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Maxaquene

a comprehensive account of the first urban upgrading experience in the new Mozambique

Ingemar Saevfors

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Human settlements
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MAXAQUENE

A comprehensive account of the first urban upgrading experience in the new Mozambique.

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What you are about to read now is neither a report nor a scientific record. It is not a fiction story either, because it carries a large number of data, hopefully useful to planners who are working with third world urban problems. My aim is to give a comprehensive account of a fairly efficient urban upgrading project in Africa, carried out by the Ministry of Public Works in Mozambique in collaboration with the United Nations Development Program. I have tried to be as objective as possible, all the while remaining aware of the natural bias called personal interpretation.

This book is based on collective experience to which a large numer of people from diverse sectors have contributed. Foremost are the people of the Maxaquene **bairro** (neighborhood) in Maputo - **bairro** inhabitants participated in the overall planning process, mainly at evening committee meetings and as volunteers who actually accomplished most of the practical work.

In addition to the participants from the **bairro** population, a small number of professionals and salaried staff were involved at one time or another. Three achitects were substantially engaged in the planning and managing of the project at different stages. Two sociologists coordinated many of the activities on the analytic and mobilizing side. Then there were a handful of extension workers, constituting the backbone of the field organization, and experts temporarily tied to the project for short-time assignments.

Before I left Mozambique in 1979, a major portion of the project team's work capacity was put into a very practical document, "MANUAL DE INTERVENCAO URBANA", a manual in Portuguese describing the methods developed in the project. We all considered it important to put our experience on record and to leave an operational tool behind before terminating our contracts and leaving the country. Apart from the manual we also produced slides and Super-8 films.

Though nearly completed, the manual was never published. Nevertheless, the need for a comprehensive document about the project became apparent. Many inaccuracies started to spread about project history, the prevailing conditions and political context. As a result the lessons to be learned from the experience could not be analyzed in an objective manner. Subsequently my architect colleagues (Barry Pinsky and Pelle Rathsman) and I decided to produce a book in English for an international public, but unfortunately this venture also collapsed.

The present text is therefore a composite of the documents mentioned above and other reports, with the intention of giving as wide a perspective as possible to the whole project, from the beginning, through its planning stages and the actual implementation phase. There follows an analysis of criticisms and lessons to be learned, and political repercussions to the whole project. I have added a fictional piece at the end as a personal impression of life in' the **caniço**. Purely technical information on project methods makes up a section of "Yellow Pages" as an appendix.

As learning by doing is an appreciated method, the purpose of this book is to review what was done and attempt to explain why and how.

Ingemar Saevfors

POST SCRIPTUM

Five years have passed since the project and processes described in this book were actually taking place. This is a long time for an individual, but a short time for a bairro and a city.

During this period Mozambique has experienced severe difficulties: more or less a state of civil war with anti-government guerilla paralyzing the countryside with frequent attacks on transport links and rural settlements. The effects on food supplies to the cities have been disastrous and further aggravated by the worst drought in recent memory.

The economy has reflected these calamities and so have the investments in housing infrastructure. No projects similar to Maxaquene have been launched. In Maputo some efforts were made in Chamanculo and Xipamanine, very central bairros with much higher densities. Conselho Executivo concentrated on low standard site and service schemes in the outskirts of Maputo in order to absorb new squatters.
DNH was transformed to Instituto Nacional de Planificacao Fisica, and the planning capacity was reoriented towards new cities in economic growth zones like Messica, Mocuba, Chokwe, Unango, Matundo. Master planning of the provincial capitals was also part of the new policy.

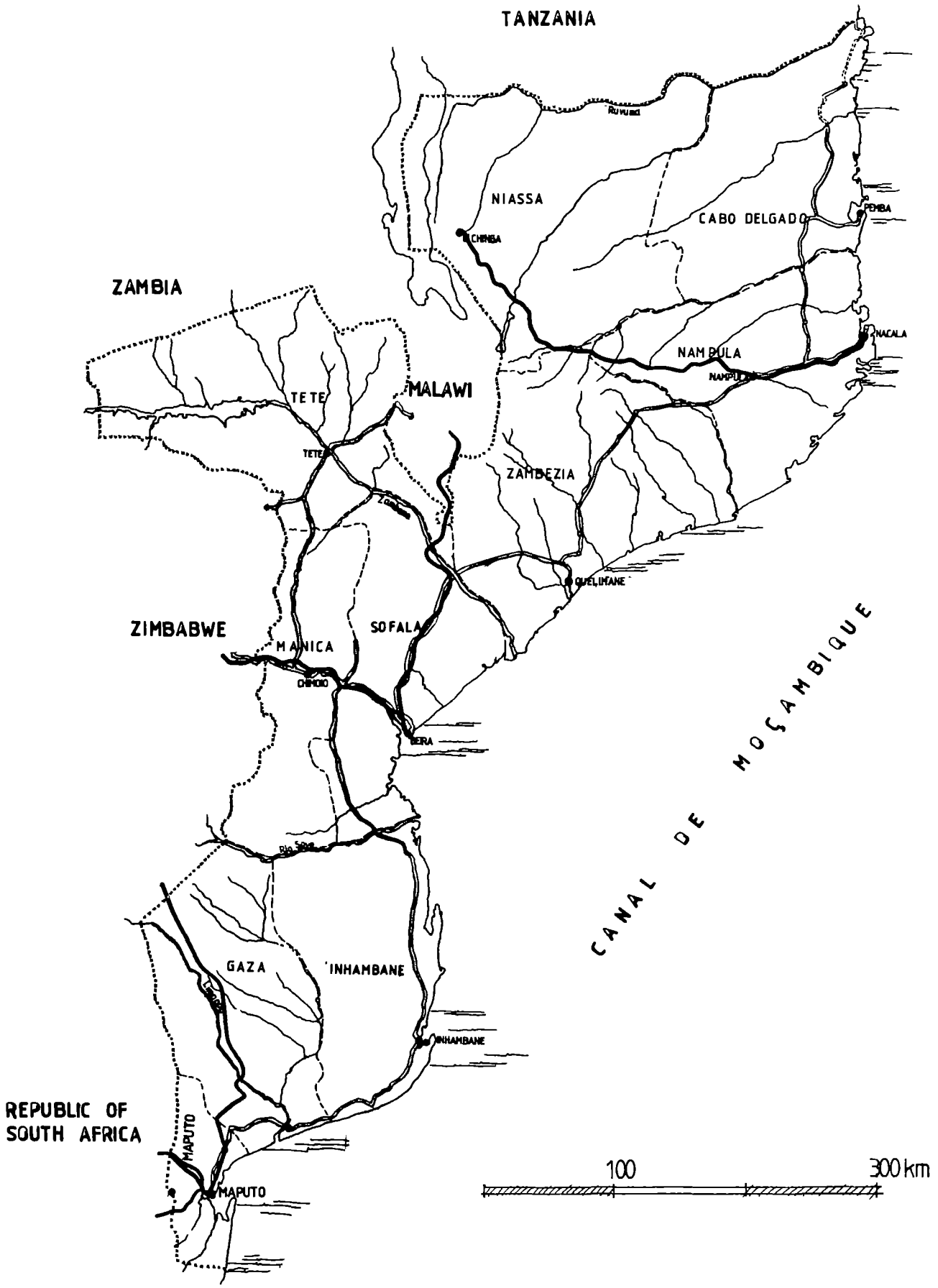
In Maxaquene no direct project continued. The question of building permits in the canicos is still not clear, and cement has been very difficult to get on the local market.
The bairro served however as a test base for a sanitation program concerning the whole urban Mozambique.

The whole problem of urbanisation and squatter settlements has become very much secondary as food shortages and security risks have become acute problems threatening the very survival of Mozambique.

Under normal circumstances - or in other countries - the Maxaquene experience may still be useful as a method and hopefully this book may in some way serve its original aims.

November 1984

Ingemar Saevfors



People's Republic of Mozambique
Provinces, major roads, railroads.

The problems of urbanization must always be seen in the light of historical context, geographical constraints and the nature of the governing economy. In the case of Mozambique political events of recent years have had such an extraordinary impact on everyday life, in every sector of society, that development problems and the attempts to solve them cannot be understood without some comprehension of the pre-independance conditions.

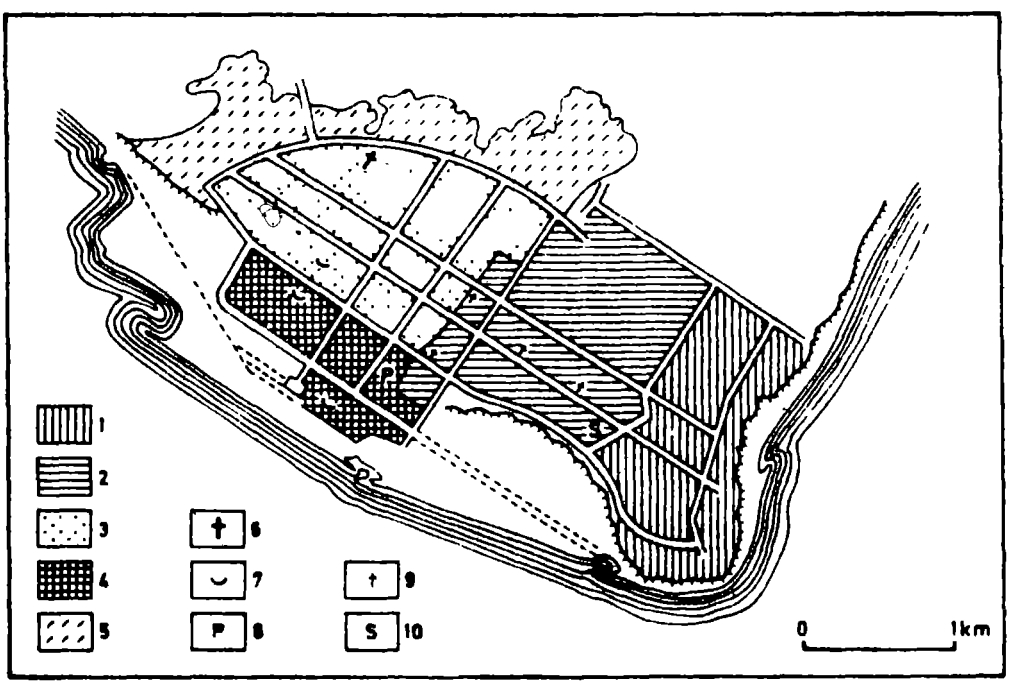
History of urban settlements

The precolonial tradition of urban centres in South-East Africa is spectacularly manifested in the stone ruins of Great Zimbabwe. Related stone ruins, although less impressive, are also found in Mozambique and the links to our times have lately become clearer. We know of sophisticated organizations like the the 15th century Mwenemutapa kingdom which covered vast territories extending to the Indian Ocean and operated gold trade with the Far East.

In the 12th century Arab merchants settled along the coast at Ilha de Moçambique, Sofala, Quelimane and along the Zambesi river. They engaged in the gold and ivory trade and a certain integration with the Africans developed, the so called Swahili culture of East Africa.

In the 1500's, after Vasco da Gama discovered the sea route to India, Portuguese seamen began using the Mozambican coast for supply bases. Their relations with the African population were initially peaceful, but soon turned hostile. At the same time the Portuguese competed with the Arab merchants for control of the lucrative trade with the Far East.

The military power of the Portuguese did not permit a deep penetration of the interior and their settlements were limited to a few riverside trading points like Sena and Tete. In the 17th century the colony was settled mainly by criminals and refugees from Portugal. Settlers and merchants also came from India at this point. Portugal offered land on lease, but the settlers, the **prazeros**, soon became powerful and independent of their weak mother country. They also became more like local chiefs with their own armies and focused their energies on the slave trade rather than on agriculture. Slaves became the most important export from Mozambique: 25,000 captives per year were shipped out at the peak of slave trade in the middle of the last century.



Lourenco Marques, 1938 (according to Zilhao):
1 - residential area, 2 - middle & lower income housing
3 - "less maintained" housing, 4 - business district
5 - unordered constructions

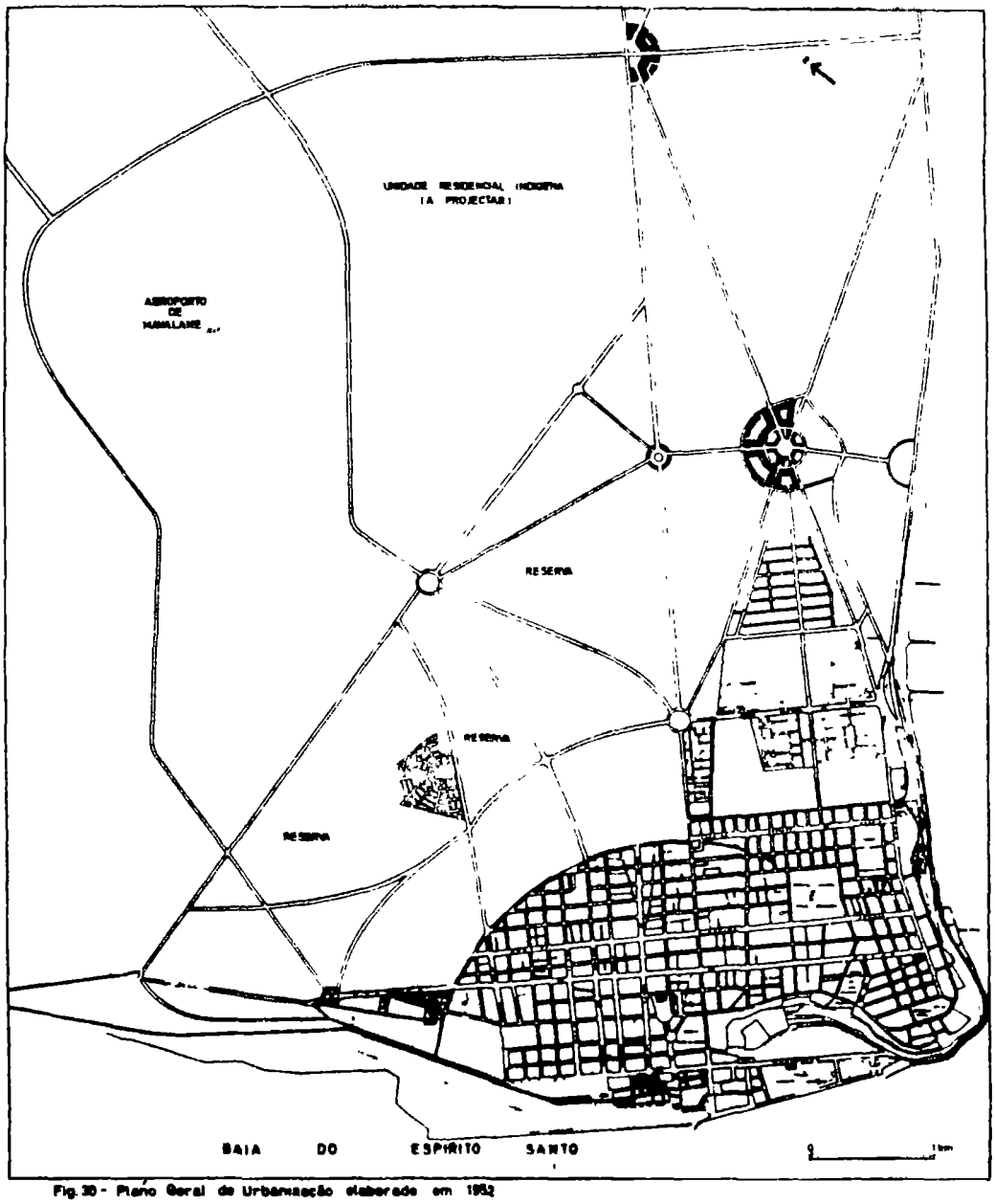


Fig.30 - Plano Geral de Urbanização elaborado em 1952

Master Plan,elaborated 1952.

The development of Maputo:
1894 - 10,000 inhabitants
1925 - 20,000
1950 - 93,000
1970 - 370,000

Source: Clara Mendes, "Maputo antes da independencia"

Colonial agro-economies like sisal and cotton palm-oil did not develop to export scale until the 1930's, having first been in the hands of large concession companies and later on taken over by Portuguese settlers. Forced labor and taxes eventually ruined the subsistance farming of the Africans, making them dependent on salaries from Portuguese plantations and later on from mines in South Africa.

The mining industry in the Johannesburg area and the agricultural development of Transvaal made a nearby ocean outlet necessary. The port city of Lourenço Marques, rather insignificant since its founding around 1700, suddenly grew important at the beginning of the 20th century when rail links were built to Johannesburg and Salisbury.

In light of the development of the cities of Lourenço Marques and Beira, it is clear that the service sector around the railroads, ports, and transit trade allowed for a growth which was alien to the simple agricultural economy of Mozambique.

Portugal's protectionism and isolation of its overseas provinces, provincias ultramarinas should also be noted. Salazar, Portuguese head of State 1932 - 1962, launched emigration programs for poor Portuguese farmers most of whom settled in the Limpopo valley. With the exception of the Mozambicans sent to mines in South Africa and the transit infrastructure, Portugal did not allow foreign capital to have great influence until the 1950's.

Mozambique was not impervious to the post-World War II liberation of Africa from its various colonialist powers. Different progressive political forces took form. FRELIMO was founded as a liberation movement in 1961 and started guerilla warfare in 1964 in the northern district of Cabo Delgado.

In Angola and Portuguese Guinéa more or less the same process took place. These wars forced Portugal to open its colonies for foreign capital; for Portugal saw that investments made by the Western powers would get the latter involved and committed to the military build-up against FRELIMO. The extensive movement of capital provoked a virtual building boom in Lourenço Marques in the early 70's. The price of land skyrocketed in speculation, the construction industry became sophisticated and expanded sensationally.

The guerilla war continued in Cabo Delgado and spread to Tete, and as far south as Beira. By 1970 one million Mozambicans were living in FRELIMO administered areas, **zonas libertadas**. The 1974 revolution in Portugal changed everything in favor of independence and therefore caused guerilla activity in Mozambique to wind down. A transitional government was set up and by June 1975, the Peoples Republic of Mozambique was a reality.

For the city of Lourenço Marques, the war had brought about a tremendous construction boom. However, the majority of Africans were left to live in huge, unplanned **caniço** areas on land owned by a few Portuguese families. Either the land was too swampy for normal construction and avoided by the planners, or it was potentially valuable and leased only temporarily in speculation.

The housing situation

The housing policy was not formal **apartheid**, but the system was very much like the one in South Africa. The Africans were allowed to live in the cities only if they were needed for work; once they passed active or productive age, they were expected to return to the countryside.

Housing standard in the canico areas.

Central Business District, Maputo. The high rise buildings from the construction boom in the early 70's.

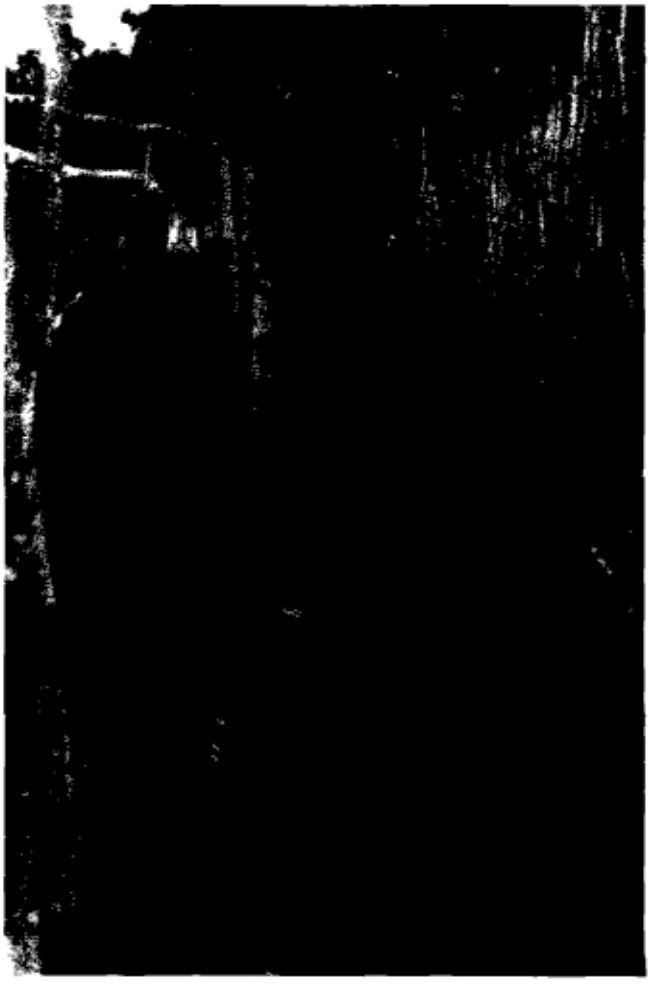
Many of the canico areas grew up on land which was unsuitable for housing and avoided by commercial developers.

With frequent checks on employment status, the urban population was under much the same control as under passlaws in South Africa, and the **caniço** suburbs were not allowed to grow without restraint. The police, especially its security branch PIDE, had a vast network of contacts and informers to control who was living in these **bairros** and what employment, if any, they had.

Although squatting was not allowed in its usual sense, the **caniço** areas developed on a land-lease basis, on short terms obviously. The landowners could in this way make a profit on land they kept unsold in real estate speculation. Once the land was sold and construction work was to start, the eviction procedure was easy. The dwellers were paid a small lump-sum as indemnification and their **caniço** houses were bulldozed away on short notice. Relocation was their own problem and usually it meant moving to another **caniço** area, most likely further away from the city.

Given these conditions it is not surprising that the level of municipal services and standard of infrastructure were the lowest possible - just enough to avoid public health hazards to the wealthy parts of the city.

The constant threat of being bulldozed away provoked a special light-weight architecture of mobility. For the majority this meant the **caniço** house, with walls built of reeds from the swamps outside Lourenço Marques and a roof usually of corrugated tin. For those who were economically better off, permission to build in permanent materials in the **caniço** areas was still denied, so the solution was the easily-dismounted house of corrugated iron sheets on a skeleton of wooden joists, **a casa de madeira e zinco**. Both types measured normally 6 m x 3.5 m divided into two rooms, the width determined by the standard length of corrugated roof sheets.



Inadequate access roads and drainage - the chronic problems in the canico areas, as in most squatter settlements.

Queuing for water - to be carried perhaps a kilometer.

Photo: Per Rathsman

A sanitary standard could not develop with the feeling of impermanence that prevailed. Yet, even poor people invested in cement floors for a minimum of hygiene. Most compounds had a pit latrine, although often of very poor quality. The worst problem was the lack of storm water drainage which caused overflooding of the latrines with great contamination risks.

Water had to be bought from **cantinas**, stores which were linked to the city water network. When located in the **caniço**, the stores were provided with bore holes, pumps and reservoirs. The women had to carry water up to a kilometer on sandy lanes.

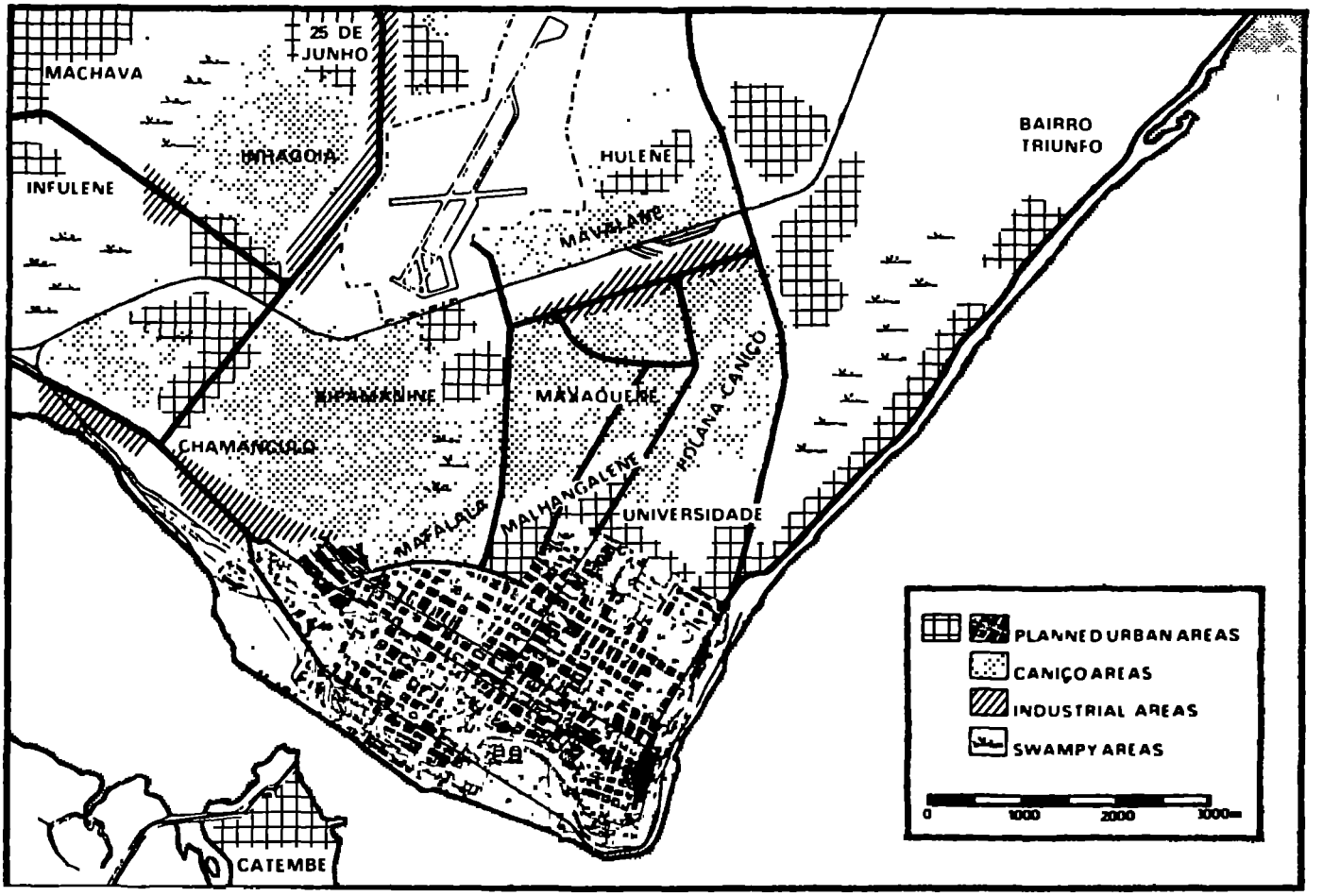
In the late 60's, through guerilla warfare, FRELIMO had made enough impact on the colonial administration that it had to reconsider its social policy. The **Projecto de Benificiaçao das Aereas Suburbanas de Lourenço Marques** was launched in order to win political support among the **caniço** population. This was in fact the very first urban upgrading project. Public taps with free water were installed, primary schools were quickly built in prefab materials (some of them even equipped with swimming pools!), a garbage removal scheme was organized, and some of the winding internal roads were even paved, which allowed for transport access and easier police patroling of the areas.

It is clear that, without the benefits of this colonial project, the situation in the **caniço** areas would have been worse today, even though the administration's intentions and the whole social and political context were completely different before independence.

With national liberation the situation of the **caniço** areas changed drastically. People felt for the first time that the government, after a dramatic switch, was on their side. FRELIMO formed **grupos dinamizadores**, responsible dweller-committees who mobilized the population for various campaigns in the neighborhood, from purely political ones to more practical tasks like clean-up. The people believed in the new government and its willingness to solve the problems of the **caniço**.

A year after independence, Mocambique nationalized land and tenement housing. The landlord was now the government For the **caniço** people this meant less rent to pay. The new rent was set according to the tenant's income and the standard of the house, which resulted in quite modest rates for the **caniço** dweller.

Most important was a new feeling of security - an end to the constant fear of being bulldozed away at any time. Even though the FRELIMO government urged the population of the **caniço** areas to wait for the necessary urban planning, many people just started to build wherever they found it suitable. Those who could afford it began building large houses in brick or cement blocks. A virtual construction boom took place and the organic and structureless form of the **caniço** areas rapidly started to stiffen, further reducing the chances of infrastructural upgrading without major demolition. However, the social mood, political enthusiasm and belief in the future were more positive and greater than ever.



Maputo 1977, the "cement city" with surrounding canico areas.

The moradores with Grupos Dinamizadores organizing themselves in the canico areas.
Photo: Eva Savfors

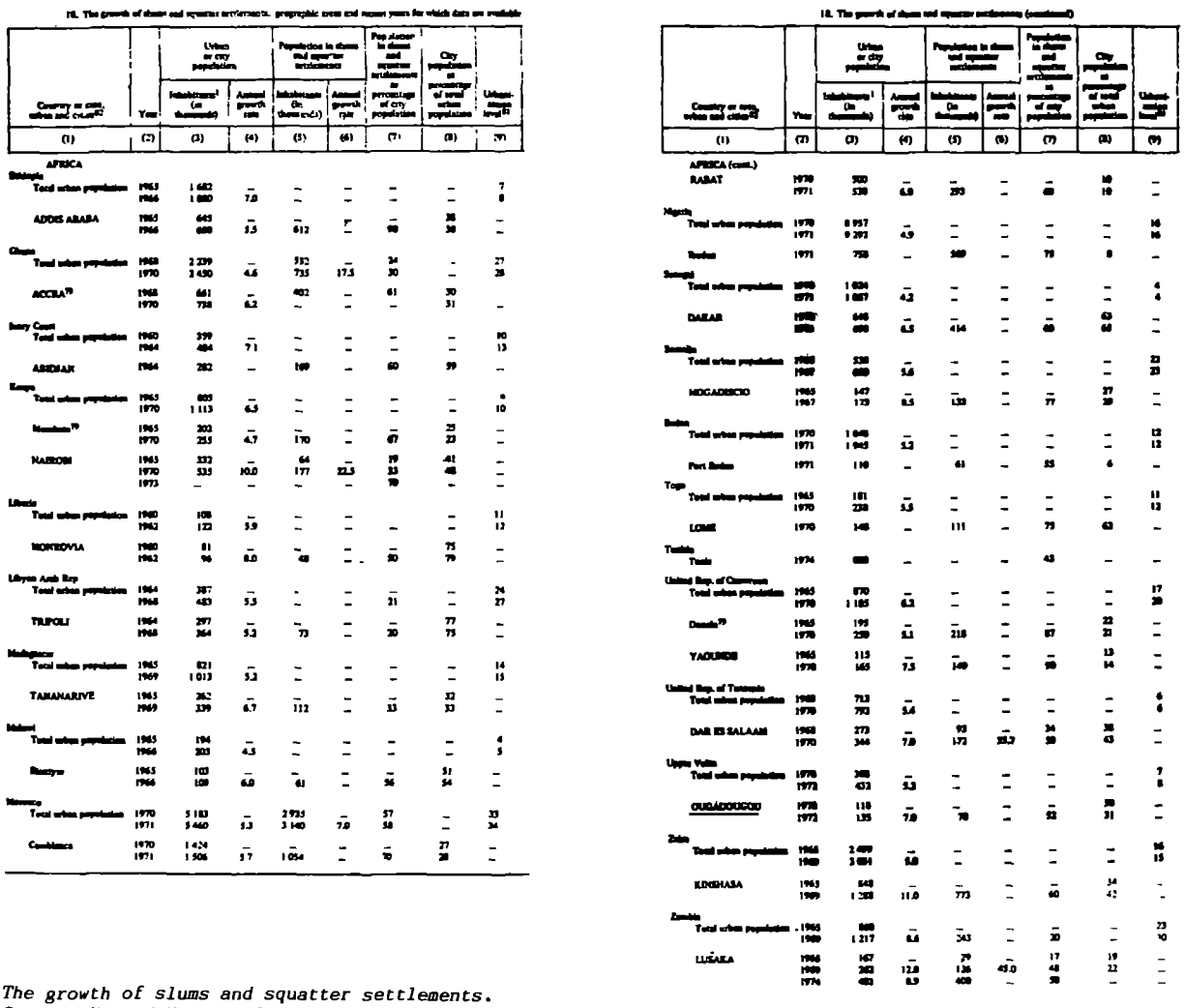
SQUATTER URBANIZATION IN GENERAL

The ideas adopted for this project are not unique nor complicated, yet it seems so overwhelmingly difficult for housing policy makers to accept the principle of **squatter settlement upgrading**, or urban rehabilitation **in situ**. Political implications will be dealt with in the evaluation part of the book (05 THE CRITICS).

The upgrading philosophy is based on a simple acceptance of some facts:

The reality is that squatter settling is a way of life for the majority of urban dwellers in African countries, regardless of the reasons, be they colonial exploitation, international labor division, liberation warfare or natural calamities.

National resources, both in terms of capital and skills, are so scarce in most African countries that the housing sector only gets a symbolic share. Housing **always** comes behind other priorities. In reality there appears to be very little difference between market and planned economies. Socialist governments may have programs for the future, e.g. mass production of prefab housing units or rural development schemes, but in fact implementation of such programs is not always attained. In terms of fund allocation in the current five year plans in Africa, resources for the housing sector are almost negligible in relation to the enormous population affected.



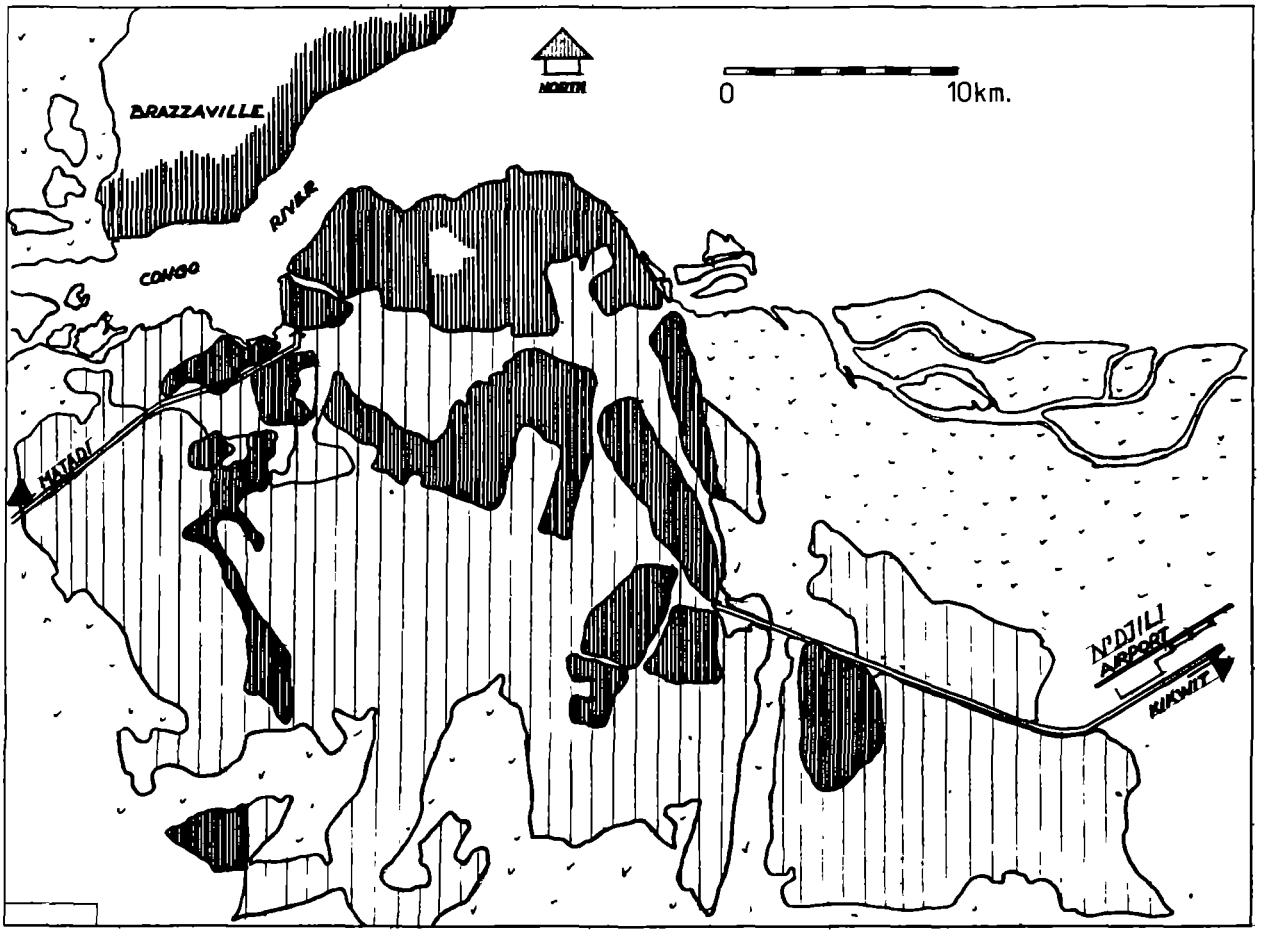
The growth of slums and squatter settlements.
Source: United Nations Centre for Housing, Building and Planning, 1975

At present the options for action seem to be very few, furthermore, the attention given by governments is surprisingly modest in light of the tremendous scale of the problem. Squatter areas normally grow at a more rapid rate than the cities they belong to. This means annually a 10-15% extension of underequipped settlements.

A serious warning is the case of Kinshasa, black Africa's second largest urban agglomeration (after Lagos), with 3-4 **million** inhabitants of whom **the majority are squatters**. With a total area of 50 km x 30 km, an infrastructure only in the planned centre and insufficient public transport, the living conditions are virtually hellish. This geographical expanse can mean a 3 hour walk each way to a job if any, or even further for subsistance farming. The result is all too often hunger and unmanageable violence. Other African cities might read their future by looking at the development of Kinshasa. Unfortunately, even if there are serious attempts, no government has solved this problem.

It is often argued that one should start at the root of the problem, which is rural-urban migration, instead of wasting resources on a seemingly hopeless, squatter situation. In theory, this analysis is probably worthwhile from a macro economic point of view; but in practice no existing national policy has been very effective. The migration wave is so massive and complex that it would be a great achievement just to attain zero growth of squatter areas. One still has to cope with the effects of an up to 3% natural increase annually. In other words, the squatter areas that exist today, are most likely to remain for a predictable future. They **will not disappear** overnight, even with gigantic efforts by socially concerned governments.

Before presenting the Maxaquene urban planning principles, a brief review of other housing policies would be useful.



The extension of Kinshasa, 1981.
Areas with (in black) and without basic infrastructure.
Source: Bureau d'Etude d'Amenagement Urbain, Kinshasa

In the 60's UN agencies, USAID, and aid organizations like SIDA, believed it was possible to build individual houses, almost one by one, in order to remedy the growing urban housing problem. Housing programs were intended for the poor, but when implemented, it was always found that only the middle and upper classes could afford the running costs and the mortgages.

With this experience, the so called "low cost" housing projects were then transformed into more cost/benefit effective **core-housing** schemes. Here, only a central part of the house with water and sewage installations, was built by the government or other organization.

When this solution also proved to exclude the poor, the **site and service** concept was launched: a plot and a water pipe - no more. Sometimes paved roads and schools were provided, but assistance to the actual house was normally limited to offers of type plans and in certain cases construction loans. This offered better spread among poor people, but it still required a fairly active government with functioning planning institutions and financial resources, at least for the basic infrastructure like main water conduits and access roads.

But, since its location on virgin land necessarily implied much greater distances to potential job opportunities, the squatter dwellers showed considerable reluctance to move. Another drawback linked to transport problems was the need for great expanses of land for **site and service** areas if implemented on a big scale. As they were usually designed with much lower density than squatter settlements there was a tremendous demand for urban land in order to satisfy the huge number of people in need. Consequently, the public transportation systems were strained even further.

In effect the implementation rate of site and service schemes was not at all compatible with the growth of squatter settlements.

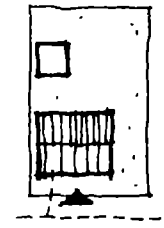
Cissin-Ouagadougou, Upper Volta. *The site and service scheme in the background.*
Photo: Eva Sävfors

Another option is the industrialized production of prefabricated elements for mass housing. According to this policy - based on heavy industry - it is the final and unique solution to shanty towns. Anything intermediate is just a waste of resources.

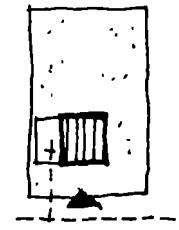
This seems to be a far too rational or theoretical solution. It presupposes that at least one generation of squatters would be willing to coldly sacrifice itself before the national economy could cope with investments in housing. Humanitarian aspects aside, the problem is that after 20 years, the urban housing situation might very well be out of control, threatening political demobilization and even the overthrow of the government.

Multi-storey concrete dwellings also involve cultural consequences in African cities. The existing examples of low cost apartment living are not too encouraging: the social relations are cracked up, the responsibility for semi-public space like staircases, or areas between buildings, is obviously not strongly felt and the imposed systems of sanitation and cooking do not correspond to traditional habits. Even though housing cultures may adapt to multi-storey living in the future, the apartment building is simply not a socially oriented solution if the urban housing problem is to be dealt with **today**.

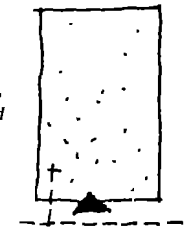
1. *Complete "turn-key" individual house.*

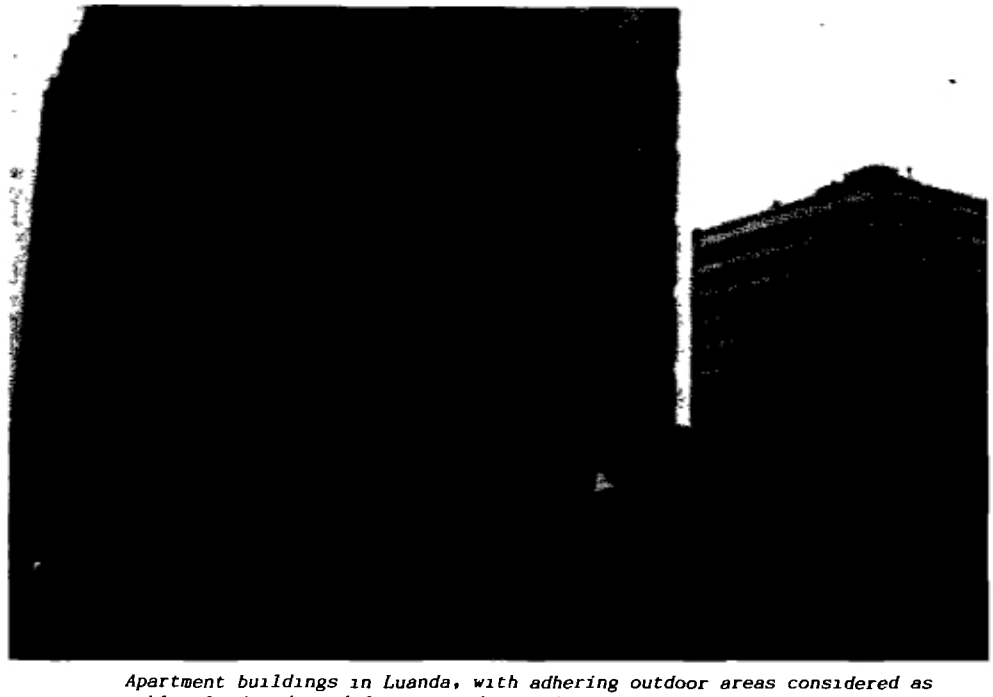


2. *Core house: Plumbing + one room provided. Extensions to be made later on by dweller.*



3. *Site and service concept: Plot, access road and water connection provided by the project. House construction completely undertaken by dweller, in some cases with bank loans and type plans.*





Apartment buildings in Luanda, with adhering outdoor areas considered as public land and used for waste disposal.

After examining existing methods, policies and theories in urban mass housing, one of the few remaining options is urban upgrading **in situ**: trying to do the best with the existing unplanned squatter settlements, be they called slums, shanty towns, pirate cities or whatever. After the first experiences in Latin America, the **in situ** method was introduced in Africa in the mid 70's: Fass Paillotes/Dakar, Cissin/Ouagadougou, George-/Lusaka, Manzese/Dar-es-Salaam. (See bibliography for references.)

It was found that the maintenance of social relations within the community had an enormous importance among the people and that the operations ran unexpectedly well. Another incentive was the legal status acquired. Just the possibility of getting title to the plot triggered off substantial investments in the home both in terms of time and money This was real self-help in every sense. As a result the upgrading method received benediction from conscientious donor countries which felt political pressure from their taxpayers for decent, respectable aid projects. Depression-stricken Western countries have little tolerance for aid scandals.

The only major drawback to upgrading that could be observed on a short term basis was the speculation mechanism. poor people upgraded their homes, sold them and resquatted. This was particularly apparent in full-fledged capitalist economies where plots could be traded like second hand cars.

Cissin-Ouagadougou, Upper Volta. The pilot upgrading project 1974-76.
Photo: Eva Savfors

In the new Mozambique, after nationalization of land and tenement housing, the conditions were excellent, if not unique, for an upgrading solution.

The upgrading methods used in the pilot project of Maxaquene are not exceptional, but they had the chance to be developed to a further extent than in other African cities, largely due to the level of mobilization FRELIMO had already attained for other purposes. The cell structures of the party, called **grupos dinamizadores**, had staged various campaigns like political meetings, cultural events, adult alphabetization, clean-up operations and mass-vaccinations. They already knew how to get organized quickly, and therefore methods could be developed taking this extraordinary asset into account. Furthermore they had the political maturity: even with high expectations for their government, the **grupos dinamizadores** had reasonable understanding of unpopular measures benefitting a long term common goal.

Urban planning concepts

The analysis of the Maxaquene **caniço** situation led to some harsh conclusions:

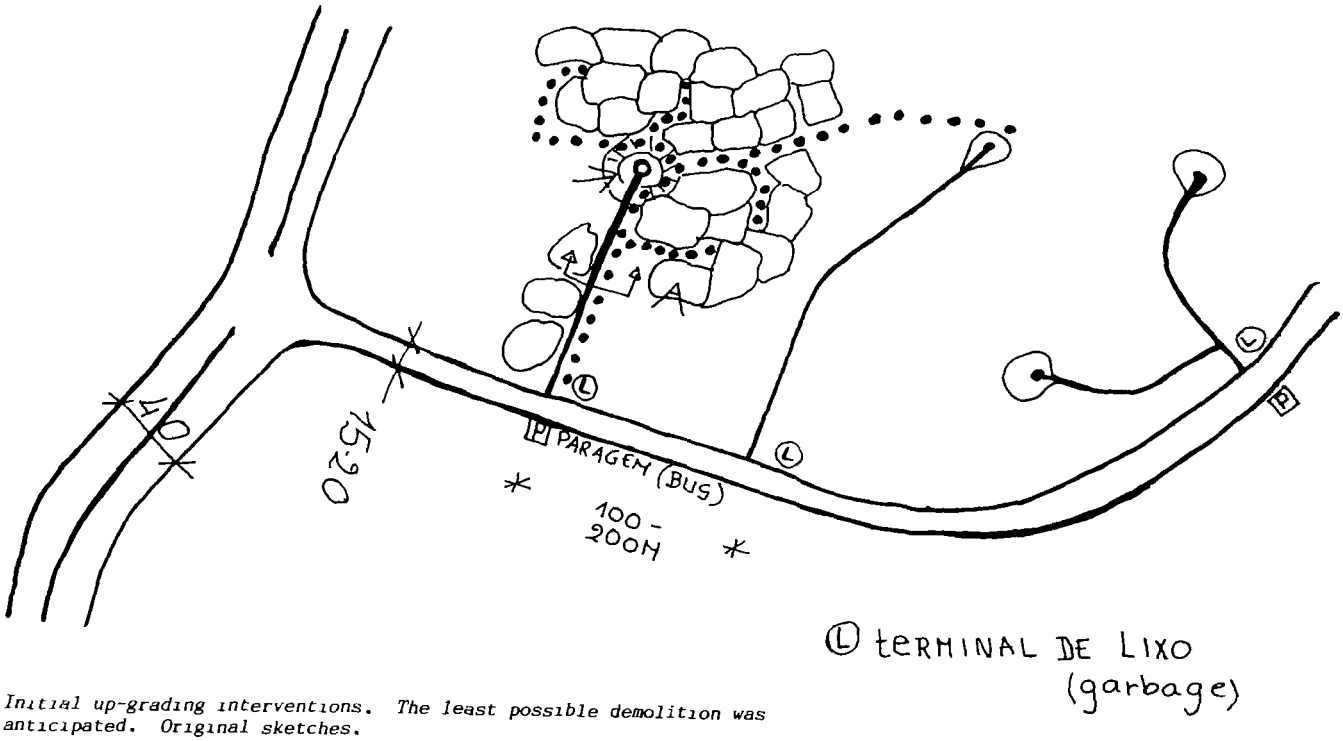
1. An urban plan, or just a simple land-use demarcation, must rapidly reach out to the **caniço** so as to channel the already on-going construction boom. As mentioned in the background description the **bairros** were in the process of "cementing" themselves: more and more people built brick houses on the spot thus rapidly coagulating the previously light weight and managable **caniço** habitat. Despite serious shortages in building materials on the official market, the boom somehow continued.

   Even though the government had decreed that the **caniço** inhabitants should wait for adequate urban planning, most people who could afford it started on permanent constructions. The situation was potentially delicate, especially if the government were to enforce its decree. Not to mention the waste of heavy individual investments, the demolition of hard-earned decent houses in brick would be a politically inappropriate act.

The Grupos Dinamizadores, people from the grassroots working for their bairro.

A land use "crash" plan with immediate effect in terms of efficient and tangible staking out programs was therefore the first thing to be done. Of course, the absence of a Master plan for Maputo was another major problem. Without commencing a study of that scope, which would have been another project altogether, basic compatability with the adjacent city networks had to be assured. Also the eligibility for housing purposes of each area had to be considered. There were definitely **caniço** areas in Maputo for which the best solution from all economic and sanitary points of view was evacuation. The absence of an operational Master plan was not unique to Maputo, but quite typical for most third world countries. The fact is that **construction goes on all the time - with or without urban planning.**

Soon after independence a brick house construction boom started in the canico areas.
Photo: Eva Savfors



Initial up-grading interventions. The least possible demolition was anticipated. Original sketches.

2. The **bairros** must be equipped with a basic infrastructure. In order to achieve a substantial upgrading of the housing conditions for a great number of people, the planning input had to concentrate on infrastructure. The factors that had the greatest impact on improving living conditions were to be found outside the actual house: piped water, drainage, sewage, garbage collection, electricity, public public transport, access for emergency vehicles, schools, playgrounds etc. Therefore it was decided to concentrate on deficiencies in infrastructure rather than penetrate the problems of individual house construction. However contradictory it may sound to the name, National Directorate of Housing, **Direcçao Nacional de Habitaçao**, the architects considered it more important to be involved in engineering water distribution than designing houses.

While water and roads, under the Ministry of Public Works & Housing, were services that had the most radical upgrading effect, other infrastructure objectives came under other ministries like Education, Health amd Commerce. This provoked problems of coordination: geographical allocation of resources for other ministries did not always coincide with our plans. However, DNH had to assume responsibility for overall planning; zoning and evacuation of land for social services had to be the first step under all circumstances.

3. The third and last target was the house itself. The approach had to be on a general, not an individual level. This meant "system solutions" to the problems of drainage, latrines, kitchen, or certain building components for self-help construction. Other services anticipated were building material sales, tool rental, and workshop facilities. All of these services had to be of a collective nature since the technicians available were too scarce to allow for involvement in individual construction sites.

It was necessary to accept step by step changing of the house standard instead of a drastic renewal of all houses at once. Beyond the basic difficulties in financing such a large undertaking, there was the danger that an overheated building boom would disturb a well-functioning social organization in the **caniço**.

Furthermore a too generous credit facility would induce overdimensioning of space and standards in relation to economic realities. The individual homeowner might be loanworthy because he had a steady employment. But in light of the general economic state of the country, excessive individual loans would push the house standard out of proportion. In other words one would be close to falling into the same trap as the so called "low-cost" housing projects described earlier.

The above three priorities - land use plan, infrastructure and lastly house constructing - constituted the basis for the urban planning concepts in the Maxaquene project, although the methods of application changed during its implementation.

Construction of a canico house: reeds on a skeleton of poles

Technical infrastructure planning

The first approach was to do **the least possible** intervention in the existing **caniço** milieu.

We opted to concentrate on water and roads. We considered bringing in an extension pipe from a main water conduit on an existing bordering street. We also thought of building a winding narrow access road between the houses so as to serve the inner parts of a **caniço bairro**, which are usually the most under-privileged.

Comptar com as nossas proprias forcas" - *Count on our own resources*

But narrow access roads would become too long since the **bairro** was 500 meters wide between existing feeder streets. A new feeder street was therefore indispensable. In order to have an effective economic distribution of the infrastructure network, it was necessary to open up this new feeder corridor for mains and conduits somewhere in the **caniço** ocean. The word "ocean" is significant because there was little variation in house density and no perceivable macro-structure, hence the cut would hit at random anyway. The corridors could not be bent, like narrow access roads. They would be too wide and always hit existing houses. There simply would not be any point in trying to save one house here in order to smash another one there. The corridor might just as well be positioned "without mercy" and be given the best distribution effect for the benefit of the largest number of people.

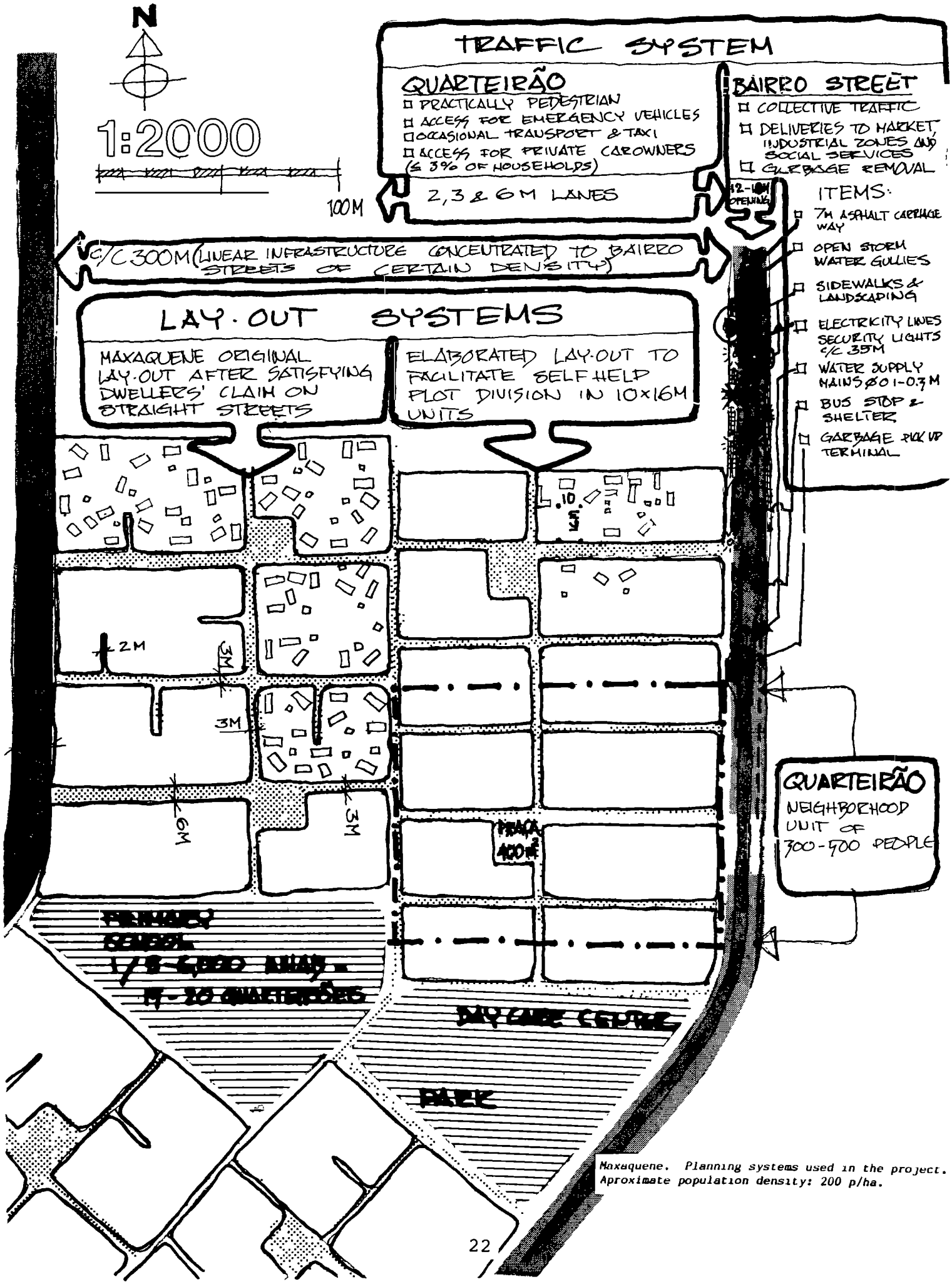
It was necessary to weigh the efficiency of the heavy linear infrastructure and its welfare spread against a fairly limited number of sacrificed houses. This was important to understand when later on encountering the more demagogic criticism that the project was having destructive tendencies.

The feeder corridor was designed with a width capable of channeling all essential utilities for the **bairro**. It was intended to be the spine where all expensive investments were concentrated, with the possibility of adding extensions later on when the national economy could afford them. The main functions of the feeder corridor would be:

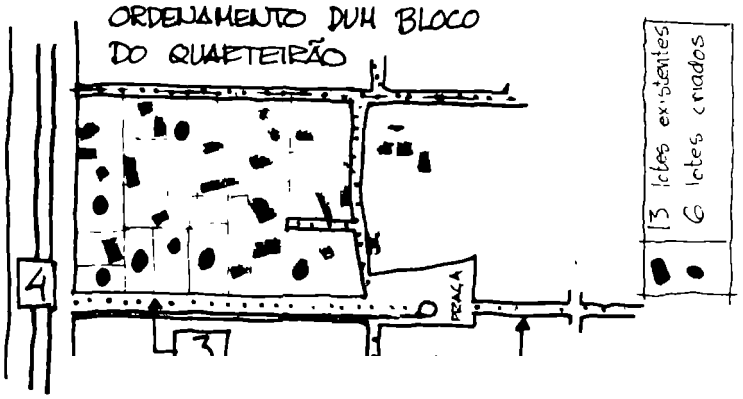
- a central street for the **bairro** with a 6 meters asphalt strip for vehicles,
- a public transport route with proper bus stops and shelters,
- a main water conduit ø 0.1-0.3 meters feeding the **fontenarios** (water taps),
- a main electric line with security lighting every 35 meter,
- a garbage collection route with pick-up stations under hygienic control.
- open storm water drainage gullies on each side of the carriage way,
- separate sidewalks on each border,
- shade trees and other landscaping elements to be planted/installed.

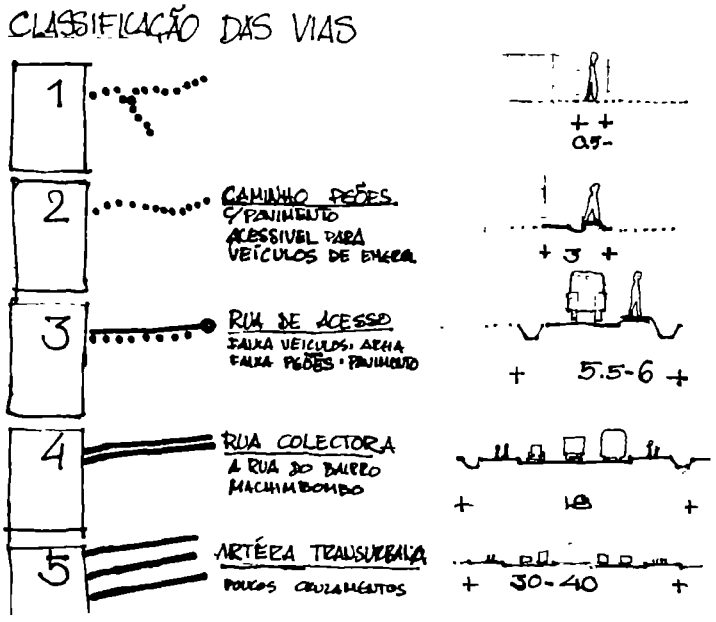
Added together, all these items required a corridor width of 18 meters. The investment in an asphalt street was considered worthwhile, not only for maintenance but also in order to reduce the strain on imported, expensive rolling material like buses, garbage trucks etc.

From the corridor, the earlier-mentioned access roads were planned to lead to some sort of a semi-public space of very local character with a **fontenario** (water tap) and a small informal meeting place. The aim was to maintain the relaxed **caniço** atmosphere with close contacts between neighbours, children playing everywhere, shade from big cashew trees etc. For lack of a more suitable word this meeting place got the Portuguese name **praça**. (A word usually referring to larger squares but used nevertheless with great fondness by the **moradores**, dwellers.)



Maxaquene. Planning systems used in the project. Aproximate population density: 200 p/ha.





Circulation networks in Maputo:
1 - common canico alley
2 - pedestrian lane usable for emergency vehicles
3 - auto access road with side-walk
4 - feeder street, channelling local linear infrastructure including bus and garbage collection routes
5 - through traffic link, imposed by the Master Plan for Lourenco Marques of 1969

Types 2,3,4,were adopted as project standards.

The small **praça** (400-500 m^2) permitted the installation of other neighborhood infrastructure items like laundry facility, telephone, electric lights for reading. There were numerous possibilities and their implementation depended on the social organization. If successful, the neighbors could form a cooperative and perhaps seek financing of paved walkways, drains, or other needs.

With the large, central corridor in the middle of the **bairro**, the access roads did not need to be longer than 60-100 meters. They ended at the **praças** and were intended for pedestrians and also for cars which could turn around at the **praça**. Since the width was 6 meters, there would be room for drainage and large trees. Separation of traffic vehicles and pedestrians on the access roads was discussed but found ridiculous, given the small number of cars owned by the **moradores**. Since the access road was a cul-de-sac street with no through traffic, only occasional taxis, "aluguer" transports (pick-up truck taxi), ambulances and service vehicles would enter.

The distance between the access roads was originally planned to be more or less 100 meters. In this way a neighborhood unit or **quarteirao** was created around each **praça** covering an area of roughly 100 m x 130 m. The **quarteirao** unit was found to be quite appropriate in scale and a second network with approximately 3 meters wide **lanes** was then introduced to delineate **quarteirao** limits and serve as links between the **praças**. These lanes would be very much like the existing **caniço** alleys, but with the minimum allowance for an emergency vehicle to pass. Both the 3 meters and 6 meters lanes were intended to be **very** flexible and adaptable to existing patterns of trees and houses. Later on, when the plan confronted reality and was submitted to people's approval, much had to be changed. The intentions of the urban planners should be extremely important to bear in mind if we wish to learn any lessons from the Maxaquene experience.

Canico habitat of Maxaquene density.

Social services

To plan and locate social services in the Maxaquene plan was quite difficult for the simple reason that no norms were yet in force. We had to draw from experience from projects in Latin America and other African countries and remember that it was in fact a **pilot project**. We checked our plans with the few Mozambican and Portuguese architects at DNH in order to have some feed-back on the proposed social service plans.

Starting with the most basic services to be located within the neighborhood reach, we calculated that a primary school and a consumers' cooperative would be needed roughly every 600 meters x 600 meters, given the **caniço** density of 150-200 persons per hectare. Service units of this size would offer reasonably economical operations for schools and shops and at the same time a decent walking distance off feeder streets for the children.

Some of the social services were grouped together in the middle of the **bairro**. This part of the urban plan was less suitable for **quarteiroes** because of the triangular shape of the "islands". Therefore we proposed that they be utilized for social services. The design of the buildings would have to be site-adapted in any case. One of the service islands was reserved for a **bairro** centre where undefined smaller services like post office, bank, specialized shops, etc, could be located.

Schools were temporarily organized in the canico areas as education was given a very high priority both by the people and by the government.

Another island was intended for workshops and other environmentally inoffensive small-scale industry. A park with a day-care center and a primary school with a multipurpose playground constituted two other islands.

From the beginning we foresaw the problem of trying to evacuate land for services for which the financing was uncertain. Nevertheless, it was necessary to relocate people from land destined for social services, streets and **praças**. Otherwise there would not be any space available for the service structures when they were to be built at a later date.

	No. of Users	No. of Unities	Caracteristics	Construction M²	Land M²
Primary School	1000	2	5x40 3 shifts =600 children	2x450	2x3000 w/ green area
Secondary School	600	-	In other bai ro, due to larger catchment area		
Day Care Center	500	6	80 children	6x100	6x500
Health Center / Pharmacy	150 vis/d	1	Only consultations	100	100
Multipurpose hall		1	500 seats + stage	300	300
Dinamizing Group		1	Meeting hall Offices	100	100
Post				100	100
Bank				100	100
Consumption Cooperatives	either 5 or 2		Shops Supermarkets	5x 100 2x 200	5x 200 2x 400
Self-help Construction Support Center		1	Workshops, offices Sales Yard	300	1000
Recreation Areas	1500	3	20x 40m coord with schools		3x1000

Service facility program for 10,000 people used as initial target in the project.

With the typical canico population density of 200p/ha, the catchment area for a primary school was set at 0.6 x 0.6 km.

House construction

The lowest rated target of the project was the individual house itself. This strategy was in line with the lessons learned from the earlier described housing projects from the 50's and 60's. We wanted at all costs to avoid getting involved in the administration of details which people could usually work out for themselves, probably better than we could. Just the same, the construction aspect could not be completely overlooked, it had to be dealt with at least on a **general** level.

When the plans were drawn up for the Maxaquene project in July 1977, there was still much belief both at DNH and UNDP in the idea of self-help workshops. These construction centres would be located in the different squatter areas. they would provide tools and equipment for **autoconstruçao**, self-help construction, offer help from qualified masons and carpenters as well as arrange for the sale of building materials. We already knew that the last function was much in demand by the population.

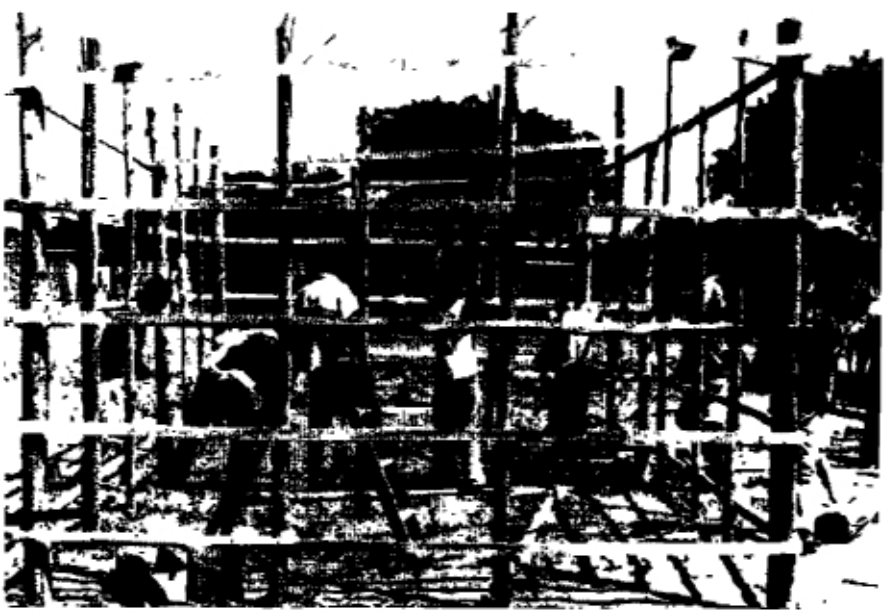
The idea of a self-help centre seemed very convincing at the time and in fact we designed an **estaleiro**, workshop, in prefab materials to be erected quickly in the small scale industrial zone within the project area. This was, at the planning stage, the main support we intended to give to house construction.

What happened to self-help workshops is described in part 04 THE PROJECT.

General aspects

The most important point of the Maxaquene plan was the very definition of land use. The task of staking out a city plan only required limited input in terms of DNH staff. But the staking out was of tremendous importance for the **moradores**. At last, the question of where they could or could not build was definitively resolved - a hitherto pending question always menacing to spoil efforts in home improvements. Since Mozambique nationalized all land in 1975, and rented houses in 1976, the classic headache in renovation projects with complicated ownership boundaries, expropriations and powerful landlords was eliminated.

In short the whole project plan was based on the principle that the people of the **bairro** should resolve problems themselves. The team of technicians from DNH could only propose plans and roughly organize their implementation. The project planning seemed to correspond well with the political climate two years after Mozambique's independence. The enthusiasm steming from over the liberation was still strong, the expectations for the FRELIMO government were high and the attitude **comptar com as nossas proprias forças** (count on our own resources) meant that people were prepared to act and to do creative work themselves.



RELATIONSHIP OF URBAN PLANNING TO PROJECT EXECUTION

It is difficult to separate planning from execution in the Maxaquene project because the pilot project character of the experience made feed-back constantly necessary for planning. The influence the **moradores**, inhabitants, had in the process required a much more open and informal attitude to planning than has been customary in Europe and Africa, perhaps even more so in Africa where a rigid mentality with roots in colonial town planning is still often present, even in revolutionary countries like Mozambique.

The layout of the sections - 03 THE PLANNING, 04 THE PROJECT - may give one the impression that the project began after the planning was completed. In fact, the two happened simultaneously and were interdependent.

This chapter gives a step by step account of project development as well as thematic focusing on prevailing issues at the respective time period.

Formal background

The Maxaquene project was originally part of a UNDP financed project called "Emergency assistance to peri-urban areas" and was monitored by Centre for Housing, Building and Planning at the UN in New York.

The new government of independent Mozambique had alredy defined in 1975 a UN housing project. At that time the Ministry of Public Works and Housing did not want experts but rather heavy machinery, tools and vehicles. The main focus of the project was to relocate people from flooded **caniço** areas and organize self-help workshops in Beira and Maputo. This was basically a site and service approach.

A big support center for **autoconstruçao assistida**, assisted self-help construction, was built in Machava, an industrial satellite city 10 km northwest of Maputo. The services were extended to assist the people with *masons and carpenters from this* **estaleiro**, *workshop*, and construction loans were organized. However sensible this policy may sound, the outcome was unfortunately very disappointing: assistance became more important than self-help. As described in chapter 03, the standard of the house was successively raised resulting in over-spending. Only high-income workers could afford the costly homes. Consequently, very few families could be housed in proportion to the heavy government investment - and again, a classic "low-cost" housing project.

A typical two-room canico house, 3x6m, in a quintal. Photo: Eva Savfors

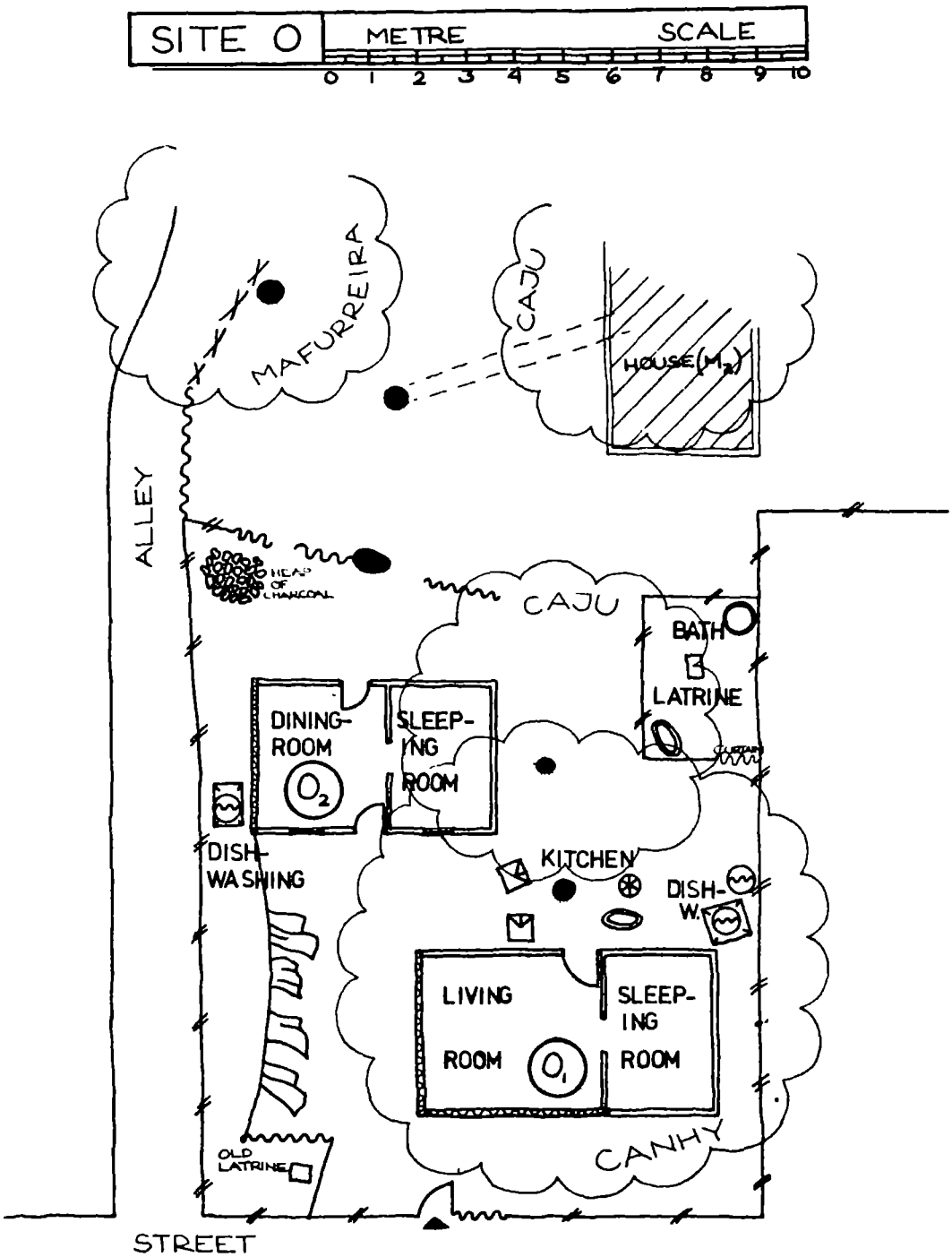
Autoconstrucao in Machava, a Maputo suburb.
The self-help part is mainly assured by women, doing the unskilled work and assisting carpenters and masons from the project staff. The standard was high, and one house costed 1977 aprox. 130 000 MZM, at the time over 4000 USD.
Photo: Eva Savfors

As more and more Portuguese professionals departed from Mozambique after finishing their contracts, the Ministry of Public Works decided to request personnel in UNDP programs. When UN experts came to the housing project in late 1976, the government attitude had altered and was open to the idea of rehabilitation **in situ** of the huge **caniço** settlements.

The Mozambican housing institutions

The UNDP project, responsible to the Ministry of Public Works & Housing (Ministerio de Obras Publicas e Habitaçao), still did not have a proper Mozambican counterpart. The former agency, Gabinete de Habitaçao e Urbanizaçao de Regiao de Lourenço Marques, created by the Portuguese for the earlier-described PBSLM projects, had administered the first UNDP-financed assistance which consisted of heavy equipment and tools. This structure was now being dissolved and in its place the Direcçao Nacional de Habitaçao , National Directorate of Housing, was created. The new director, José Forjaz, was one of the few Mozambican architects. The directorate was subordinated to the Ministry of Public Works and Housing, as were similar national directorates for Water, Roads, Construction Industry etc.

With establishment in April 1977 of the DNH, the UNDP housing project got its counter-part on a national level. However, the project activities were going to be at the local grass-roots level. The colonial municipal urban planning structures in **Camara Municipal de Maputo**, Maputo City Council, were being dismantled at the time, so no counter-part could be found there, which administratively-speaking would have been more appropriate under normal conditions. The problem was solved by giving the first upgrading project in Maputo a **pilot** study and, therefore, of national policymaking interest.



Plan of a typical canico compound drawn by Ruth Naslund, architect. From the "Malhangalene Survey".

Architecture students from Chalmers University of Technology in Sweden, surveyed a 10 ha **caniço** area in the northern sector of Maputo. Their conclusions confirmed the usual reason for poor housing standards in squatter settlements - illegal status discourages individual investments. The choice of the light-weight **caniço** building material was not necessarily a reflection of poverty but perhaps mobility, and "local" material was no longer cheaper than industrially produced bricks and roof sheets, considering the skyrocketing transport costs.

"The Malhangalene Survey" was published in 1977 by Chalmers University; its main contribution is a series of plans of **caniço** houses, drawn by architect Ruth Näslund.

The caniço people

If the institutional framework contained some difficulties, the working conditions were largely compensated by the spirit of the **caniço** people themselves. From the outset an open and cooperative attitude existed, and after proper introduction there was no suspicion whatsoever regarding our intentions. FRELIMO had made a distinct point in separating the notion of colonialism from the color of skin. It struck us often that no hard feelings were ever shown us, Boer/Rhodesian-looking foreigners, in spite of all the atrocities from colonial times and the war that was still being waged for the liberation of Zimbabwe. The combat zone was within 300 km of Maputo when the southern Gaza province was bombed by the Rhodesian air force.

As mentioned before, an amazing state of political maturity had already been achieved, and the people were highly motivated for an upgrading project. Since they were already politically mobilized, the **caniço** dwellers had a global vision on problems, and abstract ideas could be presented satisfactorily. Furthermore they had the ability to organize themselves.

In short, conditions for a project of this kind were excellent, if not unique in Africa.

After the Malhangalene Survey there was a long standstill. DNH was shaping up in the shadow of FRELIMO's third congress. New directives were underway. **Autoconstruçao** and infrastructure were keywords for the mass-housing sector. This was perfectly in line with the upgrading philosophy, so the future for the project looked good: political backing, a high degree of motivation and mobilization among the people concerned and technical/financial facilities available through the UN Development Program.

Yet the program take-off seemed almost paralyzed by inertia, contradictions, and perhaps a lack of belief in the idea of upgrading the **caniço**. After six months of postponing the project initiation, it became apparent that a separation of duties within the UN team was required. Concrete action was necessary if the project was to begin. In April 1977 Prafulta Jalantilal, a social assistant at DNH, and I were commissioned by DNH to launch a comprehensive upgrading project in a specific **bairro**.

A sala de comer - one of the two rooms in a fairly typical canico house.
Photo: Eva Savfors

Choosing a project area

The first difficult task was to choose an appropriate **bairro** for the pilot experience. Various requirements had to be faced when selecting the area:

- Was the **bairro** appropriate for housing in the first place?
- Was it worthwhile to upgrade it in terms of environmental conditions, drainage, etc?
- How would it be compatible with a coming Master Plan for the Maputo region?
- Was the density representative of **caniço** areas in general?
- How strong was the political organization and the level of mobilization?
- Were the existing social problems capable of being dealt with in a pilot project?
- What would the reactions be in the Malhangalene survey area where promises had been made about upgrading the physical conditions, particularly the latrines, if another area were chosen?

The Master Plan for Maputo was a big question mark. It was clear, however, that the essence of the 1969 Plan for Lourenço Marques was outdated and irrelevant for independent Mozambique. Los Angeles style freeways, a new supersonic airport, huge bridges over the harbour bay made it more of a utopic vision, a tecnocratic bonanza, than a tool based on economic realities. The way the poor (read African) population was considered in the plan leaves no doubt about its source of inspiration. Africans' housing was classified as temporary. By definition the "problem" would be solved when the Africans returned to their "homelands".

Nevertheless, the 1969 plan was still in use for lack of a substitute. In the fragmentary remaining structure of **Camara Municipal**, where all the topographic and cadastral personnel and data were concentrated, the colonial master plan enjoyed full respect, and its socioeconomic consequences were not even questioned. To avoid a stalemate we decided to respect the main axes of traffic planning and drainage/sewer systems of the '69 Plan. The consequences of their alteration were beyond our competence to judge. We operated inside the grid created by these axes with the perspective of what a new Master Plan was likely to be. It was agreed in DNH that the north-eastern parts of Maputo were the best suited for housing, being situated on higher land with no drainage problems and enjoying a refreshing sea breeze. In addition to the Master Plan the requirements mentioned on the previous page were also considered. In order to evaluate the complex social parameters, we scanned a number of **bairros**. Houlene, Inhagoia, Mafalala, Xipamanine, Mavalane, Zixaxa, Polana Caniço e Malhangalene 7/8.

Decisive for the choice of the Malhangalene area was, apart from the earlier described Master Plan aspects, the fact that certain commitments had been made during the first survey. When working with squatters, informal settlers, slum dwellers or whatever their name may be, there is usually only one entrance ticket. If people are let down, it just confirms what they had suspected and the project is doomed.

Soon after the initial contacts with the local GD a work group, uma comissao de urbanizacao, was created to act as a link between the project planners and the people.
Photo: Eva Savfors

The 60 hectares selected had boundaries in the form of tarred streets. These limits corresponded to the political division in **celulas**, which was very important for the social coordination of the project. Apart from the **celula** involved in the initial survey, we now had three more **celulas** and a total population of approximatively 10,000 people to work with. The name of the **circulo** was changed from Malhangalene to Maxaquene three months after the project started. (The **circulo** is the party structure above the celula and represents a population of 30,000-50,000 people.)

We made the mistake of contacting the concerned **celulas** directly, but this error was overlooked. The first contacts were very formal and polite, but tentative. We visited each **celula** and discussed the possibility of starting an upgrading project in the **bairro**. I had the strong impression that people had heard more or less the same story before but did not want to express their doubts. Song after song and numerous "Viva ..." calls framed our frequent meetings. We met at least once a week in each **celula**. Many times we had additional meetings on weekends.

After a month we had gained enough confidence among the people to be taken seriously. A **comissao de urbanizacao**, urbanization committee, was elected in each **celula**, often consisting of the same people engaged in the **grupo dinamizador**. One or two members from the **Organizacao da Mulher Mozambicana**, Mozambican Womens' Organization, were always included.

The "rules" of the project were hammered out and agreed upon in meetings with the **bairro** population before any field action started. The main principles were:

- Nobody would be forced to leave the **bairro** (the project area) because of the project. All necessary relocations should take place within, preferably close to the previous site.

- House construction would be legalized but subject to a reasonable control if building in durable materials.

- Basic infrastructure, with water as the top priority, would be installed.

In return some sacrifices had to be faced:

- No indemnification by the government would be made to families that had to move. Any individual survival problems would have to be dealt with by the community.

- Inhabitants enjoying large compounds would have to cede space for relocated families.

- Reserving space for schools, day care centres etc, did not mean that financial resources were available. Implementation of these services could take years.

On the basis of the above rules, we received a mandate from the population of Maxaquene to work out a suitable urban plan for the area.

The GD arranged a mass meeting for approval before any field work could start.

The next step was to stage a socioeconomic survey in order to have detailed data about the society in which we were going to work. A sample of 10% of the households was judged as significant enough in light of time expenditure and resources. Yet the collection of data and the interviews were carried out exclusively by the members of the respective **comissoes de urbanizacao**. The two social coordinators in the project group, Prafulta Jaiantilal and Eva Sävfors, designed the questionnaires, and only intervened in the field work when doubts arose in difficult cases.

As expected, processing of the collected material used up most of the survey time. Furthermore tedious and time-consuming mechanical office work does not contribute to the understanding of social realities. A simple computer program would have saved us months.

The survey results revealed some important facts:

- First of all we got an accurate register of all the households in the project area. These lists were necessary for picking every 10th, but became also "legal" documents for the participants. We decided together to freeze further immigration to the project area during the first upgrading phase. The households were numbered and numbers were painted on the main doors. This system proved to be much more important than expected. It helped the inhabitants to organize the **bairro** into subdivisions and neighbourhood groups and helped us identify formations in the physically confusing **caniço** townscape.

- A household was defined as a group of related people who had an acting **chefe de familia**, family head, (in economic terms). The household size ranged from 1 to 13 people, with small families in preponderance (45% of households had no more than 3 members). The medium size was 4.3 persons to a household. The mobility of relatives caused a problem in classification. Rural links of the **caniço** society were still strong.

- The 120/100 male to female predominan and half the population being under 15 years were features in common with rapidly urbanizing African cities.

- Over half the population had some elementary education. An immeasureable asset for the whole project, in light of Mozambique's general 90% illiteracy rate.

- Stated unemployment was as low as 12% of actives. However, we suspected here "ameliorated" truth, since unemployment status for a squatter was a sentence to deportation during colonial times. Now, during the new FRELIMO government, admitting unemployment was not very popular either, but in a different context and for different reasons. A national goal was rural productivity, not parasitism in the city.

- The medium family income was 3,400 escudos/month (slightly over 100 USD), but very unevenly distributed.

- Roughly 80% of homes were in **caniço**, 10% in masonry and 10% in corrugated tin sheet walls. Almost all roofs were either in asbestos cement or corrugated tin.

- The living standard was estimated in terms of private comfort. 75% of the rooms were occupied by up to 3 persons and 10% had 5 persons. These figures included children of course, but it should be noted that a standard room was not more than 10-12 m^2. Only 78% of the households had their own latrine, and only 68% a special place for **banho**, personal hygiene.

PLANNING COULD START

During the planning stages, as we were building a relationship with the people of Maxaquene, we studied aerial photo materials from the year before, covering most of the area. The pictures told us a lot about the **caniço** habitat:

The survey on socio-economic data was to a great extent carried out by the comissao people.

At first glance they gave the impression of being dense, with very little or no room left over. However, with a closer look, the use of space turned out to be rather inefficient, even though there were cases of extremely small plots (down to 50 m^2). But the lack of geometric articulation provoked a great number of wedge-shaped lost corners and isolated islands which only served for garbage disposal. There were also spacious plots, 400-500 m^2, well hidden behind high **caniço** fences. The existence of weeds proved also that space was not always well utilized.

We looked for a hierarchy in the **caniço**, but there was no distinguishable macrostructure in the system of paths, alleys and walkways. There were no linear or punctual landmarks to which we could hook on a new, more urban kind of planning. The very first idea was to bring in infrastructure, particularly water pipes as gently as possible, perhaps along a narrow, flexible road, into the inner parts of the **bairro**. Around such a branch the concept of a neighborhood unit was developed. It was figured out that a lot of the semi-public life typical for **caniço** living could be preserved on such a scale; thus the idea of a small **praça** took form. A water tap, a meeting place for neighbors, a small playground, perhaps laundry facilities and later a common telephone could all be combined here. More as a consequence to this notion came the necessity of primary "spine", the **rua do bairro**, channelling all the mains, public transport, garbage collection etc (see 03 The chapter on urban planning).

Alberto Arecchi, an Italian **cooperante** (volunteer) and urban planner joined the team at this stage. We started calculating the population densities and the possibility of avoiding overspill, i.e. expulsion of people when making room for new roads, schools and other space requiring services. These public utilities would need 26% of the project area. 10% could be gained from the existing roads and alleys, but 16% had to be taken from housing compounds. The net density (persons/area for housing) would rise from 200 to 300 persons/hectare if the overall **bairro** density was to be maintained and overspill avoided.

The first planning suggestions provoked a lot of scepticism within DNH:

Would it really be possible to absorb 16% within the **bairro**? Was it really possible to densify the **caniço** even more, given the complaints people had about hygiene standards? How would people construct in permanent materials if plots were not established? And if plots were divided, would people accept the size of approximately 150 m^2, which would be the result without overspill? Was the **comissao de urbanizacao** really representating the inhabitants?

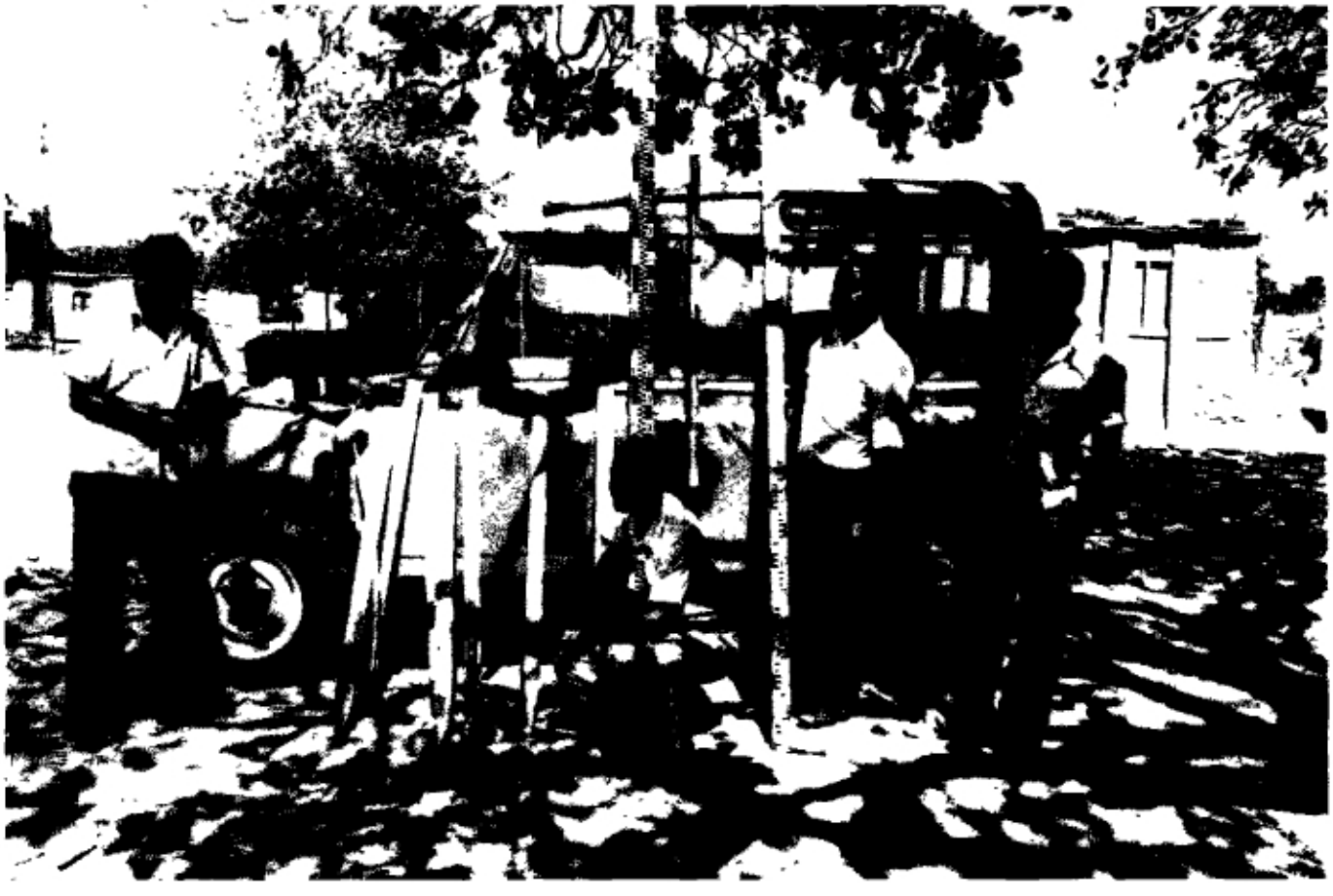
Our conclusion was to try to avoid the plot notion as long as possible, and instead divide the **bairro** into **quarteiroes**, islands within which the **comissao** would have to accomodate place for relocated families, and organize the construction of ameliorated houses as well as they could. We maintained the position that our intervention must be limited to urban planning and infrastructure. If we were to get involved in the problems of each individual house, it would have taken us years to get the project off the ground. These solutions had to come from the **moradores** themselves.

Before going further we called for a mass meeting with the population in the two central cells where the implementation would start, in order to reach the most democratic basis possible for the project. We explained the general ideas and conditions under which the project could be implemented: that no indemnization funds were available for the necessary relocation of families, that the **bairro** community would have to solve these problems, that families enjoying large compounds would have to cede space to those relocated, and that water from the new common taps would have to be paid for. Since the plan itself, the lay-out, was difficult to explain in a mass meeting we proposed the staking out of a test area where the concept of the **quarteirao** could be displayed and the effects of house removals assessed.

The meeting responded favorably to the proposals. The assurance that no one would be expelled because of the project was very much appreciated. Water taps, **fonteanairos**, had the highest priority among the upgrading components, followed by proper access roads. The overall main achievement was the legalization of construction - the prospect that from now on building of permanent houses would be officially permitted. To get these benefits, the people were willing to make sacrifices: removals and densifiation of private space. The meeting lasted all afternoon Sunday, from noon to sundown. In the end, we received a mandate to proceed with the upgrading plan.

The test **quarteirao** was difficult to stake out. The professional topographers could not see the point in saving the "huts", **palhotas**, which they usually just knocked down if they were in the way. Therefore we worked out a new system, using high rods and aimed over the roofs. With ladders and walkie-talkies, a complete neighborhood unit was staked out in this way with future streets, **praças**, and walkways traced in the sand.

This first experience was promising. The **comissao** was immediately involved in finding space for the houses that needed to be moved. They were amazed themselves with how they could "create" space. The new street alignments had a structuring effect, lost corners were utilized, fences, latrines and **banhos** were slightly moved and the problem of internal absorbtion of "overspill" had miraculously been solved. We examined and evaluated the test case with the Director of DNH and representatives from Maxaquene. We then got the green light to go ahead with the first upgrading project in Peoples Republic of Mozambique.



The staking out team with simple "over roof" equipment. See special section for technical details.
Photo: Eva Savfors

Enthusiasm in Maxaquene grew day by day. Initial reluctance and scepticism had given way to a new spirit of action that was spreading in the community. On weekends, big clean-up operations were organized. Garbage heaps were evacuated, abandoned houses demolished and old **caniço** fences were burned up so frenetically that we almost had to call in the fire-brigade. All Sunday activities were finished with a **cultura** session, which meant dancing, singing and everybody having a good time.

Even if the staking out had to be done in a new, and perhaps amateurish way, some accurate coordinates were needed if the new urban plan was ever to be integrated into the adjacent municipal networks of Maputo. Therefore cooperation was developed with the earlier mentioned **Camara Municipal**. After some tricky polygon work, they managed to place a limited number of reference marks (concrete beacons), that could be localized on a coordinated map.

The remaining staking out was accomplished by the project staff with the substantial help of volunteers from the **bairro**.

Between the concrete beacons, straight sight lines could be established, from which perpendicular lines could be staked out. All this was done over the rooftops prior to any removal or demolishing. Carlos Macave, a Mozambican extension worker from DNH, was soon in charge of these operations which were later carried out by several parallel teams.

The first blocks were done in the superflexible way anticipated in the planning session. Both the 6 meter entrance streets and the 3 meter pedestrian paths were carefully adapted to existing trees, brickhouses and even **caniço** houses if it were possible to save them. To our outmost surprise, when we came back the following day, we could not find houses for which we had made detours and bends. They were gone! They had been demolished, by the inhabitants themselves! This was the first big clash of divergent ideas between planners and users.

The **moradores** wanted at all costs to have straight streets - even if it meant tearing down expensive brickhouses and chopping down beautiful trees. We compromised by saving trees and expensive houses, while trying to make the streets as straight as possible. After all it was their own **bairro**.

When we started to save all brickhouses we inadvertently created another problem. The owners of brick houses were often considered to be **xiconhocas** (reactionnaires) - people who had not listened to the government's warnings about the risk of building houses prior to urban planning. Why should people who only thought of themselves be given special privileges? Rumours started to spread that the staking out teams were bribed. This was a very dangerous moment for the project. In a few cases we had no other option than to demolish brick houses.

Removal old caniço houses with the help of neighbors. Photo: Eva Savfors

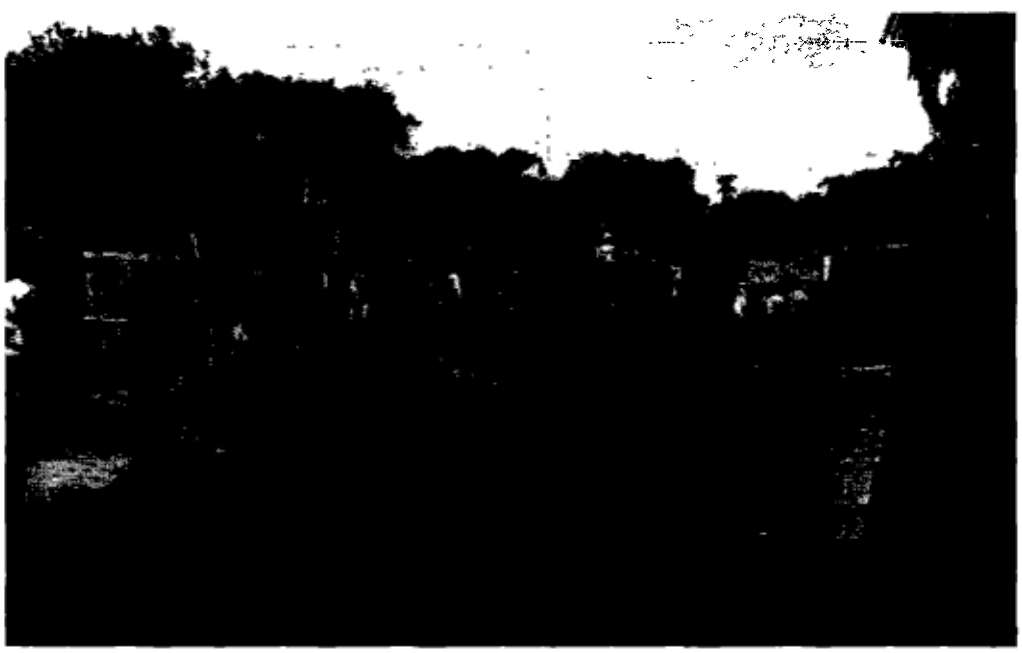
Nonetheless, the problems were rather limited compared to the scale of operations. Only in a few cases did we meet open resistance: a policeman called us to court when his ducks had been lost during transformation works. Two old men simply refused to move, one in the middle of a new **bairro** street and one in a new park area. We simply let them stay for the time being. Then, there may have been cases we never knew about since the **comissoes** sorted out social problems related to removals.

After moving out all recyclable parts of the condemned houses like roof sheets, purlins, doors, windows etc, there were usually only old **caniço** walls and cement floors left. We could now enter the heavy earth-moving machinery that the UNDP project disposed of. a bulldozer, a motor-grader, digger loaders and trucks. We discussed for a while whether it would be better to mobilize for self help for the building of roads, instead of using imported engine power, fuel etc. But since the equipment was already available and not being used for anything, mechanization was the easiest option. The bulldozer had the indispensable asset of filling and compacting old latrines and garbage pits to the extent that they were completely eliminated. The spectacular effect of having a new **quarteirao** street network made in a couple of hours had certainly a psychological value. By now, no one was in doubt about the project being serious.

For the financing of local infrastructure discussion of the **taxa de bairro** was launched. Normally these expenses would have been covered by the municipality. But, since the city council was being transformed and the **caniço bairros** would thus have to wait, there was great interest in creating a local source of finance for small scale neighborhood infrastructure like paved walkways, drainage, playgrounds etc.

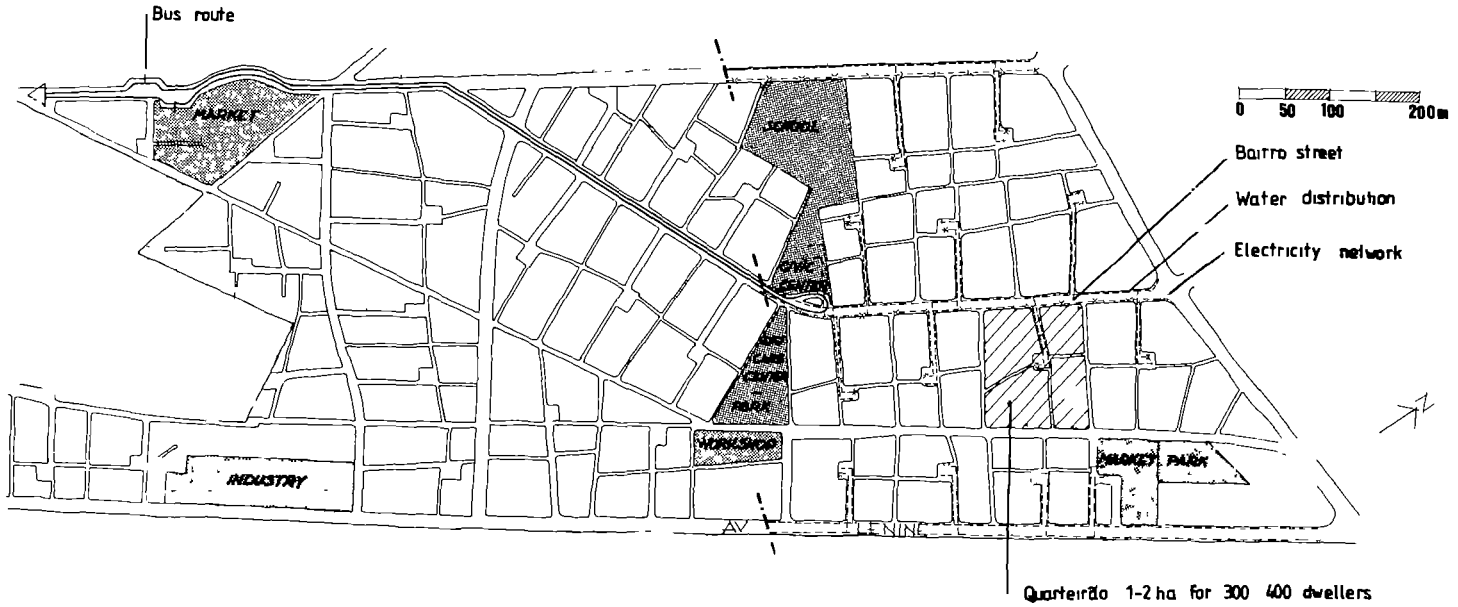
People were prepared to link a community tax to new construction in permanent materials, in the range of 5% of building costs. In this way the poorest would not be hit. The idea was even approved at a major **bairro** meeting, but DNH rejected it since it did not have a legal foundation nor official political support. Financing in a socialist state should not depend on taxes, but on proceeds from industrial production.

At this stage DNH assigned another architect, the Canadian **cooperante** Barry Pinsky, to the team. We now were able to expand operations and work with many new ideas valuable to the project. The Mozambican staff was reinforced with more extension workers on the site. Control over private house construction could now be organized.



Access street opened after all necessary removals had been undertaken by the comissao - at last, ambulances and fire brigade can serve the bairro.
Photo: Eva Savfors

Maxaquene One - the first project area involving 10,000 people. Initially this plan was submitted to an expressway on the Lourenco Marques Master Plan, cutting the area diagonally in halves.



HOUSE CONSTRUCTION LEGALIZED

First of all it was necessary to find a substitute for the extremely bureaucratic building permit system dating from colonial times. A simple, fast routine of registration would reflect much better the true construction activities going on in the huge **caniço** suburbs, even if technical details and graphic representation had to be drastically reduced.

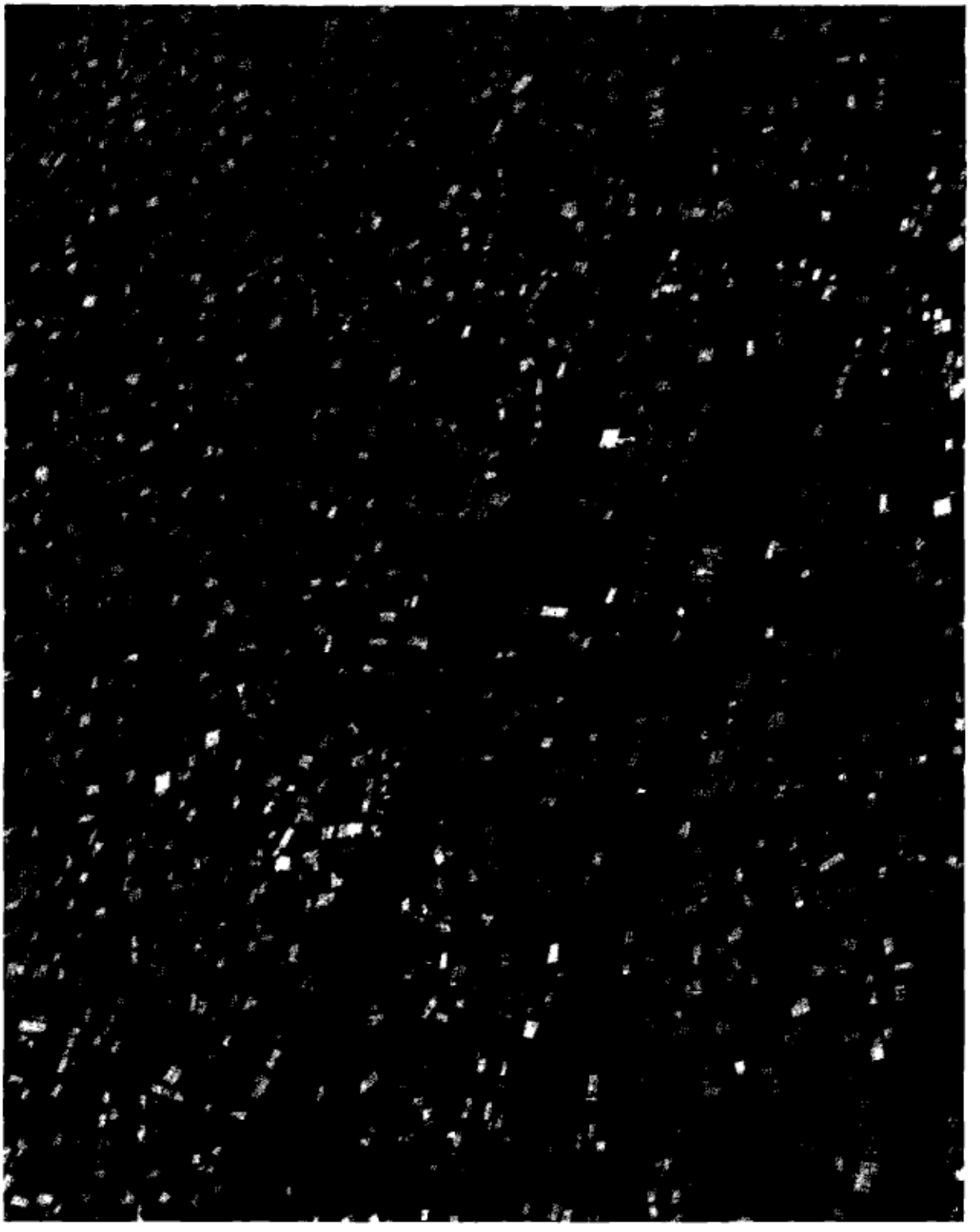
An A4-size card form, easy to photocopy, was designed to carry the essential information for localization of the houses: a schematic plan of the house and plot/compound in the scale 1:100, a few data on the materials and identification of the owner. The card was filled in on the spot by DNH extension worker. The builder first placed construction materials loosely on the ground in order to indicate the way he intended to build. If the DNH agent did not find any inconveniences for the neighbors regarding latrines, fire hazards, storm water etc, the builder was immediately authorized to proceed. A follow-up visit verified if the endorsed plan had been respected or not.

Still, it took a long time before the extension workers could handle this new system, and a lot of arbitrary decisions were taken, often without due competence.

It should be noted that the simplified system never got any legal status, even though it was useful for the project administration.

A remaining idea from the original UNDP project was that of a self-help workshop with tool rental, technical assistance and building material sales. Although we installed a nice **estaleiro** in a former Portuguese store inside the **bairro**, it never operated as planned. The need for tools was exaggerated. Local craftsmen, masons and carpenters were hired even by builders with limited means had their own equipment. However, material sales would have been a great success if the government had authorized the outlet. Next to water and access roads cement was one of the most requested items. From the beginning, negotiations went on with the government distribution office; but the scarcity of building materials in the country and the irregular national production of cement, bricks, roof sheets and sawn wood, did not allow for any surplus when the priority targets of Government construction had been catered to.

But the **estaleiro** was still very useful as a site office, meeting place, storage place for equipment, fuel and supplies for infrastructural works, and as a general centre for field activities.



The first phase of up-grading concluded: a the street network established. Polana Canico to the left had at this stage not yet been included in the project.

Given the fairly smooth implementation process in the pilot area, DNH took the decision in Dec -77 to expand the project to the North and to the East: to the adjacent **bairros** Maxaquene Norte and Polana Caniço. The population densities were lower, but the total number of people involved in the project now reached 36,000.

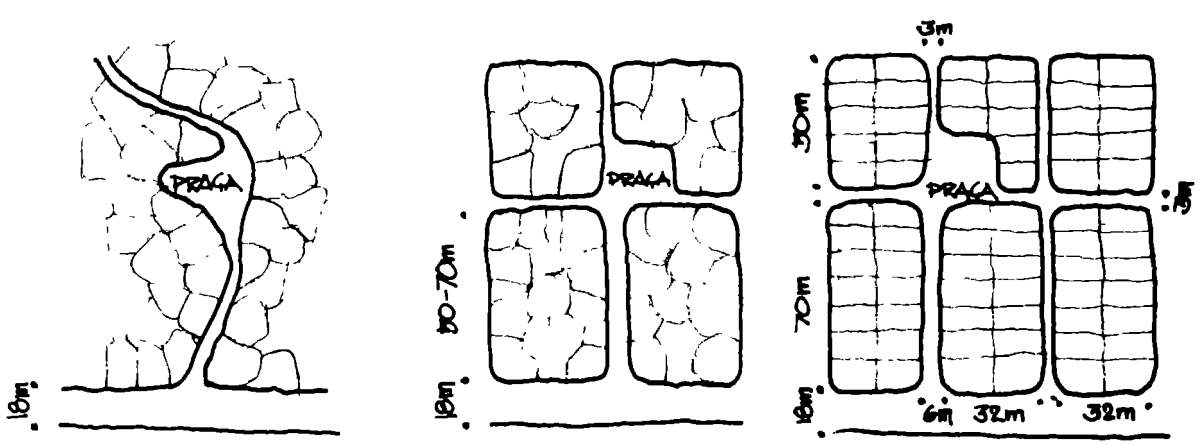
We divided up tasks for two teams, with one architect, one social coordinator and 2-3 DNH extension workers on each. The experience learned from the pilot area, Maxaquene One, allowed for much more efficient field organization. The staking out was entirely done by local staff and volonteers, and the project rolled on with amazing ease. Perhaps a little bit too fast, as we later discovered from a helicopter/aerial photo mission. In one area the **quarteirao** streets and paths looked like a fish bone pattern. An intensive recycling course had to be arranged for the extension workers who usually had had only four years primary school. Still they came a long way, fueled by committment and eagerness to learn.

Subsequently, some new urban planning principles were tried. There had been reactions against the "island" method used in Maxaquene One, where blocks of 50 m x 40 m approximately, surrounded by new pedestrian paths, had been left to the urbanization committees to sort out. It had been virtually impossible to provide every household with access to public space. The **lotes interiores**, compounds, in the middle of the island were regarded as seriously handicapped and provoked a lot of problems for the committees.

I still do not know whether it was right or wrong to give in to pressure, but we decided to launch a new pattern with a maximum block width of 32 m (block here used in the sense of "island"). In connection to the discussion about plots, which will be dealt with later, we had come to the conclusion that 16 m x 10 m would be the theoretical size affordable for a household, urbanistically speaking. If this size were exceeded the consequence would be "overspill" expulsion of families from the **bairro**.

The finer meshed street pattern provoked necessarily more destruction. It also channelled the whole process almost automatically toward plot division. Whether right or wrong, it is important to know how these ideas were developed.

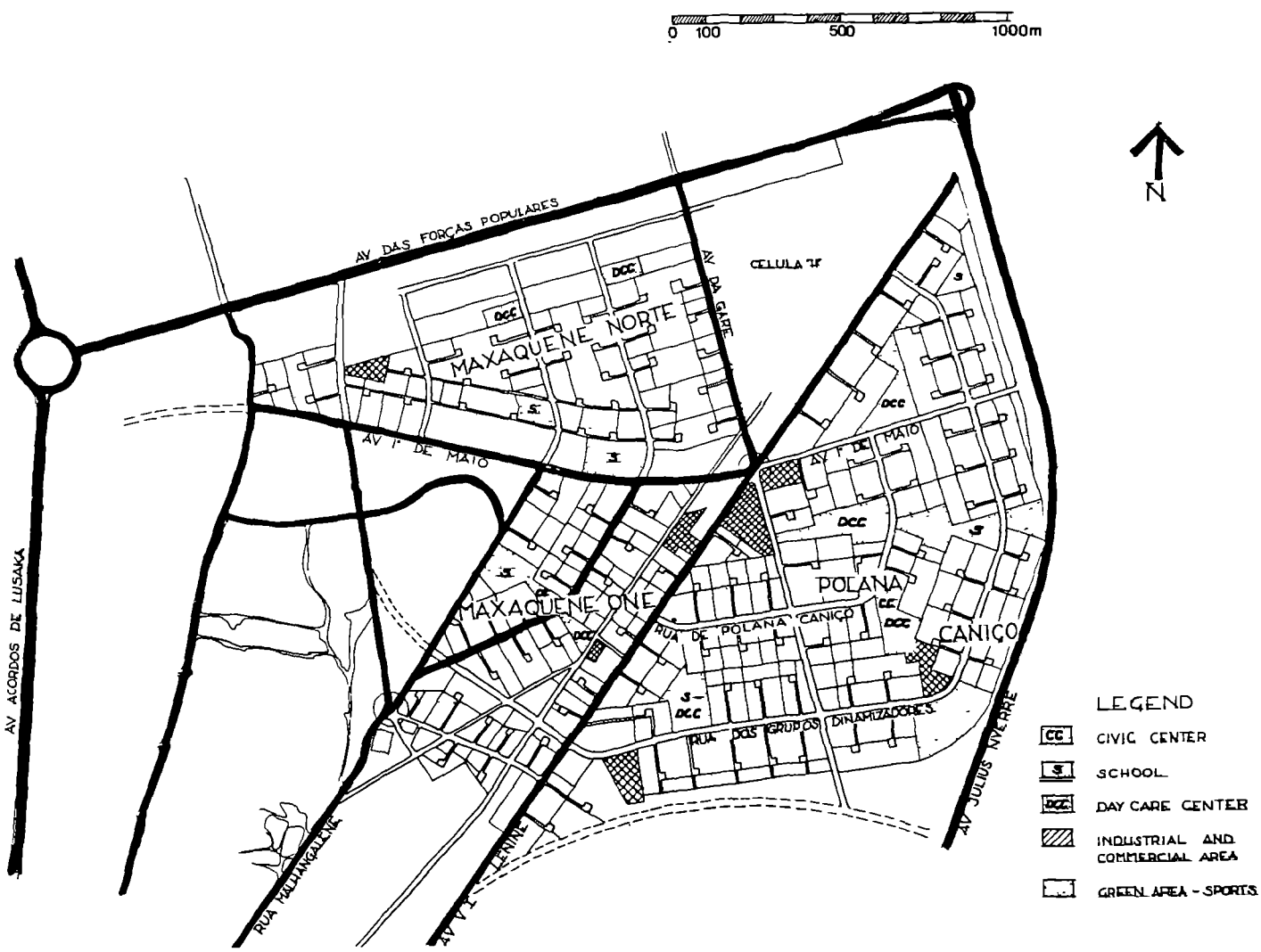
Even 2 meters wide cul-de-sac paths were tried in Polana Caniço, in order to see how much public space could be minimized. The planning aim to locate the **praça** under an existing big tree was stressed. This part of Maputo is evenly furnished with huge cashew trees, providing excellent shaded meeting places. This precious asset was not apparent to everyone, and there were some difficult moments when we could have fired the bulldozer operator.



Maxaquene. Evolution of planning concepts:
1. *Reconstruction in situ, as anticipated initially*
2. *The lay-out in the first area, after pressure from the moradores.*
3. *The Polana Canico, lay-out. Specially designed to facilitate the self-help division into 10x16m plots.*

Filipe Lopes, a Portuguese urban planner, had at this time begun to work on the Master Plan aspects for several Mozambican cities. In this way we eliminated a 50 meters wide freeway from the '69 Plan going right through our areas. Instead, a more modest traffic pattern was designed, linking our **bairros** to the industrial area along Ave de Forças Populares in the North and to the centre of Maputo in the South.

In addition, a more densely developed commercial zone was planned in the middle of the project area, around the crossing Ave Lenine/Ave 1° de Maio. Lopes was concerned with the uneconomical low density of the **caniço** suburbs, and we decided to earmark 25% of the extension areas in Maxaquene Norte and Polana Caniço for high rise development. These zones were then evacuated by the project and the transferred people absorbed into the upgraded **caniço**.



Maxaquene One and the extension 1978 to Maxaquene Norte and Polana Canico. Over 36,000 people were now involved in the project.

The field staff, mainly unskilled people trained during the project.

SELF-HELP ON ALL LEVELS

The **comissoes de urbanizacao** had assumed the important role of a link between the planners and the people. With the rapid extension of the project and the multiplication of activities, these committees could no longer cope with all the different tasks: mobilization, transmission of information, criticism and feed back, organization of house removals, data collection for socioeconomic surveys, settlement of disputes, clean up campaigns, etc.

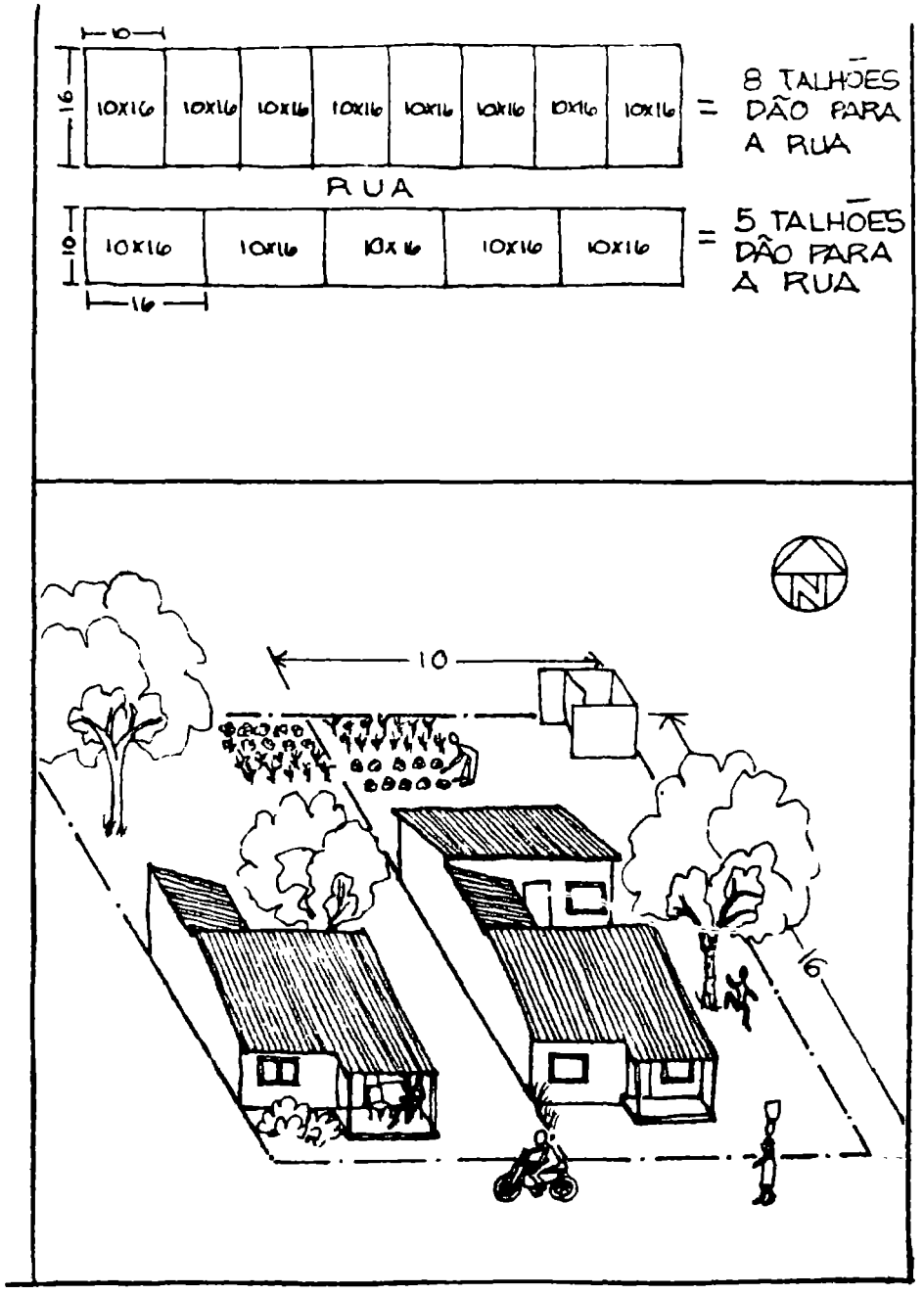
The natural delegation of duties was by the **quarteirao** level. In this way a sub-committees was elected in each **quarteirao**, representing 200-400 people. This system proved to be much more viable than expected. The sub-committees took care of all the practical matters on the neighborhood level. More people got involved in responsibilities and both political and social life were animated. In a few cases the sub-committees took over the role of **grupos dinamizadores**, which was not appreciated by the latter. This sort of competition had to be straightened out and it was concluded that the sub-committees should concentrate on practical tasks.

During the project evolution, the plot issue had constantly been debated. Relocated families had especially felt the need of established space limits within which they would not feel as if they inhabited an area at the expense of other people. The original inhabitants of the neighborhood had a tendency to behave as if they were more entitled to the semi-public space and set up rules for the newcomers. Although the insecurity of displaced families was certainly a problem of mobilization, it was nonetheless made easier with plot boundaries.

The builders of new houses wanted to know the limits, not necessarily for putting up a fence, but in order to avoid wasted investments. Since everyone dreamed of a permanent house, this pressure for plot division became overwhelming and had to be dealt with.

When we still refused to get involved with individual plot division, people in one **quarteirao** started to do it by themselves! From the beginning project targets were focused on land use planning and infrastructure, not individual house construction. Some of the reasons for not dividing up plots were: panic demand for plots if divided, unnecessary demolition of houses, scarcity of surveyor resources and possibly the positive socio-cultural value of the **caniço** habitat, often without fences.

Quarteirao 14, Rua Central, launched the concept of **parcelamento popular** and the process is interesting from many points of view. The inhabitants started by requesting data from DNH, on how much space each family would be entitled to, etc. The reasons for the theoretical size of 160 m^2 were given, discussed and accepted. Then the people proceeded to plot division with measuring tapes, pegs and great enthusiasm, but had little background in mathematics and geometry. We anxiously monitored the experience just to make sure that no inconveniences turned up. In a couple of week-ends they had managed to carry through the **autoparcelamento** in a fully acceptable way and had even produced space for **more** inhabitants to move in!



Parcelamento popular - self-help plot division. The pressure for determined plot limits ended up in a do-it-yourself system based on descriptions in a simple manual. Each quarteirao decided whether or not to plot-divide, and certain principles were established in order to protect individuals, trees and brickhouses.

The outcome was so indisputable that we had to accept this change in project objectives and just try to avoid the possible negative effects of self-help plot division. A simple manual with explicatory drawings was produced to explain some geometrical concepts and establish a few rules. existing trees and brickhouses could not be destroyed, nobody could be forced to move his **caniço** house before it perished (normal life expectancy is 3-4 years), plot division would always be volontary within a **quarteirao**. Even with this liberty of option, 90% of the **quarteiroes** in all the project areas in Maxaquene and Polana Caniço had plot divided within a year. Skilled plot dividers offered their expertise to other **quarteiroes** in a spirit of cooperation. On the other hand cases of new businesses were detected where divided plots had been traded. However, the smart dealer who had made good looking plans on cardboard was eventually **neutralisado**, exposed at a major meeting.

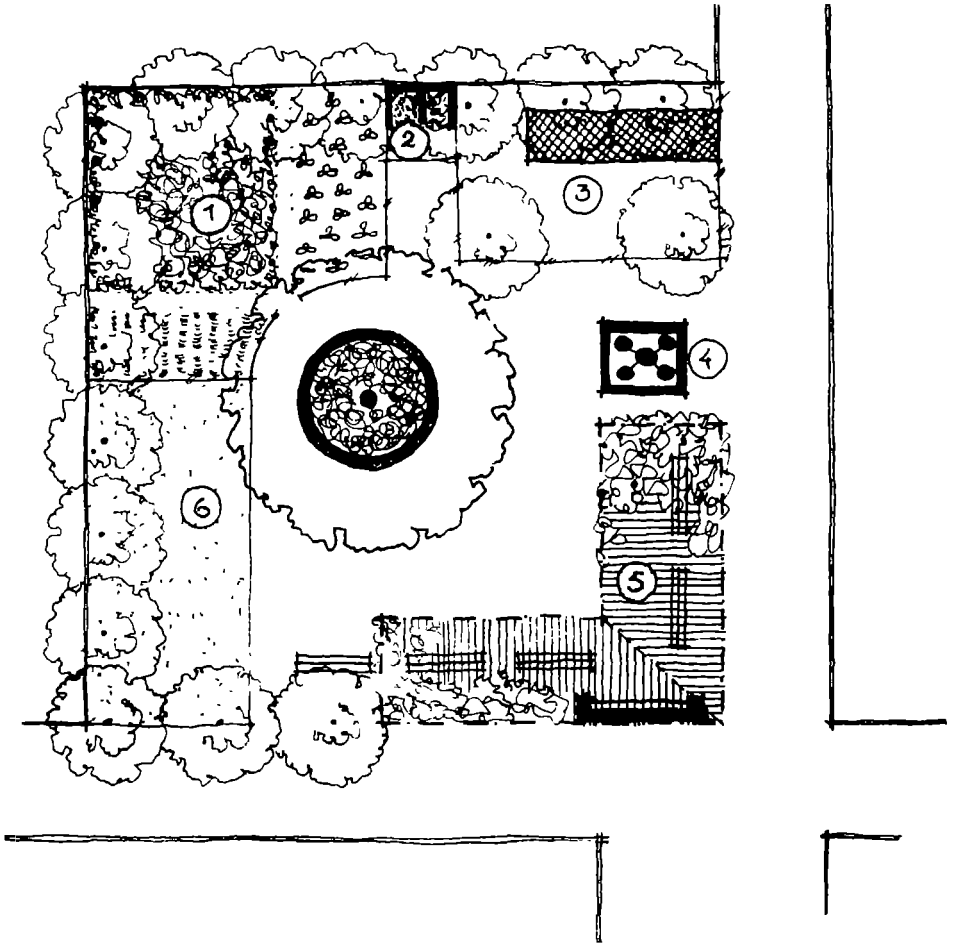
On the whole the process of self-help plot division must be recognized as a striking example of what people can do when they are determined and organized, even if they are poor.

When the configuration of a block was established, concrete marks, 0.1 x 0.1 x 0.4 meters, were entered in the ground for future surveying needs and possible signalization for aerial photography.

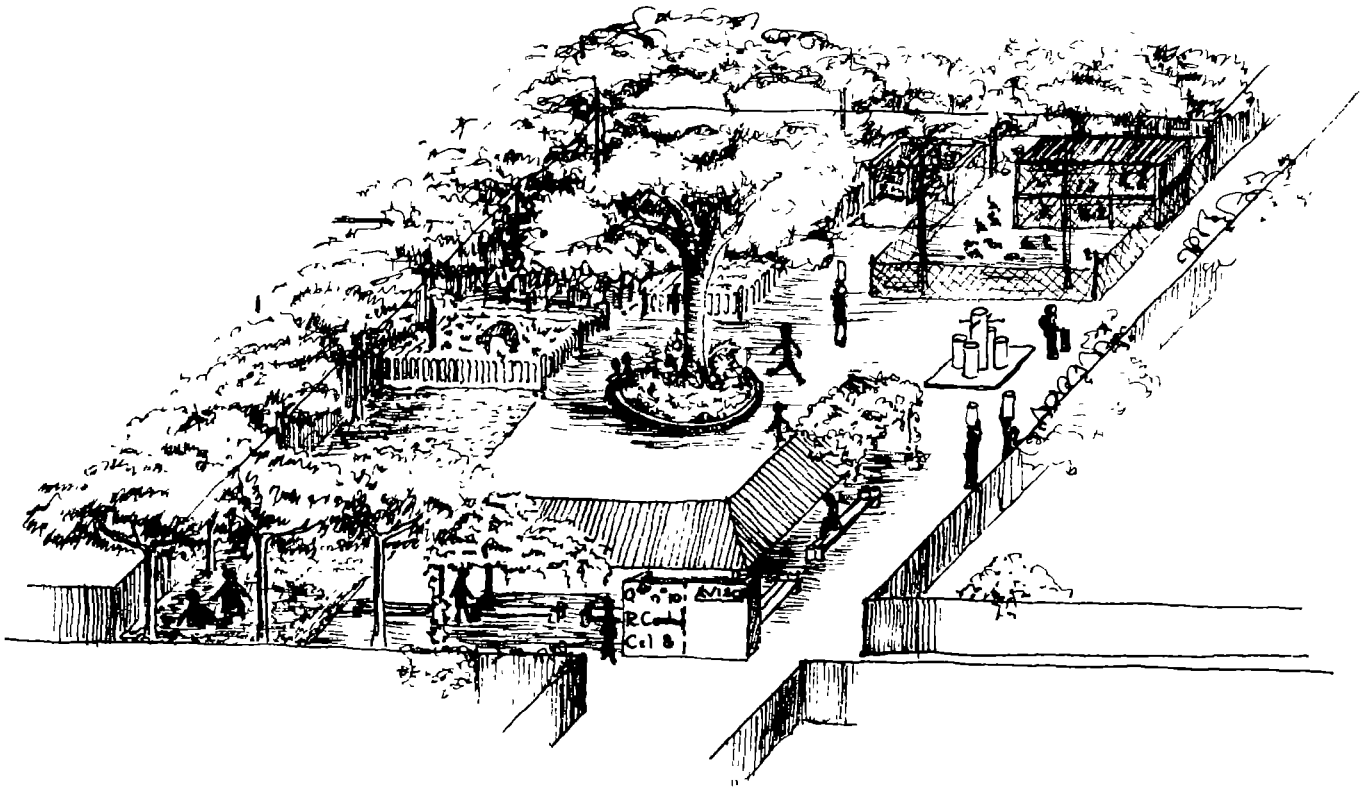
Another community action was the landscaping effort for the **praças**. At one stage a landscape architect was involved in the project and a model **praça** was created together with the neighborhood people. A small playground was arranged using scrap materials, fruit trees planted, benches made out of logs and surrounding walls painted. Some experiments were made with paved walkways using cracked up cement floors from evacuated **caniço** houses.

Not all of these items had success, but decoration of the **praça** became the pride of many **quarteiroes**, even if the design went in all directions. Some of the most beautifully colored stone arrangements, overloaded with inscriptions, looked like tomb stones. Perhaps people had been inspired by the monument building craze that reigned in Maputo at the time. However, what was essential was the feeling of identity and personal creativity that emanated from the **praça**. The neighborhood people were doing their own thing.

The Praca - a small scale, semi-public space turned out to be quite appropriate for the peaceful life in a canico bairro.
The pracas were, if possible located so as to benefit from an existing tree.



Landscaping proposal for a praca by Lenna Vasur, architect:
1 - vegetable garden, 2 - manure , 3 - chicken yard ,
4 - water tap, 5 - sun screen , 6 - grass

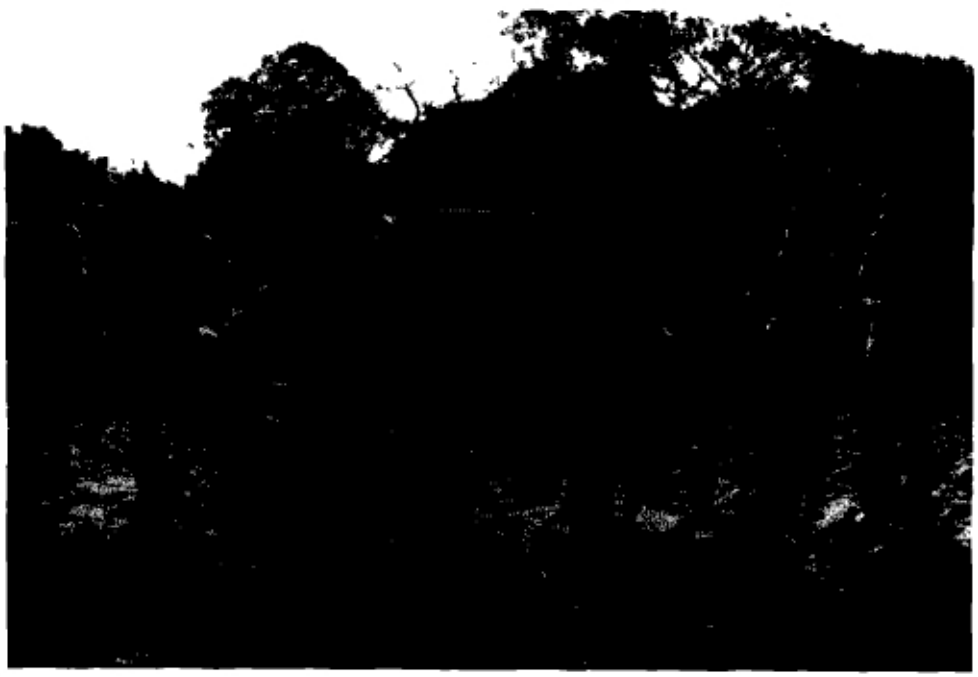


The decoration of pracas gave identity to many of the quarteiroes.
Photo: Eva Savfors

Each quarteirao organized their own clean-up schedule

Many activities developed without input from the project team, like dances and other social functions. Weekly clean-ups and garbage control became a routine. In one celulas they even had their own Public Health Board going around the **quarteirao** and checking sanitary conditions. Users of condemned latrines were obliged to build new ones.

Without idealizing, mobilization of the **bairro** people to creative action was the greatest achievement in the Maxaquene project. Nonetheless, it was difficult to explain to outsiders since their achievement were not manifested in spectacular, physical architecture.



The Kwela dance, on of the popular activities on week-ends in the bairro.

If coordination between different government structures was a problem during the infrastructure phase of the project, releasing allocated funds was another story altogether.

The Ministry of Finance could not make funds available until the middle of the fiscal year, which meant that only 6 months were left for spending the budget. The result was a tremendous under-utilization of already modest allocations.

It is amazing how much capital just sits passively in bank accounts in developing countries, frozen by bureaucracy that is often reinforced by vegetating civil servants many of whom just do not care if targeted projects are being executed or not. One gets the impression that it was easier to make the revolution out in the bush than in the corridors of ministries.

The urban planning principles of the street network has been described earlier. Briefly summarizing, the central corridor of 12-18 meters width was meant to accommodate the **bairro** street. The majority of heavy investments in linear infrastructure should be concentrated here. For example, instead of asphalting in different parts of the **bairro**, just one strip of 6 meters would be done. In cost/benefit calculation, would be included also the expenses of rolling equipment like buses and garbage trucks, whose spare parts consume precious hard currency.

Inside the **quarteiroes** the circulation on the 2,3 and 6 meters ways would primarilly be pedestrian. Car ownership was as low as 1.5% (of households), and the occasional entrance of ambulances and taxis could not justify a traffic separation. Paving and drainage works were here left to the **quarteirao** initiative.

The design of the **bairro** street was started by a Cuban engineer and continued by Lars Skamris, a Danish member of the UNDP team, who a couple of months later was tragically killed in an automobile accident. The street was built much later by a contractor but without stormwater evacuation totally secured. Unfortunately, the planned extension of a bus route onto this **bairro** street did not materialize either.

The least problematic utility to install was the electricity network. The strategy was to provide security lighting along the **bairro** street and on each **praça** in the first phase. But the offered capacity even allowed for connections to individual households. The Electricity Board was the best organized government structure we came in contact with. Perhaps purely technical problems were more readily mastered.

Power connection to a canico house - previously not allowed.

Maputo received 80% of its consumption from the Cahora Bassa hydroelectric plant in Northern Mozambique. However, the feeder lines came via Johannesburg/Pretoria thus demonstrating the nation's of predicament of being dependent on South Africa.

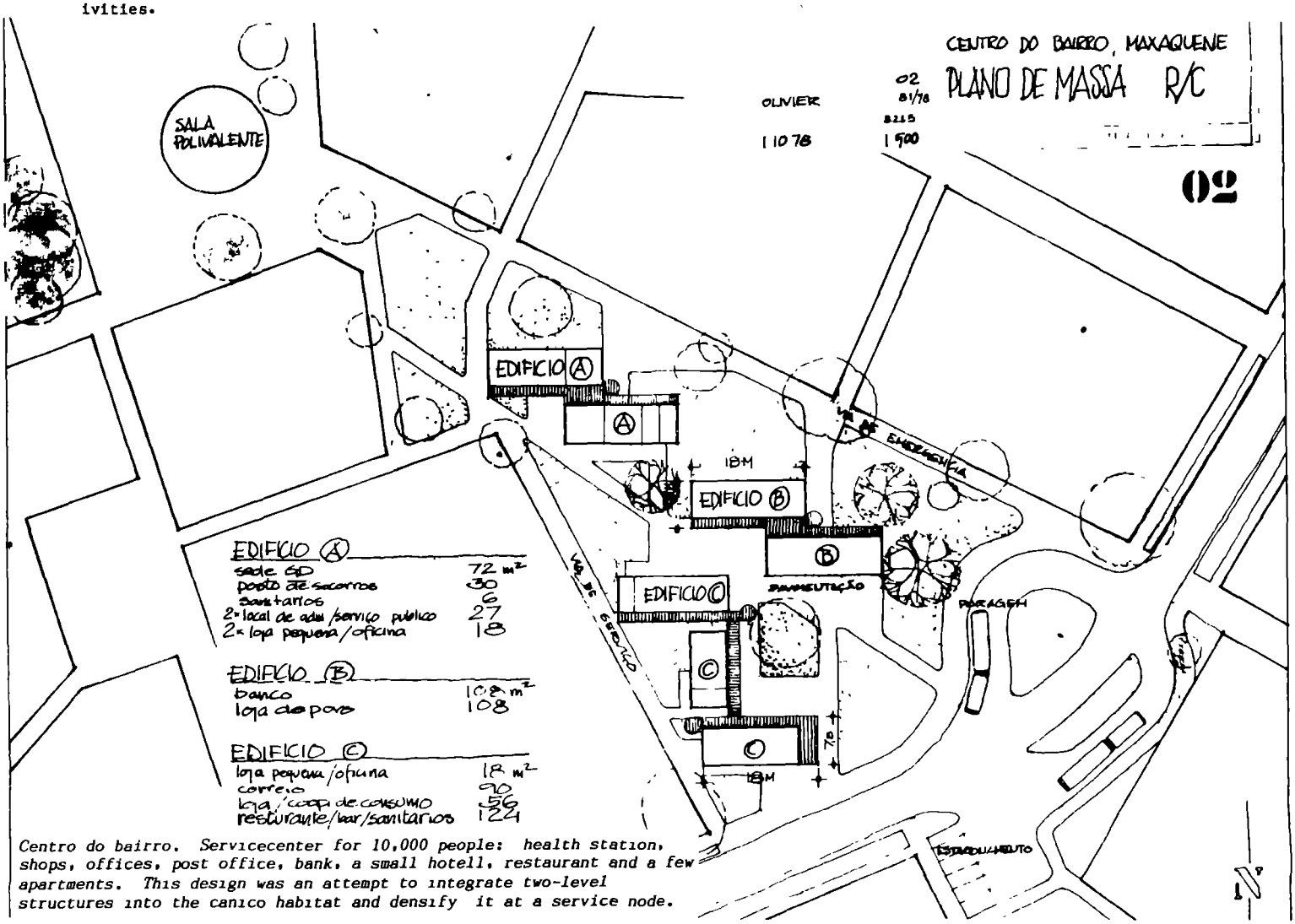
No Mozambican norms had at the time been defined for the social, cultural and commercial facilities in a bairro. We had to rely on international praxis. Latin American planning experiences were studied since they had the most similar conditions. Simultaneously, urban planners at DNH were working on establishing social service standards and could act as consultants.

The objectives were the same as in most urban settlements: The local social services should satisfy the daily needs of well being, reducing unnecessary transportation and time expenditure for the dwellers. The location of a service unit should respect reasonable walking distances but its size must allow for a viable economical operation.

Even within a **bairro** there is a hierarchy of service levels with a population basis ranging from 300 people to 50,000 people in a **quarteirao** (see chart on page 25). Some of these units could be combined in a **centro do bairro**, which would help create an attractive socio-cultural environment and give the **bairro** its own identity. Such nodes existed already at the market places, but could be diversified with non-commercial activities.

An attempt to throw more light on these aspects was done by a visiting architect, Olivier de Lignerolles, who designed a proposal for a **bairro** center in Maxaquene on a DNH endorsed program. Apart from the more common units like post office, savings bank, consumers' cooperative, and small shops. A small hostel was also integrated. The **bairro** center was designed for concrete prefabricated elements in two storeys with special concern that the center fit into the **caniço** habitat.

The center was supposed to have the end terminal of a bus route. Together with a school, a day care center, a park and a small scale industrial area, the whole layout formed a ribbon of social equipment across the **bairro**.



Centro do bairro. Servicecenter for 10,000 people: health station, shops, offices, post office, bank, a small hotell, restaurant and a few apartments. This design was an attempt to integrate two-level structures into the canico habitat and densify it at a service node.

The analyzing work prior to the design of the **bairro** center, scanned over some interesting problem areas: How can a center like this be related to the self-help spirit in an upgrading project? Since many of the services cater to a much larger population than that of the particular **bairro**, there is a democratically less evident answer. And if the decision making is made without the input of the local people, how can you avoid the negative effects of parachuted, alienated structures like many in Europe? And if self-help should be part of the construction work, how do you combine it with the fairly sophisticated technology that is needed for a denser, dual storey structure and service units with special requirements? Who would be responsible for the operation of the buildings with their different functions?

EDUCATIONAL FACILITIES

Since Independance, education is one of the top priorities in Mozambique, and is allocated a large portion of the national budget. Primary and secondary schools are planned for the provinces; there is evidently a clear political ambition to even out the tremendous gap between rural and urban social infrastructure.

This policy, for all the good reasons it may have, results in a certain vacuum for the **caniço bairros**, however underpriveliged they may be in relation to the rest of the city. The problem is not only a matter of building the premises, as many aid donors are inclined to think. It is also a question of finding sufficient and qualified personnel to the schools and providing continuous budgets to run them.

In spite of the obstacles, negotiations with the Provincial structure resulted in a self-help construction project for a primary school in Polana Caniço. But the project was stranded later on, mainly due to lack of follow-up and long term management of the whole upgrading operation.

Nevertheless, all zones destined for schools were being evacuated and the concerned families integrated into the ongoing internal resettlement process. This was in fact very important, otherwise they would have been left out when the new urban plan was consolidated and all housing space occupied.

Since 1975 informal education, for children and adults, was continuously organized by the **grupos dinamizadores** in abandoned shops, in shacks, under trees. Even though they lacked pedagogical methods and materials, such initiatives manifest in themselves the great resolve of the people to change their living conditions.

HEALTH CARE

Health care facilities were integrated into the overall planning as being an obvious part of urban upgrading. The policy of the Ministry of Health was to make a clear distinction between preventive and curative medicine. Better sanitation of the housing environment should reduce the need for hospital care. Latrine programs were launched, elementary health education was provided and vaccination campaigns organized. Added to the human aspect of less suffering, the preventive medicine policy is far more cost/benefit effective than hospitalization and treatment. Curative and emergency care is of course still needed and the government strategy was based on urban health centres serving 50,000 - 100,000 people, while unmanageable cases were transferred to the central hospital. One such health centre was proposed by the Minister of Health to be located in Polana Caniço. But again, the lack of staff and equipment resulted in the project being postponed indefinitely.

Day care centers were also under the Ministry of Health. The introduction of day care centers for children under school age was fairly recent. They were linked to the values of the new society: emancipation of women, care for children, and the desire for productive progress in industry.

In cooperation with the OMM (the women's organization), an experimental day care center project was started in Maxaquene. In a service-zoned area, two brickhouses were saved and the owners compensated for recuperable materials. The project was originally modest in its design but the Ministry of Health was establishing standards and therefore boosted its size and complexity. As OMM participation declined, the project became more and more the concern of outsiders. Two new buildings were designed and construction took over two years. The self-help component was in this case minimal.

The less encouraging examples of social services have been included in the project description to give an idea of the new type of problems that emerged during the second phase of the upgrading project - especially problems involving coordination with other government structures.

The second phase coincided with a general uncertainty about the future of the Maxaquene project. Without the necessary political support, management could not proceed in a determined way and most activities in the field slowed down. This process will be dealt with more in 05 THE CRITICS.

In spite of the delays and failures, it should be noted that the implementation of social services is usually a long term process, particularly in a developing country. Even so, zoning and evacuation of future service areas were necessary in order to avoid overspill problems later on.

With good organization, the land for future school grounds and parks can be utilized by first developing them as playgrounds, football fields or controlled gardening/farming areas. However, a strict local administration on the **bairro** level is important in order to avoid resquatting and improper garbage disposal.

The vitality and importance of the so called informal sector in squatter settlements is by now widely recognized by most urban economists. Its provision of goods and services at the lowest possible prices and its innovative self employment capacity are means of survival that no overhead organization ever can offer. It provides training of skills, it recycles waste products and develops appropriate technology - in short, many of the things the establishment tries to do but often with poor results.

In Maxaquene most trade and commerce was under the informal sector label, even if other forms of business had recently been introduced, such as **cooperativas de consumo**, consumer coops, and **lojas de povo**, people's shops. Particularly the consumer cooperatives had become important distribution links for daily necessity items. The long term target was to safeguard an even supply, partly for the members' convenience and partly to counteract hoarding and speculation.

One marketplace, organized by the Municipality in the Southern part of Maxaquene, and one squatter market in the Northern part constituted two poles of commercial and artisanal activities in the **bairro**. Along the asphalt border streets flourished a variety of different shops: radio repair, barbers, tinsmiths, tailors, carpenters and even car repair. Often the physical structures - informal sectors were rudimentary and even below the **caniço** housing standards.

The marketplaces are part of the upgrading targets.

In no way did the project aim to regulate or take command of commerce. Furthermore, the government had made a clear political retreat from the previous plan of nationalizing everything including barber shops and discoteques. The planned economy, which was the system Mozambique had chosen, had enough problems to cope within organizing the major industries and implementing important decisions for the agricultural sector. Private enterprise was therefore welcome, particularly small business. If measures involving trade and commerce were to be taken, they would have been the concern of an all together different ministry.

The role of the upgrading project for commercial life could still be quite important. The traffic zoning could offer better access conditions for deliveries as well as more safety for pedestrians. The legalization of the squatter markets should have the same effect on investments as if had on squatter installations in general. Hygiene in food markets should be easier to maintain and control. Infrastructural facilities like water, electricity and telephone would have a great upgrading impact on the commercial sector.

Small scale production was included in the planning and implementation of the project. Non air-polluting industry could even be promoted in the **caniço bairros**. Noise disturbances for the residents could be coped with through zoning, and special **areas industriais**, industrial parks, were staked out and evacuated like the other public facility land. The size of these zones was fairly modest, 1-1.5 ha, but the location important· either a connection to a market place or easy infrastructural access. Plots of different sizes were divided for distribution according to the trade and the need for space. Obviously all artisans would not have to be confined to the industrial zone, e.g., there would be no point in forcing watch repairs and simliar businesses to move.

Carpentry work shop.

As already explained, part of the strategy of the upgrading project was to avoid getting involved in individual house construction. Lessons learned from previous projects recommended against such involvement. Nevertheless, a major concern of the individual **morador** of the **bairro** was the house and how to fix it up, or build a new one. At the same time the outcome of the new urban plan - which **densified** the private living space - called for some sort of intervention on the micro level. The question of house construction could not be overlooked, and at least some recommendations had to be established.

Some work on this level had in fact been done, before the upgrading project got the green light to go ahead. Development research had been carried out on the problems of local drainage: how to get rid of water standing in puddles without waiting for the municipal evacuation systems to be extended out to the **caniço** areas. This work resulted in the so called **puncture drain**, a simple auger drilled hole in the ground filled with rocks and topped with a sedimentation trap or a silt filter. These techniques could be used for improving the immediate living environment, that is, the individual house compound. The tool rental facility at the **estaleiro** had been destined for personal use. The sale of building materials was envisaged as a main function of the self-help support center and would have been so if the government had permitted it. As earlier mentioned, there was a problem with general shortages in Mozambique.

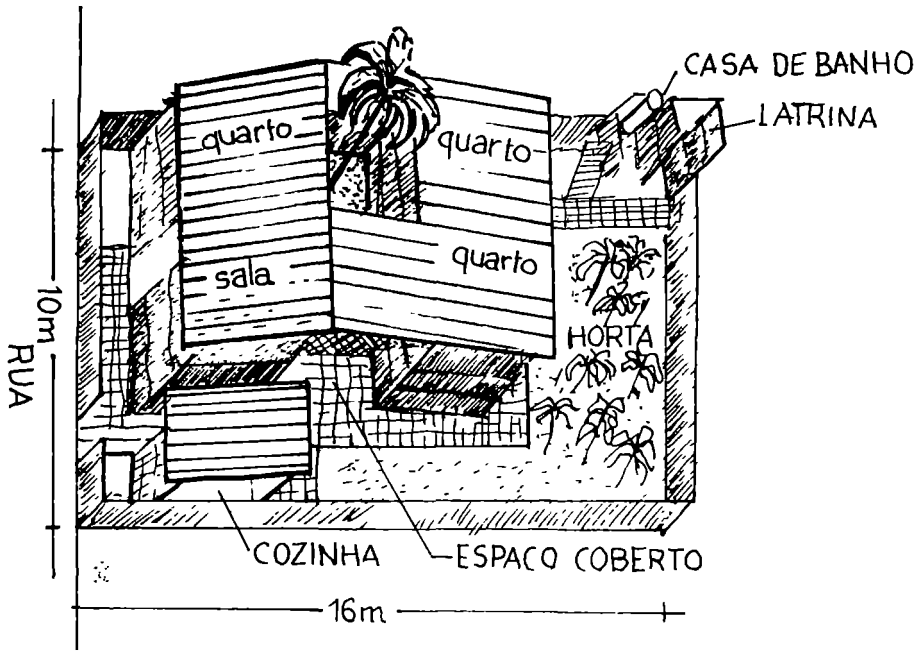
But it was not until complaints about small plots grew stronger - to the point of discrediting the reputation of the whole project - that we decided to intervene on the level of the individual house construction. However, the approach was to stimulate ideas so that builders could solve their own problems.

A couple of experimental compounds were built together with interested **moradores**. Our aim was to verify whether a rational utilization of space would make it be possible to live in 160 m^2 per household. The problem was very much linked to the sanitary systems in the **caniço**. Since densification was necessary in order to avoid "overspill" of **bairro** people - and multistory construction economically unfeasible - we had to find a mini-space on-ground solution.

First, the pit latrines usually had a large surrounding security zone because of the collapse risk. Secondly, the **casa de banho**, bathing room, just an open space with four **caniço** walls, was built exessively large

House construction was still to be based on a management by the people, as always in the canico bairros.

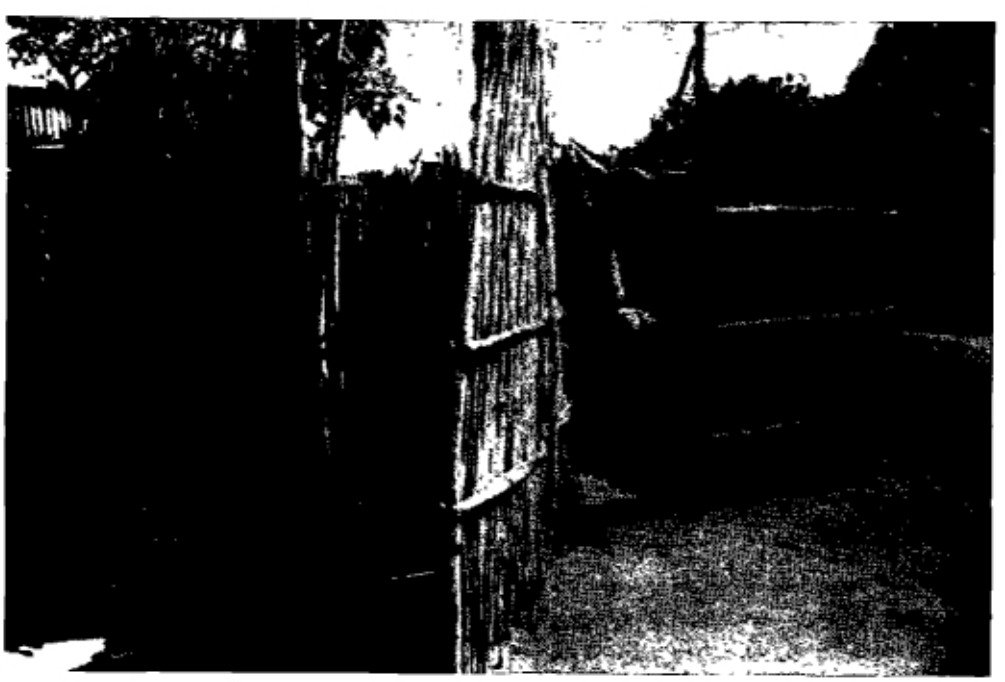
to allow for the absorption of waste water into the ground. In this way the sanitary installations in smaller compounds sometimes occupied as much space as the house itself. In addition, malfunctioning pit latrine systems often resulted in bad odors which increased the



desire for distance from the house. This space between house and latrine was not necessarily utilized. We concluded that minimum living space could be **substantially reduced** if the sanitary systems could be made more satisfactory.

Thanks to the low ground water table in Maxaquene (20 - 30 meters under ground), deep bore hole latrines could be drilled without contamination hazards. The sandy soil was free from rocks and permitted easy use of manually operated augers. The obvious advantage of this system was the small diameter of the hole, 15-20 cm, with a minimal demand for cover structure and functional space.

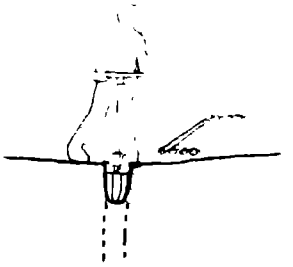
The disadvantage was the limited reception volume even with 10 m depth. This problem could possibly be solved by a "revolver" system with 4 holes permitting a full hole to be closed for 18 months and thus transforming the contents to mould. The mould could be emptied by the auger and used for gardening. However, the eventual socio-cultural resistance to such a system could not be evaluated at the time.



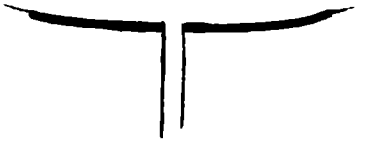
Casa de banho - the open air latrine and wash room, requiring ample space.

150 mm earth augers used for drains and latrines.

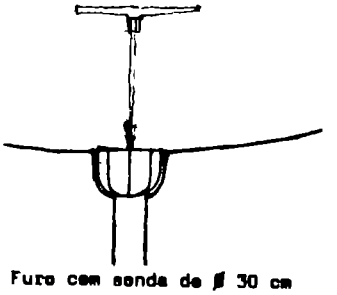
The puncture drain, a method for drying local depressions and arranging grey-water sewage on compounds. The silt or grease trap has to be looked after on a private basis.



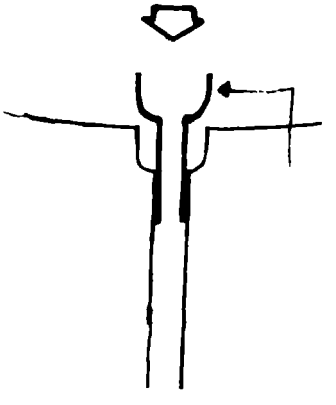
① Furo com sonda de ∅ 15 cm
6–7 m de profundidade



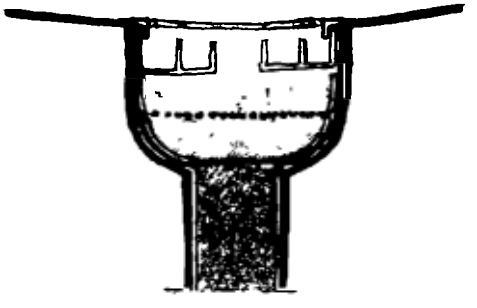
② Impermeabilização da superfície
5 cm cimento/terra 1:10



③ Furo com sonda de ∅ 30 cm



④



⑤ Enchimento de areia
Installação das cassettes de filtro
e a tampa

The new pit latrine slab requiring no reinforcement bars and a minimum of concrete, developed by Björn Brandberg, architect.
Photo: Lena Hermansson

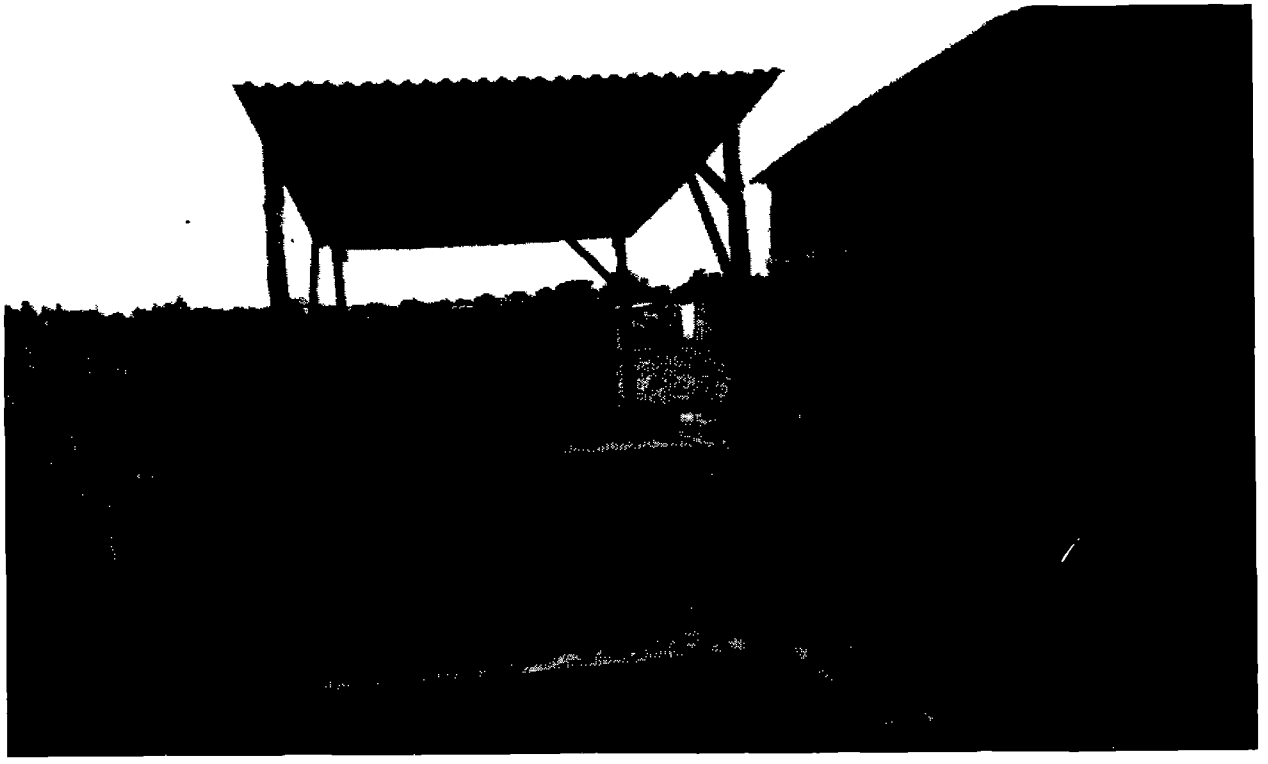
Another feature of the sanitary program was the incentive to put scarce cement where it had the best upgrading effect. Instead of piling up cement blocks on a compound for a future construction possibility (a completely passive investment until utilized), the cement could be used for latrine and bathroom floors, connecting walkways, kitchen surfaces, etc, where it would have a tremendous importance in raising the standard. A psychological problem developed. people had a strong desire to build a house once and for all; they did not want to spend anything on what was perceived as a temporary solution. For the majority, the hope of building a fancy eight room villa in cement blocks would have to be replaced by a more realistic attitude with immediate improvement of sanitary conditions.

A new type of kitchen with elevated charcoal stove was also tried. The kitchen bench was combined with a laundry/washing-up tank to make a compact and more space-economic utility unit, all the while maintaining the open air feature of African household customs.

With efficient planning of the 160 m^2 plot, it was even possible to accomodate a small vegetable garden, even though the water problem in Maputo made such use of space less likely.

A few building norms were established, partly based on previous Municipal bye-laws, partly adapted to the constraints of the **caniço** situation.
Electrical installations were forbidden in **caniço** houses for fire risks. In order to overcome the obstacles for this important amenity, a special installation plinth made of a few cement blocks was designed. This structure carried all the electrical installations and offered the same stability as an immobile permanent house. The limitation of just a couple of lamps and a socket, concentrated in the plinth, would still represent a great achievement in relation to the prevailing conditions in the dark **caniço bairros.**

Having reached the third target, the house itself, at the end of our contracts, too little time was unfortunately left to test the multitude of new ideas that poured forth from these practical experiences with the people of Maxaquene. The risk of "freaking out in an Alternative-Technology-Disneyland" was avoided by having continual close contact with the people, who rejected nonsense ideas often in very polite ways. A viable relationship for launching innovative housing experiments had been reached by the end of the project time. It was too early to draw completely reliable conclusions, but many new promising ideas were born.



Kitchen unit and paved walkways .

POST PROJECT DEVELOPMENT

Continuity of the Maxaquene project management had been secured by recruiting a new architect, Per Rathsman from Sweden, and even a few months of overlapping had been possible to arrange. The operations had by now become quite a routine and more and more could be accomplished with less foreign involvement. However, the project continued for only six months after the departure in June/July 1979 of most of the initial coordinating staff (Barry Pinsky, Eva Savfors and myself). The reasons for the project suspension were more political than anything else. In retrospect, the project seemed to be rolling along well. By the end of 1978 we were prepared for starting up a new front in a new **bairro**, since the managerial functions of the project largely had been taken over by Mozambicans, either local DNH staff or **bairro** people. Yet the reluctance of DNH to launch new projects must be seen in the light of general uncertainty about housing policy.

In late 1978, DNH requested us to concentrate instead on producing pedagogical materials in order to ensure transfer of knowhow prior to the expiration of our contracts and our leaving the country. The decision was understandable and strategically motivated so that the upgrading projects could continue. In fact, the materials you are presently reading are a product of this review work, particularly the Manual Sections in the appendix.

Our succesor architect prepared an extension to Maxaquene West, an adjacent area with 50 ha and 10,000 people, belonging to the same **circulo** as the first one. Per Rathsman tried to introduce a more flexible urban planning grid, based on existing road patterns as seen in aerial photography. In many respects this approach was similar to out first attempts, with the important difference that the population of Maxaquene West had eye-witnessed the implementation phase in the first **bairros** and certainly had aquired political maturity and practical experience. Mobilization was begun, meetings with the concerned population held and the whole operation prepared. However, in January 1980, DNH stopped most of its field activities in the **caniços** and transferred the responsibilty to **Conselho Executivo de Maputo**, City Council of Maputo.

Theoretically, this decision could be fully understood. A National Housing Directorate usually does not deal with projects of a local nature. After the pilot phase, which in our case was fully endorsed as such, it was planned that every Mozambican city should run its own projects. This was a normal and practical procedure and division of duties as in most countries.

But the complete lack of staff, means and even psychological readiness that reigned at the Maputo City Council at the time made the DNH transfer decision defendable only on the theoretical level. The project transfer was like kicking a football right out of the stadium and hoping for the best.

The political effects that the suspension of the project had on mobilized people are beyond my competence to evaluate. But common sense is enough to comprehend the confusion and disappointment that spread among the **caniço** populations.

A year earlier, in 1979, the first meeting was held with special focus on the urbanization aspects of the new socialist society (**1° Reuniao Nacional Sobre Cidades e Bairros Comunais**, First National Meeting about Cities and Neighborhoods). The problems were studied at the grass-roots level and the government ministers took tours and held meetings in the **caniço bairros** of Maputo.

The Estaleiro - a center for the field operations.

Oscar Monteiro and Joaquim Chissano (Minister of Foriegn Affairs) visited Maxaquene and discussed the results of the upgrading projects with the people.

The recommendations of the First National Meeting on Cities had a lot of similarities to the Maxaquene approach·

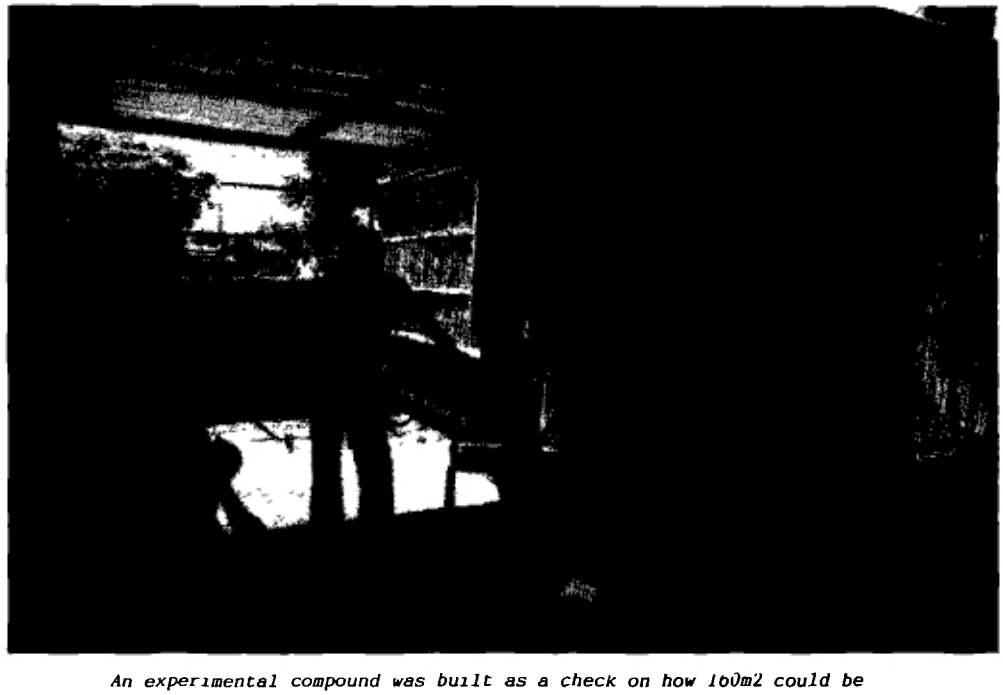
- organized participation of the people in all operations
- intensified land use planning of the **caniços (os suburbios)**, the suburbs, with zoning for social services and normal urban equipment
- utilization of local construction materials, existing local labor force and elementary infrastructure systems like water and tanks
- transformation of the **caniços** to **bairros comunais** which meant both physical and political organization (an urban parallel to the **aldeia comuna**, the communal village)
- integration of the mobilizing work of the **Grupos Dinamizadores** into the municipal organization, **Conselho Executivo da Cidade**, which should offer the technical guidance
- priorities and planning targets should be defined by the **Assembleia de Cidade**, the political representation of the city.

In spite of the seemingly full political support of the Maxaquene urban planning principles, the project was still regarded with mixed emotions. Some of the officials of the Conselho Executivo had a directly negative attitude since the 1969 Master Plan had been coldly neglected, and the **de facto** administration of the urban land use had been taken over by DNH without any legal basis. After the transfer to Conselho Executivo voices were raised to re-establish the old plan and thus wipe out the whole upgrading idea.

BASIC CRITICS

The plot size

To gain support for cancellation of the upgrading projects the City Council further pushed the issue of the plot size. There had been a lot of criticism in the press, in the **bairro** and also in DNH concerning the smallness of the 10 x 16 meters plot, concluded in the Maxaquene project as minimal space for average urban families. For obvious reasons some people found it difficult to squeeze into such a small space, especially larger families (see figure for family size distribution). However, we had proposed possible solutions; for instance the **comissoes** could in cases of real need allocate double plots. Other arguments were not well founded, like the claim of need for more space for subsistance gardening and domestic animals. With the serious water shortages, vegetable production in central Maputo could be highly questioned. Chicken breeding, on the other hand, was still possible even with more limited space than the 160 m^2 plot.



An experimental compound was built as a check on how 160m2 could be utilized in the canico context.

Another point of contention was the micro-climate. In a too crowded house pattern, a good cross ventilation is difficult to obtain. This is obvious in all tropical planning literature and the practice of spacing houses 2 to 3 times the roof height is almost a law. The application to **caniço** conditions is less relevant though. The permeable **caniço** walls permit even ventilation right through their loosely canes. Conversations with the **moradores** seldom indicate the lack of ventilation as a major design criteria. The heat problem in African housing is often overestimated by European architects. Priorities other than thermal comfort predominate when discussing project targets with the local people. If climatic problems are mentioned, it is rather the chilly winds during the dry season.

What preoccupied other urban planners at DNH was the sanitary conditions in the densified **caniço**. The existing pit latrines required a lot of space as described in chapter 04. Apart from the security zone around the pit, the smell of badly maintained latrines demanded a certain distance between the latrine and the house. In other words, the plot had to be of a certain size, not necessarily because of need for living space but in order to allow for an odor-free distance - an inefficient use of centrally located urban land. Some planners considered this land use pattern to be inevitable during the transitional phase of national development. On the other hand, DNH concentrated substantial resources on resolving the latrine problem. A new low-cost pit-covering slab was later on developed which minimized odors and health hazards. This is quite an encouraging observation the needs had channeled the design efforts in the right problem solving direction, and the initial obstacles were in fact surmountable.

The plot size question became more and more delicate and there were even rumors about a reshaping of the whole **bairro** into 12 x 18 meters plots. It was not until DNH made a survey in 1981 that the whole question came back to realistic proportions and that the reasons for the small plot size were apparent again. As explained in chapter 03, one of the main principles of the project was to avoid overspill and expulsion of **bairro** inhabitants. Since land was necessary for streets and collective utility services, there was no other logical possibility than to densify. When asked about their willingness to move out of the **bairro**, the 10% interviewed unanimously preferred the small plot. The advantages of maintaining social relationships and being relatively close to the city center probably outweighed the inconvenience of densification.

Discussion of the plot size. The arguments for a higher urban density were in fact acccepted by the majority of moradores.

Housing density

Other critics argued that the **caniço** habitat actually had a density that was **too low**. Their point was that upgrading projects like Maxaquene froze the semi-rural density which the squatter situation represented and that this pattern was uneconomical in the long run for a city of a million inhabitants. Obviously a mat of housing with only one level, sprawling for miles and miles in all directions, would be very expensive to service with linear infrastructure. Urban transportation would be costly to operate and utilities like water conduits, electrical power and sewers would get a very high cost/benefit ratio. The low density would also prevent social interaction typical in large urban agglomerations. This **endurecimento**, hardening of the low **caniço** density was considered to be a direct result of the division into individual plots.

The debate definitely had a professional quality because the master planning consequences of urban upgrading can be disputed in different ways. A compromise between urgent short-term needs and long-term goals is always delicate. The general conclusion was, however, that upgraded **caniço** must not be seen as an ever-permanent housing structure but rather as a transition form for the next 15 - 20 years. Gradual densification and the construction of 2 or 3 storey buildings, successively replacing the **caniço** over the years, were part of our urban planning vision. Actually, the grid of feeder streets and mains was designed in a way that made such transformation possible. Even short term planning considered higher density as an immediate feasibility. In fact 25% of the extension areas in Polana Caniço and Maxaquene Norte were zoned for high-rise construction and hence subject to evacuation within a short time. A substanital part of the project area could have been immediately used for high density development if needed.

Este fontenário, o primeiro em funcionamento no Bairro da Maxaquene resultou da unificação de quatro canalizações individuais. O exemplo ilustra a colaboração e interajuda existentes entre os moradores daquele bairro

NA POLANA CANIÇO E MAXAQUENE

POPULAÇÃO CONSTRÓI O SEU PRÓPRIO BAIRRO

★ PROJECTO DA D.N.H. BENEFICIARÁ DEZOITO MIL PESSOAS E CUSTARÁ DEZ MIL CONTOS

★ PARA BREVE A MONTAGEM DO PRIMEIRO GRUPO DE SEIS FONTENÁRIOS

Ordenamento dos subúrbios

Numa actividade que envolve todos os moradores, prosseguem em bom ritmo, os trabalhos da segunda fase do projecto de urbanização do Bairro da Polana-Caniço, em Maputo.

Decorrendo sob a orientação técnica da Direcção Nacional de Habitação, o projecto de urbanização em curso prevê a conclusão de abertura das ruas principais e de um furo artesiano para a captação de água, estando ainda neste momento em curso a reconstrução em locais parcelados, das casas atingidas pelo plano de ordenamento.

No mesmo projecto, cujo investimento orçará em dez mil contos e que irá beneficiar dezoito mil pessoas, está incluído o fornecimento de energia eléctrica. Um projecto idêntico está igualmente em curso no Bairro da Maxaquene, onde decorrem neste momento, os trabalhos de colocação de tubo

Porque pararam os trabalhos em Maputo?

Os moradores de certos bairros da cidade de Maputo, especificamente dos do Bairro da Maxaquene, chegam-nos reclamações sobre os trabalhos de ordenamento iniciados em 1978 pela Direcção Nacional de Habitação, (os quais incluem a introdução de infra-estruturas como ruas de acesso, água canalizada, esgotos, fossas e parques infantis) que pararam já há mais de um ano.

CONSTRUIR AO ACASO SEM VISÃO DO AMANHÃ

15/2/80

*** Violação de princípios urbanísticos**

*** Parcelamento da Polana Caniço e Maxaquene não concorda com o desejo dos residentes**

O sol estava picante, já passava um pouco do meio-dia. Não obstante, dois homens, de calções, tronco nú, pás em punho, misturam cimento com areia, ajudados por uma adolescente. Trabalham no acabamento da sua casa de alvenaria, num dos bairros suburbanos da capital. Embora seja hora de repouso, eles trabalham. A vontade, o anseio, a esperança de concluir as obras da casa são maiores. A sua construção foi iniciada já há muitos anos. Ela começa a envelhecer antes da conclusão, como velhas começam a ser as esperanças de dezenas de famílias que, neste bairro ou noutro, continuam a alimentar, de ver concluir-se, um dia, a casa de blocos com que sempre sonharam. O que fazer? Paciência, há muitas dificuldades – diz-se em autoconsolação.

The daily "Noticias" or the weekly "Tempo" followed the Maxaquene project and did not hesitate to voice criticism on the plot size and later on the project transfer.

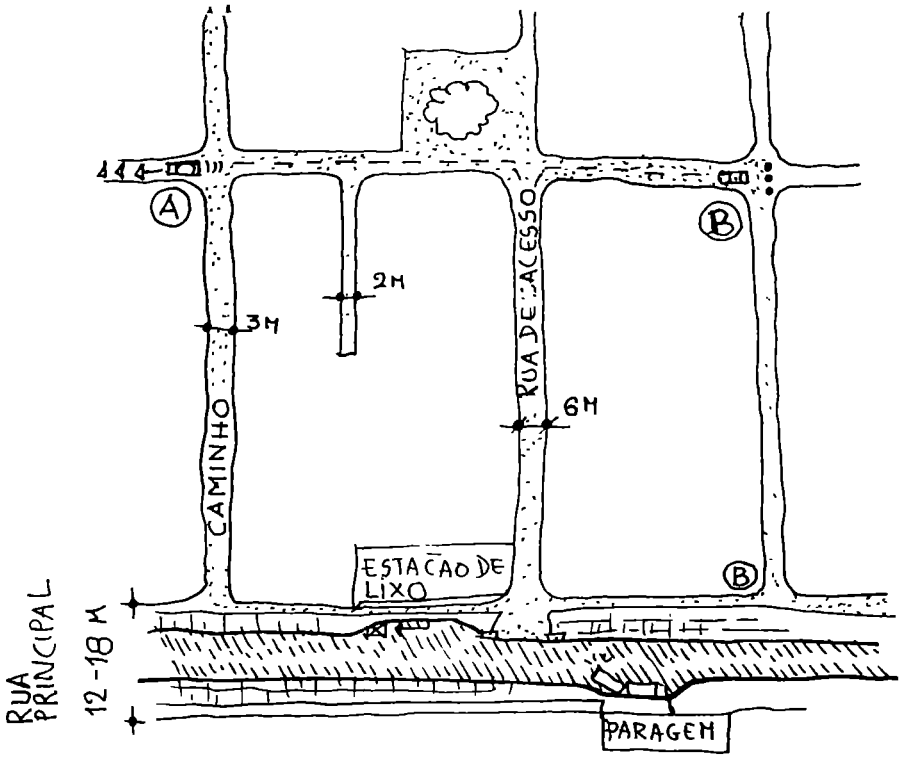
The critics of traffic planning represent diametrically opposed opinions.

The **moradores** took all opportunities to express their appreciation for the new streets that allowed ambulances and transportation vehicles to enter inner parts of the **bairro**. They were concerned, however, with the lack of parking space and lanes to allow private cars to enter individual plots. The dream of owning a car was apparently widespread.

Some urban planners at DNH considered the Maxaquene plan disastrous for the pedestrians and children, as motor vehicles were now allowed to enter the **caniço**. Previously it had been practically impossible due to the narrowness of the alleys. Complete traffic separation was claimed to be the only answer. Others believed that the density of the streets was unnecessarily high and that the feeder corridors (18 m) were too wide. In general, they felt that too many houses had to be demolished for the sake of street penetration.

Most points of view had certainly some relevance although the necessity of compromises was not always understood. As explained in chapter 04, the **moradores** pushed for implementation of rectilinear streets far vide would never allow for an efficient traffic separation. Without physical obstacles like fences, ditches, walls, strips of landscaping, etc, people would walk wherever they wanted. Given the low car ownership figures, a complete separation would be ridiculous. An integration of traffic based on the pedestrians' demands, i.e. low speed, was actually a much more realistic solution inside the **quarteiroes**. This is incidentally something very close to the Dutch **woonerf** concept which is currently being tested by urban planners in Europe. The advantages are that with limited risks children get fairly used to traffic dangers and dwelling areas do not become isolated dormitories.

However, on the large feeder streets pedestrians should be separated, but in a realistic way. Only positive separation is likely to work, i.e., pedestrians volontarily choose a paved walkway because it is more comfortable than the asphalt of the vehicle driveway. That is why ieeder streets would have to be so large; sidewalks on each side of the driveway, plus drainage gullies, bus stops, garbage terminals, etc.



The problems of traffic safety in the neighborhood units (point A) could easily be handled with obstacles for motor traffic (point B).

The house demolition

The destructive effects of street network implementation were further discussed by the urban planners at DNH. In Polana Caniço demolition figures could attain as much as 40% of existing houses, and strangely enough, this happened in the lower density part of the project area. Obviously demolition to this extent was not necessary to make way for streets. It was partly a volontary process of removal due to the incredible desire to position the house in relation to the street alignment and obtain the feeling of being **urbanizado**. To what extent there was pressure from others in the **quarteirao** is impossible to evaluate without more sociological research. It must be understood, however, that the removal of a **caniço** house was never seen as a disaster by the **moradores** themselves. If the house was more than 4 - 5 years old, the **caniço** and most of its poles would have to be renewed anyway. If the house was relatively new, everything except the cement floor was recycable.

The planning democracy

One thing that could be questioned, was the real influence individual **moradores** had in the urbanization committees and whether relevant points of view were channelled all the way to the DNH staff. Again this could only be measured with a super sensitive survey for which there were very few resources. The division into **subcomissoes** helped at least to organize the **moradores** and provide them with a way to participate in planning.

What became clear, however, was the right of veto which the **comissao de urbanizacao** had over us, the urban planners from DNH. Apart from the street issue - which has been covered sufficiently -the rather interesting case of the **carpinteiros**, carpenters, should be mentioned. Our land use plan had provided a special zone for small scale industry and workshops.

When this area, next to our **estaleiro**, workshop, by the way, was to be evacuated like all the other service zones, people simply refused - with full support from their commission. In order to understand, the sudden disapproval, the commercial role of the carpenters in the **bairro** must be made clear. These craftsmen produced, mainly for Portuguese clients, sophisticated and expensive furniture, ultimately destined for export. They usually made quite a good living from it. Such demand caused the carpenters to raise the price level for **bairro** furniture. Hence they were often considered to be exploiters of the people and the idea of demolishing houses just to accomodate space for them was very unpopular. We simply had to cancel this particular workshop area since many craftsmen would have been carpenters.

On the whole one could say that there was sufficient **red light feedback** in the relationship between planners and users in Maxaquene to avoid planning disasters. Between this method of negative criticism and the situation where people are taking an active and creative part in planning, there is naturally a long road to travel, and the procedure is neither obvious nor easy.

The indemnification problem

One of the conditions from the start of the project was that the indemnification problem must be taken care of by the **bairro** organization itself. This contrasted unfortunately with earlier experiences from colonial times when **caniço** people had actually been paid off when forced to move, even though the lump sum was low. First of all a the beginning of the project, there were no government funds available for indemnification. Secondly, we wanted to avoid getting involved in endless cases of assessment and arbitration which the people themselves were much more capable of handling.

Surprisingly enough the people had almost no objection to the lack of guarantees from the government. Again their political maturity was impressive. they relied on their own neighborhood resources. Whether removed families actually received substantial help from their neighbors would be a matter of another careful survey, but very few complained openly about not receiving assistance.

POLITICAL REPERCUSSIONS

The social development that takes place in an upgrading project must necessarily have political implications. Even in a socially progressive society like Mozambique, with schools for everybody and free medical care, such programs can have side effects that turn out to be quite complex on a national level.

Autonomy versus central planning

First of all, a pilot project brings with it a lot of means to create a privileged **bairro** in comparison to surrounding settlements. A sort of "West Berlin" is built up with convenient facilities like running water, bus routes, electricity, etc, in the midst of other squatter areas.

By channeling demands in an organized way, upgraded **bairros** might become large pressure groups whose claims are difficult to satisfy with a weak government budget. Urban upgrading can in this way become directly subversive and a dangerous weapon in the hands of conterrevolutionaries and political groups based on discontent.

The **bairro** urbanization committees themselves became quite powerful simply by organizing acitivities with the moradores. The local **Grupo Dinamizador** felt in some cases a certain competition. Such conflict normally were resolved by a general division of responsibilities. FRELIMO itself had in fact often pronounced its support of the two opposing principles of central planning and local self-reliance.

Although potentially contradictory the problem was perhaps more practical than ideological. The difficulty consisted in knowing the limits to local decision-making.

General city development

Local committees devoting their efforts to the development of their own **bairro** may sometimes clash with the city administration. A certain **bairro** egoism can develop where the local needs of one **bairro** play a dominating role in urban planning of a much larger scale. Of course, some of these matters should have been settled by a Master Plan. The general confusion over land use directives and the lack of planning professionals made such confrontations quite unaviodable in the Maputo situation.

The most striking example was perhaps the claim for a water network extension as related in chapter 04. The social injustice of lawns being sprinkled in the residential areas while no water was available in the **caniços**, was difficult to explain to the **moradores**, but so were the pure technical problems. Piping networks, pumping stations, fire defense reserves, etc, must normally be calculated for a whole section of a city and not just for a **bairro**. Separate pipe lines could become very uneconomical.

Basic land use was again debated in DNH. Discussions arose as to whether it was wise to let upgraded areas like Polana Caniço occupy some of the most attractive parts of Maputo overlooking the Indian Ocean. At the same time, claims for exclusive land to build on came from diplomatic missions and government institutions.

Different opinions about housing policy

As briefly described before, two opposing strategies for urban housing reign in Mozambique as in most African countries. One is the type of approach the Maxaquene project represents: acceptance of squatter settlements as part of the economic realities in a postcolonial situation and a decision to immediately improve the situation.

The other strategy claims that only a heavy construction industry can cope with the problem in a satisfactory, permanent way. The shameful slums should be replaced once and for all by decent and modern dwellings. This program should essentially be implemented in the form of prefabricated apartment buildings. If the budget is too small, one must be prepared to wait. Anything intermediate is just patchwork and basically a waste of resources in the long run.

Of course the description of these two diametrically opposed strategies is schematic and simplified. In the real debate, arguments from both camps have been intermingled and no clear-cut line has been easily distinguishable, either among government officials or among planners. Polarization is made here merely as an attempt to analyze different attitudes. I personally believe that hesitation as to which of the two strategies one should adopt is largely the reason for the standstill of the upgrading projects in Maputo.

It is five-thirty in the morning, day break over the **caniço** and wake-up time for most of its inhabitants. Inadequate urban transport and empty pockets oblige people to walk for hours each day in order to secure a job, or search for one. They have to get up early.

It's still rather chilly and humid. The morning dew lingers on the sparse weeds in the sandy soil. The smell of small charcoal fires begins to spread. The breakfast, if any, is in most cases just a cup of tea. Transistor radios start to sound here and there. Most of them are tuned in to Radio Bantu from South Africa, attracted by its **gumpa-gumpa** music. The raw saxophones of the typical "township sound" slice through the early morning.

The pegging out crew from Direcçao Nacional de Habitaçao is still half asleep when their Land Rover moves into the **caniço** sand in low gear. One member coming from another direction is always late, but never fails an explanation. This time it is a sick relative he had to bring to the hospital. Together with the **bairro** volunteers they are finally getting organized. On top of the Land Rover one man in securing a free sight line to a target rod half a kilometer away. A few branches have to be cut down from a tree and he is guiding a collegue over the crackling walkie-talkie.

People are taking their morning baths now. In the open air **casa de banho** they can scoop up some precious water from a bucket and take a shower, only protected from view by thin **caniço** walls. The privacy is a delicate matter. Insufficient sound insulation of the **caniço** walls has set social laws for polite and sensitive behavior. No matter how rudimentary the house may be, nobody enters somebody else's compound without announcing himself... "Com licença".. (with your permission...).

Six-thirty. Workers are already trudging the sandy alleys to reach the few tamac main streets where they form virtual flocks moving downtown. They are properly dressed in shirt and trousers. Many of them carry a small bag, surprisingly often from TAP, the Portuguese airline. The danger of the careless motor traffic does not seem to frighten anyone. Only the roaring, Russian built GAZ army trucks on gigantic wheels may have some impact. **Forças Populares** are not known as the most talented drivers in Maputo.

Bernardo, a dishwasher in a hospital kitchen, 35 years, is walking to his job. At night and on weekends he works in the local **Grupo Dinamizador**. For him FRELIMO and independence mean, above all, dignity - in spite of very simple living conditions. Bernardo is a bright man. The ability to read and write brings him a long way in discussions and meetings with officials. But he has a pounding headache now, maybe a slight malarial fever coming on. The late work sessions at night are tiring and it is sometimes hard to do his daily work properly. In the afternoon he will have to queue up for two or three hours if he does not want to miss the new delivery of sugar at the **Loja de Povo** store downtown. Life is not that simple. But a militant Mozambican does not complain. He continues to walk.

Eight o'clock. The DNH team is now surrounded with three to twelwe year old children. All the commands from a man high up on a big ladder, from which he is directing the staking out rods, are repeated by a choir of youngsters. **"Leva banderolla ... mais para esquerda ... Chega!"** A nasty little fellow is imitating all the movements and gestures of the man on top of the ladder, who cannot do anything from his ridiculous position. Another little angel in a dirty Seven-up t-shirt is accompanying the scene, singing a song with a cheeky vibrato, holding a DNH peg as a pretended guitar. A big **mafureira** tree is giving problems for the sight line. The whole staking out axis has to be moved to another parallel position in order to avoid the obstacle.

Some women are returning from the market. The babies are secured to their backs with speckled **capolana** cloths. They carry baskets with frozen fish, cabbage and other vegetables. Fortunately it is the fresh produce season now. In November the market stands will be quite empty again. The women greet us politely with "Lichile ...", (good morning in **changana**) and walk by silently. One of them giggles. No one in the team knows why.

The DNH bulldozer driver arrives and announces the stand-still of the machine two kilometers away, where the project implementation has reached the stage for opening new streets and squares. Again the fuel supplies have not been replenished in time, in spite of several reminders. The red skinned Swedish architect lifts his hands in dispair and thinks of the popular fourth addition to the official motto "unity, work, vigilance": **unidade, trabalho, vigilancia ... paciencia**! After an argument and a personal cash loan, the diesel fuel is fetched from a downtown gas station and half-an-hour later the huge machine is moving again. The sight is spectacular. A new street is created in a matter of minutes. Old stinking latrines are filled and the top soil neatly compacted. The ever present children are swarming around the roaring bulldozer, dangerously close

to it in the deafening, hellish noise. An elder, responsible for watching them approaches again with a long, tiny branch which he uses as a whip. The kids spread quickly in a fanshaped pattern, crying for fright and excitement. The project coordinator sweats at the thought of an accident with a heavy machine crushing a child. He turns around jut to discover that a beautiful cashew tree is being leveled to the ground by the monstrous mechanical beast. When he explodes "What the hell for?", the answer comes in a matter-of-fact way that the tree was standing on the new street. Thoughts of ecology, use of heavy machinery, landscaping are zig-zaging through his head. Nobody else is mourning the tree. In Africa vegetation seems to be considered almost as an enemy, always invading and threatening. When an enthusiastic spectator has exclaimed that it is so much easier to knock the tree down now, when it is fairly small, the whole incident is abandoned.

In another part of the **bairro**, people are preparing for the bulldozer. Most of the removals have already been arra ged. God knows how the committee has managed to find the necessary space. Most houses are already evacuated or "stripped" from recycable parts like roofs, doors, etc. Only a round hut with thatched roof remains intact. This is a very unusual house type in Maxaquene. The owner, an old white-haired man, bluntly refuses to move to the allocated place. The committee members smile at us with embarrassment and propose that the "papa" be left in peace for the time being. The planned street is large enough here to allow for a by-pass.

Nine o'clock. Women and children who have been lining up for water at the municipal **fontenarios**, walk home over a kilometer of heavy sand. Each carries 20 liters in a tin container on her head. Clothes and dishes must be washed. The laundry is hung up in the **quintal** compound to dry in the sun. After washing the dishes, the waste water is thrown in a corner where a family of ducks eagerly slurp up the greasy liquid.

Maianga has a carpenter workshop, a simple shack that allows rain shelter for his two trainees and some materials. They are distant relatives from Inhambane and work with him for practically nothing. The work bench is quite rudimentary - basically a rough plank with one end fixed to a tree that just happened to be there and the other end supported by the wooden frame of the shack. His tools seem to be completely worn out, but the finished products are impeccable shiny mahogany tables, complicated chairs, bedsteads. He has just finished an order for a Portuguese family who will return to Lisboa. They want to get something for their Mozambican escudos, which are worthless outside the country. The raw materials, wood like umbira, jakaranda and teak, come all the way from Beira by truck. They are hard to obtain. Maianga complains a bit about various provision difficulties in Maputo. Then he goes back to his work, waxing a sideboard, and starts to sing softly in falsetto.

It is ten o'clock at the **estaleiro**, DNH's site office. People who want to build brick houses are requesting a site visit in the hope of obtaining a building permit. A young DNH extension worker receives them in a pretentious manner which is often normal for government officials. His insecurity is barely covered up. But Mapinga, one of the more experienced and relaxed officials, makes a joke and the ridiculous formality is suddenly broken up.

Amelia, 30 years old, with a sick husband and three children, wants to build a decent house. She earns some money working as a house maid for an exiled Chilean family downtown. Her aunt from Gaza stays with them and takes care of the children. She has brought maize, rice and millet from the countryside; otherwise Amelia's meager income would not suffice for their daily food. She dreams and envisages a four room house with bathroom like the ones the Portuguese build. After som discussion with DNH people, Amelia agrees that it would be a good idea to start with two rooms first and later on extend the house. The plans do not seem to be of any inconvenience for the neighbors, so she gets her permit on a card where the compound is localized and a sketch of the house plan is plotted down. Amelia reads and writes well. She participates in the Mozambican Women's Organization, OMM; in her **quarteirao** she checks latrine standards as a member of the local committee. She is interested in trying the new bore hole latrine system introduced by the project.

Eleven o'clock. The sun is getting hot and the staking out people who started at dawn are winding up work. One of the faithful volunteers, Sebastiao Langa, 45 years old, is going home with empty pockets even though he has been working almost a full day with the DNH crew. He is unemployed, a miner who has returned from the gold mines in Koefontein in South Africa. Accustomed to hard work, he hammers down the pegs with such force that the ground trembles. But he is a bit sarcastic about not having anything to eat at home. Maybe the neighbor will give him some rice tonight.

Noon. Some of the employed **caniço** inhabitants come home for a two hour lunch break. On the paved streets

the traffic is intense again, mainly with government officials and priviliged foreigners in private cars.

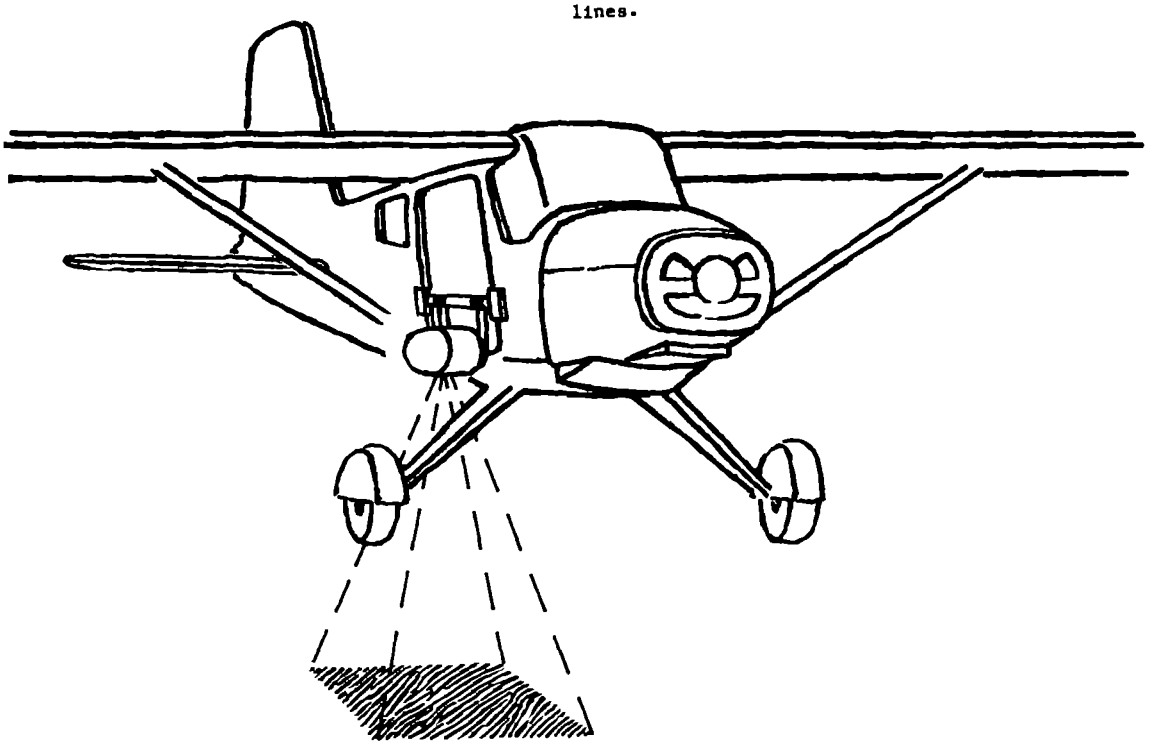
Two o'clock p.m. The **caniço** is quiet. The afternoon heat discourages activities. The oven effect of tin roof houses moves people to the shade of a tree, where they rest on a mat or do some household work like peeling vegetables. In an abandoned shop an alphabetization class goes on. Women read in unison with loud voices. The teacher mechanically instructs much like an army plutoon commander. The class repeats in staccato.

Five p.m. The heat has let up and people begin coming home from work. In front of the cooperativas de consumo, next to the market, people are lining up for soap. Next to the burned out wreck of a truck, a handfull of scool-boys play football with a bundle made of rubber ribbons. Everybody seems to enjoy the cool hour before sunset. But one tries to profit from daylight as much as possible. In the **quintais** women are cooking dinner, the only substantial meal of the day - maybe a soup of vegetables and millet porridge. At sundown the family is united. A table with chairs is often part of the furniture in one of the crowded rooms, called **a sala de comer**, the name used in bourgois Portuguese homes. In Patricio's house a Petromax kerosene lamp lights up the room brightly with a hissing noise. His wife and the smallest cildren have already eaten, so Patricio has the meal with his two eldest sons, Fabiao and Domingos.

It is 8 p.m. The **bairro** planning committees are gathering at the **Grupo Dinamizador's** meeting place. Forty to fifty people sing FRELIMO songs as the secretariat prepares the agenda at a long table draped in a red cloth. Behind them, on the wall of corrugated iron sheet hang the portraits of the president, Samora Moises Machel and the late Edouardo Mondlane who was killed during the liberation struggle. The chairman stops the singing with a raised fist and a "Viva FRELIMO!" "Viva" the people answer with a resounding echo. After a long series of similar slogans the meeting starts. First, the stage of project development is reported, then new plans are presented and discussed. Special problems are aired. This evening a building committee member is accused of drinking too much. The man is even red-eyed tonight after too many "bazookas", the nick-name for the Lourentina beer in a family size bottle. Without pity the meeting declares him **neutralizado**, dismissed and discharged from his tasks. The next issue is the fate of a family that was forced to move twice, due to an incompetent DNH agent who staked out pegs in the wrong place. The project coordinator has to apologize and proposes some sort of compensation. Everything is translated from Portuguese to Changane, the Zulu-related language of the Maputo region. One gets the impression that the interpreter adds personal comments because each translation takes ages. Tonight the water supply problem is debated again and the meeting goes on until eleven. Then the song "**FRELIMO vencera, Mocambique vencera, Africa vencera**" solemnly rises. People are singing in different parts and it is just like at church. The chairman shouts "**A luta continua**". "**Continua**" bellows the crowd and they walk out into the pitch dark night.

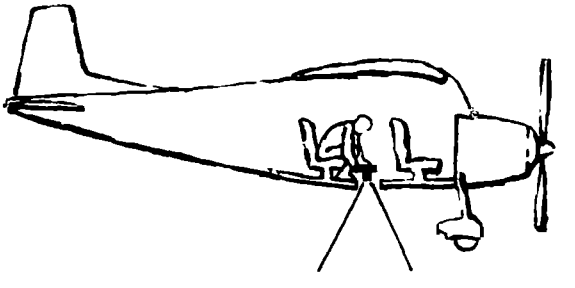
A day in the **caniço** is over.

In practically all planning acitivities there is an immediate need for maps or other forms of geographic representation of data. Apart from the topographic features, it is usually necessary to assess the present situation in terms of land use criteria like occupancy patterns, population densities, infrastructure standards, and sanitary conditions. If there are any maps or aerial photos available, they are usually outdated, especially in the case of squatter settlements, because the migratory movements are very swift. On maps squatter settlements are generally not represented since they are illegal by definition. On-ground surveys are up to now extremely time consuming, particularly in unplanned squatter areas where winding lanes break the sight lines.



An aerial photo survey is extremely useful to have at several stages of the project in order to control its evolution. To bring in a professional aerial photography crew with specialized aircraft to wait for the right type of weather conditions involves so much money, time and efforts, that it is nearly impossible for low cost upgrading projects. The expenditure is even greater on missions outside the capital city.

A fairly simple remedy is the semi-professional method used in the Maxaquene project. Although not attaining exactly the same quality as the professional 9" x 9" pictures, the result was largely satisfactory for monitoring the progress of the work. This method had the great advantage of being expedient at low cost. When weather conditions permitted, an aircraft was rented and the pictures developed the same night.

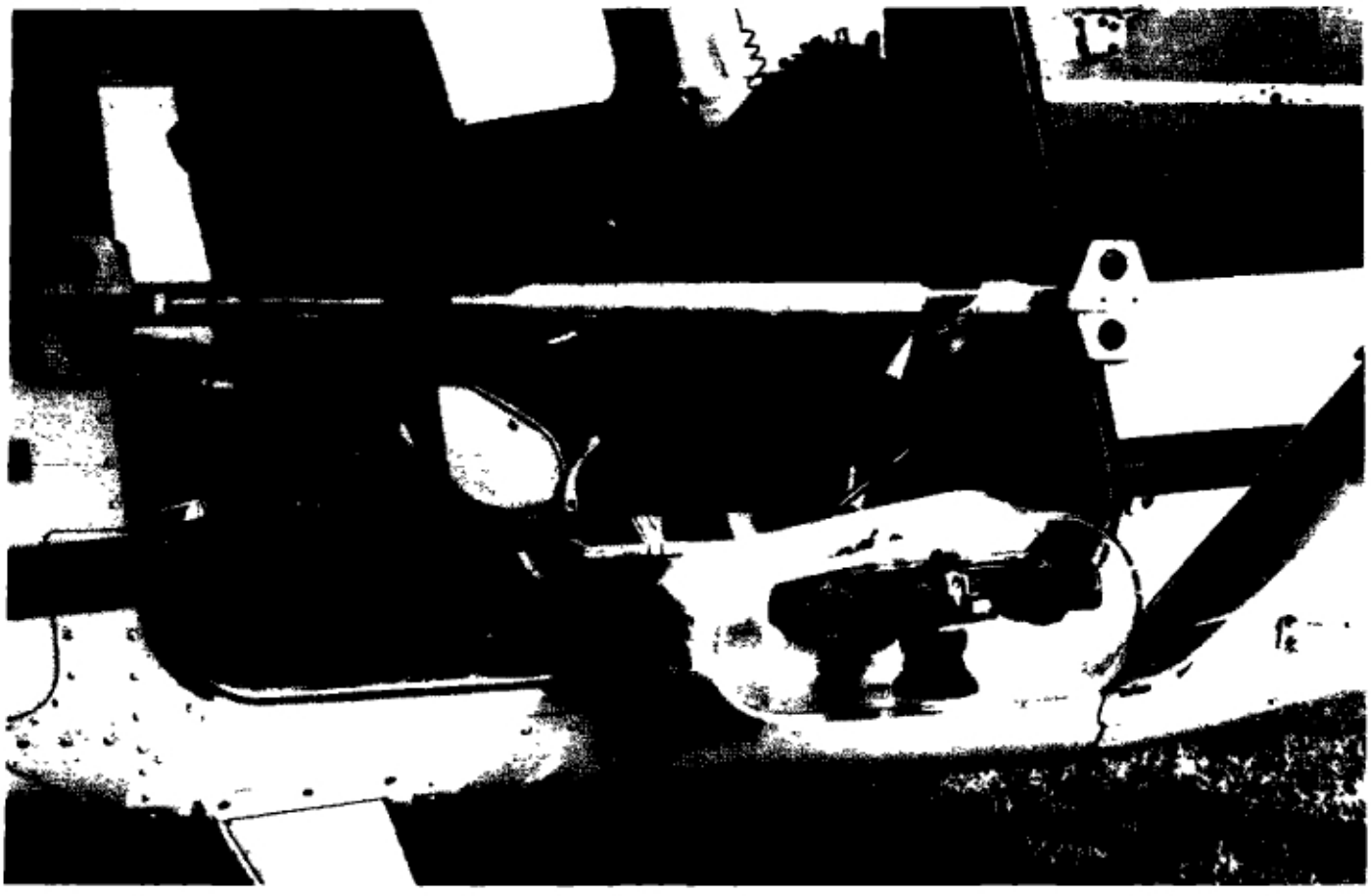


Aircraft

In our case, we used a Jet Ranger helicopter with removed back port door. It allowed for vertical shots without any problems. When an ordinary airplane is used, a trap in the bottom of the fuselage is usually necessary to get the same effect.

Leaning out of the windows of an ordinary plane is, in fact possible, in spite of the violent air stream - but the pilot responsible for the flight security has to be consulted at an initial stage of the mission planning. The difficulty is to assure the verticality and the right frequency of shots when working under such conditions.

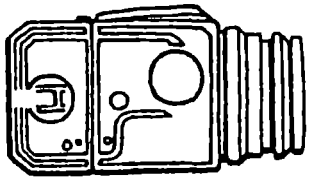
A low cost aerial photography device to be used on high winged small planes like Cessna 172, 206, etc now exists. It is marketed by HABITROPIC, a third world tool company in Stockholm, Sweden. The idea is to make use of ordinary air club aircraft without any transformation at all. One door is simply removed and the equipment mounted temporarily. The system permits vertical shots fired automatically for chosen altitude and aircraft speed.



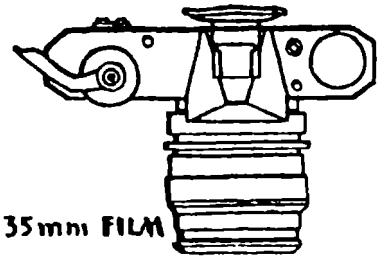
Camera equipment

In Maputo we used a Hasselblad, producing 6 x 6 cm negatives but an ordinary 35 mm camera is perfectly sufficient. A motor drive device and a high capacity film magazine facilitate the operation.

As a photograph always gives a central projection of the target, the picture can never be entirely true to scale. In other words the periphery of the image does not have exactly the same scale as the center. Therefore the pictures cannot be used as measurable maps without a complicated cartography process (restitution). In most upgrading schemes this drawback is rather insignificant in view of the simplicity with which the aerial pictures can be produced. And if some checkpoints on the ground with known geometric coordinates are signalled (made visible on the picture by painting white circles around them on the ground) at least some true measures for reference can be indicated on the photo.



6x6 cm NEGATIVES



35mm FILM

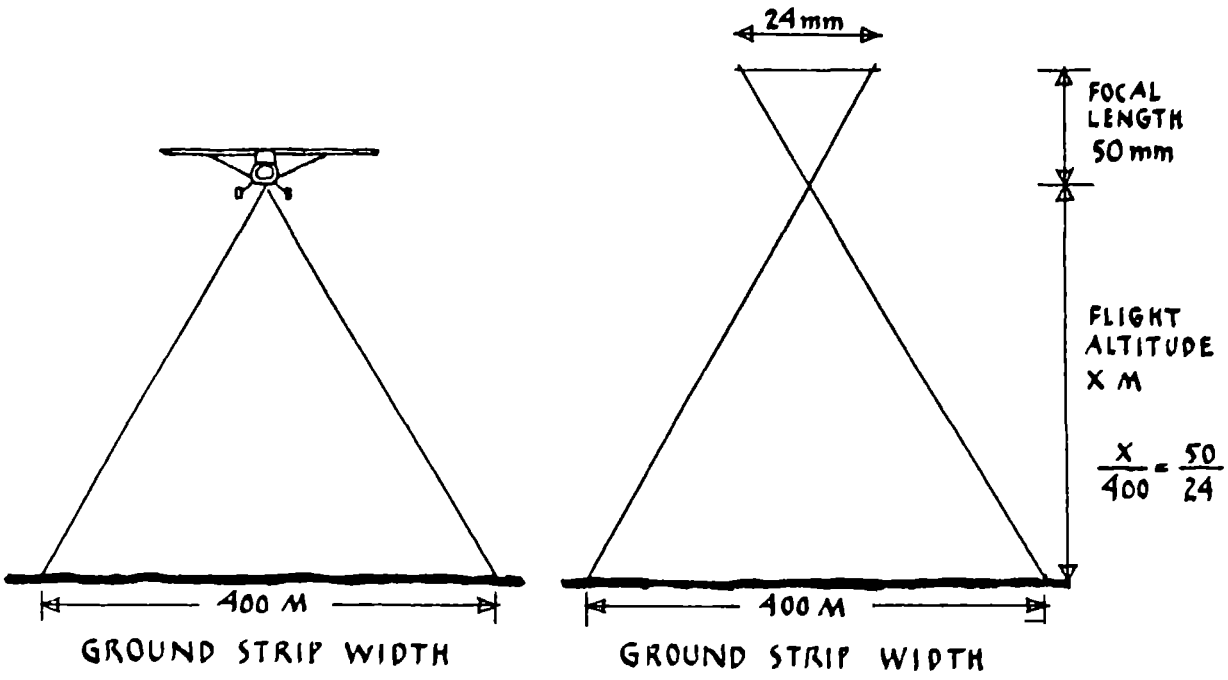
CIRCULAR SPIRIT LEVEL

The use of a wide angle lens influences the distortion effect and the choice has to be made between:

Normal lens	Wide angle lens
little peripheral distortion	higher peripheral distortion
more shots	more ground on each picture = convenience when making a mosaic composition
more flight runs	better flight economy

Flight planning

Depending on what level of urban planning is envisaged, the ground area to be covered on each picture is determined. For rehabilitation projects the scale 1:2000 is very common. It gives a practical format with an information scope ranging from the individual household to the overview on a neighborhood. Without pushing the photo enlargement to extremes, this gives us roughly 300 - 500 meters width of ground that can be covered by the sequence of aerial photos. Larger scopes with less detail dissolution may very well be interesting for master planning points of view.



Normal black and white film of 125 ASA, or even color slide film, can be used. The shutter speed is set at maximum to avoid vibration effects on the sharpness. The aperture reading can be taken horizontally, right out in the air, as the luminosity is more or less the same for the vertical direction. Sudden changes in luminosity when a cloud is passing the sun can give drastically deteriorated results. An automatic aperture adjustment is therefore an asset. It should be noted though that all this extra equipment is just making the work easier, but it is not indispensable.

The most important special equipment is a small circular spirit level fixed to the camera. This simple instrument can be taken from a surveyors' rod or an old theodolite and will assure the verticality of the shots.

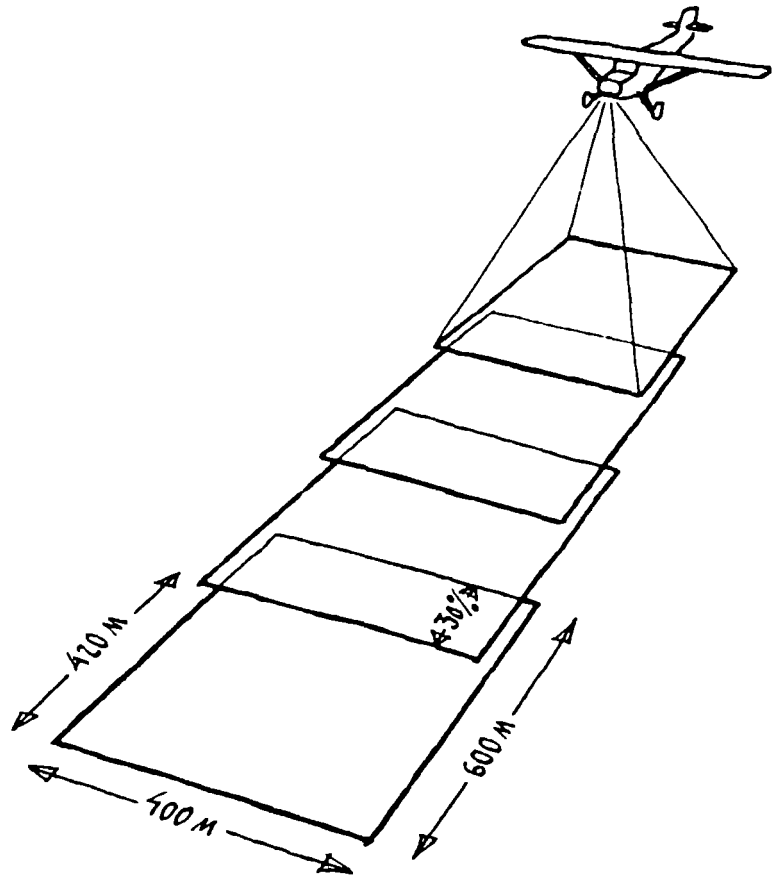
If a ground strip width of 400 meters has been chosen and a normal lens of 50 mm is used on an ordinary 35 mm camera, the flight altitude can now be computed. It is a simple law of geometry that is used to establish the relationship:

$$\frac{\text{focal length}}{\text{negative size}} = \frac{\text{flight altitude}}{\text{ground covered}} \quad \text{(see figure)}$$

Supposing that the camera is held with its longer side parallel to the cruising direction then it is the 24 mm side of the negative that has to be compared with the ground strip width. Hence we get the flight altitude:

$$A = \frac{400 \text{ m} \times 50 \text{ mm}}{24 \text{ mm}} = 833 \text{ meters} = 1220 \text{ feet}$$

Remember that in all communication with the pilot as well as on aircraft instruments, altitude is always expressed in feet!



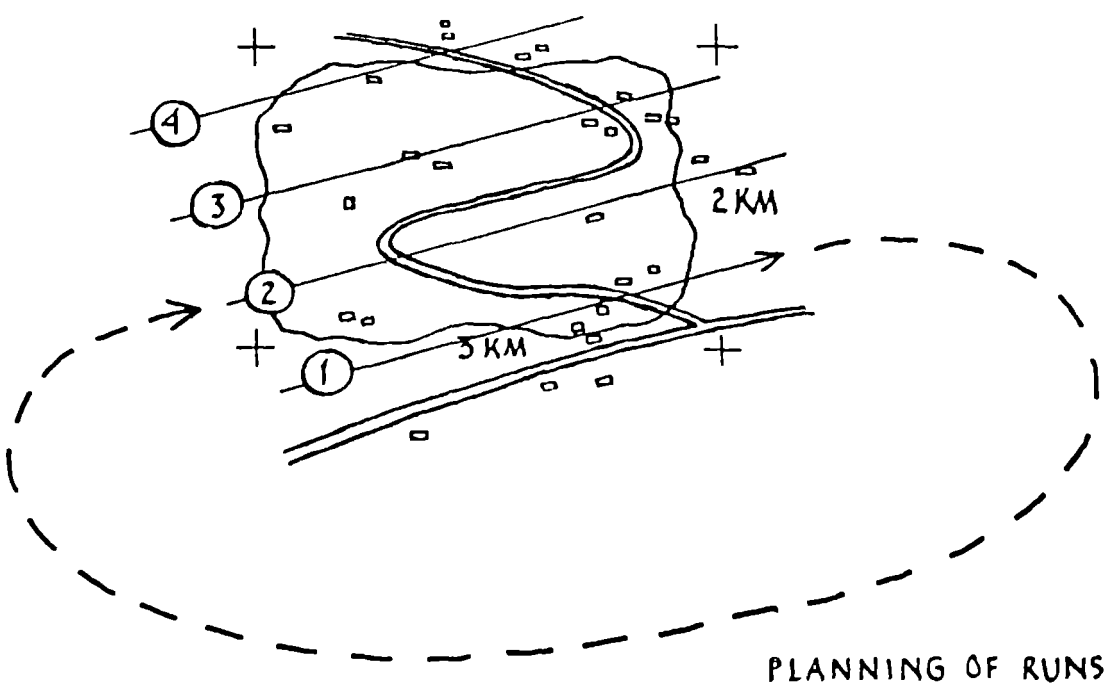
Frequency of shots

Normally an overlapping of the pictures of 20 - 30% is desired to ensure a continuous coverage in the longitudal sense. If stereo vision is envisaged, every part of the ground strip has to appear on two photos which means that a 60 - 70% overlapping will be required. If 400 meters has been chosen as the ground strip width, 600 meters will consequently be the length of ground that appears on each photo, since the sides of the negatives have the relationship 24 mm/36 mm. If a 30% overlapping has been determined, the aircraft has to dislocate itself 600 meters - 30% x 600 meters = 420 meters between each shutter release.

Supposing that the speed of the aircraft is 100 miles/hour, or the **true ground speed** as it is called when the effects of winds are considered as well. 100 miles/hour = 44.4 meters/second. The time to go 420 meters is consequently 420/44.4 = 9.5 seconds, which is also the frequency of the camera shots.

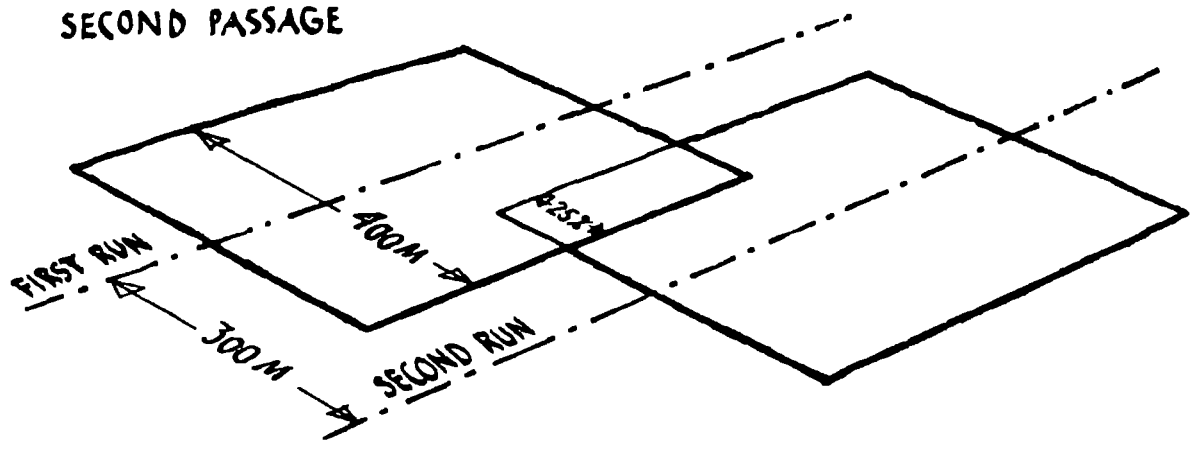
Flightpath planning

The target area has to be roughly measured and its typical features studied so that the necessary **runs** can be economically planned. Each run is a straight flight path along which the camera is triggered off in serial shots with the above calculated frequency. To make things simpler, all runs are parallel to each other and to some linear landmark like a road, a fence, an electric line, etc. All runs go in the same direction, which makes the handling of the photo prints easier and usually does not cost much more flight time. The aircraft has to make quite a wide bow anyway to get the right approach for the next run.



PLANNING OF RUNS

It is also necessary to determine some landmarks that will help to indicate the start and the finish of each run. It is extremely difficult to see the exact position of the aircraft vertically when one is inside the cabin. Therefore landmarks should be found perpendicular to the flightpath and also in the run alignments to enable the pilot to make the right approach. If no landmarks are available, cars, colored oil drums, flags etc, have to be positioned to provide this reference system. Things happen so fast in aerial photography that everything has to be known and perfectly clear prior to the flight. The strips of aerial photos should also overlap in a transverse direction by 20 - 30% to avoid the risk of empty strips in the coverage. If the area covered on ground is 400 meters wide, the alignment of the next parallel run should be indicated: 400 meters - 25% x 400 meters = 300 meters further away.



In flight routines

After take off, the camera aperture is adjusted to an accurate light reading and landmarks are retrieved for the first run approach. It is a great asset when the aircraft is equipped with intercom headsets. This allows easy communication with the pilot while full concentration is given to the navigation and camera operation. Preferably a third crewmember should count the seconds and give the right trigger frequency, if this is not done automatically with an intervalometer. Otherwise the cameraman risks making an error somewhere because there are too many things happening at the same time.

It should be assumed that the pilot has to understand the importance of constant speed and altitude and a straight flightpath during the runs. A smooth and level flight is also necessary when the camera is in operation, although this mainly depends on the weather conditions.

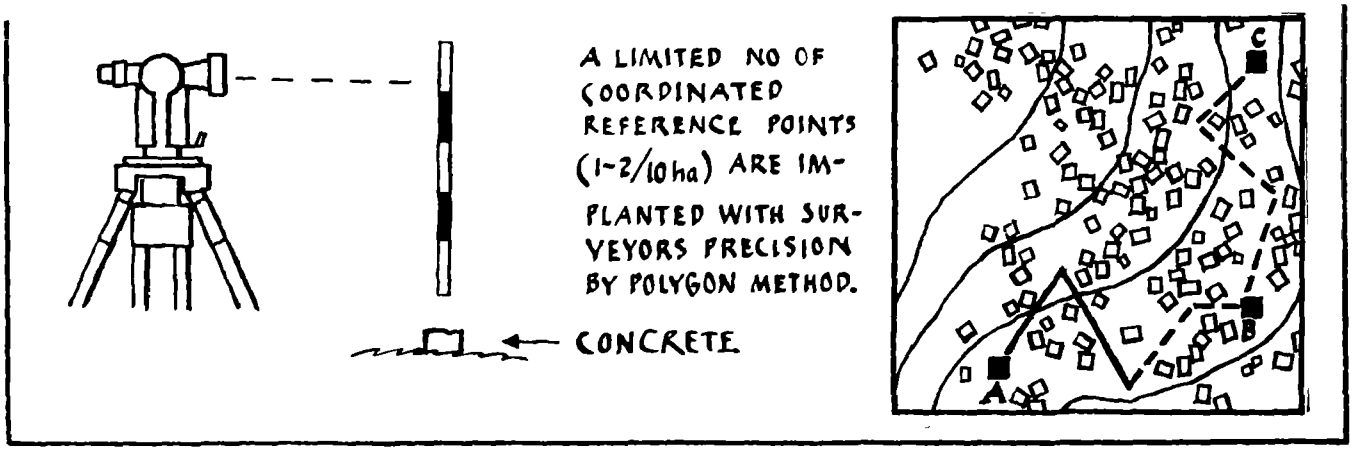
Note that military authorities may have to be consulted prior to an aerial photography mission.

The technique of visualizing the urban plan before any demolition takes place was developed in Maxaquene just because the existing surveyor methods were not adequate for the squatter situation.

In previous situations topographers always used to claim free sight-lines before starting to work. This meant total demolition of obstructing "palhotas", a disparaging name for **caniço** housing. Since most squatter settlements form irregular patterns with winding alleys, the requirement meant an enormous demolition of houses. With the prevailing attitude vis a vis the **caniço** people during the colonial administration, bulldozing had not been much of a problem.

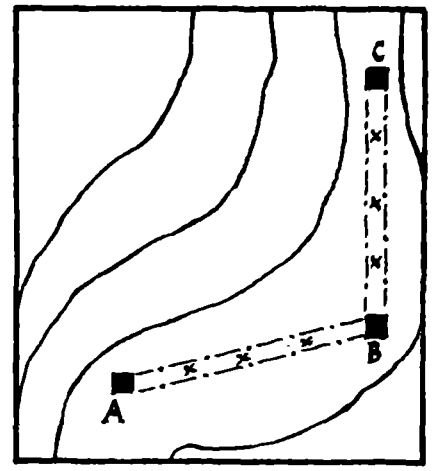
With the new independent government and the upgrading approach, a totally different technique had to be developed. it had to be based on a certain planning democracy in the sense that the **moradores** needed to know the configuration of the new plan **before** any demolition. This requirement was essential for the basic self-help principle of the whole project. The dweller committees had to organize the necessary removals in an acceptable way.

The new technique consisted of using a system of sight lines above the roof-tops. Between certain known marks, pegs could be placed in the ground, the position having been determined by a long rod moved into the alignment of the sight line.

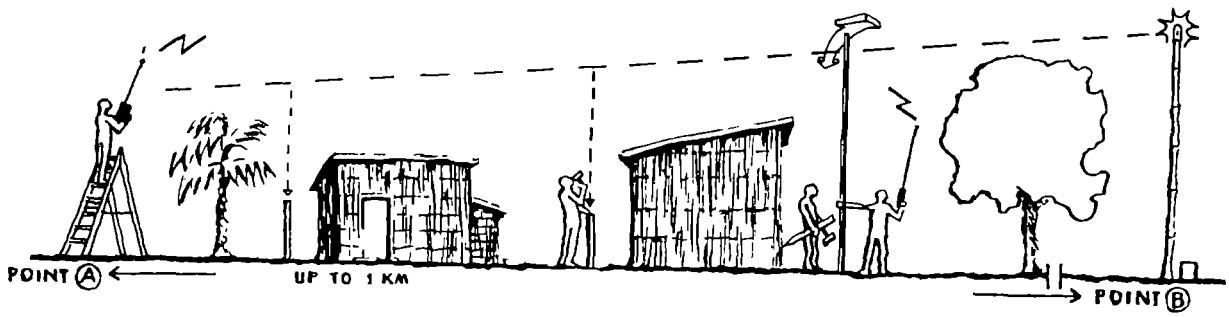


1. The first reference marks were coordinated and integrated with the city's geometrical network. Their positioning was a combersome job where the surveyors had to work their way through the **caniço** while measuring polygon traverses. But luckily only 1-2 marks were needed per hectare. These reference points were then consolidated with solid concrete marks. because if the references were lost the whole staking out porcedure started to float. The worst problem later on was with bulldozers (or they heavy machinery) which pulverized the concrete marks like biscuits.

2. Between two such reference marks it was possible to establish a sight line above the roofs. Long red and white painted surveyor rod or bamboo sticks were erected over the reference marks. It should now be possible to see one rod when standing on a 2 meter ladder at the other mark. If the distance was up to 1 km, it could be difficult to detect the target rod, especially if large trees were in the way.



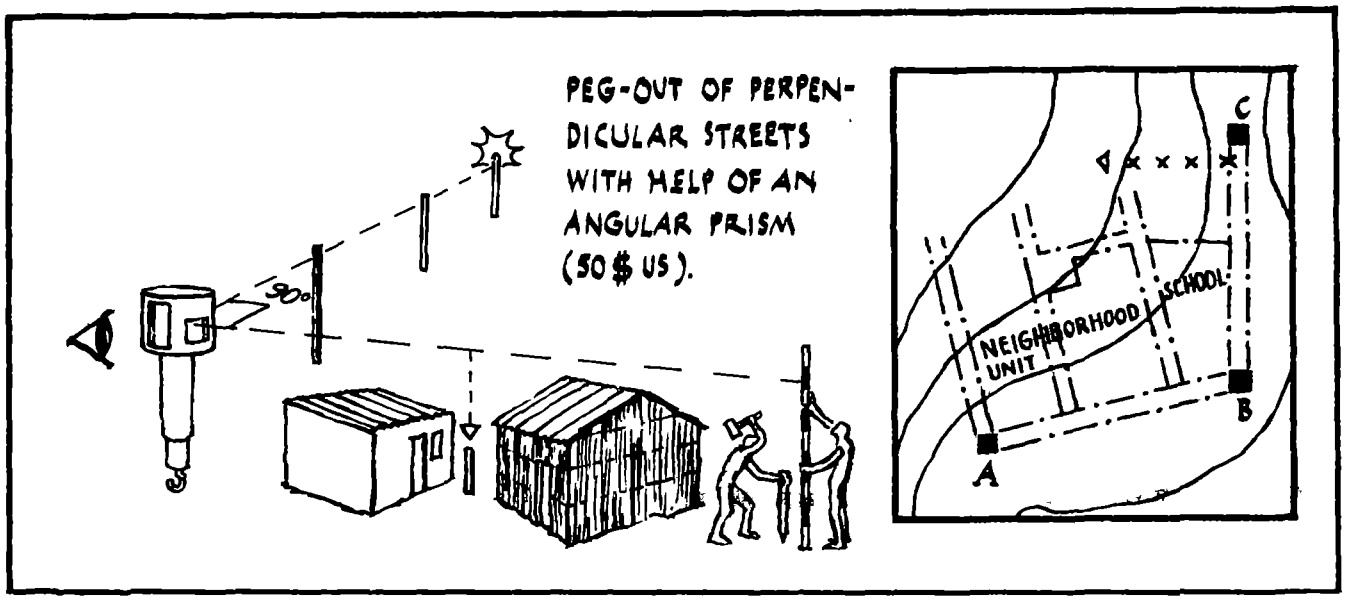
For that problem a rotating halogen beacon was attached to the top or the target rod. It was the same 12 V equipment that is used on emergency vehicles. The moving flash reflexes were very easy to observe on adjacent trees even if the target rod happened to be exactly behind a big tree.



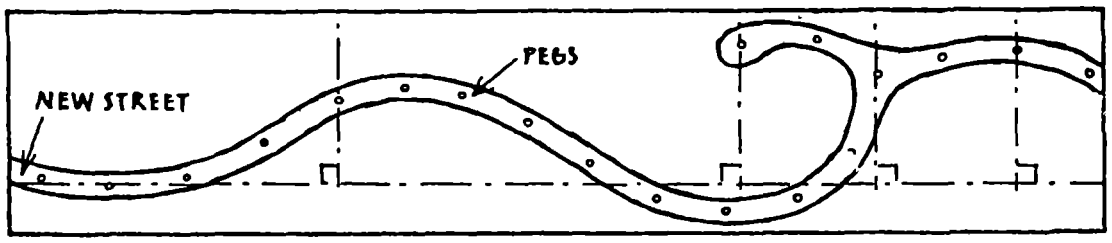
PEGS BETWEEN HOUSES AND TREES GUIDED INTO ALIGNMENT WITH HELP OF 2-WAY RADIO (150 $ US/PAIR)

3. It was now possible to position pegs all along the sight line. With the help of cheap, short-distance walkie-talkies and a third mobile rod the pegs were guided into alignment of the sight line. Distances were measured with an ordinary meter tape above the roof-tops.

4. Having one line established, it was then easy to stake out shorter perpendicular lines. To get the 90° angle, we used a simple angular prism (unit price: 50 USD). The same procedure with ladders and rods was repeated but over a much shorter distance (up to 150 meters).

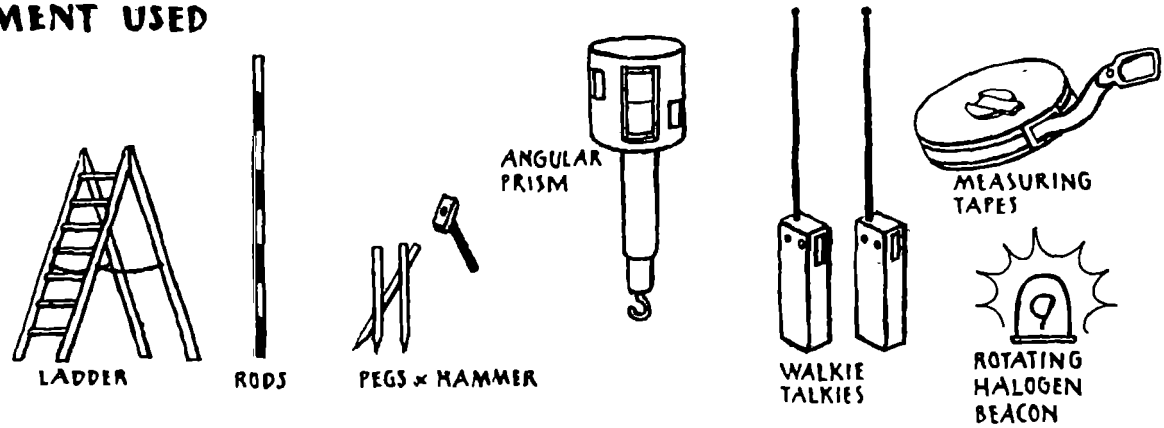


The limitation to rectilinear and perpendicular lines in the urban planning could have been overcome with a second system of pegs which used the first system only as a reference network (see figure). But as rectilinear streets were unquestionably in demand by the **moradores**, the possibility of staking out curves was never used in Maxaquene.

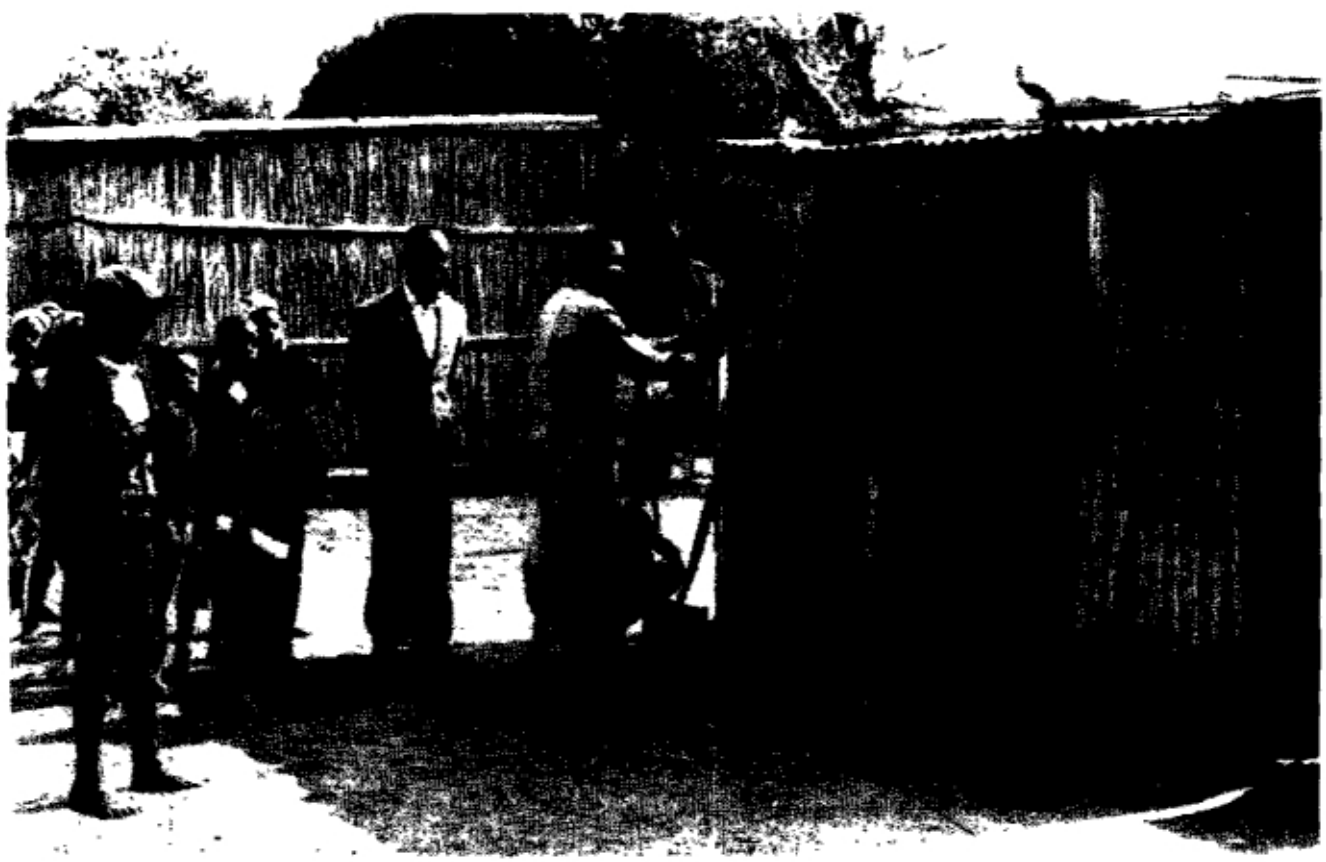


5. After necessary house removals it was now possible to open up the new streets, squares and public zones with a big wheel loader or a bulldozer and a motor-grader. As pegs disappeared quickly during the work, it was necessary to consolidate the new plan by digging concrete marks (0.1 x 0.1 x 0.5 meters) into the ground, as soon as possible after the departure of the bulldozer. Otherwise the delicate staking out work was partly lost.

EQUIPMENT USED



With this method, streets **pracas** and zone limits were staked out without damaging any houses or trees. Planning decisions could be changed when the pegs physically demonstrated unacceptable or adverse effects of the plan. Family removals could be reduced to an absolute minimum. Furthermore, local comittees had the chance to organize transfers in a socially decent way. This was one of the most important aspects of the whole upgrading operation.



The live costs of an upgrading project like Maxaquene can be divided in different forms:

Operational costs (UNDP/Government financed)

project staff (professionals, intermediates, locals)
administrative support
transport (vehicles, fuel, service)
heavy machinery (bulldozers, wheel-loaders, trucks, graders used in self-help or non-contracted works)
equipment (handtools for self-help actions, surveyors' equipment, two way radios, cameras, slide projectors, tape recorders, office equipment)

Investments in infrastructure (Government input)

contracts for water distribution networks, road construction, electrical mains, normally carried out "turn-key" by contractors or other government bodies.

Hidden costs

Work or expenses assumed by the **bairro** population and seldom expressed in monetary terms:

organizational and administrative work by committee members
practical works and assistance to field staff by volunteers
house demolitions, removals and reconstruction.

Comments to the cost charts

The cost based on evaluations (1979) when the official exchange rate was 1 USD = 33 MZM (Meticais, at the time Mozambican escudos).

This cost recapitulation is based on the first project area, "Maxaquene One" with 10,000 people on 60 ha, divided into 30 quarteiroes with 60 -80 families in each.

UN expert salaries were not applied here as Mozambique had the option for further projects to contract low-cost international volonteers, **cooperantes**, as professionals. (UNDP did finance one architect in the Maxaquene project.)

Utilization costs for schools and government buildings are considerably underestimated as were the per square-meter costs given by the respective ministries.

Managerial costs, however, should theoretically be reduced in a post pilot project situation since the methods were simplified and the field organization became much more efficient.

PROJECT / WORK	DESCRIPTION	1st.yr.	2nd yr	3-5 yrs	5-10 yrs	Organization in charge
PRINCIPAL INFRASTRUCTURE ON A BAIRRO LEVEL						
Water Project	1st. Phase: Water standpipes linked to city network	1750 C	1750 C			D.N.A.
	2nd. Phase: Individual connections 2200 families @ 1000 $ 00			1100 C	1100 C	Residents
Roads Project	6m Asphalted strip x 1000 running meters		1000 C	500 C	500 C	D.N.E.
Electricity	1st. Phase: Main Road, Social Services	600 C				E.M.
	2nd. Phase: Squares		500 C			E.M.
	3rd. Phase: Domestic connections 220 families @ 600 $ 00			720 C	720 C	Residents
Drainage/Sewage	(Not included in the Maxaquene project, as drainage was less of a problem.					D.N.A.
Garbage Collection	50% Cost of a truck plus garbage deposit		650 C			City Council
SOCIAL EQUIPMENT						
Primary School	2 schools, 1/ 5000 people			2700 C	2700 C	D.P.E.S.
Day Care Center	4x150 children each			5000 C	5000 C	"
Social/Culture Center				3500 C	3500 C	"
Health Center	1 center / 10000 people			3500 C		"

Alternative with bore holes 3000 C first yr. 3000 C 2nd. yr.

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PROJECT VOCABULARY & ABBREVIATIONS

aldeia comunal	communal village, rural collective settlement
autoconstrucao	self-help construction, self-help housing
bairro	residential area with more or less defined limits, usually low-income but not necessarily a squatter area
banho, casa de banho	bathroom, toilet (even a simple pit latrine, open air with light caniço screens)
caniço 1	reed, 1-2 cm in diameter, 2-3 m long, growing in swampy areas in Southern Mozambique, used as wall building material for temporary housing
2	general name for squatter areas in Maputo, "os bairros de caniço"
celula	smallest organizational unit in the FRELIMO party organization; linked to residential areas of 2-3.000 people or production units
circulo	organizational unit covering 10-20 celulas and 20.000-40.000 people
comissao de urbanizacao	neighborhood contact group specially elected by the people in a celula for the upgrading project
cooperante	expatriate professional, usually contracted for 1-2 years on a solidarity basis
DNA	Direccao Nacional de Aguas, National Water Directorate, a division of Ministry for Public Works, responsible for water and drainage networks
DNE	Direccao Nacional de Estradas, National Directorate for Roads
DNH	Direccao Nacional de Habotacao, National Directorate for Housing, a division of Ministry for Public Works, responsible for physical planning, housing projects and special government construction projects 1977-1982
DPES	Direccao Provincial de Equipamento Social, Provincial Directorate for Social Services, coordinating locally allocated funds
estaleiro	workshop, store at construction site
FRELIMO	Frente de Libertacao de Moçambique, liberation movement founded 1962, transformed into a marxist-leninist party in 1977, as the sole in the political system of Mozambique

fontenario	public water stand pipe
GD	grupo dinamizador, dynamizing group, local work groups started by FRELIMO for political and social mobilization, practical tasks e.g. sanitation, education etc
Lourenço Marques	Colonial name changed to Maputo 1976
MOPH	Ministerio de Obras Publicas e Habitacao, Ministry for Public Works and Housing
morador	dweller, bairro inhabitant
OMM	Organicao da Mulher Mocambicana, the Women Organization of Mozambique
parcelamento	plot division, plot layout
PBSLM	Projecto de Benificiao das Areas Suburbanas de Lourenco Marques, a project launched by the Portuguese administration in the early 70's in order to alleviate some of the worst problems in the poor areas in order to gain political goodwill with emphasis on water and schools
praça	square, small public space (2-300 m^2) in a quarteirao, with fontenario, meeting place, playground etc
quarteirao	block, neighborhood unit for 2-300 people, on a 1-1.5 ha area, usually bordered by walkways or streets, a concept developed by the project
quintal	compound, plot, division space
UNDP	United Nations Development Program, an agency focusing on technical assistance, less on substantial financing