



2001 Technical Review Summary

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by Omar Hallaj

Mayotte Development Projects

Mayotte, Comoros Islands



Architect

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Client

Société Immobilière de Mayotte

Design

1978 - ongoing

Completed

1993 - ongoing

Mayotte Development Projects

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I. Introduction

This report outlines the activity of the Société Immobilière de Mayotte (SIM), a mixed-economy company that mediates social housing policies in the French Overseas Territory of Mayotte. The small island is part of the Comoros archipelago, but has chosen by popular vote to remain with France. Since 1978 the SIM has provided more than 40 per cent of the housing stock on the island, and has worked to develop a local compacted earth brick industry based on available natural resources and traditional master-builder labour organizations. In addition, SIM is a leading force in the economic growth of the island.

The following represents a brief summary of a large body of work. In some instances, typical cases have been documented to convey some idea of the complexities involved in these initiatives. These should be regarded as examples, not solely as singular projects. SIM interventions are evident in every village and commune on the island.

II. Contextual Information

a. Historical background

The ethnic mix of the island reflects its long history of involvement with the various trading and warring communities inhabiting the lands along the western part of the Indian Ocean. Malagash, East African and Omani traders, along with merchants from Shiraz, have all left traces of their heritage in Mayotte. Beginning in the fourteenth century, the island witnessed a large infiltration of traders from the coasts of Arabia, who brought with them the doctrines of Shafii Sunnite Islam and an affiliation to the Shazeli mystic traditions. The word 'Mayotte' is itself of Arabic etymology, meaning 'place of death' (many ships sank in the vicinity).

Today, the majority of the population is Muslim, but has retained in its social practices many indigenous traditions such as matrilineal family structures and beliefs in spirits and other pre-Islamic cults. The language of the island is similarly a mixture, known as 'Shimahori'. It is a blend of many phonetic traditions, including Swahili, Bantu and Arabic, among others, and there are considerable linguistic differences between Shimahori and the other languages of the Comoros. This did not stop intermarriage and close trading ties with the other islands in the region, however. The differences that led eventually to the retaining of Mayotte under French administration, in contrast to the rest of the Comoros Islands, are mostly political rather than cultural.

In the eighteenth and nineteenth centuries the East African coast and islands were embroiled in conflicts between the various small warlords and princes of the region. A Malagasy prince by the name of Adriantsuli sold the island of Mayotte to the French in return for a yearly stipend and protection. The French maintained only a small garrison and a skeleton administrative body on Mayotte, but located on a smaller island, as Mayotte's location was neither important economically nor useful for maritime traffic because of the dangerous approach through the coral reef.

In 1946, France divided its remaining ex-colonies into two domains, Territoires d'Outre Mer (TOM), and Départements d'Outre Mer (DOM). The first is dominated administratively by the appointed *préfet*. TOMs retained many of their own customs and laws, and received a lower level of French government spending. The DOMs by contrast were closer to the main 'Métropole' in their administrative system, and benefited from a higher level of state spending. The Comoros were accorded TOM status and the administration of the islands was moved from Dzaoudzi in Mayotte to Moroni in Grand Comoro. This shift culminated in a feeling among the Mahoris that Mayotte island was losing prominence in the region and brought fears that the more learned and better-connected Comoros islands would come to dominate theirs. Because of this, the people of the island voted overwhelmingly to stay with France when the independence of the islands was brought to popular vote in 1974. Mayotte reaffirmed its intention to remain with France in the vote of 1976, and was therefore confirmed as a TOM. The rest of the Comoros became an independent republic.

The TOM status of the island ensured the preservation of some local legal practices (mainly polygamy, inheritance laws and the *qadi* judicial system) and established a pyramidal administrative structure run by the *préfet*. For many Mahoris, staying with France meant preserving a special prominence and independence in the region. It also meant it had better prospects of eventually receiving DOM status and greater economic benefits. Already, despite its low economic viability as a French TOM, the island enjoys a considerably higher standard of living than its neighbouring Comoros, and is beginning to witness an influx of clandestine migration.

The motion to stay with France was mostly supported by the lower strata of society, particularly by women. The old elite, having been pro-independence at first, has come to appreciate the benefits of staying with France. Today even the most ardent critic of French presence on the island is willing to concede that the majority of its inhabitants are not likely to go back on their pro-French stance in the near future; in fact, they voted overwhelmingly in 2000 to move closer to the French departmental system. The confirmation of Mayotte as a Collectivité Départementale is awaiting final ratification. For some, this is the last step towards full departmental integration, for others it represents another stalling technique on the part of the French government, which they believe to be unwilling to invest the extra development funds needed to bring the island on par with other DOM domains.

Mayotte's special status has established a mood of interim politics and an attitude of economic stalling on the island. As the French did not insist on applying the 1981 decentralization laws in Mayotte, the seventeen communes of the island are not in full command of their local resources. The main assembly (the Collectivité Territoriale de Mayotte, CTM) is becoming increasingly powerful. At the ratification of the new status of the island, the elected president of the assembly instead of the appointed *préfet* will assume the executive office. In reality, the French government manages approximately 60 per cent of public funds on the island, while the rest is managed by the local administrations.

In 1976, when the French presence on the island was reconfirmed, Mayotte's standard of living was considerably inferior, even when compared to other French Overseas Territories.

The question of housing was a primary concern for the administration, along with the provision of basic equipment, clinics and schools. The Direction de l'Équipement (DE) is officially in charge of financing all of the above, as well as much-needed infrastructure. The state decided that the work should be carried out by various means. Some programmes were directly administered by the DE, while others were delegated to special agencies. Housing was delegated to one such society, the Mayotte Realty Company (Société Immobilière de Mayotte). It started as a governmental agency in 1978 and operated as such until 1993. From that date on, SIM has operated as a semi-independent society of mixed economy. The state still provides the majority of its funding at ever-increasing rates. However, SIM has acquired the mandate to finance and establish its own projects as a land developer in addition to its original role of providing housing. To that extent, the project nomination differs considerably from its previous nomination made in 1986. The whole administrative context of the housing operations has undergone much change in the last few years.

b. *Architectural context*

Traditionally the inhabitants of Mayotte lived in small villages. Housing traditions varied according to ethnic mix and topography. In general most houses belonged to the women. The woman's family would endow her with a small property on the edge of town and the husband would move in, but in case of divorce or polygamy (common, though not dominant) he would move out: the woman retained the security of her home. In addition to the small two-room hut (*nymbi*), the house would include a closed courtyard that would define a private domain (*shanza*). The space of the *shanza* would be used up over the years with additions to the main hut, huts for elder daughters, outhouses, and other domestic structures.

The land occupancy pattern of the island was one of incremental growth, and The Collectivity would ensure the occupancy right within a domain. Land ownership has only recently become a dominant issue. The traditional elite could sell land at ever-increasing prices, but today the division between those who can and those who cannot afford to buy land is becoming more acute. Throughout the early years of SIM there was still a cooperative spirit of communal distribution of land occupancy permits. This is not the case today. The issues surrounding the scarcity of real estate are now at the forefront of public debate, and the state is having to draw up land-use plans and territorial maps to ensure the availability of housing sites.

The male children are usually separated from the main household at puberty, when they are sent to build a small one-room shack called a *banga*. The *banga* is a colourful structure that serves both as a male initiation space and as a means of staking out new land for the family on the edge of town.

American anthropologist John Breslar, who was present on the island in the 1970s, documented many of its different housing practices. Also, a young architect, Atilla Cheyssiak, conducted research into the construction techniques of the traditional Mahori houses. These early studies directed the first efforts of SIM, and led them to provide housing models that were both compatible with the building types present on the island and the housing practices of the people.

In general, the traditional structures of the Mahoris were built with vegetal materials such as wood, thatch and woven leaves. Mud and clay were mixed with straw to make a batting cover for the walls. Elaborate construction techniques were used. The more technical aspects of the work were carried out by specialized craftsmen, especially carpenters. The rest of the work was done by the community through a system of mutual help (*musada*). This latter concept is evoked in a religious and social context in the construction of mosques and communal buildings and the maintenance of public spaces.

Mosques comprise the main type of communal structure in the villages. The mosques of Mayotte are small buildings with pitched roofs. The length of the building runs in the direction that points towards Mecca. Mosque buildings are slightly larger than most of the houses and are surrounded by an arcade. The mosque is usually slightly more elevated than the space of the main plaza. Some use masonry in their construction, which is otherwise rare in Mayotte.

c. *Geography and climate*

The Comoros archipelago is a set of four large and several smaller islands off the eastern coast of Africa. Mayotte is comprised of one large island (Grand Terre) and one smaller island (Petite Terre) and many even smaller, uninhabited islands. Set in the centre of a volcanic reef, the island is surrounded by shallow waters, which create a natural barrier around the island. The total surface area of Mayotte is small (approximately 374 square kilometres), but its 1,000 square kilometres of lagoon make it one of the largest coral reefs in the world.

The tropical climate of the island can be divided into two main seasons. The six months from mid-October to mid-April are the rainy season with monsoons. The rest of the year is generally clear, but high humidity persists all year round. Temperature variations are minimal – around 28°C on average (the constant temperature of the lagoon). As a result, the island has been enveloped by heavy green vegetation that is only broken to make way for small urban settlements. These are mostly distributed around the coasts, with a few exceptions in the hinterland. Plant life on the island predominantly consists of coconut trees, papaya, mango, baobabs, banana, raffia and bamboo.

The delicate microclimate of the coral reef makes Mayotte particularly susceptible to major climate changes. The persistently high temperature caused by El Niño almost destroyed the coral stock one year. Similarly, changing drainage patterns and use of coastal sand for construction left a perceptible effect on the bio-conditions of the lagoon (the removal of coastal sand is now prohibited).

The climate of the island was conducive to self-sustaining agricultural activity for most Mahoris, and fishing in the lagoon provided an extra source of nutrition. The only source of trade with the outside world was the island's sugar cane, vanilla and ylang-ylang plants. The making of coral jewellery set in gold was once a famous craft industry, but now, as the destruction of the coral reef is endangering the ecological stability of the island, it is strongly

discouraged. Few minor crafts existed on the island to complement the limited and generally self-sustaining economic activities of the inhabitants.

Mayotte's population stands at about 155,000 inhabitants. Of these, about one-quarter are immigrants from neighbouring countries. Almost 60 per cent of the population are under twenty years of age. On average the family income is about USD 800 per month, although a quarter of the population is thought to be living in extreme poverty, at less than USD 150 per month.

III. Programme

a. What conditions gave rise to the formulation of the programme?

Although Mayotte is one of the poorest French territories, its living standards are considerably better than those of its immediate neighbours. In the last twenty years the population of the island has grown at the high annual rate of fifty-seven per thousand. This has largely resulted from a reduction in infant mortality and an increase in the birth rate. Approximately one-quarter of this growth, however, can be attributed to clandestine migration from the neighbouring Comoros. In addition to this, after the affirmation of the island's status within the French system, there followed an influx of metropolitan functionaries, who mainly came to staff urgently needed education and health facilities. Today this group accounts for over 2 per cent of the island's population.

In 1974, almost the entire population lived in traditional housing, and only a few French administrative buildings were built with 'hard' materials. The overwhelming majority of the housing stock lacked sanitary facilities, and was judged to be insalubrious. Thus, the early efforts of the housing programme were directed towards providing housing *en masse*, focusing attention mainly on the need to provide sanitary and stable structures. Today, the housing market is considerably more complex and is ever changing. This renders the question of housing, particularly social housing, increasingly more difficult to handle. With the considerable shift towards a demand-driven market, the housing issue is becoming tangled with issues of land management, urban planning, communal politics and market trends.

The housing policies of SIM had to shift from the direct provision of housing units in the early years towards a more pro-active role in territorial management, which meant that many of its early basic founding principles were superseded. Those principles were directly responsible for providing approximately 40 per cent of the housing stock on the island, an achievement that has won SIM considerable respect among the people of Mayotte; indeed, the SIM hut (*case SIM*) has become a household name on the island. However, its new need to engage in abstract urban management and planning operations has alienated SIM from its grass roots. Today SIM is having to rethink its strategies. For the last four years, the institution has commissioned many self-critical studies in an effort to review its current strategies and chart new ones. One of the basic and most impressive aspects of the SIM operation is its capacity to adapt to new conditions and to experiment with new modes of operation.

b. *General objectives*

Mayotte is an island of limited resources and restricted access to the outside world. The main port was only recently opened up to deep-sea ships, and the airport accommodates only mid-range aircraft. The cost of imported materials therefore remains very high. Moreover, the materials most commonly used for making concrete mixes – mainly sand and aggregates – must be produced by crushing volcanic rock. As has already been mentioned, the use of coastal sand was endangering the ecological stability of the lagoon and was prohibited. Therefore, any mass housing programme had to start with the development of a building material that would be ecologically sensitive, available locally and inexpensive to produce.

Another aspect of the challenge to develop a social housing scheme has to do with the establishment of labour networks that would transcend the *musada*. This spirit of community support is still very keenly felt, but it needed to be developed in new directions to accommodate the steadily increasing demand for house-building skills.

The early strategy of the SIM founders was based on the development of a process that would address both of the above considerations. The chosen building material was compacted earth brick (Brick de Terre Comprimée, BTC). This material was developed continuously, with the assistance of a special programme run with the cooperation of the University of Grenoble (CRATerre), who managed to devise a form of brick that was comparable to concrete masonry units (CMU) in terms of strength and resistance to impact. The local brick was made from clay and pozulan volcanic cinder, both of which are available in abundance on the island. But more importantly, SIM worked on developing a labour force capable of operating the brick-manufacturing shops, as well as skilled masons and an administrative structure to regulate contracts. The main motive behind the SIM strategy was to develop a local brickwork industry. This helped to resolve many issues, and turned the provision of housing into an opportunity to develop the local economy rather than being a burden on it.

SIM has religiously defended its use of BTC and the engagement of small-scale masonry enterprises, for which rigorous training and qualification programmes were developed in cooperation with various other institutions and agencies. A special union was formed to organize the masons and technical training bodies were engaged to provide continued training programmes. SIM further supported the nascent industry by promoting BTC as a fashionable material, even for the fancier homes of the wealthier state functionaries, public buildings and large-scale urban developments.

Providing for the developing requirements of the housing programme necessitated what seemed like a counter-current in French housing policies. SIM has argued that the changes taking place in the housing market need to respect the local patterns of house ownership. It was better, therefore, to start with modest housing structures owned by their residents rather than with the more developed rental housing schemes. To that end, SIM worked with the local communities and communes to prepare the new sites and to make them available for newcomers to the housing market. Later as the realty became harder to allocate locally, SIM undertook the acquisition of new plots and their preparation for phased and assisted home ownership.

The objective of establishing the structural conditions needed to sustain a housing programme was complicated by many nostalgic assumptions concerning auto-construction, communal mutual help and non-capitalistic methods of distributing building materials. SIM tried a myriad of subsidiary schemes to develop the production of housing further. These schemes were given names that were associated with the roles they were to play, such as the *musada* (mutual help), a cooperative institution set up to sell building materials to the house owners. These schemes invariably proved inefficient, and were becoming burdensome in the new monetary economy of Mayotte. SIM moved to privatize them, while still maintaining small shares of investment to allow for a transitory phase.

c. *Functional requirements*

As SIM is engaged in many programmes, the functional requirements for each will be discussed separately. However, three modes of jurisdiction define the SIM operation:

Direct provider of social housing: this is a mandate under which SIM provides affordable housing for the lower-income groups. This is the primary activity of the institution. However, as this has become a rather standard operation, the running of the programme requires little technical intervention. SIM is in a position to provide about eight hundred basic units (two- and three-room houses) per year.

A development agency for the communes: in this capacity SIM has been delegated the authority to work on related urban problems, primarily the issue of rehabilitating and upgrading the spontaneous settlement areas (Résorption de l'Habitat Insalubre, RHI). This operation is directly sponsored by the DE and controlled by the communes, but SIM is often engaged because of its record of competence in handling this kind of work. The main SIM intervention has taken place in the newly emerging slum areas around the main towns. About six thousand precarious houses exist mainly in the two main sites around Mamoudzou. With the increase in migration, these areas are expanding at the rate of about five hundred new houses every year. SIM is responsible for clearing of rights of way and providing clean drinking water, and has undertaken an intensified assisted house-ownership programme.

Property promotion: with the increasing demand on rental property to accommodate the housing needs of state functionaries (mostly metropolitan), SIM acts as a self-motivated landlord. It purchases land, develops the sites, constructs housing estates, and leases and manages property. In this capacity, it has provided a total of 1,400 housing units to date. The production of rental units is in the range of 250–300 per year. This is an enterprise that SIM evolved to compensate for the lack of other institutional mandates in this field. SIM also purchases urban land, develops it for public and commercial uses and puts it back on the market. SIM is not directly responsible for urban planning, but as it is one of the strongest real estate bodies, it has considerably influenced the outlook of the capital city, Mamoudzou. SIM defends its engagement in this market on the basis of promoting sound urban design parameters and encouraging the use of brick in public architecture. It uses the standard artisan-based contracts for all its work. Furthermore, its managers argue the need for densification in the urban centre to curb the housing sprawl.

As SIM functions in these different ways, the next part of this report will undertake a separate description of each. In most cases SIM interventions are spread all over the island, so only a few sites will be described in detail. It would be very difficult to describe all of the SIM experiments, failures and successes over its twenty-two years in operation. The interventions described are the following:

- Social Housing Programme
- Revitalization of Insalubrious Housing
- Property Promotion
 - Place Mariage
 - Kavani Sud
 - Tsounzou I
 - Barakani and Jacaranda Buildings

Social Housing Programme

IV. Description

a. *Building data*

The social housing programme developed by SIM has undergone many changes in the last few years. In the first phase, SIM had to meet the immediate need to upgrade the poor housing conditions on the island. Under this mandate SIM produced over fourteen thousand housing units at a rate of approximately eight hundred per year. This enabled a large percentage of the population to move from mud- and tree-huts into semi-stable conditions. However, as the population was growing very rapidly in the meantime, the demand for new housing became a major issue. Thus, for some time, SIM has been working to provide a major part of the new demand for the housing stock. Today about 40 per cent of the primary households are built by SIM. The ability of SIM to provide new housing is encumbered by the fact that land is becoming scarce. The old communal system of providing land for housing is severely hampered by the monetary transformation of the economy. Thus, even though SIM's budget has been steadily increasing over the years, the number of housing units produced has not kept pace, and remains at the rate of 700–800 units per year.

A recent demand on the housing market has become more acute of late. The early housing built by SIM is now in need of rehabilitation, or expansion at the very least. The self-help work undertaken by the house owners to expand their homes or refurbish them has always been considered a healthy endeavour. Indeed, the original theory of SIM was to provide the basic housing unit and amenable conditions for growth. However, as has become apparent, the owners have not invested the effort needed to bring the basic housing unit up to a better standard. Furthermore, the new additions were often poorly constructed and in most cases without proper safety regulations. This led SIM to direct its efforts into developing the technical and financial means to assist these house owners. An experimental phase is now under way that is intended to develop a workable programme. The quantitative data for a programme of additions is hard to assess, however.

b. *Evolution of design concepts*

SIM has been very careful to develop viable architectural models within the parameters of strict financial and social constraints. Their catalogue of models has evolved considerably. They continuously evaluate the requirements that have to be met by their basic units, and change their design accordingly. In the social practice of the Mahoris, cooking always takes place in the *shanza* and not in the house, and sanitary facilities are placed as far away as possible. Therefore, the basic unit does not reflect modern service requirements. Rather extreme attention is given to the placement of the unit within the domestic space of the *shanza*. The various housing units made available by SIM are therefore geared more towards accommodating issues of frontage, access and expandability. Thus, considerable effort is devoted to identifying the needs of each client.

The SIM architects have produced a wide variety of models, tested them, evaluated their uses and assessed the way people have adapted them in the long term. What seems like a simple design problem therefore turns out to be a very long process of cumulative modifications. The basic housing models evolved according to the materials used, their basic amenities, and even their colour. Compounded with the fact that each of the residents will tend to undertake enhancement work and make additions in their own way, the impact of the houses on the fabric of the settlement is anything but uniform. Thus it is possible to pass by some settlements where more than half the housing was built by SIM without feeling the monotonous effect that most social housing projects produce.

SIM has tried to maintain this notion of natural placement in their larger projects as well, when a considerable number of units is introduced wholesale into one particular site. This was often done by mixing units of different sizes and economic viability together in an attempt to avoid problems of social segregation. In these latter sites, however the impact is more jarring and the adjacency of the units seems artificial.

c. *Structure, materials, technology*

SIM uses the compacted earth brick, BTC, in all their work as matter of principle. The technology for making this material is not complex but depends on simple pressing machines and various sizes of metal formwork. The quality of the brick is dependent on the careful mixing of clay and pozulans, and the sealing of the brick for curing is an important factor in the final compression strength of the brick. However, the most important factor in determining the quality of the building is the way in which the bricks are laid and interconnected, the detailing of the mortar joints, and the quality of the mortar. Although the use of clay and pozulan mortars is more sensible, SIM has accepted cement mortars because the quality control needed to produce adequate earth-base mortars is beyond site management capacity. In sum, the type of masonry needed to construct the BTC is an essential part of the quality of the construction. Thus the training and qualifications of the brick producers plays as much an integral part in assuring the quality of the BTC construction as the skill of the masons. To that end SIM has worked hard with the union representing the masons on developing standards of BTC production and construction. The Mayotte brick has acquired a national industrial standard of its own.

Concrete is reserved for the grade foundations and ground slabs, although localized use of concrete at the corners and in the tie-beams is considered in some models. Masons are usually trained to handle the concrete work although the use of concrete remains rather limited in the actual construction. (Masons' contracts constitute the largest portion of the cost of the construction.) The level of detailing on the basic units tends to be minimal. The main concern of the SIM architect was the structural detailing of the units to accommodate changes in a safe and sensible manner. Careful insertion of a concrete tie-beam at lintel height enables an attic to be added in the future; the positioning of concrete columns at the corners makes it possible for the side walls to be opened up so that an extra room can be built. The housing units are all roofed using corrugated metal sheets. The metal is imported and comes in large rolls. A local industry cuts and folds the standardized metal sheets.

Nonetheless, its early insistence on BTC as the main building material drove SIM into some technical decisions that were sometimes not economical. Today, SIM is more accommodating, and will accept the use of other materials in their design work. Stone, CMU and even concrete elements are incorporated into the design of the new units. The issue became more complicated with the advent of the new economy, when many started to associate the new building materials with social status. Thus, the inclusion of new materials became important to avoid the problems of social stigma that can follow social housing projects. SIM has also initiated new colour schemes, which are discussed with the future owners individually, to make the basic unit more personalized. Colour combinations have been carefully developed, and a catalogue of colour is offered along with the design-catalogue for the prospective home occupants. Colour is added using water-based paints, which allow moisture to pass through and therefore prevent problems of moisture accumulation in the BTC. As their means improve, the owners will eventually complement the decoration of their houses by adding decorated porches, elaborate wooden shutters and front doors.

d. *Origin of technology, materials and labour*

The actual technology needed to build an SIM house is very basic. The elaboration of the production procedures, appropriate mixes, quality-control tests and installation techniques were developed to a large extent with the help of a university team from the Métropole, along with metropolitan architects working for SIM. However, SIM has also nurtured highly qualified local technicians. This generation of SIM operators is now leading the new phase of material and construction development. As BTC technology is young and untested, its adaptation into everyday practice will play a vital part in ensuring its future development and success.

BTC is entirely constructed from locally available components. By contrast, the metal and the cement used in construction are both imported, and together they constitute a considerable portion of the cost of the unit. Although the material is cheaper, the cost of the BTC masonry reflects a larger labour cost. SIM has continuously argued that the dependence on BTC as opposed to imported building materials will result in larger benefits for local labour. It is estimated that the money spent on BTC construction reflects almost twice as much local labour retention as is needed with CMUs.

The SIM housing concept has been dependent on the idea of developing an old labour tradition of master craftsmen (known locally as *fundis*). These were trained, qualified and organized into a labour union (CAPEB) that was affiliated to a national union organization. Only qualified *fundis* can apply for SIM contracts. The contracts tend to be individual to avoid larger general contractors from pushing the nascent industry to the wayside. Although this can result in more administration, it nevertheless ensures quality as well as cost control. SIM negotiates the cost of labour and material with the union on a yearly basis. This in turn has brought a level of stability to the market. Compounded with the fact that SIM provides the warranties for construction, the status of the masons has been nurtured to the extent that many of them have been able to start up small enterprises in their own right. A typical masonry enterprise usually consists of a qualified *fundi* and several assistants. The *fundis* are all

Mahoris. However, with the increase in clandestine immigration, a growing number of workers within the BTC industry are immigrants from the Comoros.

SIM itself employs some 120 people working out of two main offices in Mamoudzou and several branch offices throughout the island. The management and senior architects are mostly metropolitan but many of the technical offices are administered by Mahoris. The interface with the local communities is managed by a qualified group of Mahoris. The president of SIM is, by definition, an elected member of the General Assembly. Therefore, to a large extent the administration of SIM still leans heavily towards metropolitan professionals, although increasingly the Mahoris are assuming positions of leadership.

V. Construction Schedule and Costs

a. Project history

SIM initiation:	1978.
SIM becomes a mixed-economy company:	1993.
Duration of the social housing programme:	ongoing.

b. Total costs and main sources of financing

The total amount spent on social housing up to 2001 has reached FRF 1,750,900,000 , or approximately USD 300,000,000. The financing of the programme is mostly supported by the French government (60 per cent), the Mayotte General Assembly (10 per cent), the local communes (10 per cent), and the beneficiaries (10 per cent). This division indicates a heavy state subsidy, but it should be kept in mind that this investment reflects the cost of the basic unit. The continuous self-help of the beneficiaries in the form of additions and site improvements does eventually bring the owner's contribution to about 50 per cent. The state provides its subsidy in the form of a special budgetary line (LBU). Such funding restrictions play against other metropolitan trends of diversified funding for housing.

It should be noted that many of the SIM experimental programmes are financed through a special research fund for the overseas departments, called SPIOM. This fund was widely tapped to advance technological and administrative programmes, new design concepts, post-occupancy studies and even limited programmes of new types of housing. One such project is a new breed of homes, three storeys high and measuring 4 metres square, which is intended to help deal with the problems of increasing urban density within the spontaneous settlements of Mamoudzou. These special programmes cover the initial design and development costs of the first few units, and ensure a proper evaluation of their performance before they are generalized. Although this fund is not very large, it plays a significant role in sustaining innovative approaches to social housing.

c. Comparative costs

The basic SIM two-room unit costs about FRF 110,000 (USD 15,700). This cost is by any comparative means rather high. The owners are expected to put forward FRF 14,000 for the

initial acquisition of the unit. For most residents this latter sum provides the basis of comparison with other options. A basic shanty made of corrugated metal without proper foundations or sanitation can cost up to FRF 8,000. A concrete and CMU two-room house (with a flat concrete roof to allow for future expansion) can cost up to FRF 90,000. An exact replica of the SIM house built outside SIM regulations (without permit) and without warranties can cost up to FRF 80,000. SIM defends its high cost of construction because it specifies higher quality, warranties and sound sanitary installations (proper septic tanks).

For most people on the island the process of acquiring an SIM house can constitute a heavy investment. The average family will have to wait between one-and-a-half and two years before it can save enough money to make the initial payment of FRF 14,000. In the meantime, SIM will work on their behalf to acquire permits and prepare contracts.

It should be remembered that the high cost of construction is directly related to the fact that imported materials are very expensive. A sack of cement sells for USD 10 and a typical CMU cinder block for about USD 1.

d. Qualitative analysis of cost

The cost per square metre of building is USD 350. This includes main site preparation, foundations, BTC walls, concrete structure, roof structure, metal roof, woodwork, paint, mains water connection, sanitary facilities, septic tank, permit fees and administration. The largest part of the cost is masonry and concrete work.

e. Maintenance costs

SIM provides the basic warranty on behalf of the small enterprises, although in the long run the costs of maintenance are borne by the owners. A good deal of this cost reflects additions and improvements. A typical family can invest up to FRF 4,000 a year on house improvement.

BTC technology is very new, though in principle it depends on old and proven materials. Almost all the units built by SIM twenty years ago are still occupied and are in good shape. Some have been transformed for commercial use as land-use patterns changed in the most densely settled areas. However, the salubrity of the SIM houses is a relative matter. Only one-third of the SIM housing was improved in the tangible manner anticipated under the self-help theory, while the rest was improved only marginally. In response to this, SIM is now launching an assisted programme for improving and expanding the older housing stock. New design work has been carried out to facilitate vertical and horizontal expansion of the units, improved sanitation and even some level of decorative ornamentation. It is still too early to evaluate the results.

Revitalization of Insalubrious Housing (RHI)

IV. Description

a. *Building data*

The problems of precarious housing (a general label applied to a many different housing conditions, including squats, spontaneous settlements, poorly maintained traditional housing and unsanitary habitats) present a major challenge to the housing policies of the DE. About six thousand such households occupy about fifty locations throughout Mayotte, but the problem is becoming most pressing around the capital city of Mamoudzou. Two main shanty towns have emerged to the north and south of the rapidly growing city. The number of precarious houses is increasing at a rate of about five hundred units per year. The state is worried about this uncontrolled growth for political reasons as well as its impact on services. From a purely technical point of view, these areas present an added demand for public utilities. Moreover, their location on the edge of the city encroaches on the high end of the old volcanic hills. The removal of surface plantation and its replacement by compacted dirt have increased the danger of soil erosion. The winter rains wash under the poorly constructed shanties and leave whole neighbourhoods at the mercy of floods.

The precarious housing areas are usually very densely populated. Densities reach eighty households per hectare, or approximately 450 people per hectare. About 70 per cent of the inhabitants in these areas are immigrants with no official status. A sociological study carried out in the area revealed that most were recent arrivals, and that a higher proportion was male. The organization of the neighbourhoods is less dependent on social networks than that of traditional neighbourhoods. Many people occupy sites under hidden leases issued by original owners of the land. In some places there is squatting, and squatters have been known to lease their previous residence as they move up the social scale.

b. *Evolution of design concepts*

The DE has allocated some funds to deal with the problem and tried in many instances to handle the issue on its own in each commune. However, the problem in the two main sites around Mamoudzou was eventually delegated to SIM. The main idea behind the SIM intervention was to introduce a level of stability to the public rights of way in the neighbourhoods. These small alleyways negotiate their way through the difficult hilly topography, the densely built shanties, the technical requirements of infrastructure installation and the original legal parcel divisions. The alleyways are then linked to major roads. These roads were planned along the paths of least social and topographic resistance.

The planning of each area was devised in a way that would subdivide the large conglomeration into smaller neighbourhoods. These in turn are serviced and managed, and in the long run each small parcel can be replaced by a small housing project for the very poor (*habitat très social*). Thus, the process is incremental and produces small but direct improvements over a large area.

The majority of the RHI work is limited to basic stabilization of the soil, and the provision of infrastructure. SIM has recently started to experiment with the concept of working in small parcels to revitalize the housing structures. One pioneer experiment consists of a small plot of about 150 square metres. SIM negotiated a scheme with the residents whereby five shanties inhabited by five different but related households were to be replaced with more compact two-storey structures, thereby liberating more open space and making provision for proper sanitary facilities.

The first phase of the RHI programme has proved to be successful. It remains to be seen, however, whether SIM will succeed in introducing the small parcel intervention scheme on a larger scale. SIM's earlier work, carried out in close cooperation with the inhabitants and on a small scale, is often considered uneconomical.

Mass clearance of an entire neighbourhood was also tried out in some locations such as M'gombani. In this particular case, main streets were bulldozed (the land was purchased by SIM) and new regularized housing was introduced along the main streets, pushing precarious structures to the side or between the blocks. This latter procedure is perhaps effective in resolving spatial problems, but it remains to be seen whether the original inhabitants of the site were directly helped; in fact the most immediate evidence points to the displacement of the original community. Furthermore, the regularized grid imposed on the neighbourhood is at odds with the surrounding urban fabric. In this particular case, the resolution of the RHI problem was financed entirely by SIM in its capacity as a private promoter. This aspect of SIM's work will be discussed below.

c. *Structure, materials, technology*

The work to improve the public rights of way is very basic. The minimum width of the alley is negotiated with the residents, and the passage is then cleared and compacted. Infrastructure work is carried out in a very rudimentary way (flexible water pipes and semi-covered sewer ditches). The top surface of the road is then paved with stone tilted to one side. The kerbstone directs surface drainage down the hill to avoid erosion problems.

d. *Origin of technology, materials and labour*

The operation is dependent on two imported materials: cement and flexible piping. The rest of the materials are available locally, although the crushing of the local volcanic stone for aggregate is expensive and requires imported crushing equipment.

The large body of civil work involved in the RHI project has meant that SIM has been obliged to work with large contractor firms, with the exception of the final paving, carried out under standard small contracts within the *fundu* system. The technology uses a high proportion of concrete, needed for infrastructure works and for retaining walls. Local volcanic rock is used for pavement, and is crushed to obtain the necessary aggregate and sand for the concrete mixes.

The planning work for these RHI projects is carried out by the SIM urban management department. The contractors are a mix of small masonry enterprises and larger contractors. Most are local enterprises, although often a considerable part of the large contractors' personnel is made up of Comoran immigrants.

V. Construction Schedule and Costs

a. Project history

The project is ongoing, with a yearly budget since 1998.

b. Total costs and main sources of financing

The DE has allocated on average around FRF 40 million per year to deal with the problem of insalubrious housing; the communes provide an additional FRF 22 million. To date the total spending on RHI work in Mayotte is in the range of FRF 248 million (USD 40 million). The DE funds are mostly covered by national budgets for infrastructure renovations. Only a small part is covered by the LBU housing fund.

c. Qualitative analysis of costs

The average cost of the basic RHI operation reflects an expenditure on the level of FRF 1.5 million per hectare (USD 215,000 per hectare).

d. Maintenance and life performance

The RHI programme is very recent, so it is hard to determine the maintenance expenses at this stage, or how the system will fare under the repeated cycles of heavy rains. It is the responsibility of the communes to handle the maintenance work in the future. In the past, the communes' funding has not been sufficient to cater for the services needed, but with the new status of the island, they stand a better chance of directly affecting public funding.

Property Promotion

Under this category falls a large body of activities undertaken by SIM in the last few years. In this area SIM operates as a private but non-profit-making developer. It buys land at market value, initiates appropriate programmes, develops the site with its own funds and either leases the property or sells it to public and private users. SIM projects in this domain involve sizeable urban interventions. These are developed either in small increments or wholesale. They represent diverse initiatives such as housing for lease, mixed-use urban developments, public office space and commercial buildings. The following are but a few examples of their work in this arena.

Place Mariage

IV. Description

General Data

The Place Mariage is a centrally located plaza at the tip of the city of Mamoudzou, not far from the docking station for the ferries linking the two main islands together. The plaza was an empty lot at one side of the main market. SIM acquired the land and began a series of projects. Today the project is in its last phase, with all four previous phases fully implemented. The total area of the site is 14,689 square metres, and the total built-up area is 11,600 square metres. The site occupancy rate stands at less than 50 per cent. This reflects a rather low density by metropolitan standards, but in Mayotte this is considered very dense. Indeed, the Place Mariage is marketed as an example of the higher densities needed to sustain the vitality of the city centre. The site contains forty rental housing units that comprise less than one-third of the built-up area. The rest is commercial and office space.

b. Evolution of design concept

The site is longitudinal in proportion. It has a noticeable slope towards the eastern (sea) side. In the first phase, SIM initiated two rows of mixed-use buildings. The ground level was designated for commercial use, and the top floor was residential. The ground-level frontage to the main plaza makes a continuous gallery and defines a shaded pathway around the open space. At a later phase SIM announced competition work to continue the development of the plaza. Several architectural firms were then commissioned to design other structures.

In its final form the plaza makes a very well-defined urban open space. To the east a professional syndicate building demarcates the frontage towards the sea. This building was not developed by SIM directly and its architectural language diverges from the rest of the structures on site. However, this grand gesture in white concrete follows the massing requirements set by the SIM masterplan for the plaza. Opposite this building stands a 43-room private hotel, and next to it is the SIM headquarters building. The three buildings comprise the eastern edge. At the west end stand two three-storey structures with high gables facing the plaza and demarcating its end. Between the two ends stretch the two rows of mixed-use buildings. The northern part of the plaza is demarcated by a high hill and the development

ends with the row of mixed-use structures. To the south, by contrast, the site allowed for another row of developments comprised of a commercial building, a row of rental property, an underground car park, and a site for an upcoming phase of office development.

The main gallery surrounding the open space is well shaded and provides a well-used pedestrian pathway. In general, the building materials on site reflect SIM's promotion of local products (BTC, wood and stone). The horizontal shading devices provide a continuous design vocabulary. This continuity of detailing was successfully managed despite the fact that the various phases were designed by different architects. The only exception to the rule is the professional building that SIM did not develop. Even the privately developed hotel uses compatible forms and has a non-obtrusive frontage. The ensemble of buildings and the residual spaces in between combine to create a lovely public environment.

The weakest part of the composition is the landscaping. The central part of the plaza is used for parking. The placing of greenery in between has not been as meticulously thought through as other aspects of the project, and the plants in the middle are too big, undermining the view across the plaza.

c. Structure, materials and technology

As a matter of principle, the technology, materials and labour organization used by SIM on all of their sites is the same. The only difference on this project was the innovative use of the horizontal shading devices. SIM's insistence on this continuity is based on the need to support the small enterprise system, especially the BTC industry. Furthermore, SIM architects are keen to develop a local context for the city. Therefore, the architectural firms that were engaged in the competitions were strongly encouraged to work with locally available materials and skills.

d. Origin of technology, materials and labour

Since work at this site represented a new phase of SIM work, only the most qualified masons were hired. As some of the structural works involved a more complicated use of concrete, SIM engaged general contractors for the work, and aluminium contractors were taken on for the construction of the office buildings, which needed complex envelopes. These materials constitute a deviation from SIM's standard practice and an increased dependence on imported elements.

The choice of architects engaged in the various phases of the project was diverse; some are locally based, others are metropolitan firms.

V. Construction Schedule and Costs

a. Project history

Design phase: 1990–97.

Construction: 1991–99 (final phase to begin in 2001).

Occupancy: began 1992.

b. Total cost and main sources of financing

The total cost of implemented phases reached about USD 8,000,000 (based on a long-term exchange rate of about FRF 6 to the USD). SIM provided all the financing and recovers its investment by leasing and selling property at slightly below market value. SIM does not stand to make a profit from its development but is responsible for ensuring the viability of its investments.

c. Comparative costs

The cost of construction here was 70 per cent higher than that of a typical social housing project. The housing provided on the site is of a considerably higher standard than that provided by the social housing programme. The average rent of a housing unit on the site stands at about USD 500 per month; this is comparable with the highest 10 per cent of the leasing market on the island.

d. Qualitative costs

The cost of the construction has been calculated on a unit basis at about USD 600 per square metre. This reflects the cost for site development but not the price of the land.

e. Maintenance costs

These are hard to determine, as the individual owners or users have different programmes. SIM maintains the landscaping of the site at a low level, using in-house staff (about one-quarter of SIM personnel are landscape workers).

The commercial quality of the construction is reflected in the level of detailing and standard of work. The construction details are typical of commercial development and are expected to have limited lifespans. The basic structures are, by contrast, of enduring materials and will last for longer periods.

Kavani Sud

IV. Description

Building data

This rental housing development is located in the southern part of Mamoudzou. It is comprised of ninety-nine housing units grouped in blocks. Each block contains between two and twelve units. The total built-up area is about 10,250 square metres. The site itself is about 6 hectares, with provisions for expansion.

b. Evolution of design concepts

The site of the development is on a high hill overlooking the southern part of Mamoudzou. SIM usually prefers to use steeper sites for rental property, for technical reasons: social housing units are usually equipped with individual septic tanks, restricting their implementation to rather flat terrain. Also, the social housing and assisted-ownership units cannot bear the added cost of shoring and retaining walls. The rental developments are constructed wholesale and are provided with collective waste-water treatment units. This makes it more feasible to use the force of gravity to move the sewage, and makes the rental property better adapted to sloping sites.

The organization of the units into small blocks allows open cross-views onto the surrounding green areas. The small spaces between the blocks and along the continuous front porches create a semi-private space where children can play near their homes.

The units are supported on stilts in a sensitive response to their sloping site, set at different angles to accommodate the varying topography. The positioning of the blocks, their harmonious colours and bright metal roofs, together with the added height given to them by the stilts, combine to create an impressive presence on top of the hill. SIM has also undertaken the development of the road networks and landscaping. In the future SIM plans a small social housing neighbourhood next to the site. The general policy aims to integrate various types of housing structures in close proximity, thereby avoiding issues of social segregation. This development will add to the massive presence of gabled roofs on top of the hill.

c. Structure, materials and technology

The same considerations governing choice of material and technology apply in this project as well.

V. Construction Schedule and Costs

a. Project history

Design phase: 1997.

Construction: 1997–98.

Occupancy: began 1998.

b. Total cost and main sources of financing

The total cost of implemented phases reached about USD 9,200,000 (based on a recent exchange rate of about FRF 7 to the USD). SIM provided all the financing and recovers its investment by leasing out the property.

c. Comparative costs

The cost of construction for the leased housing development is twice that of a typical social housing project. The housing provided on the site is of a considerably higher standard than that provided by the social housing programme. The average rent of a housing unit on the site stands at about USD 600 per month.

d. Qualitative costs

The cost of the construction is calculated on a unit basis at about USD 900 per square metre. This reflects the very high cost of site development and the waste-water treatment unit. The land itself was acquired very early on in the SIM programme. In the last twenty years the price of land has increased over 500 per cent.

e. Maintenance costs

These are hard to determine, since the construction is very recent. SIM maintains the landscaping of the site using in-house staff.

The construction details are typical of mass-production housing developments and are expected to have limited lifespans. The basic structures are, by contrast, of enduring materials and will last for longer periods.

Tsounzou I

IV. Description

a. Building data

This project is built on two sites in a small town within the commune of Mamoudzou but not within the city limits. It comprises a mixture of rental property and an assisted-ownership programme. Tsounzou I is the most interesting of the two because it manages to provide a critical mix of the two types of housing in close proximity. Tsounzou II is similar to the Kavani Sud programme. This description therefore concerns itself with Tsounzou I. The programme consists of 66 rental apartments, 36 assisted-ownership units, and 12 commercial units. The total surface area of the site is about 44,462 square metres, and the overall built-up area is 10,052 square metres.

b. Evolution of design concepts

Tsounzou I has an interesting site plan, with rental property gently overlapping the assisted-ownership units. These units make use of the gentle slope of the site by introducing a series of stepped pathways in between. The gridiron plan of these units is offset by this difference in gradient, which creates an ever-changing vista that successfully disguises the monotony of the plan.

c. Structure, materials and technology

The same considerations governing the choice of materials and technology apply in this project as well.

V. Construction Schedule and Costs

a. Project history

Design phase: 1993.
Construction: 1994–99.
Occupancy: began 1995.

b. Total cost and main sources of financing

The total cost of implemented phases reached about USD 8,000,000 (based on a recent exchange rate of about FRF 7 to the USD). SIM provided all the financing and recovers its investment by leasing out the property and selling the assisted-ownership units to new owners (this latter part of the programme receives some state support).

c. *Qualitative costs*

The cost of the construction is calculated on a unit basis at about USD 770 per square metre. This reflects the very high cost of the site development and the waste-water treatment unit.

d. *Maintenance costs*

These are hard to determine, since the construction is very recent. SIM maintains the landscaping of the site using in-house staff.

The construction details are typical of mass-production housing developments and are expected to have limited lifespans. The basic structures are, by contrast, of enduring materials and will last for longer periods.

Barakani and Jacaranda Buildings

IV. Description

a. Building data

These are two developments in the central area of Mamoudzou. Barakani is a mixed-use building. The ground level is comprised of six commercial stores, while the top three floors are divided into fourteen residential apartments. The site is about 1,500 square metres. The Jacaranda site is comprised of a medical dispensary and an office building (now occupied by the Customs Administration). The site is about 1,200 square metres. The total built-up area on the two sites is about 5,025 square metres. These developments demonstrate the added emphasis given to densification in the city centre in the last few years.

b. Evolution of design concepts

The Barakani neighbourhood, in the centre of Mamoudzou, has important political significance. The Hospital Street where the building is located accommodated all the central French administrative buildings, including the courthouse, police, commune, church and the DE. SIM acquired a site, occupied by a small medical dispensary, in a land-swapping initiative. SIM bought another site closer to the main hospital a few hundred metres away in Jacaranda, and offered that site for a new and enlarged medical services building and office spaces; the site on Hospital Street was then transferred to the ownership of SIM.

The Barakani building design has had to respond to a variety of considerations. The frontage on the main street had to keep up with the institutional setting of the street, even though there is a small precarious settlement area immediately opposite. On the back elevation, the façade was to be more residential in character to accommodate the existing and future housing developments around the site. The architects therefore provided the frontage with a vertical repetitive pattern, small shaded windows and, most importantly, the semblance of an eaves line at the base of the highest floor. This last detail was to make the building more compatible with the general eaves line of the street. The skyline of Mamoudzou is predominantly horizontal, and the commune was worried that the scale of the building would be overwhelming. By contrast, the rear reflects a more fragmentary composition with a greater emphasis placed on shading devices (in the southern hemisphere the north side is more prone to sun exposure).

In contrast to Barakani, the Jacaranda site is positioned on top of the hill overlooking the residential neighbourhood below. Therefore, the construction needed to be predominantly horizontal. Two main buildings sit at a narrow angle from each other, creating a small but interesting public plaza in between. The two structures are accessed from the top of the hill and there is provision for an underground car park entered from below. The dispensary building is much used, and a porch has been provided as a waiting area. This porch provides continuity of the space between the two buildings.

The two buildings are equipped with an innovative horizontal wooden louvre system to protect their envelope. The wooden shades are interspaced with stretches of whitewashed vertical masonry. The tilted roofs are given an extra slope in the centre to provide a slight vertical culmination to the mass.

The interior of the dispensary building is organized longitudinally, between the two side stairs. Waiting areas are surrounded by medical offices. The emphasis on large waiting areas is necessitated by the fact that the building is heavily used and hundreds of people, mostly women, may have to wait for hours before they are served. This is the most important dispensary in the vicinity. The other dispensaries planned in Mamoudzou are not yet in service.

c. Structure, materials and technology

The same considerations in the choice of materials and technology apply in these projects as well, although in this particular case the finishing materials on the inside of the Barakani building are of considerably higher quality. The southern façade is further detailed with vertical courses of brick. The exterior shading devices in the Jacaranda site constitute a technological innovation for the island, although the skills used in their construction are available on the local market.

V. Construction schedules and costs

a. Project history

Design phase: 1998.

Construction: 1999–2000.

Occupancy: began 2000.

b. Total cost and main sources of financing

The total cost of the Barakani building is about USD 1,785,000 and for the Jacaranda site is USD 2,715,000 (based on a recent exchange rate of about FRF 7 to the USD). SIM provided all the financing.

c. Qualitative costs

The cost of the construction is reflected on a unit basis at about USD 900 per square metre. This reflects the very high cost of the finishes.

d. Maintenance costs

These are hard to determine, since the construction is very recent. Furthermore, the Jacaranda site is not under the ownership of SIM and its maintenance is subject to special state budgets.

The construction details are highly sophisticated for the level of construction on the island. They represent new techniques of construction. Their life cycles are very hard to estimate at this early stage.

VI. Technical Assessment

It is hard to give an overall assessment of SIM's work. SIM projects have made a major contribution to new construction on the island in the last twenty years, especially in the field of housing. In general, SIM has been able to fulfil a basic need for many categories of housing. Its policy in recent years to build apartments for lease is often misunderstood as a move away from SIM's social-housing mission. However, there is a growing need to provide housing for a large number of metropolitan professionals who are required to staff basic medical, educational and administrative services, and this will continue until local professionals are trained and can assume their rightful role. By then, however, the emerging professional class will be requiring new housing, and it is still not clear whether the new generation will move into the rental market or will maintain the matrilineal emphasis which provides housing for women near their mothers.

The other types of SIM development are hard to assess at this stage. The Place Mariage proved to be attractive as a shopping area for the well-to-do. However, as the island is entering a new phase of monetary economy, supermarkets are already planned on the outskirts of Mamoudzou. Whether the BTC industry is capable of providing a viable alternative to the imported, large, warehouse-prefabricated, metal structures is unclear for the moment.

SIM's emphasis on BTC technology has given a boost to the local economy, but most importantly it has developed a building material which is less damaging environmentally. BTC is extremely compatible with the hot and humid climate of the island. Its mass serves as an important protection from the heat, while its porosity minimizes the risks of condensation. Thus far, BTC has fared well in response to the heavy rainfall in the wet season. To that extent the development and promotion of BTC has provided a structurally stable, environmentally friendly and economically viable technology.

Although BTC has proved to be a durable material, problems arise when it is not properly installed. BTC construction is reliant on a high level of quality control. Because of this, many local politicians are refusing to accept it in public building commissions. There is no evidence, however, that BTC is less durable than CMU. Schools built in the same period have often aged in a comparable way.

The continuous attention SIM has given to the training of masons and producers has brought the level of expertise in this area up to a high standard. SIM has accepted complex site administration procedures to ensure the participation of small enterprises. This initiative was applicable on all their sites – social housing as well as promotional developments. The net result is a mature industry comprising over 350 small enterprises employing about 5 per cent of the total labour force on the island, and ensuring adequate compensation despite the increasing rates of unemployment.

The low level of technology involved in SIM construction, however, has a negative effect on the technical performance of buildings. Issues of accessibility and egress are poorly treated, even in commercial developments. Stairs are often not designed to an acceptable standard and

invariably the disabled have no access to sites developed by SIM (nor to any other public areas on the island for that matter).

The SIM design enterprise has been motored by the vision of a limited number of architects. However, their work has managed to remain experimental despite the repetitive nature of the social housing programme. The general detailing of the SIM houses is often of secondary importance to their positioning on the site. The ingenuity of the programme lies in its ability to introduce incremental change on the landscape, although the SIM architects have not been as successful in handling massive programmes. At first the introduction of change incrementally was deemed a political necessity, to avoid social ruptures. Today there is political pressure to expand the programme horizontally. Previous procedures have been undergoing a thorough re-evaluation since 1997. It is only hoped that the innovative thrust of the early years will not die down.

SIM has undoubtedly made a major impact on the housing situation in Mayotte, at least on the quantitative level. On the qualitative level SIM has provided housing standards that are economically unsustainable. Today most of the SIM houses are still lacking some basic amenities. The basic theory of self-improvement is only partially viable. This is not entirely SIM's fault, but it proves once again that housing economics is still an area in need of development. SIM has conducted some post-occupancy studies and is pressing for involvement in the coming phase of home improvements.

The RHI programme requires detailed monitoring. The low-level intervention, especially on the level of surface drainage, will have to stand the test of time before it can be assessed.

SIM construction projects are expensive for the quality they achieve. This is in part due to the cost of building materials on the island and to the need to pay appropriate wages to small enterprises. However, in the long run this will threaten the ability of these enterprises to compete on the local market. The state is expected to increase its funding of social housing continuously over the next few years, especially after the ratification of the new status of Mayotte. However, there is growing pressure to direct the funding into assisted-ownership and low-income rental housing, especially as the availability of land for individual units has become scarce. Thus, in the short term, the economic viability of the SIM operations is guaranteed, but it is not clear whether or not this can be sustained. The question of the sustainability of the social housing programme is dependent upon many other factors. Indeed, at this stage the issues surrounding sustainable development in Mayotte are political.

VII. Users

The majority of the beneficiaries of SIM social housing projects are lower-income groups. However, SIM has failed to assist in cases of extreme poverty. SIM's RHI operations are limited to Mamoudzou, while the state handles the other sites. Women feature prominently among the beneficiaries of the programme. The traditional concerns surrounding matrilineal settlement patterns clearly encourage the status of women as home owners. Furthermore, women featured very strongly in the movement for French departmentalization and women are very active on the island. With the introduction of monetary economic activities, it is men

who work outside the home and earn money. The traditional support network that enabled women to acquire communal lands is fading away. Especially in urban areas, real estate is increasingly scarce and requires heavy investment. As SIM does not provide land directly but cooperates with the communes for allocation, the scarcity of land has reduced the availability of SIM housing to women as well as to the very poor. Today, the major obstacle before increased production can take place is not a limitation of state subsidies but the scarcity of real estate.

This problem is being treated on many levels, such as direct negotiation with the communes, allocation of housing terrain in the land-use plans, and direct purchasing by SIM. The question of the very poor now being discussed is judged to be beyond the reaches of the RHI operations. Direct cooperation with the residents of the precarious areas promises positive results.

The '*case SIM*' is today a common term on the island. The acquisition of a basic unit represents upward mobility for most. Saving for the initial payment can take up to four years. The less accepted SIM operation is in the area of rental property. Very few see the merit of building fancy homes for state functionaries, the need to attract qualified educators and doctors notwithstanding. The least appreciated interventions are the urban promotions. For many observers, SIM has become a mammoth usurping all urban activities. SIM defends its operations on the basis that it is the only competent organization in this domain. The counter-argument has been that the direct involvement of SIM will make it impossible for small operators to compete. There are many voices demanding the division of SIM into smaller entities, but this is not likely to happen in the near future. Therefore public opinion still supports the increased demand for social housing and displays a lack of understanding regarding the other activities of SIM. For some, the new direction of SIM represents a betrayal of its original mission.

This criticism has been raised by politicians and technicians as well, but in general, the credibility of SIM is still very high. The management of SIM itself has yet to provide a new direction for the future.

VIII. Persons Involved

It would be impossible to list all the main craftspeople involved in a particular project since the SIM strategy is by definition one which includes the largest possible number of enterprises. Therefore the following listing is restricted to the main people involved in the SIM operations in general. These people are involved in most of the current SIM operations, and most have been with the society for several years. Only in the case of the Place Mariage are the design teams for each phase different. These are included at the end, along with all the craftspeople involved.

Previous SIM presidents

Dominique Vian
Pierre Schoeffer
Georges Goffret
Jacques Saugier
Henri Jean Baptiste
Ibrahim Aboubacar (current)

Previous directors

Pierre Yves Perrot 1980–82
René Quaranta 1982–87
Robert Casalis 1988–92
René Quaranta 1993–99
Jean Gibert 1999–present

Main architect

Vincent Lietar:
Architect 1981–87
Director of production 1988–93
Vice director responsible for production 1993–present

Current department heads

Jean-Luc Le Run, general secretary
Arnaud Duchet, realty and planning
Thierry Lignier, social housing
Fabrice M'lanao, financial management

Other important personnel

Pascal Zilliox, architect
Louis-Paul Lemieux, architect
Fayadhuiddine Maanli, quality control
Abdallah Allaoui, rental housing manager
Dhoul Kamal Dhoihit, operation manager
Moudjitaba Bacar, operation manager
Soraya Belhaouane, architect
Halifa Ahmed, commercial assistant for social housing

Support organizations

Jean-Paul Debien, director of equipment
Gino Salimbeni, OI DF training centre
Soulaïmana Moussa, chairperson of the CAPEB workers union

Place Mariage Zone 1

Main actors

Owner	Société Immobilière de Mayotte
Design	Lelli Architectes, Paris
Supervision	Socotec, Mayotte
Technical studies	S2i, Ile de la Réunion

Enterprises

General contractor	SMEC, Mayotte
Masonry	Mayotte Bâtiment, Mayotte
Roofing	SMEC, Mayotte
Aluminum profiles	Mayotte Aluminium, Mayotte
Shading devices	Bati Services, Mayotte
Electricity	Colomb, Mayotte
Plumber	EPSM, Mayotte
Painter	Piquet, Mayotte

Place Mariage Zone 2

Main actors

Owner	Société Immobilière de Mayotte
Design	Thierry Germe, Lille
Supervision	Socotec, Mayotte
Technical studies	S2i, Ile de la Réunion

Enterprises

General contractor	SMEC, Mayotte
Masonry	Mayotte Bâtiment, Mayotte
Roofing	Rousseau, Mayotte
Woodwork	Somag, Mayotte
Aluminium profiles	Mayotte Aluminium, Mayotte
Electricity	Colomb, Mayotte
Plumber	EPSM, Mayotte
Pavement	Achirafi Yacoub, Mayotte
	Confiance, Mayotte
	Nafion Ali, Mayotte
	Prix Unic, Mayotte
Painter	EMF, Mayotte
	Piquet, Mayotte

Place Mariage Zone 3

Main actors

Owner	Société Immobilière de Mayotte
Design	Société Immobilière de Mayotte
Supervision	Socotec, Mayotte
Technical studies	SEIB, Mayotte

Enterprises

General contractor	Mayotte Bâtiment, Mayotte
Roofing	Somicharp, Mayotte
Wood work	Somag, Mayotte
Aluminum profiles	Mayotte Aluminium, Mayotte
Electricity	La Générale d'Electricité, Mayotte
Plumber	EPSM, Mayotte
Painter	Sté Leclère Freres, Mayotte

Place Mariage Zone 4

Main actors

Owner	Société Immobilière de Mayotte
Design	Mayotte Architecture, Mayotte
Supervision	Socotec, Mayotte
Technical studies	SEIB, Mayotte

Enterprises

General contractor	Mayotte Bâtiment, Mayotte
Roofing	Somicharp, Mayotte
Wood work	Somag, Mayotte
Aluminum profiles	Mayotte Aluminium, Mayotte
Electricity	La Générale d'Electricité, Mayotte
Plumber	EPSM, Mayotte
Pavement	Sté Leclère Freres, Mayotte
Painter	Sté Leclère Freres, Mayotte

Omar A. Hallaj
May 2001



ACOUA



BRANDÉLÉ



CAVANI



MGOMBANI TYPE 2



MGOMBANI TYPE 3



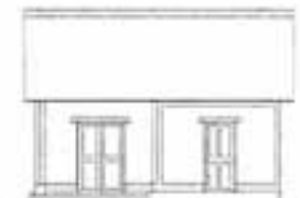
MGOMBANI TYPE 4



FOUMBOUNI



MTSAPÉRÉ



PAMANDZI 2P



TSINGONI 2P



TSINGONI 4P



TSOUNDZOU

AFTER ESTABLISHING PERSONNAL NEEDS OF THE FAMILY, BASIC MODELS ARE PROPOSED WITH EXTENTION POSSIBILITIES AND OPTIONS FOR IMPROVEMENT





AFTER EXPERIMENTATION AND RESEARCH BASIC MODELS EVOLVE ACCORDING TO DENSITY AND URBANISATION



RHI SITE PLAN



Above: SIM works with the local communities and communes to prepare the new sites and to make them available for newcomers to the housing market. Later, SIM undertook the acquisition of new plots and their preparation for phased and assisted home ownership.

Below: General view over a SIM built settlement in Mamoudzou; since 1978, SIM has provided more than 40 per cent of the housing stock on the island.





Above: As a development agency for the communes, SIM has been delegated the authority to work on related urban problems, primarily the issue of rehabilitating and upgrading the spontaneous settlement areas.

Below: A view down an alley which has undergone upgrading and infrastructure improvement.





Above: A basic two-room unit known as the Casé SIM; to date over 11,000 have been constructed all over the island.

Below: The SIM architects have produced a wide variety of housing models. A typical Casé SIM unit in Chiconi has cooking facilities outside the house and a separate structure containing the toilet.





Above: General view over the housing site in Bandrélé.

Below: The basic housing models evolved according to the materials used, their basic amenities, and even their colour.





Above: The minimum width of the alley is negotiated with the residents, and the passage is then cleared and compacted. Infrastructure such as flexible water pipes and semi-covered sewer ditches are added.

Below: The RHI aims to improve the infrastructure and living conditions. The top surface of the road is paved with stone tilted to one side. The kerbstone directs surface drainage down the hill to avoid erosion problems.





Above: The Place Mariage is a centrally located plaza at the tip of the city of Mamoudzou. The site contains forty rental housing units that comprise less than one-third of the built-up area. The rest is commercial and office space.

Below: In the Place Mariage, commercial facilities are located below the housing units. This ground-level frontage to the main plaza makes a continuous gallery and defines a shaded pathway around the open space.

