THE NATIONAL URBAN POLICY STUDY FOR EGYPT: AN APPROACH TO NATIONAL URBAN SETTLEMENT AND INVESTMENT STRATEGIES

by

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Abstract

There is a continuing interest in urban settlement strategies in developing countries. At the same time, there is a growing recognition of the interdependence of macro-economic goals and settlement strategies. Thus, there is a need for conceptually sound and operationally useful approaches to the selection of policy and investment programming choices that simultaneously influence macro-economic performance and the settlement system.

This paper describes the approach to these choices developed for the National Urban Policy Study for Egypt and was written by the Director of the NUPS study. In addition to assessing the strengths and weaknesses of the approach, the paper comments briefly on subsequent adaptations of the approach in other countries. The paper concludes with suggestions for additional research that could enhance the applicability of such approaches to choices of settlement strategies and their investment implications.
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Preface

This paper was prepared for a seminar on urban policies sponsored by the Water Supply and Urban Development Department (WUD).

Most developing countries continue to experience rapid urbanization and increased concentration of urban growth in their primary cities. One consequence has been an increased interest in urban spatial policies (and investment strategies associated with them) that are aimed at achieving more decentralized or more "balanced" growth among cities of different sizes and across regions. This paper describes an initial approach to the estimation of macro-economic and cost implications of such spatial policies, prepared for the Arab Republic of Egypt as the National Urban Policy Studies (NUPS). The approach represents an attempt, therefore, to place urban policies in the context of macro-economic policies and constraints -- an issue which is receiving continuing attention in the work of WUD's Operation Policy and Research Division.

Harvey A. Garn is an economist and consultant to the Operation Policy and Research Division of WUD and was the Director of the NUPS study. Prior to conducting this study, he was Program Manager of the Urban Economic Development Program at the Urban Institute.

The author wishes to express appreciation for the interest of World Bank colleagues, Koichi Mera and Kyu Sik Lee, in this paper. Major contributions to the NUPS study which were made by Ernst Slingby (PADCO, Inc.) and Frank Martin (USAID) as well as by Al Van Huyck, the President of PADCO, Inc. are gratefully acknowledged also.

David de Ferranti
I. Introduction

There is a continuing interest in urban settlement strategies in developing countries. In recent years, Brazil, Mexico, Peru, Egypt, Turkey, Nepal, Bangladesh, Thailand, Indonesia, Philippines, and Korea, for example, have all adopted, or are studying the adoption of, explicit policies. All are interested in policy analysis relating to the spatial distribution of population and economic activity and the sectoral investment requirements to implement them. Interestingly, there is a growing recognition of the interdependence of policies which are primarily intended to achieve macro-economic goals and settlement strategies with their sectoral requirements. There is a need for conceptually sound and operationally useful approaches for providing advice on policy and programming choices that simultaneously influence macro-economic performance and the settlement system.

The National Urban Policy Study (NUPS) for Egypt, conducted by PADCO during 1980-82, represented an initial effort to meet this need. The

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1/ The author of this paper directed the study. Al Van Huyck, President of PADCO, was the principle-in-charge. Others on the staff who made major contributions to the design and implementation of the analytic approach used in the study were Frank Martin and Ernest Slingsby.
primary purpose of NUPS was to help the Egyptian government design an urban settlement strategy (i.e., to identify spatial redistribution alternatives and associated sectoral investment requirements). In the study, four alternatives were prepared and estimates of their expected direct investment requirements for jobs, shelter and intra- and inter-urban infrastructure were made. Among the alternatives, the base case scenario was not a trend extrapolation. Rather, it was the urban population distribution which had the lowest expected cost for direct investment in employment creation to reach an aggregate employment target for the 38 urban areas which had over 50,000 population in 1976. The other scenarios included (1) a major build-up of Suez City as the most likely competitor of Cairo and Alexandria for efficient population growth enhancement, (2) an effort to expand not only the Canal cities but several cities in Upper Egypt south of Cairo, (3) an effort to create decentralization alternatives in the remote areas of the Sinai, the Red Sea coast, the Northwest coast and the Western Desert. For each alternative, settlement employment, population and their associated costs were estimated. These estimates and other characteristics were then utilized to illustrate quantitative tradeoffs associated with the spatial and sectoral alternatives.

The approach or modifications of the approach have now been used in Senegal, the Ivory Coast, and Nepal and in the National Human Settlements Policy Study (NHSPS) in Pakistan. Not surprisingly, the implementation of these studies (as well as NUPS) has revealed the need for critical appraisal and further development and refinement of the approach. Improvements in the approach and additional applications of an appropriately modified approach would be of use to the Bank in responding to requests for assistance in urban
strategy design and in helping to improve inter-Bank linkages between project and country economic work.

It is clear that, it is not possible to specify on a priori grounds a set of settlement population or economic activity targets that are optimal. In other words, changes in the distribution within the settlement system are not properly viewed as goals of public policy in themselves. Efforts to influence such changes should be initiated, if at all, for other purposes.

In the Egyptian context, the relatively universal goals for urban settlement strategy were enunciated: contribution to a high rate of national economic growth and reductions in interpersonal and interregional disparities in income and social welfare. The Egyptian government was particularly concerned, also, with the continued growth of Cairo. To this list, the government added the protection of arable land from urban expansion since land suitable for agriculture is the same five percent of the total area where almost all of the people live. In Egypt there is limited scope for economically efficient development of new agricultural land. The analytic approach developed for the study was designed to illuminate the trade-offs in terms of such goals that were implicit in alternative spatial and sectoral strategies. A major part of the effort was devoted to the establishment of operational means of doing so.

This brief paper has three purposes. First, it will summarize major elements of the approach used. Second, it will comment on subsequent extensions or adaptations of the approach -- e.g., the recently completed National Human Settlements Study for Pakistan. Third, it will suggest areas in which further research would be helpful in improving the approach or adapting the analysis to the many other developing countries which are
concerned with urbanization issues and are attempting to devise suitable settlement strategies.

II. Major Elements of the Approach

While it is true, as suggested above, that there is no a priori basis for selecting a settlement strategy that simultaneously optimizes all the goals that may be set for it, it is true also that one does not need to begin an investigation of settlement strategies without paying attention to the very considerable research that has already been done. Findings (or analytic approaches) which run strongly counter to what this research has shown must necessarily be subjected to special scrutiny. Several general conclusions from earlier research were given considerable weight in the design of the NUPS study and should be clearly stated at the outset.

Settlement systems tend to develop relatively large concentrations of population in a few national and regional centers because of the strong economic advantages of such agglomerations, in terms of the efficient organization and operation of production and the provision of income-earning possibilities for residents. Such concentrations occur in locations which offer specific economic advantages; they do not occur randomly across national space. It has been found, that more concentrated settlement systems tend to be generally more effective producers of national and regional economic growth than more dispersed systems. Furthermore, the accumulated advantages and disadvantages of particular prices makes it extremely difficult to make radical changes in the settlement system in a short period of time through governmental action even if large expenditures of resources are committed to such change. In terms of sectoral interventions, past research has shown that
a spatial policy of redistributing urban population to specific locations chosen by the government cannot succeed if an employment base is not created. Given that the efficient location of economic activity is not possible everywhere, there are likely to be significant cost and/or output variations associated with production, employment and provision of infrastructure in alternative urban locations. To the extent that this is true, alternative allocations of investment will have important implications for aggregate output growth, future public and private investment requirements and levels of demanded industrial and residential infrastructure and services.

A. Structure of the Analysis

The specific analysis used in NUPS involved several partially, and some fully, integrated steps that attempted to take account, where relevant, of such considerations as those cited above. Annex A is a schematic overview of the full scope of the analysis. A summary of the basis for the recommendations from the NUPS Final Report is Annex E.

At the aggregate level, demographic and economic projections were utilized primarily to provide order of magnitude estimates of variables used as control totals in the subsequent analysis.

1. Demographic Projections

On the demographic side, NUPS did not make its own projections. Rather, a review was made of seven sets of projections and the assumptions made in them. Virtually all the projections assumed declining fertility rates with the differences among them resulting from variations in the assumed rate of decline. On the basis of the review and additional data from the 1980
Census, it was concluded that the most probable range for total population was between 64.7 and 70.3 million. In subsequent work, total population of 67.5 million was used, implying a decline in annual growth rates from 2.51% in the 1975-80 period to 2.24% in the 1995-2000 period. Labor force estimates were made on the basis of age-specific labor force participation rates for males and on the basis of age and education for females. Trends in education level of females between 1960 and 1976 were assumed to continue. The labor force estimates for a total population of 67.5 million in 2000 were about 21.5. In calculating the urban population share, it was assumed that the rural growth rate (after accounting for rural-urban migration) would continue to fall, resulting in a range of urban population estimates from 34 to 39 million, with 37 million used as the baseline figure in the subsequent analysis.

A weakness of the procedure used was that -- while the estimates of total, rural and urban population were compared for rough consistency with the economic projections and other relevant data and studies -- no methodological linkage between the demographic and economic projections was established. This would clearly have been desirable since rural to urban migration is responsive to the relative rates of growth of employment in agricultural and non-agricultural sectors of the economy. In NUPS agricultural employment was projected to decline from about 45% of total employment in 1975 to about 28% at a 5.5% growth rate in GDP and to about 26% at a 7% growth rate by 2000 in the aggregate projections. The changes in agricultural employment estimated were consistent with other existing projections.

From the perspective of 1984, it now appears that the assumed resident total population of 67.5 million and an urban population of 37 million are probably on the low side. Thus, the NUPS estimated costs for
direct investment in urban job creation and infrastructure are likely to be lower than those which would, in fact, be incurred at the service standards used in the costing analysis (to be described later).

2. Economic Projects

The aggregate economic projections provided order of magnitude estimates of sectoral GDP and employment at different assumed rates of investment for (1) Agriculture; (2) Mining, Manufacturing and Construction; (3) Petroleum; (4) Housing and Infrastructure; and (5) Services. The projection model used was an iterative investment-driven model based upon assumed sectoral shifts in the allocation of investment shares reflecting increases in the demand for industrial products as urbanization levels grow. Expected increases in capital intensity were reflected in reductions in employment per unit of investment and increases in incremental capital to output ratios. Incremental capital output ratios were calculated with an assumed lag of one year. ICORS, sectoral investment shares and unemployment investment rates were based upon historical trends, review of aggregate investment plans, plus judgement of future trends.\(^1\) Policy variables (except insofar as they influenced parameter choices) were not explicitly included in the model.

Given the structure of the model, growth in GDP and employment were determined by the share of GDP invested. An investment rate of 29% of GDP resulted in a 7% growth rate over the 1985-2000 period. At 20%, a growth rate of 5.5% was estimated. From 1975 to 1980 investment averaged 27.5% of GDP,

\(^1\) See Annex B for the parameters used.
although only about half of the investment came from domestic saving. In light of this, the future ability of the economy to sustain an investment rate of 29% is an optimistic assumption.\footnote{Although the study included an assessment of domestic saving prospects, a sensitivity analysis of aggregate investment for varying levels and shares of domestic and foreign savings was not done.} In the subsequent analysis, investments at this rate were used to estimate the non-agricultural, non-petroleum resource pool for financing needed investments in employment creation and inter- and intra-urban infrastructure. Since the estimate of the resource pool is optimistic and the estimate of the urban population possibly low, the study's conclusions that efficient locations should be sought for investment, standards of services be carefully considered, levels of cost recovery increased through using standards based on demand (willingness-to-pay), and that increased efforts to mobilize domestic saving should be made should carry even greater weight.

The aggregate economic projection model used was not a sophisticated model. Much could be done to improve it -- e.g., the inclusion of policy variables explicitly influencing domestic savings rates, testing of the stability of ICORS with various time-lags, and more detailed sectoral disaggregation. It is arguable, however, that the model used was sufficiently sophisticated for the purposes for which it was used. A more serious deficiency may be that no explicit feedback loop was established between expected output variations resulting from alternative spatial distributions of investments and the aggregate model. As will be described more fully later, "efficiency" in the allocation of job-creating investment was defined as minimizing the expected cost of reaching an urban employment target that would
support the urban population at reasonable employment/population ratios. It is obvious that this is not necessarily an "efficient" solution in terms of maximizing output. The fixed structure of the aggregate economic model did not allow for variations in the output per worker that would result from job-creation allocations in alternative spatial locations. Attention may have to be given to this issue in further refinements of the approach.

3. **Settlement Investment Allocation**

The allocation of investment to each of the 38 urban areas with 1976 urban populations of 50,000 and above was done in two stages which are important to distinguish. In the first stage, direct investment in job creation was allocated in a way which determined settlement-specific average cost and population growth estimates. These latter estimates were used in the second stage as targets for infrastructure and services at various standards. Thus, the method used was different from a traditional planning approach in which population targets by settlement are taken as given and then costs for job creation, infrastructure and services deduced from these targets. In such an approach the selection of population targets is frequently arbitrary, reflecting someone's notion of a desirable distribution. Consideration of the costs is often secondary. Furthermore, plans are developed only for a limited number of urban areas and intra- and inter-urban infrastructure elements and services. The aggregate benefit and cost implications of such independently developed plans are frequently overlooked.

The two-step process used in NUPS also needs to be distinguished from the approach used in the NSPS study for Pakistan. In the case of NUPS, direct
investment in job-creation was allocated and expected population growth calculated from it. Intra- and inter-urban infrastructure and service costs and appropriate standards were then estimated from these population distributions. The most "efficient" distribution was defined as the solution which yielded a predetermined aggregate urban employment target for the lowest expected direct investment cost. Differences between the most efficient and other settlement distributions can be thought of as the provision of less output-producing employment for a fixed amount of investment or a requirement for more investment to provide the same amount of output-producing employment. Thus, the NUPS "least-cost" solution, while not a direct method of maximizing output, would be close to an output maximizing solution. In the NSPS study for Pakistan, the "least-cost" solution was the solution with the lowest aggregate cost of employment creation and infrastructure and services. Not surprisingly, there was a substantial difference between the "least-cost" and the "efficient" solution in the Pakistan study because of the tendency in the latter to distribute large increments of population to places with relatively low standards of infrastructure and services.

4. Allocation of Employment Creation Investment

The procedure used in NUPS to allocate investment in employment creation was a departure from previous approaches. The rationale behind the approach and the assumptions made, therefore, need to be critically examined. 1/

1/ See Annex C for a schematic diagram of the procedure.
Most new urban jobs will be in the manufacturing, construction and service sectors. Contrary to the assumption made in the aggregate model that there are fixed relationships between investment, output and employment, the assumption was made that the unit cost of generating new employment is not constant throughout the country. The relationships assumed in the aggregate projections were based upon historical data plus the estimates in the 1980-1984 national investment plan. They, therefore, implicitly assumed a given spatial and sectoral allocation of investment. Since a major part of the purpose of NUPS was to investigate implications of alternative distributions a mechanism had to be found to allow for cost and output variation across settlements.

At the level of sectoral detail for which reasonably reliable information about the settlement-specific sectoral distribution of employment could be obtained (the five broad sectors mentioned above -- agriculture; mining, manufacturing and construction; petroleum; housing and infrastructure; and services), it was not possible to consistently estimate the cost or output variations attributable to variations in factor utilization by detailed sub-sector. Consequently, we argued that one general factor that would influence costs was agglomeration effects associated with the initial industrial base. Places with a larger share of their employment in Mining, Manufacturing and Construction (MMC) would be expected, other things being equal, to have a labor force with more accumulated industrial skills, and more of the prerequisite industrially related infrastructure and business services. As a result of such agglomeration economies, per unit capital and operating costs would tend to be lower than in places with more meager initial industrial
bases. Location away from such places is possible but costs would tend to be higher.

"The firm will experience transport delays leading to both higher transport and higher inventory costs, shortages of locally produced materials (especially construction materials), difficulty in locating and recruiting skilled workers, and work slow-downs when critical machinery needs repair and local servicing is not available. The combined effect of these consequences is to increase the cost of building and operating (industrial establishments) where agglomeration economies are limited."  

In the NUPS work, the assumption was made that initial agglomeration economies could be represented by the share of each city's employment in MMC. Average costs were assumed to vary in inverse relationship to this ratio. As of now, the sectoral distribution and subsectoral mix of Cairo's MMC and service sectors is highly correlated with the national mix. Consequently, it was assumed that the expected cost per MMC and service job in Cairo would tend to be equivalent to the national average cost per job estimated in the aggregate projection at an equivalent growth rate.

On the basis of this argument and these assumptions, a regional cost variation index was calculated from the following equation:

\[ RCVI = 0.5 [1 - \left( \frac{EMPMMC_i}{TOTEMP_i} / \frac{EMPMMC_{cairo}}{TOTEMP_{cairo}} \right)] \]

where: \( EMPMMC_i \) = miming, manufacturing and construction employment in settlement \( i \).

\( TOTEMP_i \) = total employment in settlement \( i \).

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1/ Dr. Frank Martin, unpublished manuscript on the investment costs of spatial deconcentration policies, pp. 8-9.
This index is a measure of the percent deviation of the city average cost per job from the national average cost per job. For Cairo, the index is 0. For areas with a greater industrial share of employment than Cairo (e.g., Alexandria, Tanta and Mahalla) the index is negative and for those with a smaller share (e.g., Qena and Aswan) the index is positive.

Initial cost-saving advantages of agglomeration economies, however, can be eroded if, over a short period of time, a large number of new projects are undertaken to expand employment opportunities rapidly. In short, places with lower average costs initially cannot grow at even higher rates over a given time period without increases in costs. It was postulated, therefore, that there is a relationship between expected average cost per job and the rate of employment expansion per year. These costs were called "growth management costs" in NUPS.

Utilizing both the regional cost variation indices and the assumed positive relationship between average investment cost per job and the growth rate of the population, city-specific average cost curves were calculated for the 1985-1990 period. Specifically, it was assumed that:

Average Cost (AC) = Ag^4

where:

\[ A = \frac{\text{national average cost per job} \times (1 + \text{RCVI})}{\text{national average annual employment growth factor}} \]

\[ g = \text{city annual employment growth factor} \]

e.g. 1.03 for 3% growth per year.

The exponent on "g" assumed (4) provides a scale for "growth management costs."
Thus for Cairo (RCVI = 0), for example, the expected average cost per job would equal the national average cost per job if employment in Cairo grew at the same rate as national employment.

Having established city-specific cost curves, it remained to determine allocations under alternative decision-rules for allocating direct job-creation investment. The initial allocation (the "least-cost" or "most-efficient" allocation) was the allocation which equalized the marginal cost of adding an additional job in all 38 settlements.

The relation between city-specific cost-curves and the growth rate of employment specified above was used in all of the cities with population of 50,000 or over without adjusting for the initial size of the employment base or population. This was a considered choice; but is nevertheless an arguable assumption. On one hand, the case could be made that the exponent (the NUPS analysis having used a constant exponent of 4) should be positively associated with size on the grounds that more rapid growth rates in places which are already large would add disproportionately to costs because of congestion and other diseconomies of size. The other side of the coin is, however, that larger places have both more and more adaptable labor forces and business-related infrastructure and services and could, therefore, more easily accommodate to additional investment projects. These factors would suggest the possibility that the exponent would decline as size increases. While it is true that a large growth rate in a place with a small employment base implies a relatively small absolute increase, achieving even this increase may result in at least temporary cost-increases such as cited above by Frank Martin. Smaller places may have less flexibility and adaptability to change. To the extent this is true, the advantage of having to adapt to a
smaller absolute increment for a given growth rate may well be eroded by the necessity of overcoming the problems of inflexibility. The judgement used in the NUPS analysis was that the argument for scaling the exponent to city size was not persuasive either way so a constant exponent was used. The subsequent analysis, using city-specific average cost curves, could accommodate an assumption of a scaled exponent without modification of the procedures although it would affect, of course, the allocation by settlement. One of the major areas for additional research suggested by the NUPS analysis is to explicitly investigate such relationships between growth rates, average and marginal costs. The relationships assumed in NUPS, while plausible, were not grounded in extensive empirical analysis of this relationship.

5. Alternative Allocations

As a first step, then, in developing alternative settlement patterns, city-specific average direct investment cost per job as a function of the employment base growth rate was established as above yielding a family of average cost curves for the 38 settlements. The next step was to use these in conjunction with different allocation decision rules to determine simultaneously specific average costs per job and employment growth rates by settlement.

In NUPS, the initial allocation (or base case) used the decision rule of minimizing the direct investment cost across all the 38 settlements to achieve a given aggregate increase in employment. The aggregate employment requirement was based on the economic projections for non-agricultural and non-petroleum employment described above.
Operationally, the "least-cost" solution (for a given set of average cost functions) is the allocation which equates the marginal cost of investment to create an additional job across all settlements. In this base case allocation, no a priori constraints on settlement employment growth rates were used. Given the procedures described above for establishing the intercepts of the average cost curves (the regional cost variation indices), the allocation using this rule favored places with existing industrial bases and economic growth potential in the first (1986-1990) period. The scaling used for growth management costs, however, permitted a non-zero allocation to each of the 38 settlements. This procedure was then repeated for the two remaining periods (1991-95) and (1996-2000) after taking into account the effects of prior allocations on the industrial base of each settlement and, therefore, on the array of regional cost variation indices. In each of the three periods, estimated employment growth was converted to population growth by using incremental employment to population ratios consistent with changing labor force participation rates from the demographic projections.

Three major alternatives to the "least-cost" (efficiency) allocation were devised using a combination of a priori constraints and allocation decision rules. The Government of Egypt was interested in the possibility of a counter-magnet to Cairo, a regionally decentralized "growth node" approach, and a major effort to expand population in the remote areas of the Sinai, the Western Desert, the Red Sea coast, and the Northwest Coast.

In the first of these alternatives to the "least cost" solution (the counter-magnet solution), regional constraints were set a priori for Cairo, the Delta, and the Canal region. Alexandria was not constrained since it is
the prime current attraction other than Cairo. However, the Canal was allocated sufficient investment to grow at a more rapid rate than in the "least-cost" solution since Suez City is the most obvious candidate other than Alexandria for industrial growth. The allocation to North and South Upper Egypt and the Remote areas was not constrained. The allocation by settlement of the regionally constrained totals in the Delta and Canal and in the unconstrained regions was based on the "least-cost" allocation rule.

In the "growth-node" alternative Cairo, Alexandria, and the Delta were constrained with residual allocations as well as allocations among settlements within the Delta on the least-cost basis. For the fourth alternative, a population constraint for the Remote areas (equivalent to the planning figures for master planning efforts in those areas) which was a much larger figure than was allocated to those areas in other alternatives was used in addition to the constraints in the third alternative.

The variations in regional population distribution produced by these various allocations are summarized in Table 1. Several key points can be made on the basis of the figures in Table 1. On "least-cost" grounds both Cairo and Alexandria (especially the latter) would be allocated more and could be expected to be able to absorb more population than trend growth. The growth of Cairo, in all other cases, and of Alexandria, in two of the three other cases, would have to be constrained at a below trend growth to permit expansion in designated target areas -- at increased resource costs. Examination of the relative costs shows the increased costs associated with degrees of decentralization. Further information on the relative costs are shown in Annex D.
Table 1: Alternative Population Distribution (000's)  
(1985 and 2000)

<table>
<thead>
<tr>
<th>Alternative Population Distribution</th>
<th>Cairo</th>
<th>Alexandria</th>
<th>Delta</th>
<th>North Upper Egypt</th>
<th>South Upper Egypt</th>
<th>Canal</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (000's)</td>
<td>9,707</td>
<td>3,042</td>
<td>3,347</td>
<td>668</td>
<td>1,221</td>
<td>1,041</td>
<td>251</td>
</tr>
<tr>
<td>Trend</td>
<td>16,023</td>
<td>4,418</td>
<td>5,597</td>
<td>980</td>
<td>2,291</td>
<td>2,291</td>
<td>390</td>
</tr>
<tr>
<td>Least-Cost</td>
<td>16,420</td>
<td>5,778</td>
<td>5,175</td>
<td>849</td>
<td>1,581</td>
<td>1,577</td>
<td>270</td>
</tr>
<tr>
<td>Counter-Magnet</td>
<td>15,000*</td>
<td>5,258</td>
<td>4,864*</td>
<td>795</td>
<td>1,482</td>
<td>4,000*</td>
<td>253</td>
</tr>
<tr>
<td>Growth-Node</td>
<td>15,200*</td>
<td>4,400*</td>
<td>5,111*</td>
<td>1,374</td>
<td>2,526</td>
<td>2,596</td>
<td>438</td>
</tr>
<tr>
<td>Remote Area Plus Growth Node</td>
<td>15,000*</td>
<td>4,400*</td>
<td>4,861*</td>
<td>1,398</td>
<td>2,525</td>
<td>2,165</td>
<td>1,300*</td>
</tr>
</tbody>
</table>

**Direct Investment Cost**  
(L.E. Million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>8,423</td>
<td>12,868</td>
<td>22,247</td>
<td>43,538</td>
</tr>
<tr>
<td></td>
<td>8,891</td>
<td>13,493</td>
<td>23,010</td>
<td>45,394</td>
</tr>
<tr>
<td></td>
<td>9,134</td>
<td>13,248</td>
<td>22,268</td>
<td>44,650</td>
</tr>
<tr>
<td></td>
<td>9,351</td>
<td>13,634</td>
<td>23,051</td>
<td>46,036</td>
</tr>
</tbody>
</table>

*Indicates a priori constraints.

**1/** Not calculated on actuals because of the 1976 war.

**2/** Not calculated on actuals due to conflicting data and exclusion of portions of the Sinai.

**3/** These costs exclude intra- and inter urban investment costs.
These figures show, also, the effects of the procedure adopted of accounting for interim changes in the employment mix. The costs tend to converge among alternatives over time; suggesting that some of the costs of decentralization are transitional costs. The degree of convergence implied, however, may be an exaggeration in two respects. First, the procedure used did not allow for failed investments, except implicitly in the differences in regional cost variation indices and "growth management costs". Second, the cost figures used for the Remote areas were considerably below the investment cost per job figures which became available for specific investment programs in remote area master plans. NUPS figures, therefore, are probably considerably lower for the "growth-node" and "Remote area plus growth-node" alternatives than they would be likely to be. The figures shown above, however, imply a GDP loss of between 4.5 and 6% of projected GDP for the alternatives relative to the "least-cost" solution, if the aggregate output to employment ratio is used to make the calculation.

6. Intra- and Inter-Urban Infrastructure Investment

In this discussion paper it is not necessary to review in detail the procedures for estimating total and per capita costs for housing, inter- and intra-urban infrastructure. Six features of the procedure, however, do need to be discussed. As a background to the discussion, it should be stated that settlement-specific estimates were made for investments for required housing and infrastructure for new population and to rehabilitate or expand existing infrastructure and services. Land costs were not included in the cost estimates; since the view was taken that these costs reflect the
relative benefits of locating in different urban areas or sites within a given area. Thus one would expect higher land value in places which are promising locations. Costs which were included in the intra-urban estimates were housing (exclusive of land), water, sanitation, distribution systems for electric power, intra-urban roads and walk ways, transportation, education, health, and community facilities and administrative facilities. Inter-urban estimates were made for the transportation networks, electric power generation and transmission, telecommunications and bulk water. The basic data for these estimates include historical data on existing systems, tenders on recent projects, master plan data where available, and comprehensive sector plans (e.g. for inter-urban transport, telecommunications, and power).

The first feature of the procedure which requires additional discussion is that, at least in the case of Egypt, existing data showed a significant correlation between per capita costs, the standard of service provision and the density of settlement. Per capita costs increase with higher standards and decline with density in NUS estimates for water, sewerage, and circulation costs (m²/capita of circulation networks). In the case of power distribution networks per capita costs decline with increases in population served. Consequently, it was found that it was possible (on a cost basis) in many cases to provide higher standards in more densely settled areas and/or larger areas at equivalent per capita costs for lower standards in less dense or smaller places.

The second point to emphasize is that the cost estimates included the investment costs for rehabilitation or upgrading of existing infrastructure to serve the existing (1985) population. As a general rule, and even though
maintenance of physical and social infrastructure is quite generally ignored in Egypt except for crisis repairs, the allowance for rehabilitation as a proportion of per capita costs tended to be higher for most types of infrastructure in urban areas other than Cairo and Alexandria. Not only do Cairo and Alexandria have relatively higher standards of service provision than other places (attributable to their higher incomes and greater demand as well as more official largesse); but also, greater (if not overwhelmingly successful) efforts have been made to keep the services operational.

The third point is that the standards of service provision need to be different in different urban areas to reflect, on one hand, the implicit differences in demand and willingness to pay and, on the other hand, the strategic role an urban area is expected to play in a given settlement alternative. Generally speaking, it was assumed that higher income places would have (or demand) higher standards of service and that places which were expected to receive special emphasis in the allocation of direct investment in job creation would require increasing standards of housing and infrastructure. The method used to reflect both the demand and inducement effects of infrastructure was to develop an array of infrastructure packages at various standards and per capita costs and utilize different packages depending on the prior allocation of direct investment funds. Thus, for example, in the counter-magnet alternative, Suez City was expected to receive a greater allocation of direct investment funds than in the "least-cost" or "efficiency" solution. Thus, for costing, an infrastructure package more equivalent to that of Cairo and Alexandria was used for Suez City than in the "least-cost" solution. The strength of this approach was the recognition of the necessity
to take potential demand differences and inducement effects into account, which is not always done in equivalent studies. The weakness was that the relationships were only approximated since income effects on infrastructure demand were not explicitly calculated.

The fourth point, which is implicit in the discussion of the allocation of direct investment funds above, is that it was assumed that the causal sequence runs from employment and output growth to personal income increase and then to demands for industrial, business and residential infrastructure and services, rather than assuming a set of settlement strategies driven by prior allocation of investments in infrastructure and services.

Fifth, the procedure for the estimation of inter-urban infrastructure relied heavily on major sector studies which had been done on the basis of a more-or-less explicit set of assumptions about the future spatial location of demand. In cases where it was possible -- e.g. in inter-urban transport -- the investment plans proposed in the overall sector plan were altered for each of NUPS alternatives to reflect differences in the spatial distributions from that assumed in the sector plan.

Finally, considerations of user affordability, cost recovery, and aggregate resource requirements led to the development of costs for both existing standards and modified standards which were more affordable from the perspective of households and aggregate financial constraints. Table 2 shows the final calculations of per capita costs for the alternative recommended (the Preferred Strategy) reflecting the existing and modified standards. The figures decline over time in real terms because of the assumed time phasing of
Table 2: Housing and Inter-Urban Infrastructure Costs Per Capita (1979 L.E.)

<table>
<thead>
<tr>
<th>Settlements</th>
<th>Existing Standards</th>
<th>Modified Standards</th>
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<tr>
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<td><strong>Remote Areas</strong></td>
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rehabilitation of existing systems. Although an effort was made to estimate affordability, a weakness of the approach was that explicit cost-recovery estimates by shelter and infrastructure types were not made or related back to implications for the aggregate investment pool.

7. Feasibility and Benefit Estimation

In the NUPS analysis, the primary quantitative test of feasibility was a comparison of the aggregate costs (direct investment in employment plus inter- and intra-urban infrastructure) with the pool of investment resources included in the aggregate economic projections. With a projected real rate of growth in the GDP of 7% (which assumed an aggregate rate of investment of 29% of GDP), the total investment in the 1985-2000 period would be L.E. 126.7 B. At a projected growth rate of 5.5% (which assumed an aggregate rate of investment of 20% of GDP), investment would amount to L.E. 77.9 B.

The analysis of the growth prospects of the economy indicated that domestic saving averaged 55% of gross investment during the 1975-79 period and had been declining since 1977. The average saving rate relative to GDP over this period was 16.4% and had also declined since 1977. It is questionable, therefore, that a gross investment rate of 29 percent of GDP can be sustained over the next 15 years; although foreign savings had permitted an average investment rate of about 27% from 1975-79 and the 80-84 investment plan called for a 29% rate.

1/ Included in non-quantitative assessments were reviews of legal and administrative arrangements and issues, two local area case studies, and a Delphi-type of non-quantitative judgement of the relative effects of the alternatives.
In NUPS aggregate projections, the portion of total investment allocated to the Agriculture and Petroleum sectors was 16.5%. If these shares were to obtain, the urban investment resource pool over the 1985-2000 period would be about L.E. 106 B at a 7% growth rate of GDP. Of the alternatives analyzed only the "least-cost" and the "preferred strategy with modified standards" alternatives were feasible within this pool. Costs in the "counter-magnet" alternative were estimated to be about 12 percent greater than the "least-cost" alternative and exceed the pool by about L.E. 10 B. Costs in the "growth node" alternatives were about 13 percent greater than the "least-cost" solution and would exceed the pool by about L.E. 10.5 B. The "remote area plus growth node" alternative was estimated to cost 27 percent more than the "least-cost" alternative and exceed the resource pool by about L.E. 25 B.

The purpose of these comparisons was to emphasize trade-offs which are likely to need to be made. A failure to achieve a 7% growth rate, for example, would require reducing infrastructure standards under essentially any alternative, delaying service provision and/or significant reductions in agricultural and petroleum-related investment. These comparisons, also, help make it clear that attention needs to be paid to replenishing the public portion of this resource pool through subsidy reductions and cost-recovery from users where relevant. Further analysis of affordability indicated that with current standards, public subsidies for intra-urban infrastructure and housing would amount to 47, 48 and 45 percent of total costs for the 1986-90, 1991-95, and 1996-2000 periods respectively. Finally, these comparisons serve to show that the spatial emphases and sectoral aspects of urban policy have non-trivial impacts on expected costs. In the Egypt case, a substantial
decentralization away from Cairo and Alexandria to Upper Egypt and the mostly desert areas remote from the Nile cannot reasonably be attempted without expecting substantial increase in costs for both generating employment and provision of the necessary housing, inter-and intra-urban infrastructure.

In one sense, the benefits of careful selection of locations for spatial emphasis and standards of service can be expressed as differences in the aggregate cost and public subsidy savings among alternatives. These kinds of differences can be expressed also, of course, in terms of employment and implied output (through the use of output/employee ratios from the aggregate economic analysis).

As indicated earlier, interaction between the allocation of investment and the aggregate economic projections was not established in the NUPS analysis. Nor were settlement-specific estimates made of output relative to employment. Consequently, the cumulative GDP effects of choosing relatively high cost locations were not tested. Such a test would clearly be desirable. The "least-cost" solution (cost-minimization with an aggregate employment target) is clearly not necessarily equivalent to an output-oriented efficiency solution -- e.g. the maximization of output benefits minus cost -- if output per worker variations across settlements is taken into consideration. Complementing the approach used with more direct estimates of the output side is desirable. Similarly, greater sectoral detail than the broad sectors used would enhance the estimation of both "least-cost" and output or net output maximizing alternatives.

An effort was made, however, to provide relative benefit and net benefit measures in NUPS. The first approach used was to make use of the variability in urban population distribution among alternatives and the
empirical finding in numerous studies of a positive association between city-size and various measures of GDP. In particular, the relative benefits in terms of non-agricultural GDP of each alternative were estimated using the relationship shown below:

\[ \text{GDP}_{na} = a(P_i)^b \]  

(3)

where: \( P_i \) = population size of settlement \( i \)  
\( \text{GDP}_{na} \) = non-agricultural GDP

This was a relative measure since the parameter "a" was calibrated to non-agricultural GDP for one alternative and then the consequences of choosing different alternatives estimated from it. Relative net benefits (benefits calculated as above minus costs) were then calculated for each alternative.

Because of the considerable concern in Egypt (which is replicated in many countries) with the growth and size of Cairo attempts were made to account for disamenities in the analysis. This was done in two ways. First, the growth management costs (additional costs as a function of growth) were deducted from benefits. In the "least-cost" alternative, Cairo and Alexandria accounted for over 80% of the growth management costs, but that alternative still had estimated net benefits almost twice as large as the "Remote Area plus Growth Node" alternative.

Second, an estimate was made of the aggregate cost of disamenities in the two extreme alternatives cited above in terms of their degree of concentration in the settlement system. These estimates showed that the
saving advantage of the least-cost alternative (most concentrated) was reduced from about 27 percent without taking disamenities into account to about 24 percent with disamenities. It is worth mentioning that those who argue most strenuously that disamenities exceed benefits in large cities of developing countries around the world in spite of continuing migration to them often fail to note that the issue is the marginal increase or reduction in disamenities associated with changes in the rate of population growth. Direct efforts to reduce disamenities through large city interventions may be more cost-effective than efforts to affect their level through spatial decentralization strategies.

Third, a Delphi-like non-quantitative assessment was made based upon judgement of the performance of alternatives on nineteen criteria by urban research professionals.

B. NUPS and Related Subsequent Applications

Since its original preparation in 1980-82, the approach developed in NUPS has been used "in a very preliminary and limited application" in Nepal as well as in Senegal by PADCO. In addition, in the National Human Settlements Policy Study for Pakistan, the Bank provided technical assistance in which:

"the primary goal of the technical assistance was to transmit the methodology used in the NUPS project undertaken in Egypt by PADCO in 1980-82. The rationale

for this is that NUPS offered the only operational methodology for quantifying the costs of alternative urban settlement patterns. In attempting to replicate the approach in Pakistan, the NUPS methodology was modified, refined and elaborated.  

Because of the preliminary and limited nature of the applications in Nepal and Senegal, these uses will not be discussed extensively here. It should be said, however, that while these applications have provided a useful means of raising urban settlement strategy issues with interested officials, the limited time and data available did not permit reaching nor were they intended to reach, definitive recommendations. One result is that there are some substantial discrepancies resulting from implications of different sets of assumptions which do not appear to have been resolved. Discrepancies of this kind are a danger when using only partially integrated components of analysis and can easily lead to rejection of even well-supported recommendations. Such a danger will remain a problem until the approach is further developed to provide endogenous elements linking the components. In the interim, very careful attention must be paid to consistency checks at each step of the analysis.

The NHSPS in Pakistan was a more extensive effort to adapt the NUPS approach to a different country. From the point of view of the authors of the NHSPS study there are two main differences between NUPS and NHSS. The first is that the urban coverage (in terms of number of places and city-size) was

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more extensive in NHSPS than in NUPS. NUPS included job creation and intra-urban costs for the 38 urban areas of Egypt over 50,000 in 1976. NHSPS included 293 urban areas over 10,000. In Egypt, included urban areas accounted for about 82% of the total urban population in 1976. In Pakistan included areas accounted for about 70% of the urban population. The inclusion of more places obviously increases the data requirements and the necessity to make plausible assumptions about data elements from sketchy base data.

The second difference, cited by the authors of NHSPS between NUPS and NHSPS is in the treatment of "least-cost" and "efficient" distributions. NUPS defined the "least-cost" distribution as the distribution which equalized the marginal job cost per job across settlements. Variations in output per worker across settlements were not explicitly estimated. Thus the NUPS "least-cost" solution will also maximize incremental output only if these latter variations are relatively small. This is unlikely to be true so it is correct to say that NUPS' "least-cost" solution is efficient only in the sense of minimizing job creation costs for achieving a targeted level of urban employment. Additional information is required to say how the "least-cost" solution is likely to compare with an output-maximizing solution or other tested alternatives. In terms of net benefits described above, however, the "least-cost" solution provided the largest net benefits of the tested alternatives.

NHSPS defined efficiency in two ways, in terms of value-added per capita and an efficiency/cost ratio of an index of value-added per capita to an index the sum of job creation and infrastructure costs. It is not at all clear how the NHSPS procedure would compare with NUPS alternatives. Particularly, the second criteria does not necessarily imply choices which
maximize net benefits (benefits-costs). Furthermore, the inclusion of all infrastructure costs in the cost index make the interpretation of the aggregate on the productivity of job-creation investments uncertain.

NUPS and NHSPS differed in the identification of the least-cost solution. In NUPS a separation was made between job creation and infrastructure costs that is important conceptually and in terms of the reported results of the two studies. In NUPS, the causal sequence assumed was that direct investment in productive activity generates labor demand and induces labor mobility (if necessary) to meet this demand. Labor demand is, therefore, both the determinant of population and income growth and consequently of the demand for shelter and infrastructure. Thus, except for variations in output/employment ratios across settlements mentioned earlier, a solution which maximizes labor demand should be expected to correlate positively and significantly with an output maximizing solution for a given investment expenditure. In NUPS, it was expected that places which received sufficient direct investment to create growth in labor demand, and implicitly income, would have increasing demand for shelter and infrastructure services and standards of service. Thus, in each alternative, shelter and infrastructure packages were applied which reflected these expected variations in demand.

In NHSPS, however, the least-cost distribution minimized total investment costs (direct job creation, shelter and infrastructure costs). This appears to be a major source of the conclusion in NHSPS that least-cost distributions differed sharply from efficiency solutions. Starting the analysis of least-cost with existing levels and standards of service by
settlement, it is not at all surprising to find that the inclusion of shelter and infrastructure costs would tend to favor places with relatively low levels of income, limited employment bases and lowest cost standards in the least-cost solution. This was exacerbated in the NHSPS by the inclusion of land costs which NUPS excluded for reasons cited above. Higher land prices, reflecting higher valued opportunities for use, are expected to be associated with urban areas having greater productivity and generating greater income increases. The NHSPS treatment of costs, also, significantly affects the allocation chosen to give priority to places with high efficiency cost ratios. A more appropriate measure would use a net benefit measure (the relative net benefit measure used in NUPS is described above) rather than a ratio; that is output-cost rather than an output per capita index over a cost index.

Another difference that is significant is that NHSPS made the assumption that the sectoral output and employment mix as well as "relative urban efficiencies" remained constant over the 20 year period. In NUPS, the effects of investment on the sectoral employment mix by settlement were taken into account in each of three five year periods. These adjustments changed regional cost variation indices to reflect shifting patterns of agglomeration economies. In particular, the NUPS approach allowed for prior investment in manufacturing to be reflected in changing patterns of agglomeration economies in the various alternatives. This adjustment, also, takes account of aggregate shifts in the sectoral composition of output and employment over time and helps insure consistency between the aggregate estimates and the spatial allocations. In these respects, then, the initial NUPS approach is superior to the modified approach used in NHSPS.
Some of the ideas, however, that are reflected in the NHSPS modifications are clearly in the right direction. In particular, as indicated above, NUPS alternatives are predominantly determined by cost considerations—the relative net benefit calculations played no direct role in establishing the alternatives or the "preferred" solution. Indeed, the "preferred" solution offered in NUPS was not directly derived from cost minimization or net benefit maximization. This was clearly not an ideal approach. The "preferred" solution in NUPS (as opposed to the alternatives derived by the procedures described above) is accurately described as a modification of the least-cost alternative to be somewhat more responsive to policy-makers' preferences than the unconstrained least-cost solution.

III. Outstanding Issues

The procedures for estimating likely cost and output variations across settlement alternatives were different in NUPS and NHSPS. However, both efforts were concentrating attention on the right kind of question. Improved knowledge of the likely cost and output consequences of allocating scarce resources among urban places (or, as is often the case, the consequences of attempting to restrict the flow of both capital and labor resources to particular places) has important implications for the achievement of the goals of national economic policy as well as the goals of urban policy more narrowly defined. Such knowledge clearly has implications, also, for the degree of possible achievement of interpersonal (and possibly, over time, inter-regional) equity goals. Neither approach went far enough, however, either conceptually or empirically in capturing these variations. In NUPS,
only the cost side was directly considered and only for broad sectors within which there are wide variations in capital to output and worker to output ratios. The NUPS orientation in implicitly treating the demand for shelter and infrastructure as a derived demand was more conceptually satisfying than the NHSPS treatment of both job creation and infrastructure costs as an aggregate. On the other hand, the effort to incorporate output differences in the analysis in NHSPS was a move in the right direction.

At the heart of both approaches is the hypothesis that there are important and non-random variations in the costs and expected outputs across urban settlements. The most important outstanding issue is to develop empirical estimates of such variations and their causes.

The other major outstanding issue is how to effectively integrate the various components of the analysis. Both NUPS and NHSPS included: (1) aggregate economic and demographic analysis and projections, (2) allocation and costing modules for generating alternative settlement patterns and sectoral requirements, (3) feasibility analysis, (4) benefit and/or net benefit analysis and (5) derivation of a "preferred" set of spatial and sectoral policy and program recommendations. In neither study were these components sufficiently well linked explicitly to ensure consistency or to trace critical interdependencies. As a result, the approach is too dependent upon the, possibly very different, judgment of those conducting the studies of how to implicitly control for differing implications of assumptions and ensure at least rough consistency among elements and with well-established empirical or theoretical relationships. Consequently, the recommendations are potentially open to criticism on both relevant and irrelevant grounds. In
serious studies of alternative settlement strategies it is likely to be the case that the recommendations which are made, if adopted, would affect the operations of many national ministries and have significant implications for local governments and sources of external funds. In these circumstances the value of a consistent, checkable conceptual basis for the many analytic elements is obvious.

IV. Future Research Directions

The continuing, even expanding, interest in urban policies and urban settlement strategies in developing countries and the amount of resources being utilized to implement them in many countries provides a current need for conceptually sound and operationally useful approaches of the type attempted in NUPS and subsequent applications or modifications such as that in NHSPS. There is clearly a need to provide analytic means for tracing the mutual interaction between macro-economic performance and changes in the level and distribution of sectoral activity among settlements. NUPS and NHSPS both represents initial efforts to meet this need.

If the approach is improved, additional case studies and further applications could be of use to the Bank in establishing linkages between project and country economic work as well as to policy makers and operational ministries in developing countries. A needed first step in improving the approach is to better establish empirical estimates of output and cost variability and their determinants by urban settlement. In this process, it would be useful to maintain the NUPS distinction between investment costs associated with job creation and investment and other costs associated with
the provision of shelter, residential and business infrastructure services. 
In the NUPS formulation the causal sequence runs from investment in job 
creation and output generation to increased income and population which 
generates demand for shelter, residential and business services. This 
suggests that efficient locations for output generation and job creation would 
tend to demand higher levels of shelter and infrastructure services. It would 
be useful to empirically test the relationships between places with high 
expected net output benefits (output-costs) and levels of shelter and 
infrastructure services. In the NUPS formulation a positive correlation is 
expected.

In NUPS, a relationship was postulated between the growth rate of 
employment and the incremental costs of job creation. In NHSPS, it was 
assumed that beyond a certain growth rate (6% in NHSPS) a threshold is passed 
where costs tend to be higher. The existence, magnitude, and form of the 
functional relationship between costs of various kinds and growth needs to be 
empirically tested.

In addition, it would be useful to couple this empirical work with 
other estimates of output and cost variations and their determinants. Among 
these latter variables the size of the urban settlement, its rate of growth, 
its density, economic functions, sectoral mix of output and employment, 
location in relation to other settlements, and transportation linkages are 
obviously relevant. In some cases -- e.g., the relationship between income 
and city size or per capita infrastructure costs for public utilities and 
density -- much related research and empirical work has been done. This work 
needs to be brought together with new empirical work on output and cost 
variability.
Once this empirical analysis is done (and assuming it yields some systematic relationships), it would be possible to test more rigorously than was done in NUPS and NHSPS the benefit and cost implications of following different policies in the allocation of expenditures and establishment of incentive/disincentive structures in the pursuit of population redistribution strategies. In turn, more rigorous identification of benefit and cost consequences of different spatial strategies would permit better linkage between these strategies and macro-economic expectations and objectives.
Fl
NUPS METHO
AGGREGATE DEMOGRAPHIC AND ECONOMIC MODULE (ADEM)

(1) Economic Projections:
Major Inputs:
- Historical data
- 1980-84 Plan data
- Technological assumptions
- Aggregate growth ratio
Major Outputs:
- Sectoral growth ratios:
  - Output
  - Employment
- Sectoral investment requirements:
  - Total
  - Investment per employee
- Domestic investment and domestic saving

(2) Demographic Projections:
Major Inputs:
- Historical data
- Other projections
Major Outputs:
- Total, rural, and urban population
- Urban labor force
- Trend projections of settlement populations

SETTLEMENT ALLOCATION/COSTING MODULE (SACM)

(1) Investment for Employment
Major Inputs:
- Allocation of investment by settlement for employment
- Historical data
Major Outputs:
- Settlement growth potential
- Settlement average cost curves
- Total employment required
- National average investment per job

(2) Shelter and Intra-Urban Infrastructure & Services
Major Inputs:
- Settlement population and change in population
- Gross densities
- Field data on settlements
- Sectoral studies/plans
- Analysis of recent programs
- Identification of existing standards
- Explicit/implied subsidies
Major Outputs:
- Levels of service provision
- Standards packages
- Investment costs per capita
- Operating/maintenance costs by sector

INVESTMENT FOR SHELTER/INFRASTRUCTURE

Major Inputs:
- Settlement population and change in population
- Gross densities
- Field data on settlements
- Sectoral studies/plans
- Analysis of recent programs
- Identification of existing standards
- Explicit/implied subsidies
Major Outputs:
- Levels of service provision
- Standards packages
- Investment costs per capita
- Operating/maintenance costs by sector

Source: "Analytical Methodology for Preparing National Urban Policy Recommendations" (Dr. Research, May 1983.)
FIGURE 1
THODOLOGY OVERVIEW

CONTROL/FEASIBILITY/RISK MODULE
(CFRM)

(1) Financial Feasibility
   Major Inputs
   - Total resources available
   - Domestic resources available
   - Total job creation/shelter and infrastructure costs
   Major Outputs
   - Total resource surpluses or deficits
   - Total resource requirements from foreign sources
   - Identification of possible within-alternative variation in service standards

(2) Administrative/Legal Feasibility
   Major Inputs
   - Administrative and legal structure and provisions
   - Field analysis of administration and determination of policies and programs
   - Settlement growth and new patterns
   Major Outputs
   - Assessment of adequacy
   - Comparisons of alternatives

EVALUATION OF STRATEGIC ALTERNATIVES MODULE (ESAM)

(1) Non-quantitative Assessment of Benefits and Costs
   Major Inputs
   - Characteristics of settlement patterns and sectoral requirements
   - Development objectives
   Major Outputs
   - Rank orderings of alternatives from better to worse in non-additive criteria

(2) Quantitative Assessment of Benefits, Costs, Net Benefits
   Major Inputs
   - Settlement patterns and costs
   - Urban disamenity levels
   - Output parameters
   Major Outputs
   - Total and per capita income benefits
   - Total and per capita costs
   - Net total and per capita benefits

PREFERRED STRATEGY RECOMMENDATIONS

(1) Spatial priorities, population targets, investment costs
(2) Sectoral priorities, standards, service levels, investment costs, cost recovery
(3) Summary costs, performance characteristics, benefit/cost analyses

"(Draft), PADCO, Inc. in association with Garn
## TABLE I-B.6

PARAMETERS USED IN FIXED COMPONENT SYSTEM

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**SOURCE:** NUPS Calculations.

NUPS Final Report
Legend for Symbols

Legend for Symbols
- LEVEL OR AMOUNT
- MATRIX OF LEVELS
- PARAMETER OR FUNCTION
- RATE OF CHANGE
- DECISION RULE OR QUESTION
- SUMMATION

CODE TO ABBREVIATIONS

$$T = \text{Time; } T_0 = 0 \text{ is initial year; } T_i = \text{i is last year of first period}$$

Subscript:\n- \( i \) = Sectors
- \( j \) = Settlements
- \( e \) = Total

MM/C/S = Mining, Manufacturing and Construction plus Services
ICOR = Incremental Capital/Output Ratio
ILR = Investment/Labor Ratio
C = Average Investment Cost per Job
A = Intercept of Average Cost Function
\( g \) = Employment Growth Rate
MC = Marginal Investment Cost per Employee
TC = Total Investment Cost for Job Creation
PROCEDURE FOR ALLOCATING INVESTMENT FOR JOB CREATION

\[ \text{Regional cost variation index} \]

\[ \text{Settlement Employment Change} \] 

\[ \text{Settlement Total Cost} \]

\[ \text{Total Job Creation Cost} \]

\[ \text{Settlement Population Change} \]

\[ \text{Settlement Population} \]
# Table 2
## Summary of Urban Development Costs 1986-2000 (L.E. Millions)

<table>
<thead>
<tr>
<th>Sector</th>
<th>A</th>
<th>B₁ Efficiency</th>
<th>B₁ Equity</th>
<th>B₂ Efficiency</th>
<th>B₂ Equity</th>
<th>C</th>
<th>NUPS Preferred Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1986-1990</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>8,423</td>
<td>8,891</td>
<td>9,030</td>
<td>9,134</td>
<td>9,299</td>
<td>9,531</td>
<td>8,689</td>
</tr>
<tr>
<td>Urban Infrastructure</td>
<td>12,429</td>
<td>13,728</td>
<td>15,528</td>
<td>14,646</td>
<td>16,226</td>
<td>17,803</td>
<td>10,078</td>
</tr>
<tr>
<td>Inter-Urban Infrastructure</td>
<td>4,883</td>
<td>5,117</td>
<td>5,280</td>
<td>5,192</td>
<td>5,279</td>
<td>6,071</td>
<td>5,071</td>
</tr>
<tr>
<td>Total</td>
<td>25,735</td>
<td>27,736</td>
<td>29,838</td>
<td>28,972</td>
<td>30,784</td>
<td>33,405</td>
<td>23,838</td>
</tr>
<tr>
<td><strong>1991-1995</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>12,826</td>
<td>13,493</td>
<td>13,598</td>
<td>13,236</td>
<td>13,360</td>
<td>13,620</td>
<td>12,984</td>
</tr>
<tr>
<td>Urban Infrastructure</td>
<td>13,200</td>
<td>16,394</td>
<td>17,129</td>
<td>15,474</td>
<td>17,551</td>
<td>21,884</td>
<td>10,023</td>
</tr>
<tr>
<td>Inter-Urban Infrastructure</td>
<td>6,375</td>
<td>6,016</td>
<td>3,877</td>
<td>7,199</td>
<td>5,949</td>
<td>8,212</td>
<td>8,891</td>
</tr>
<tr>
<td>Total</td>
<td>32,401</td>
<td>35,903</td>
<td>37,604</td>
<td>35,909</td>
<td>36,860</td>
<td>43,716</td>
<td>31,898</td>
</tr>
<tr>
<td><strong>1996-2000</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>22,247</td>
<td>23,010</td>
<td>23,157</td>
<td>22,268</td>
<td>22,475</td>
<td>23,051</td>
<td>22,421</td>
</tr>
<tr>
<td>Urban Infrastructure</td>
<td>14,818</td>
<td>18,357</td>
<td>19,523</td>
<td>17,469</td>
<td>19,675</td>
<td>23,127</td>
<td>11,524</td>
</tr>
<tr>
<td>Inter-Urban Infrastructure</td>
<td>7,990</td>
<td>8,285</td>
<td>8,496</td>
<td>9,044</td>
<td>9,136</td>
<td>10,468</td>
<td>11,702</td>
</tr>
<tr>
<td>Total</td>
<td>45,055</td>
<td>49,652</td>
<td>51,176</td>
<td>48,781</td>
<td>51,286</td>
<td>56,646</td>
<td>45,447</td>
</tr>
<tr>
<td><strong>1986-2000</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>43,496</td>
<td>45,394</td>
<td>45,785</td>
<td>44,638</td>
<td>45,074</td>
<td>46,202</td>
<td>44,094</td>
</tr>
<tr>
<td>Urban Infrastructure</td>
<td>40,447</td>
<td>48,479</td>
<td>52,180</td>
<td>47,589</td>
<td>53,492</td>
<td>60,441</td>
<td>31,425</td>
</tr>
<tr>
<td>Inter-Urban Infrastructure</td>
<td>19,248</td>
<td>19,418</td>
<td>20,653</td>
<td>21,435</td>
<td>20,364</td>
<td>24,751</td>
<td>25,464</td>
</tr>
<tr>
<td>Total</td>
<td>103,191</td>
<td>113,291</td>
<td>118,618</td>
<td>113,662</td>
<td>118,930</td>
<td>131,394</td>
<td>101,182</td>
</tr>
</tbody>
</table>

1. The methodology for estimating direct investment costs in industry is described in Appendix II.C.

2. Includes telecommunications in urban infrastructure other standards similar to Estimate 2.

CHAPTER II

THE ANALYTICAL BASIS FOR THE RECOMMENDED STRATEGY

The central purposes of this study is the design of a feasible strategy for national urban policy to regulate urban growth and establish requirements and priorities for investment in urban areas to the year 2000. The major elements of NUPS recommended strategy have been summarized in Chapter I and are described in greater detail in Chapters III-VII.

It would be inappropriate to attempt to summarize all of the material contained in prior reports in this Final Report. Rather, this chapter is provided as a means of emphasizing elements of the work which are most essential for understanding the basis for our national urban policy recommendations.

The Study Team has been guided throughout the study by the view that the adoption of a feasible and successful national urban policy by the Government of Egypt could make a substantial contribution to the well-being of the Egyptian people during a period of rapid development and increasing urbanization of the population. Feasible and successful policies, however, must be based on sound principles and valid inferences from the facts about Egypt. This review of earlier work will concentrate, therefore, on the principles we have employed and the analysis we have done to ensure that the recommendations are worthy of government support.

I. KEY PRINCIPLES FOR NATIONAL URBAN STRATEGIES AND POLICIES FOR THEIR IMPLEMENTATION

The NUPS Team understands national urban policy as an important element in the nation's development policy but not the whole of it. Urban policy is primarily concerned with elements of public policy which affect the settlement system. The settlement system is the spatial and functional distribution of economic activity, population and service facilities or activities in the country. National urban policies are those national policies which operate through interventions in the settlement system to achieve national objectives such as economic growth, interpersonal equity, and inter-regional equity.

There are many factors (other than explicit urban policy) which can influence the settlement system in positive or negative ways. That is, there are many causal influences operating on the system of which public actions and policies are only a part. Nevertheless, the outcomes of interest in developing improved policies are the positive or negative effects on the achievement of national goals, regardless of whose actions cause them.

As a result of the study of national settlement systems and urban policies in many countries, it is clear that many of the most important influences of government

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1/ Source: NUPS Final Report
on the settlement system are policies and practices of the government that are not necessarily thought of as urban policies. A policy of rapid industrialization, for example, produces increased urbanization and concentration of population in major urban centers, whether or not it is intended to do so. Expansion of public sector activities results in increases in public sector employment which, in turn, fosters growth in major governmental centers relative to other locations. Subsidies designed to alleviate problems of low income people in high cost urban areas increase the rate of migration to such urban areas. Capital subsidies designed to induce additional industrial investment may lead to use of more capital and less labor than is desirable in maintaining urban employment as well as provision of assistance to firms that would have made the investment anyway.

Policies which have these kinds of effects are often called implicit urban policies to distinguish them from policies explicitly chosen to have specific desired effects on the settlement system. In urban policy formulation, it is desirable to consider as many of these kinds of policies as possible. Consequently, this study has explored policy issues that go well beyond the specific mandate of the Ministry of Development in the attempt to define a sound urban policy.

Three such issues are of extreme importance. First, a spatial policy of redistributing urban population to specific locations chosen by the government cannot succeed unless spatial policy and planning is integrated with industrial policy in general and industrial location policy in particular. The location and magnitude of the employment base is the major factor influencing the location of population in Egypt as elsewhere. If spatial policy and industrial location policy diverge significantly, spatial objectives will not be achieved. At the same time, spatial planners must take account of the factors which make some industrial locations better than others setting spatial objectives. The efficient location of industry is not possible everywhere. The choice of spatial targets for population expansion in economically unattractive locations will result in industries which fail, thus, wasting resources, or which require continuous cost subsidy to keep in operation, thus, utilizing funds that could be more effectively used elsewhere.

Consequently, the integration of spatial planning with industrial policy (especially location policy) is essential to: (1) increase the likelihood of achieving spatial targets, and (2) reduce wastage of public investment and hold program costs within reasonable bounds.

The second key issue is the need for integration of spatial policy with sectoral policies for housing and infrastructure. In the housing and infrastructure sectors, public expenditure is substantial and Government policies have a pervasive influence. The amount of public expenditure depends upon the levels of service provided (service standards), the amount of the public outlays which is recovered from recipients of the services, and the number of places receiving housing and infrastructure allocations.

The provision of high levels of public services at relatively low cost to recipients in particular locations can obviously provide an incentive for businesses and people to locate there. If housing and infrastructure policies are intended to be used as instruments for changing the population distribution across cities, rather than solely to meet service demands wherever they are, it is essential to have differential (rather than uniform) standards and cost recovery mechanisms in different places.
Ministries responsible for specific infrastructure or service sectors do not necessarily take account of the incentive effects of the levels of services provided, standards and cost recovery mechanisms used. Consequently, policies in these sectors can, and frequently do, operate at cross-purposes with spatial objectives.

As is true in spatial choices for industry location, it is essential for those determining spatial priorities to assess the implications of their choices on the total requirements placed upon sectoral ministries. If the number of places suggested for spatial emphasis is large, or in places with non-existent or substantially deficient housing or infrastructure, the ability of the sectoral ministries to meet the requirements within acceptable budgeting limits may be seriously impaired.

The third key issue is the need to ensure that spatial and sectoral policies and plans for spending be realistically related in their total requirements and the timing of expenditures with the ability of the public sector to mobilize resources. Since it is generally the case that the sum of resource requirements for desirable programs and projects will exceed the amount of resources it is feasible to make available, choices among desirable activities must continuously be made. This has implications for both resource-raising ministries and resource-using ministries. The former ministries require realistic estimates of requirements as an input to considerations of monetary and fiscal policies (e.g., interest rate policy, tax policy, subsidy and transfer policy, and pricing policies). The latter ministries, in addition to being aware of the general constraint, should consider possibilities of adopting resource-generating (e.g., cost-recovery mechanisms, assessments of profitability of industrial investments) and cost-saving (e.g., choice of standards) approaches to spatial and sectoral policies.

Our analysis shows that it is extremely important for the GOE to adopt two general policies to guide all spatial and sectoral choices for national urban policy in order to achieve a better balance between resource mobilization and resource requirements than is likely if present practices and policies are continued:

- Priority should be given in program choices and spatial locations for investment in programs and locations where economic efficiency can be demonstrated.

- Industrial investment policies and sectoral policies for housing and infrastructure should be based upon the principle of conserving the amount of public investment required. Priority should be given to encouragement of private investment in both job creation and housing, development of standards for housing and infrastructure that are affordable by a broader portion of the urban population, and increased efforts to recover public investment outlays from the recipients of publicly supported housing and services.

While the NUPS Team recognizes the difficulty of correctly anticipating all the public and non-public influences on the settlement system, it is critical to a national urban policy (as a minimum) that a major effort be made to link spatial priorities with the policies of ministries with responsibility for the major policy instruments: job creation investment (or inducement), housing and infrastructure investment, standards of service provision and cost recovery. Finally, it is necessary to make a serious effort to match the investment and other resource-using
plans of the ministries responsible for spatial and sectoral policies with policies for mobilizing resources.

II. SETTLEMENT STRATEGY OPTIONS

In the search for a suitable urban policy for Egypt, what settlement strategy options need to be considered? As suggested above, settlement strategies are essentially population redistribution and service provision strategies implemented primarily through shifts in the spatial distribution of employment and investment.

In looking for appropriate options, a question is whether some kinds of urban population distributions tend to be better than others in achieving various national objectives.

As indicated in our previous reports, the major national objectives which are likely to be achieved more or less fully depending upon the settlement and sectoral strategy adopted are:

- Achievement of a high rate of national economic growth.
- The maintenance of social justice through interpersonal and inter-regional equity.
- Reduction of the adverse consequences of concentration in the primate city.
- Protection of arable land to contribute to the production of food and the growth of agriculturally based industry.

The experience of other countries and the NUPS study of Egypt show that no single settlement strategy is simultaneously the best way of achieving such multiple objectives. At the same time, it is clear that there is sufficient regularity in the effects of types of settlement systems for some reliable generalizations to be made about what kinds of expectations the Government should have if they promote a particular type of settlement system.

The most pronounced of these regularities is the tendency of more concentrated settlement systems (that is, with relatively large national and regional centers) to be more efficient generators of economic growth and per capita income increase than more dispersed systems. It follows that more concentrated systems also create the possibility of achieving greater inter-personal equity; both because of greater employment opportunity for low income people resulting from growth and because the "growth surplus" can be used to provide a greater range of public services and redistributional transfers.

The other side of the coin is that concentration tends to produce increased polarization of the settlement system in the major metropolitan regions and may increase the disparity between income in these regions and regions which lack economic potential. The polarization of the settlement system can result in
substantial diseconomies (associated with rapid growth and large size in the metropolital region) which reduce the net benefits of concentration. (See Appendix II-A, for a discussion and indicative estimates of such diseconomies.)

Inter-regional equity (greater equality or convergence of regional incomes) may be better served by a more dispersed settlement system. These benefits (like the benefits of a concentrated system) have associated social costs. That is, they are likely to be achieved at the social cost of reduced rates of national growth in output and per capita income and loss of capability to increase inter-personal equity through reductions in the "growth surplus." It should be noted also, that experience with inter-regional dispersal strategies internationally has not resulted in substantial contributions to reductions in the growth of primate cities.

These general principles have strong theoretical and empirical support in this study and in studies by others of urban systems. The issue was summarized well by Koichi Mera, after an extensive review of both theoretical and empirical literature relating to over 45 countries as follows:

"The available empirical analyses show that large cities are more productive and that the largest cities are likely to be particularly more productive relative to others in a less developed country. Therefore, a decentralization policy of investment and population distribution over the country cannot be encouraged...if the national goal is to maximize the growth of national products.

"However, it is known that urbanization generally increases per capita income of the areas affected. Therefore, if the national goal is to achieve a more equitable distribution over different regions, even at some sacrifice to the GNP growth rate, then a policy directed toward development of under-developed regions can be justified."

The Egyptian Government is strongly committed to the national objectives of achieving a sustained high rate of economic growth and improvements in social equity. The commitment to economic growth which is often stressed by public officials and national development planning is predicated on the maintenance of an annual growth rate of GNP in excess of 7 percent a year. That growth rates at this level are very difficult to achieve is shown by a recent World Bank finding (1979) that such high rates were achieved by only 7 of 125 countries over an extended time period such as the planning period for this study. While there are many uncertainties about whether or not this high level of growth can be maintained, the implication of a high growth objective for settlement strategies for Egypt is clear. The kind of settlement system that would tend to promote maximum growth! is a regionally concentrated system which makes full use of the economic potential of major urban settlements, such as the Cairo and Alexandria metropolitan region.

Does the same conclusion follow from the government's commitment to social equity? Here the answer depends upon whether the emphasis is primarily on inter-personal equity (convergence of income and opportunity across individuals) or inter-regional equity (convergence of income and opportunity across all regions of the country).
Considerations of inter-personal equity tend to support a more concentrated, efficiency-oriented, settlement system rather than a dispersed system. Harry Richardson, in his recent NUPS Working Paper, wrote:

"An efficiency-oriented settlement strategy offers the best prospects for promoting inter-personal, as opposed to spatial, equity because metropolitan area concentration is relatively more beneficial to the poor than to the rich and because it generates more surpluses for potential direct redistribution. Also efficiency in the allocation of scarce public investment resources tends to result in a wider distribution of the benefits of urban infrastructure and public services among groups."

For reasons already cited, a more dispersed system and strategy is more likely to promote inter-regional equity than a concentrated system. Hence, whether a more concentrated or a more dispersed system is to be preferred on equity grounds depends upon the relative weight policy makers attach to improving the relative position of low income people wherever they reside or of all the people who reside in lagging regions. If greater weight is attached to the former, a strategy of encouraging urban concentration is likely to serve both national growth and equity goals. If greater weight is attached to the latter, the simultaneous pursuit of growth and equity goals requires a mixed strategy with less concentration than would be optimal on economic growth criteria alone and more concentrated than would be optimal on inter-regional equity criteria alone.

The NUPS recommended strategy is to place primary emphasis on seeking national economic growth and gains in inter-personal equity and less emphasis on attempting to achieve convergence of regional income across all regions of the country over the next two decades. However, we propose that a focused effort be made in selected Upper Egypt cities to develop the industrial base for improving incomes in this relatively low income region.

This overall conclusion remains valid in the current context, even after a generous allowance for additional diseconomies associated with concentration in the Cairo and Alexandria regions, as described in Appendix II-A.

III. ALTERNATIVES CONSIDERED IN DEVELOPING THE RECOMMENDED STRATEGY

Under any alternative, the settlement system of Egypt must accommodate somewhere all of the future resident population. Our analysis has been based upon the assumption that the resident population in Egypt will rise to at least 67.5 million people by the year 2000.
Figure I-5 showed the year 2000 resident population estimates for rural areas, urban areas and trend population estimates for Cairo and Alexandria compared to earlier years. As discussed in Chapter I, it is possible that the resident total population will be higher than 67.5 million (due to failure of birth rates to decline and potential reductions in foreign demand for Egyptian workers). It is possible, also, that the urban population will increase to more than the estimated 37 million since there is little prospect of enough agricultural employment being added to provide jobs to support the additional rural population. A policy of increasing rural non-farm employment to take up the slack is not recommended because low density industrial development in rural areas would be wasteful of arable land and because agriculturally-related industry will need to form a major element in urban industrialization policy and should be located primarily in urban areas. Our estimate of 37 million urban residents should be treated as a minimum planning figure.

From the perspective of these population growth estimates, urban areas as a whole will experience an annual rate of growth of at least 3.5 percent per year. The policy problem is how to select spatial locations with enough economic potential to make job creation investment both large enough to prevent high levels of unemployment and profitable enough to become largely self-financing over time. If spatial policy is unsuccessful in this regard, there will be too few resources to maintain public infrastructure and build new capacity to meet service the requirements of the urban population.

NUPS analysis of the economic context for urban policy choice recognizes the positive features of the recent performance of the economy; but recommends caution in assuming either that the high rates of economic growth in the last few years will continue or that the growth represents a major improvement in the performance of the domestic economy. The mobilization of sufficient investment resources to maintain high output growth, generate sufficient employment opportunities, and provide needed services requires urgent attention. The shortage of domestic resources slows down implementation of selected projects and limits the ability of the country to fully utilize international assistance.

Thus, the context within which alternative strategies should be considered is one of high and increasing demand for urban jobs and services and probable limitations on the ability of the Government to mobilize enough domestic resources to satisfy these demands fully. In this context our analysis shows that it is essential to select spatial priorities for urban development that contribute to an efficiency-oriented settlement strategy and sectoral policies which are consistent with a strategy of conserving public investment -- that is, the provision of housing and other infrastructure at affordable standards (reducing initial outlays per capita) accompanied by increased efforts at higher levels of cost-recovery from those served by public investment (increasing the return flow of reinvestable funds.)

IV. SPECIFIC ALTERNATIVES

In arriving at these conclusions, the implications of four basic alternative settlement strategies were explored. These were:
Alternative A: This strategy is designed to select spatial priorities by emphasizing generation of economic growth at the least cost. Priority is given to places with established industrial potential.

Alternative B1: This strategy emphasizes inter-regional decentralization through the development of a new major metropolitan area in the Suez region, preferably in Suez City.

Alternative B2: This strategy emphasizes inter-regional decentralization through multiple growth centers.

Alternative C: This strategy adds an emphasis on urban development in the Remote Areas to the multiple growth center approach of B2.

The recommended strategy, described in Chapter 1, was developed from the results of examining the settlement distributions which result from these strategies; the estimated costs of developing industrial employment and both inter- and intra-regional infrastructure; and an assessment of the strengths and weaknesses of each of the alternatives. Tables summarizing the analytic framework and assessments of each of these alternatives are shown in Appendix II-B.

The populations for the 40 urban centers with over 50,000 population aggregated by zone and the implied growth rates from 1985-2000 under the various alternatives are shown in Table 11-1.

The analysis confirms for Egypt the general principle that more dispersed settlement patterns require substantially greater financial outlays than more concentrated systems. Alternative A, the most concentrated strategy, is estimated to cost approximately 10 percent less than the most concentrated version of B1; about 14 percent less than the most dispersed version of B2; and about 22 percent less than C, the most dispersed strategy. These costs are summarized in Table 11-2. Procedures for estimating the direct investment costs for job creation are described in Appendix II-C. Our analysis of the strengths and weaknesses of the alternatives on five sets of evaluation criteria is summarized in Table 11-3.

V. SUMMARY OF ANALYSIS LEADING TO THE RECOMMENDED STRATEGY

The key principles, findings and spatial recommendations derived from the earlier analysis are summarized here in order to focus attention on major issues in the choice of a national urban policy for Egypt.

A. Principles

1. The settlement system is the spatial and functional distribution of economic activity, population, population serving infrastructure in the country.

2. National urban policies are those national policies which operate through interventions in the settlement system to achieve national objectives. Changes in the settlement system are not properly viewed as goals in themselves; rather they are initiated for other purposes.
## Table II-1

### POPULATION OF THE SETTLEMENT ALTERNATIVES

<table>
<thead>
<tr>
<th>Settlement</th>
<th>1990 (IN THOUSANDS)</th>
<th>1990 - 2000 GROWTH RATE(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B1</td>
</tr>
<tr>
<td>Cairo</td>
<td>11,457</td>
<td>11,066</td>
</tr>
<tr>
<td>Alexandria</td>
<td>3,809</td>
<td>3,867</td>
</tr>
<tr>
<td>Delta</td>
<td>3,857</td>
<td>3,728</td>
</tr>
<tr>
<td>Canal</td>
<td>1,187</td>
<td>1,624</td>
</tr>
<tr>
<td>North Upper Egypt</td>
<td>716</td>
<td>727</td>
</tr>
<tr>
<td>South Upper Egypt</td>
<td>1,322</td>
<td>1,342</td>
</tr>
<tr>
<td>Remote</td>
<td>238</td>
<td>239</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>22,586</td>
<td>22,593</td>
</tr>
</tbody>
</table>

Source: NUPS analysis.
## TABLE II-2
### SUMMARY OF URBAN DEVELOPMENT COSTS 1986-2000
(L.E. Millions)

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>A</th>
<th>B₁ EFFICIENCY</th>
<th>B₁ EQUITY</th>
<th>B₂ EFFICIENCY</th>
<th>B₂ EQUITY</th>
<th>C</th>
<th>NUPS PREFERRED STRATEGY²</th>
</tr>
</thead>
</table>

### 1986-1990
| INDUSTRY                      | 8,423 | 8,891 | 9,030 | 9,134 | 9,929 | 9,531 | 8,689 |
| URBAN INFRASTRUCTURE          | 12,429 | 13,728 | 15,528 | 14,646 | 16,226 | 17,803 | 10,078 |
| INTER-URBAN INFRASTRUCTURE    | 4,883 | 5,117 | 5,280 | 5,192 | 5,279 | 6,071 | 5,071 |
| TOTAL                         | 25,735 | 27,736 | 29,838 | 28,972 | 30,784 | 33,405 | 23,838 |

### 1991-1995
| INDUSTRY                      | 12,826 | 13,493 | 13,598 | 13,236 | 13,360 | 13,620 | 12,984 |
| URBAN INFRASTRUCTURE          | 13,200 | 16,394 | 17,129 | 15,474 | 17,551 | 21,884 | 10,023 |
| INTER-URBAN INFRASTRUCTURE    | 6,375 | 6,016 | 3,877 | 7,199 | 5,949 | 8,212 | 8,891 |
| TOTAL                         | 32,401 | 35,903 | 37,604 | 35,909 | 36,860 | 43,716 | 31,898 |

### 1996-2000
| INDUSTRY                      | 22,247 | 23,010 | 23,157 | 22,268 | 22,475 | 23,051 | 22,421 |
| URBAN INFRASTRUCTURE          | 14,818 | 18,357 | 19,523 | 17,469 | 19,675 | 23,127 | 11,324 |
| INTER-URBAN INFRASTRUCTURE    | 7,990 | 8,285 | 8,496 | 9,044 | 9,136 | 10,468 | 11,702 |
| TOTAL                         | 45,055 | 49,652 | 51,176 | 48,781 | 51,286 | 56,646 | 45,447 |

### 1986-2000
| INDUSTRY                      | 43,496 | 45,394 | 45,785 | 44,638 | 45,074 | 46,202 | 44,094 |
| URBAN INFRASTRUCTURE          | 40,447 | 48,479 | 52,180 | 47,589 | 55,492 | 60,441 | 31,425 |
| INTER-URBAN INFRASTRUCTURE    | 19,248 | 19,418 | 20,653 | 21,435 | 20,364 | 24,751 | 25,464 |
| TOTAL                         | 103,191 | 113,291 | 118,618 | 113,662 | 118,930 | 131,394 | 101,182 |

---

1. The methodology for estimating direct investment costs in industry is described in Appendix II.C.
2. Includes telecommunications in urban infrastructure other standards similar to Estimate 1.

SOURCE: NUPS analysis.
### TABLE II-3
**EVALUATION SUMMARY**
**AVERAGE SCORES AND AVERAGE RANKS**

<table>
<thead>
<tr>
<th>EVALUATION CRITERION</th>
<th>A</th>
<th>B1 EFFICIENCY</th>
<th>B1 EQUITY</th>
<th>B2 EFFICIENCY</th>
<th>B2 EQUITY</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Score</td>
<td>Rank</td>
<td>Score</td>
<td>Rank</td>
<td>Score</td>
<td>Rank</td>
</tr>
<tr>
<td>1. Social Effectiveness</td>
<td>4.0</td>
<td>3.0</td>
<td>5.1</td>
<td>3.5</td>
<td>4.8</td>
<td>3.3</td>
</tr>
<tr>
<td>2. Economic Efficiency</td>
<td>2.1</td>
<td>1.5</td>
<td>3.1</td>
<td>2.2</td>
<td>4.7</td>
<td>3.4</td>
</tr>
<tr>
<td>3. Management &amp; Implementation</td>
<td>2.2</td>
<td>1.7</td>
<td>4.5</td>
<td>3.5</td>
<td>5.5</td>
<td>4.0</td>
</tr>
<tr>
<td>4. Risk</td>
<td>3.2</td>
<td>2.1</td>
<td>4.4</td>
<td>2.4</td>
<td>5.3</td>
<td>3.5</td>
</tr>
<tr>
<td>5. Cost</td>
<td>-</td>
<td>0.1</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>4.0</td>
</tr>
</tbody>
</table>

1. Numerical values are shown to help provide a sense of the relative differences among alternatives as judged by NUPS professional staff. Judgments of others may differ or individual criteria may be weighted differently than the equal weighing used to derive the average values. There is no technical or scientific basis for adopting particular weighing system. Average scores and average ranks are both shown in this table. In the procedure used an alternative could be assigned a score of 1 to 10, with a score of 1 best and 10 worst. The numerical values of the scores are a rough guide to not only which alternatives rank highest but how great the differences are among them. The average rank is simply the sum of the ranks assigned by all evaluation staff divided by their number.

2. See complete list of sub-criteria under each of these general headings in Appendix II-B.

3. These ranks are derived from cost estimates rather than the evaluation procedure described in footnote 1.

**SOURCE:** NUPS analysis.
3. Important national objectives which are relevant to the choice of national urban policy are:

- Achievement of a high rate national economic growth.
- The maintenance of social justice through interpersonal and inter-regional equity.
- Reduction of the adverse consequences of concentration in the primate city.
- Protection of arable land to contribute to the production of food and the growth of agriculturally based industry.

4. Since there are many national purposes or goals, it is not likely that any one settlement system will be best for all purposes or that a single strategy can serve all purposes equally.

5. Settlement systems tend to develop relatively large concentrations of population in a few national and regional centers because of the very strong economic advantages (both nationally and personally) of such agglomeration. These concentrations occur in locations which offer specific advantages; they do not occur randomly across national space.

6. It is extremely difficult to make major changes in the settlement system in a short period of time through government action even if large expenditures of financial and other resources are committed to such change.

7. To affect the settlement system in planned ways, it is absolutely essential for industrial investment and location policies to be consistent with spatial priorities, since the availability of jobs is the most important factor in determining where people live or migrate to.

B. Findings

1. More concentrated settlement systems are generally more effective producers of national and regional growth, especially during a period of rapid economic development. More dispersed systems are more costly to initiate and maintain in terms of both financial costs and real resource costs (such as materials for housing and infrastructure, personnel and management costs).

2. Our empirical estimates of alternative spatial strategies presented in the study confirms this conclusion for Egypt. Our estimates show that the costs for both job creation and infrastructure are likely to be about one and a third times as much in a strategy of dispersion as in a strategy which concentrates investment in places with established economic potential.

3. Analysis of population growth and prospects for expansion of rural employment leads to the conclusion that urban population will continue to grow at rates above the national rate of population growth, resulting in substantial increases in the demand for urban jobs, housing, and services.

4. Continuation of recent high rates of economic growth cannot be taken for granted. Even if high rates are maintained, substantial increases in the portion of the
growth allocated to investment (rather than current consumption) will be necessary to finance job creation and needed infrastructure investment. Such substantial increases are required that it would be unwise to base inflexible spending plans on their occurrence.

5. If domestic saving plus foreign assistance does permit sufficient investment to achieve a 7 percent annual rate of economic growth, the total investment pool would amount to about 125 Billion L.E. between 1986 and 2000. Our least cost estimate for investment in job creation and infrastructure for the 40 largest cities and urban population in Remote Areas only is more than four-fifths of this total. The cost estimate for the most dispersed strategy is over 5 Billion L.E. more than the total pool.

6. These estimates demonstrate that a feasible national urban policy will require the government to now make strategic choices which are highly selective among:

- The numbers of urban places which will receive priority emphasis — it is not feasible to attempt to simultaneously upgrade all existing urban settlements, develop extensive industrial bases in all of the largest cities, substantially expand urban places in Remote Areas, and build free-standing New Cities as currently planned.
- The standards of housing, infrastructure and community services — the standards of housing and service packages need to be selected to reflect both spatial targeting and greater affordability within urban areas.
- The amount of cost recovery to be sought from recipients of publicly provided services — subsidies should be reduced by cost recovery mechanisms that are more consistent with ability to pay of various income groups than is true of current practice.

7. There is a significant danger that the failure to adopt feasible strategies regarding spatial emphases and sectoral policies will result in substantial deterioration in the level of services and well-being of the bulk of the urban population, result in even more rapid and uncontrolled growth in Cairo, and limit rural initiatives as well as waste scarce resources.

C. Recommendations

1. The NUPS Team recommend, therefore, the adoption of two very important general policies to guide spatial and sectoral choices for national urban policy:

- Priority should be given in programs and spatial locations or investment to programs and locations where economic efficiency can be demonstrated.
- Industrial investment policies and sectoral policies for housing and infrastructure should be based upon the principle of conserving the amount of public investment required. Priority should be given to encouragement of private investment in both job creation and housing, development of standards for housing and infrastructure that are affordable by a broader portion of the urban
population, and increased efforts to recover public investment outlays from the recipients of publicly supported housing and services.

2. **Recommended Spatial Emphases**

- **We recommend the adoption of a policy of selective decentralization over the next 15-20 years to Suez and two to three Upper Egypt areas — Qena/Naga Hamadi, Aswan and Assiut — rather than special decentralization efforts spread over many places.**

- A major push in Suez city can lead to the development of a large urban competitor to Cairo and Alexandria, enhance the growth prospects of the Canal region, and build a base for subsequent growth in Sinai and along the Red Sea Coast.

- Special emphasis on Qena/Naga Hamadi can take advantage of recent major investments in industry in Naga Hamadi and enhance future growth prospects in the Western Desert and the Red Sea Coast. The major difficulty will be generation of a larger economic base to attract population and the construction and maintenance of the infrastructure to serve them in the Qena/Naga Hamadi corridor.

- Aswan and Assiut are reasonable choices on locational grounds for special emphasis — Aswan as the southern anchor of the settlement system and Assiut as a key anchor to the development of the middle portion of the Upper Nile Valley. In these cities, too, the development of an expanded economic base at reasonable cost is the major concern.

- The Delta poses a major challenge for urban policy and its integration with rural policy. The Delta has sufficiently strong economic advantages to attract substantial investment in industry. Unless such economic growth is carefully managed, Delta cities will increasingly spill-over into high yield agricultural land. We recommend special emphasis on Tanta and Mansoura as test cases for the development of growth management strategies and increased consolidation of regional service functions in a few centers to serve smaller urban places, villages, and farms in the Delta Region.

- The Alexandria Metropolitan Region should be encouraged to grow (through increased industrial and infrastructure investment) as the major urban competitor to Cairo. This growth should be planned for and managed as a single metropolitan region although the current urban area is in three separate governorates. The major policy issue is defining and controlling the directions of growth since feasible growth directions are on old agricultural land, newly reclaimed land, or land currently being developed as low density touristic/recreational sites. Priority should be given to:
  - infill in peripheral kisms,
  - providing infrastructure services in fringe areas where growth is desired, and
  - additional close-in settlements, rather than in New Ameriyah over the next ten years.
Under any feasible spatial alternative, the Cairo Metropolitan Region will experience considerable growth; which should be taken into account in spatial and sectoral plans. The major policy issues for Cairo are:

- The selection of locations for new growth,
- the redirection of growth trends from rapid expansion in a generally north-south axis to an eastwest axis, and
- management of services throughout the urban region.

The highest priority should be given to:

- Encouraging more dense development in peripheral, relatively low density kisms,
- provision of serviced fringe sites for low income residential development to encourage the deconcentration of highly dense core kisms,
- development of several close-in settlements (such as 6th of October and El Obour) which in addition to well located desert fringe sites, would provide areas for new industrial and service sector growth as well as new residential sites, and
- consideration of an extended time frame for further development in 10th of Ramadan and Sadat City to permit investment allocations to be directed to priority developments cited above in the near future and possible restructuring of new city development plans to serve a broader range of population than can now be served at affordable service levels.

During the next 10 to 15 years, only limited and experimental urban development activities with high economic payoffs or significant learning potential should be undertaken in the remote areas until the priority efforts described above provide improved development linkages to support future urban growth in these regions.
NOTES
CHAPTER II
THE ANALYTICAL BASIS FOR THE RECOMMENDED STRATEGY

1 See Appendix II-A.


4 This figure (125 Billion L.E.) includes investment required for the agriculture and petroleum sectors. This means that the most dispersed strategy is not affordable even if growth is sustained at 7 percent and no investment funds are allocated to these two sectors.