked to choose between alternatives A and B. After they had shown their preference, they were asked to choose between C and D.

In total 210 informants made a choice; 27 did not respond and made it clear that they had no opinion on the matter. The answers can be put into three combinations:

- 144 respondents first chose alternative A and then C (AC=68.6%)
- 8 respondents first chose alternative B and then C (BC=3.8%)
- 58 respondents first chose B and then D (BD=27.6%)

This shows that approximately two thirds of the respondents emphasize the homogeneous character in region of origin in the dwelling blocks. This corresponds with the present situation in the dwelling blocks of households who chose the combination AC 82% are presently living in dwelling blocks that are homogeneous according to region of origin. It should be noted that only 12% of those who chose AC, presently live in dwelling blocks with different regions of origin.

Of the households who chose BD, 54% presently live in homogeneous dwelling blocks according to region of origin. Apparently, there is no obstacle preventing these respondents from changing from the present situation.

In table 2-2 the chosen preferences were compared to the residential class of the respondents.

In the 2nd and 3rd class there were 70 respondents and in the 4th and 5th class, 140. If the BC choice is disregarded, it appears that in the 2nd and 3rd class the ratio is, AC:BD=36:28=58:42 and in the 4th and 5th class, AC:BD=106:30=78:22.

| TABLE 2-2: Preferences and present residential class |
|---------------------------------|---|---|---|---|---|
| Preferences | 2 | 3 | 4 | 5 | T  |
| AC          | 4 | 34 | 93 | 13 | 144 |
| BC          | - | 4 | 4 | - | 8 |
| BD          | 9 | 19 | 26 | 4 | 58 |
| TOTAL:      | 13 | 57 | 123 | 17 | 210 |
One can tentatively state that in the 2nd and 3rd residential class there is relatively more interest in living in dwelling blocks with households coming from different regions of origin.

A definite choice between the alternatives A, B, C and D appeared to be difficult. All together 167 households gave a preference for one of these alternatives. From the following list it became clear that half of the informants showed a preference for alternative A.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>choice no. of households</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>85</td>
<td>50.9</td>
</tr>
<tr>
<td>B</td>
<td>43</td>
<td>25.7</td>
</tr>
<tr>
<td>C</td>
<td>29</td>
<td>17.4</td>
</tr>
<tr>
<td>D</td>
<td>10</td>
<td>6.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>167</td>
<td>100.0</td>
</tr>
</tbody>
</table>

One quarter of the informants chose the B alternative which means that 3/4 preferred to live in dwelling blocks with households with equal spending levels. This is remarkable as the results of this research show that people tend to live in dwelling blocks with households with different levels of spending. In fact, this means that the aims of the masterplan of 1959 which tried to create homogeneous neighbourhoods according to the level of spending of the households was supported by the respondents.

Table 2-3 shows the relationship between the preference for a certain composition of the dwelling block and the composition of the present dwelling block, whether mixed or homogeneous according to their region of origin.

Table 2-3 Present situation in dwelling block and chosen dwelling block composition.

<table>
<thead>
<tr>
<th>dwelling block</th>
<th>choice alternative</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>homogeneous(1)</td>
<td></td>
<td>57</td>
<td>19</td>
<td>22</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>mixed</td>
<td></td>
<td>13</td>
<td>20</td>
<td>5</td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td>unknown</td>
<td></td>
<td>15</td>
<td>4</td>
<td>2</td>
<td>-</td>
<td>21</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>85</td>
<td>43</td>
<td>29</td>
<td>10</td>
<td>167</td>
</tr>
</tbody>
</table>

(1) according to their region of origin.

Those who chose alternatives B or D are spread equally over the homogeneous and mixed dwelling blocks. The year of settlement had little influence on the final choice of a certain alternative. The respondents who chose for A-B-D are spread relatively equally over the two earlier defined groups (settlement of the households in Port Sudan before or since 1971). Only those who chose alternative C are more strongly represented in the groups that settled before 1971 (62%).
The arguments for the choices that were made can be grouped into four categories:

a) arguments that emphasize an equal level of spending between neighbours.
b) arguments that emphasize the same region of origin.
c) arguments that emphasize a different level of spending between neighbours.
d) arguments that emphasize a difference in region of origin.

The choice for alternative A was mainly based on the idea that there would be less chance of conflict between neighbours if they were from the same region of origin and because an equal level of spending gives less opportunity for jealousy. Also the chance of cooperation was thought to increase.

The choice for alternative B was defended by pointing out the equal spending level (less jealousy), but also the greater chance that Sudanese people from different regions would get to know each other. People are living in the same country and in the same city, so it would be beneficial if they understand better their differences in cultural background. Living in the same dwelling block could contribute at this process.

The arguments for the choice of alternative C are:
- because people come from the same region there will be more cooperation and fewer conflicts.
- different spending levels could encourage those who are better off to help their neighbours. The solidarity between families from the same region is an important point.

The choice for alternative D was defended by pointing out:
- the desirability that Sudanese groups coming from different regions should learn each other better in the future.
- differences in spending level make it possible for people to help each other and also encourage contributions for public services in the neighbourhood.

2.5. Conclusions

The main conclusion is that alternative A is the best choice for half of the respondents. About 2/3 of the informants point out the importance of a homogeneous composition of dwelling blocks according to AC combination.

About 1 of the informants especially emphasize the equal spending level of the households in the dwelling blocks. This choice clearly differs from the existing situation in the dwelling blocks that were analysed in this research.
B) The neighbourhoods where the spatial structure will be changed. This is a more radical operation as it means a widening of the streets, a larger amount of land to be reserved for the construction of public services and an enlargement of the plot size.

The A type doesn't entail any specific problems. The present tenants can sign a lease with the government for a period of twenty years. This has important advantages because a plot user in the 4th class can officially only obtain a users license from the city council for one year. Even though it is legal to build a dwelling using "hard" building materials at one's own risk, it is clear that the twenty-year lease will give greater security. With the promotion to a 3rd class neighbourhood all the actual users will be considered. There will be no limiting income level. One will, however, have to pay the sum of £S. 400 to the regional government when signing the lease. This could be a serious handicap for a number of families with a low level of spending. Officially the sale of a plot in the first five years is not allowed.

The sum of £S. 400 per plot certainly does not cover the costs of the construction of infrastructure and public works that are needed for the 3rd class. According to the town council the real price of a plot in a 3rd class neighbourhood should be £S. 3000 (1). It is obvious that the real price of £S. 3000 would give many families serious problems with payment when a 4th class neighbourhood is promoted to 3rd class.

The B-type clearly creates more problems for the residents. Because fewer households will be able to have a plot in the future, it has been decided that the actual legal tenants who currently live on a plot will have priority. This means those families, who, in the past, were given permission by the council to settle there. Those who just rent living space will have to find a room elsewhere, and the absent tenants will have forfeited their original rights.

The legal tenants who are selected in this way can then sign a contract for a period of twenty years. Apart from paying £S. 400 for the Regional Government, they have to move in many cases their house (completely or partially). This means in reality that a double price is charged and probably a large number of families will not have the means to raise the necessary money.

The risks involved in this operation include the relegation of many families to "spontaneous" zones and the illegal sale of plots.

(1) The estimated price of a plot in a first class area should be £S. 9000 and in a second class area £S. 7000 in 1984.
3.1.2. Rehabilitation of "spontaneous" dwelling zones

In the period of 1970-1976 many "spontaneous" dwelling zones in Port Sudan were relocated and later spatially restructured. Because Port Sudan is surrounded by a desert area, few serious problems were encountered when un-used land was divided into plots and the households in the "spontaneous" dwelling zones were offered a plot in these new 4th class neighbourhoods.

At the moment, particularly the Southern Western part of the city is occupied "spontaneously". Dar es Salaam is a rather old dwelling area in which presently many households have settled with family or friends from the same region since 1950. Dar El Naim is not as old, but has experienced an enormous growth since 1980.

Oleih is enclosed by the two planned neighbourhoods of Korea and El Murganya; the residential density (number of households per ha.) is high because spatial expansion is hardly possible.

From the research done by Euro-Action-Accord (1) it is clear that these spontaneous dwelling zones are formed by different quarters that are homogeneous, according to region of origin of the households.

In these quarters many families have sufficient financial means to buy a lease for a second or third class plot. It is therefore an open question whether the promotion of a spontaneous dwelling zone to a fourth class neighbourhood will be the best solution.

There is an international discussion about whether or not existing "buildings" should be maintained as much as possible in these spontaneous dwelling zones. In the case of Port Sudan one must realise that maintaining the present buildings means that the social networks will also remain intact. Using the terms that represent the alternatives in chapter 2, the C alternative will in fact be realised, meaning the homogeneous dwelling blocks where households will have as characteristics the same region of origin but different levels of spending.

Maintaining the existing buildings also means that the present allotment pattern is maintained. This first proposal means a limited adjustment of the current network of roads and streets and a legalization of the undoubtedly irregular sizes of the existing plots.

However, it is also possible to preserve the existing social net-
works in the quarters and to allow the households to remain in the same quarter when plots are changed. In order to offer all households an equal-sized plot, the plots will probably have to be made smaller in this second proposal.

If a standard size of at least 224 m.sq. is set then it is almost certain that many households will have to leave the "spontaneous" areas to an overspill area. This also leads probably to the breaking of many social ties in these "spontaneous" dwelling zones.

A third proposal considered in this respect is the possibility that the local government could consciously sever the existing social networks. This means that after execution of the spatial restructuring plan a conscious effort will be made to settle households in neighbourhoods with similar spending levels. Furthermore, one could encourage a greater mixture of people from different regions of the country when the plots will be allocated. A quarter consists of about 200 plots, five quarters form a neighbourhood (1000 plots).

Our research shows, however, that the majority of the households prefer to have neighbours from the same region of origin. If the households are given the choice to live in a quarter that is homogeneous according to their region of origin, then it is probable to compose a neighbourhood of 5 different homogeneous quarters. In that case there will be a mixed population on neighbourhood scale. Children from the five quarters will be able to attend the same school in the neighbourhood; the medical center and also the neighbourhood market will be a meeting place. A gradual integration of different population groups can be encouraged in this way.

3.1.3. Spatial structure of expansion zones

The BCEOM draft of the new Masterplan for Port Sudan designates several expansion zones. The strategy that receives special attention concerns the spatial structuring of these zones into residential classes. This means that according to BCEOM the spatial structure of the city will continue to be determined by classifying the neighbourhoods as 1st, 2nd, 3rd or 4th class. Other possibilities are not considered. BCEOM does point out that the 4th class neighbourhoods, which will be newly structured, can be used to offer the residents of the "spontaneous" zones a place to live. The areas that are vacated in this way (e.g. Dar el Naim) can then be reallocated. Households from another quarter of Dar el Naim can then be relocated there. The operation can be repeated several times until the entire spontaneous zone has been spatially structured into a fourth class zone.

Therefore, BCEOM links the new expansion zone to the relocation operation that is to be implemented in the spontaneous zones. During the research in Port Sudan certain other possibilities
were presented to the neighbourhood committees and to the members of the city council, and were also discussed by the planning committees of the council.

Considering that in the next 15 years Port Sudan will grow from about 300,000 people to at least 500,000, it would seem desirable to create new dwelling areas for about 200,000 people. Furthermore, the spatial restructuring of the South-West zone (Dar es Salaam - Dar el Naim) should receive specific attention. It has been estimated that there are currently 90,000 people or 15,000 households living there. On the bases of these figures it is desirable to mainly pay attention to the "spontaneous" dwelling zones and to the space needed for city expansion. One could also involve the spatial restructuring of the fourth class neighbourhoods in this discussion in the case of the promotion to a third class neighbourhood including the changing of the layout of the area.

The remaining existing neighbourhoods are not considered here because it is not probable that the government will initiate large spatial changes here.

The spatial alternatives that have been presented are in fact possible combinations of currently existing situations. A combination of the first and second class neighbourhoods means that a compromise will have to be found for the desired level of infrastructure and public services. The given actual cost of a plot in a 1st class neighbourhood was £.S. 9,000 in 1983 and £.S. 7,000 in the second class. A possible compromise is that in the future the plot will cost about £.S. 8,000 (in these new dwelling zones).

A combination of 1st, 2nd and 3rd class means that adapted infrastructure and level of services will have to be selected in the desired dwelling zone. The plot size within the dwelling zone could vary between 250 and 400 m.sq. The price per plot could be calculated from the amount of dwellingspace in m.sq. As the plot increases in size so will the price per m.sq. A plot of 250 m.sq. could cost £.S. 3,000 (£.S. 12 per m.sq.) and a plot of 300 m.sq. could cost £.S. 15 per m.sq., while a plot of 400 m.sq. at a price of £.S. 25 per m.sq. will have to cost £.S. 10,000. The infrastructure and level of services is consequently equal for all households in this new dwelling zone, but depending on the plot size, a set contribution has to be paid. Furthermore an annual plot tax will be imposed for the maintenance of the infrastructure.

The following spatial options were offered to the above mentioned informants:
Choice 1: continuation of the separate structure of 1st, 2nd and 3rd class neighbourhoods or a mixture of 1st, 2nd and 3rd class neighbourhoods in a new dwelling zone.

Choice 2: continuation of the separate structure of 1st, 2nd, 3rd and 4th class neighbourhoods or a mixture of 1st, 2nd, 3rd and 4th class neighbourhoods in a new dwelling zone.

Choice 3: a mixture of 1st, 2nd and 3rd class neighbourhoods on one hand and the fourth class neighbourhoods on the other or a mixture of 1st, 2nd, 3rd and 4th class neighbourhoods in one new dwelling zone.

Choice 4: a mixture of 1st, 2nd, 3rd class neighbourhoods on one hand and 4th class neighbourhoods on the other or a mixture of 1st and 2nd class neighbourhoods on one hand and 3rd and 4th class on the other.

Choice 5: a mixture of 1st, 2nd and 3rd class neighbourhoods on one side and 4th class on the other side, or 1st class neighbourhoods separately and a mixture of 2nd, 3rd and 4th class neighbourhoods.

Each time a further explanation was given about the following aspects:

a. In principal all children in a neighbourhood attend the same primary school. There is also a neighbourhood market and a health center for the residents of the neighbourhood. A neighbourhood consists of about 1000 plots for approximately 6000 people.

b. A new dwelling zone (also 1000 plots) is a mixture of some residential classes. Consequently, the children in this dwelling zone will attend the same school, and it can be expected that more social ties will come about through the school, market and health center.

c. A neighbourhood or new dwelling zone can be split up into several quarters. A quarter consists of about 200 plots; 5 quarters therefore make up a neighbourhood or new dwelling zone.

d. In a quarter households can settle according to the alternatives A, B, C and D as described in chapter 2. A quarter then consists of 10 dwelling blocks (each containing about 20 plots).

e. The level of infrastructure and services is the same for all the households in a neighbourhood or new dwelling zone. However, differences in plot size between quarters are possible.

3.2. Consideration of the spatial options

The members of the neighbourhood committees and members of the city council paid extensive attention to the presented spatial options. All together 33 members of committees and city council attended the meetings. At times people had to leave early so that all members did not always give an opinion. In table 3-1 the results per neighbourhood are presented for the 5 possible choices.
In this paragraph the main arguments for the choices that were made are discussed. The report of the special meeting of the planning committee of the city council will also be presented here.

3.2.1. Remarks about the choices

Table 3-1 shows that the first choice was limited to choosing between the continuation of separate 1st, 2nd and 3rd class neighbourhoods or an integration of these three residential classes. A large majority (69%) chose for the suggested combination because the real differences in spending level are not so large and because this integration offers a better chance for the realization of an acceptable level of infrastructure and services.

In 1983 about 11,000 households were registered in the Town hall to apply for a new plot. This concerned about 6000 households for the 3rd class, 4000 for the 2nd class and 1000 for the 1st class. In the chosen combination of (1+2+3) it will at least have to be attempted to supply water and electricity (private supply points), unhardened roads and a drainage system in the new dwelling zone.

In 1983 the costs of water and electricity supply were estimated to be £.S. 182 per plot and for the unhardened roads and drainage gutters the charge would be 62 plasters per m.sq. (100 plasters = £.S. 1). For the second choice the opinions were far more divided. The majority chose for a new formula; a combination of all the existing residential classes. One of the main conclusions one can draw from this is that the current planning system which is based on the four classes should no longer be used as a guideline for the spatial development in Port Sudan. The main argument is that the infrastructure and level of spending can then quickly be brought to an acceptable minimum level for all households in the city.

The third possible choice gave the respondents a chance to choose between a combination of (1+2+3) and the 4th class separate, or a combination of 1st, 2nd, 3rd and 4th class in a new dwelling area. A large majority (70%) chose the first alternative. The motivation for this choice was that such a differentiation would mean that about half of the households in Port Sudan would be able to make use of the relatively better (but more expensive) infrastructure and public services. The other half would have a limited access to public facilities but the cost would also be significantly lower, because the infrastructure would be limited to public water taps and unhardened roads. Dividing the city into two separate dwelling zones was considered desirable in order to limit the envy and jealousy.

The majority does not consider a complete mixing of all households to be realistic. Seven respondents did choose this alternative because they were of the opinion that the present spatial division between wealthy and poor should cease to exist.

The results of the fourth possible choice were surprising. A vast majority chose for a clear division between a small wealthy elite (10 to 15%) on the one hand and a combination of (3+4) in a separate dwelling zone on the other.
### TABLE 3 - 1

**CHOICES FOR ALTERNATIVES IN CASE OF PLANNED EXTENSIONS IN PORT SUDAN**

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<thead>
<tr>
<th>CHOICES</th>
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<td>1-2-3</td>
<td>1-2-3-4</td>
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<td>(1+2+3)-4</td>
<td>(1+2+3)-4</td>
<td>(1+2+3)-4</td>
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<tr>
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<td>1+2+3</td>
<td>1+2+3+4</td>
<td>(1+2)-(3+4)</td>
<td>(1)-(2+3+4)</td>
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</tr>
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<td><strong>EL MEDINA WEST</strong></td>
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<td>2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>HAI EL THAMRA</strong></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EL SHATY</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>KOREA - BLOCK 2</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>KOREA - BLOCK 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DAR ES SALAAM</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>EL NOUR - BLOCK</strong></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(1-2-3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EL NOUR - BLOCK</strong></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>(4-5-6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EL SHIHDA</strong></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>ABU HASHISH</strong></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>10</td>
<td>22</td>
<td>9</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>31</td>
<td>69</td>
<td>41</td>
<td>59</td>
<td>70</td>
</tr>
</tbody>
</table>

**Table Notes:**
- The table lists choices for alternatives in case of planned extensions in Port Sudan.
- Each row represents a different location, and the columns represent different planning options, with the total and percentage calculations provided at the bottom.
A combination of (1+2) would have the special advantage that a high level of infrastructure would be realized, that multi-storey buildings would be possible and that everybody would have to build a house, shop or office with hard building materials. In the combined (3+4) dwelling zone only one storey buildings would be allowed in order to avoid neighbours having a direct view into homes on a lower level; it would also be possible to use hard and less durable building materials and this combination would still make an acceptable level of infrastructure and services possible.

The last possible choice separates either the 1st or the 4th class. The majority (55%) chose the combination (2+3+4) and the 1st class in a separate dwelling zone. It would not be desirable to completely isolate the 4th class; quite a large number (15) of the 33 informants found it undesirable to combine the 2nd and 4th class because this would lead to unacceptable differences in wealth. The households in the 1st and 2nd class especially would often want to build houses with several storeys and this could lead to conflicts.

The respondents were also asked (see table 3-2) to make a choice between quarters that are homogeneous in level of spending and those that are homogeneous according to their region of origin (1).

For the first choice most (72%) opted for B rather than A. People live in an urban Sudanese society which can't tolerate that households from different regions of the country have unequal chances of settling in certain dwelling zones.

Although the majority was less (58%) for D (when choosing between C and D), the basic principle was maintained. The local authorities are not allowed to refuse Sudanese citizens the right to settle in a dwelling block.

On the basis of these different choices we can at least conclude that a combination of (1+2) or (1+2+3) can be considered possible options for the replacement of the present-class division of neighbourhoods in Port Sudan. Furthermore, the members of the neighbourhood committees were of the opinion that the quarters ought to be composed of people from different regions of the country. More mixing of Sudanese households on the quarter level is considered desirable. This can contribute to a gradual decreasing of present contrasts and prejudices between different Sudanese population groups in Port Sudan.

3.3. Consideration of the spatial options by the planning committee of the council

Because the members of the planning committee usually attended the meetings of the neighbourhood council, the meeting with the planning committee of the city council of Port Sudan could hold (1) in these conversations we spoke of quarters i.e. a group of 10 dwelling blocks in one area. The A-B-C-D-choices were presented on quarter level; in the interviews with the households this was limited to dwelling blocks.
<table>
<thead>
<tr>
<th>CHOICES</th>
<th>A or B</th>
<th>C or D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEIGHBOURHOOD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EL MEDINA WEST</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HAI EL THAWRA</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>EL SHATY</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>KOREA BLOCK 2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>KOREA BLOCK 1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>DAR ES SALAAM</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>EL NOUR BLOCK (1-2-3)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>EL NOUR BLOCK (4-5-6)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>EL WIIHDA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>ABUHASHISH</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>%</td>
<td>28</td>
<td>72</td>
</tr>
</tbody>
</table>
few surprises. The combination of classes (1+2+3) in a new dwelling zone (A) seemed to encourage an equal infrastructure and level of services. Furthermore, the fourth class should form dwelling zone (B) with the understanding that the price per plot would be considerably less than the price in zone (A).

The advantages of mixing households from different regions and with different spending levels are as follows:

there will be more chance of social and economic integration of households which is beneficial to the functioning of the community on a quarter level. It also offers more chances to shop-keepers and small businesses because there is more buying capacity in the neighbourhood and differences can be overcome by a more direct contact through sportsclubs and community centers.

But the disadvantages should not be under-estimated. Multi-storey buildings next to squalid single storey structures will not promote mutual understanding. Children will urge their fathers to buy luxury goods which they can't afford (compare the present situation in the neighbourhood El Medina). Although the members of the committee certainly realise that there are definitely some differences in spending level in the "spontaneous" neighbourhoods, they find that a promotion of these neighbourhoods to fourth class is the most desirable alternative. However, the spatial structure will have to be such that in a few years time, improvements to the infrastructure will be possible without changes in the spatial development plan.

It is considered preferable to create a fund (1) in the near future for the gradual improvement of the infrastructure and public services in the new dwelling zone (B). Apart from the contribution paid when the plot is allocated (£S. 50 or £S.100), a tax of 12.5 piasters per m.sq., per year is considered reasonable. This means that for a plot of 224 m.sq. a tax of £S. 28 is due. In this way a new dwelling zone (B) comprising 1000 plots will yield £S. 28.000 per year. If this amount is registered and spent for each dwelling zone separately, this could form a good incentive to pay this annual tax to the Town council. It would give the Town council a good chance to substantially improve and maintain the infrastructure and services in the coming years with the support of the residents and the neighbourhood committees.

4. Summary and Conclusions

4.1. Summary

Port Sudan was founded at the beginning of this century on the shores of the Red Sea. Sudan needed a harbour with a larger capacity than that of the old harbour of Suakin. In 1906 Port Sudan was linked to the capital city Khartoum by rail. The new harbour town could then be built according to a plan by the British governors.

(1) Municipal Fund for Urban Development
The residential domain was divided over four residential classes. The 1st class residential area is situated in the center, the second and third class bordered on this, while the fourth class neighbourhoods formed the periphery of the city.

This basic set up of the spatial structure of Port Sudan was confirmed in the Masterplan of 1959. The allocation of a dwelling place was to be based on the spending level of the households. The level of infrastructure and services in each residential class had to be such that the households would be able to pay the costs of the plot. Therefore, the households with the highest level of spending would be placed in the 1st class and those with very little means would be able to live in the fourth class.

In the planning literature (1) a lot of attention has been paid to the advantages and disadvantages of combining different levels of spending in one neighbourhood. It is supposed that, among other things, spatial proximity of households with different levels of spending is beneficial to the lower income groups. This positive influence could have the effect of preservation and maintenance of houses, more chances of employment and greater access to infrastructural and service facilities.

Apart from the level of spending, the region of origin of the households is also very important in Port Sudan. Considering the important cultural differences between the population groups, it can be expected that immigrants will tend to choose a place to live close to their relations. In this way it was considered probable that many Sudanese households in Port Sudan thought the level of spending of their neighbours less important, but tried to settle in a neighbourhood by families from the same region of origin.

It is estimated that there are currently 90,000 people living in "spontaneous" dwelling zones in the South Western part of the city. It is also estimated that Port Sudan (now 300,000 inhabitants) will have to house 1 million people by 1995. It therefore seems relevant to ask whether, in the next ten years the existing regulations of the spatial policy should be applied or whether it is desirable to adapt these regulations to the actual settlement behaviour and/or the settlement wishes of the households of Port Sudan.

This research was primarily aimed at analysing the actual settlement behaviour of the households and finding out how this corresponds with the official rules and regulations of the spatial policy. It was further attempted to investigate the margins within which it is considered possible to adjust the regulations and introduce new spatial proposals. It was also considered important

(1) for a summary see article by Wendy Sarkissian - "The idea of Social Mix in Town Planning (1976), Urban Studies (1976), 13 - p. 231-246.
to contribute to the broader international discussion if it is desirable to adapt the level of infrastructure and services to the realistic financial possibilities of the households involved in the planning of a neighbourhood.

4.2. Conclusion

237 interviews with households were conducted. The results show that there is a large mixture of levels of income of households in the 3rd and 4th class. The expectation that there is a strong homogeneity according to their region of origin was confirmed: 64% of the households resided in homogeneous dwelling blocks. This homogeneous character appears even stronger in dwelling blocks with a low level of spending.

During these interviews for alternatives were presented to the respondents, concerning the most desirable composition of the dwelling blocks. From this investigation of the preferences it became clear that 3/4 of the households preferred a dwelling block that is homogeneous in level of spending. About 2/3 of the respondents found that dwelling blocks which are homogeneous according to their region of origin are preferable.

In meetings with members of the neighbourhood committees different spatial options for the future planning of new neighbourhoods were discussed. A good incentive for these conversations were the plans for the spatial restructuring of the existing 4th class neighbourhoods and "spontaneous" dwelling zones; also 11.000 households had applied to the Town council for a new housing plot in the third (600), in the second (400) or in the first (100) class. From these conversations it can be concluded that a combining of the first and second class or of the first, second and third class will raise little objection.

A majority of the members of the neighbourhood councils consider the combining of (1st+2nd) and (3rd+4th) a better alternative than the combining of the (1st+2nd+3rd) class and keeping the 4th class separate.

However, it must be added, that a majority of the members of the planning committee of the Town council showed a clear preference for a combination of (1st+2nd+3rd) class to form a separate dwelling zone (A) and the fourth class would then become dwelling zone (B).

Arguments for a division into two spatially separated dwelling zones in Port Sudan mostly concerns:
- the possibility for a better adaptation of the level of infrastructure and services to the different groups that can be clearly defined according to their level of spending.
- there will be better chances for the integration of different Sudanese population groups.
- it will be easier to adjust the quality of the housing in both zones (A) and (B) to the actual possibilities for investments in housing by the households.
APPENDIX 1

Guideline for an interview

Introduction

This research in Port Sudan concerns the analysis of the existing town planning regulations.

The results of this research may be useful for a better urban development in the near future of this town.

Please will you be so kind to answer some questions related to the activities of your family and the planning of your area in Port Sudan. We will present these questions to the head of the households.

1. I would like registerate the name of the head of this household.
   Who is the head of this household?
   Indicate the number of this plot.
   Indicate the age of the head of the household.
   Indicate if he/she is married.
   What is his/her religion?

2. Were you born in Port Sudan?
   If not, could you tell us in which province of the Sudan you were born?
   Were you born in another country?
   Was your wife born in Port Sudan?
   If not, could you tell us in which province of the Sudan she was born?
   Was she born in another country?
   In which year was she born?

3. Please can I write down the total number of your children actually living in Port Sudan or elsewhere.
   How many of your children are actually living on this plot?

4. In what year did you obtain a lease for this plot?
   Do you possess an official document?
   In which year did you actually occupy this plot and house?

5. In what year did you rent this plot?
   What is the rent of this house?

6. Where were you living before?
   Was it a planned area?
   Did you own the house or did you rent it?
7. What were your reasons for this change?
   
   Do you have special reasons for living in this part of the town?
   Do you want to change your location in the near future?
   If so, will you give us your reasons?
   Indicate the desired neighbourhood.

8. Please will you give a description of your house (number of rooms, veranda, kitchen).

   Is there a shop or workshop on this plot?
   If so, indicate some articles in the shop and the activities in the workshop.
   Who owns the shop/workshop?
   Who owns this house (in case of rent)?
   Where is he living?

9. a) Do you know who built this house?
    Did you build this house by yourself?
    When did you build it?

   b) When did you buy this house?
    Did you change something afterwards?
    Please will you give a description?
    What were the reasons for this change?

   c) Do you possess one or more houses in this town?
    In which neighbourhood?
    Is this a 1 - 2 - 3 - 4 class or a spontaneous, not planned area?

   d) Will you present us with the approximate value of your real property?

10. Food products, house rent, medical treatment etcetera are rather expensive in Port Sudan. In our report we will explain the most serious obstacles for living in the different neighbourhoods of your town. We will present the results of our investigation without mentioning your name.

    We hope that you will trust us in answering the following questions:

    a) What did you spend on food products last month or last week?
    b) What did you spend last month on . water
        . electricity
        . transport
        . medical treatment
        . school fees
        . gas or wood
        . rent of this house?

    c) Please can you indicate your other expenses?
        . taxes
        . contributions
        . financial assistance to members of your family or friends.
        . other expenses?
d) Your total monthly expenses for living in this town are approximately £S. ...........

How did you obtain this money:
. your monthly income
. sources or income of members of your household
. rent of your house
. rent of a shop or workshop
. financial assistance by a member of your family
. other sources of income?

11. a) Now we present you with a map of your dwelling-block. We will indicate your plot number. Referring to your information you belong to the L.O.W.I.G./L.I.G./M.I.G./H.I.G./S.U.H.I.G. in this town. You told us also that your region of origin was: ...................... We put your house with the color of your region on this little map of your dwelling block. Please could you inform us of the region of origin of your neighbours in this street? Do you know them very well? Are they members of your family? If so, can you indicate if your neighbours belong to the L.O.W.I.G./L.I.G./M.I.G./H.I.G./S.U.H.I.G. in this town?

AT HOME: Present the results of this investigation and complete it with your own information of this dwelling block.

<table>
<thead>
<tr>
<th>Level of Income</th>
<th>Level of Spending</th>
</tr>
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<tbody>
<tr>
<td>L.O.W.I.G.</td>
<td>£ 150 monthly</td>
</tr>
<tr>
<td>L.I.G.</td>
<td>151-250</td>
</tr>
<tr>
<td>M.I.G.</td>
<td>250-400</td>
</tr>
<tr>
<td>H.I.G.</td>
<td>400-600</td>
</tr>
<tr>
<td>S.U.H.I.G.</td>
<td>600</td>
</tr>
</tbody>
</table>

11. b) You know that Hai el Matar is a new residential area of Port Sudan. Supposing that you could obtain a dwelling plot in that area, then we will present you with the following alternatives for your dwelling block:
A - families which belong to your own level of income and of your own region of origin
B - families which belong to your own level of income but from different regions of the Sudan or from abroad
C - families which belong to different levels of income but who are from your own region of origin
D - families which belong to different levels of income and who are also from different regions or from abroad.

Will you explain your preference?
What are your reasons for this choice?
Do you prefer another alternative?
Will you explain this alternative?
Why do you prefer this alternative?
12. We will try to obtain a clear picture of problems and obstacles in the different neighbourhoods of this town. We prepared a list of a number of possible problems and obstacles. Please will you inform us of your experience and opinions concerning these different topics:

a) What are your daily activities in Port Sudan or elsewhere? Did you have serious problems or difficulties in executing these activities? If so, will you give us a full description of your problems and difficulties?

b) What are the daily activities outside your house of other members of your household? Did they have problems or difficulties in executing these activities? If so, will you give us a full description of their problems and difficulties?

c) Did your wife or yourself meet serious problems or difficulties in living in this house and courtyard? (noise, water supply, electricity, cooking of food, living-space for everybody, too hot in summer, too much dust etcetera). Did you try to improve the situation in the past? Will you make improvements in the near future? Why?

d) Did you or members of your household meet with serious problems and difficulties in living in this neighbourhood? (place for children in the elementary school, quality of food products in the shops in this neighbourhood, prices of other goods offered in the shops in this neighbourhood, quality of the services in the dispensary of the neighbourhood, difficulties in finding assistance in the neighbourhood in case of emergency (e.g. an accident or serious illness of a child, your wife or yourself). Could you explain to us what people visit and support you in case of a serious illness of a member of your household? In what neighbourhoods do these people live? Do they belong to your own region of origin or to the region of origin of your wife? If not, will you indicate their region of origin? What is the religion of these people?

e) Do you encounter serious obstacles in this town concerning transport to your daily work? What do you normally use: bus, private car, car or bus of the company, motorcycle, bicycle, by foot? How much time do you need to travel from your home to your daily job?

f) Did you have serious difficulty in finding a house for yourself or for a member of your household? What was the nature of these difficulties?
g) Did you participate in the construction of a school, dispensary, public water tap or other services in this neighbourhood?
Please can you tell us something more concerning the financial contributions for the construction and maintenance of the different services.
Did you meet obstacles?
Did you participate directly in the organization which was charged with the realization of these services in your area?

13. We will try to discuss some of these problems and obstacles in your area in a general way with the representative of this neighbourhood in the Town Council.
But we prefer also to discuss these subjects with other influential people in your neighbourhood.
Please could you mention 5 influential people to us in this neighbourhood?
What are the names and daily occupations of these people?

14. This is the end of our interview.
Are there still any questions?
APPENDIX 2

Description of some terms:

1-Households: this implies the group that lives on the housing plot and who in accordance with local custom, either communally or not, consume their meal of the day on the plot.

2-Dwelling block: this implies a number of adjacent plots surrounded by either streets or ground that is not reserved for building. The plots are primarily used for residence; in a number of cases; shops and light industrial activities, possibly in combination with housing could be carried out on these plots.

3-Quarter: a quarter is formed by a number of dwelling blocks and consists of about 200 plots. Depending on the chosen principles for the spatial policy, the households in a quarter could form a homogeneous or mixed group, according to their level of spending or region of origin of these households.

4-Neighbourhoods: a neighbourhood comprises 5 quarters and therefore consists of about 1000 plots. The members of the households will generally make use of the primary school in the neighbourhood, health center, neighbourhood market and shopping center.

5-Homogeneous composition of households, according to their level of spending: the composition of a dwelling block, quarter or neighbourhood is said to be homogeneous when at least 60% of the households are considered to have an equal spending level.

6-Homogeneous composition of households according to their region of origin: the composition of the dwelling block, quarter or neighbourhood is said to be homogeneous when at least 60% of the head of the households have the same region of birth.