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Analysis of School Size and Grade Structure in the Public Schools of Jordan: Policy Implications

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FOREWORD

Educational policy-planners in their endeavors to find viable approaches to increasing the efficiency of education systems and solving endemic problems related to need, equity and utilization, in the absence of valid information and reliable data-based research evidence, often find themselves in dilemmatic situations. Particularly in developing countries decision-makers are habitually inclined to make policy decisions on the basis of political expediency, intuitive gut-feeling, or pure speculation rather than rational evidence. Increasing financial concern, budgetary restrictions, and statutory requirements of some funding agencies, in recent years have somewhat induced the policy-planners to find ways to make more-informed cost-effective decisions.

The **National Center for Educational Research and Development** (NCERD) was recently created as an independent institution charged with developing national educational database, establishing and operationalizing Education Management Information System (EMIS), evaluating the effectiveness of education reform subprojects and programs, conducting policy-based reseach to guide rational educational policy-decisions, and serving as a clearinghouse for documentation and dissemination of information.

Evidently, to ensure that research findings will be utilized in decision-making, research must come up with alternatives to which increasingly scarce resources could be deployed more efficiently. Indeed, to enhance the potential of policy-research to influence decision-making, the research must go beyond simple description of research findings. Policy-oriented research must take into consideration the conflicting interests of rival forces the decision-makers have to address while allocating priorities to competing problems and alternative solutions. Understanding the mechanism how issues are developed, and what information structure is required to address the issue at hand on the part of the researchers, can go a long way in making significant impact on policy formulation decisions. In many cases, the researchers should adopt a proactive stance that could draw the attention of ploicy-makers to unnoticeable subterraneous factors related to the issue and thus assist policy-makers to frame and tackle policy issues in technically more sound ways.

One of the critical issues related to new school coustruction policy in Jordan stems from the fact that many schools are of very small size (student enrollments). The size problem is further complicated by the fact that most public schools have

haphazardly staggered grade patterns that are related to such factors as location and ownership of schools. Under education reform that aims at enhancing the quality of education, new school buildings have to be provided to relocate rented schools and accommodate natural increases in student enrollments. This raises the issue that in order to cater for the accommodation of increased student population which strategy is wiser, cost-effective , and efficient ? To coustruct new schools or to expand the capacity of existing schools by adding needed rooms.

As a major part of the Education Reform Program in Jordan, school construction policies are addressed in the context of related issues (size, class structure, ownership, and location), nationally at a macro level, regionally at directorate level, and locally at the level of urban and rural areas within directorates. Results suggest that school construction ploicy should be directed toward increasing the size of existing schools by adding required number of rooms, wherever feasible, to existing schools instead of constructing new schools.

This study may serve as an example to demonstrate how educational data routinely collected by education ministries can be structured in a database and utilized to focus on important policy issues by identifying and analysing the pertinent variables and inferring meaningful conclusions on the basis of evidence latent in the available data.

More important , this study is a significant attempt to show how properly analysed, validly interpreted and clearly presented information can alter a course of action and improve policy decisions. Thus, by implication this study signifies the importance of properly maintained database and efficient Education Management Information System (EMIS) for the implementation of education reform programs in the developing countries. I hope that various audiences of education policy-planners, researchers, and academia would find the study illuminating and worth emulating in several ways. If this trend catches on, I would consider the NCERD's effort in establishing the Database and operationalizing the EMIS and information dissemination system is proving fruitful.

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Victor Y. Billeh
President , NCERD

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Since the bulk of the study and its substance is derived from numerous analyses and statistical computations and presentation of results involves numerous graphical illustrations, a lot of accumulated hard work was put in by the two industrious research assistants, namely, Mr. Hisham Al-Dajeh and Mr.Yasser Mohawish; their contribution is gratefully acknowledged.

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The keen interest and useful comments of my friend and colleague Dr. Taiseer Al-Nhar were a continual source of encouragement and insight ; I extend my cordial gratitude to him and hope for his continued cooperation.

PREFACE

Realizing the deleterious effects of rented and double shift schools on the quality of education, the Government of Jordan incorporated in the Educational Reform Program (ERP) the National Program to construct new schools to replace all rented and double shift students and to accommodate the enrollment-increases due to natural rate of population. In pursuit of raising student achievement levels and quality of education in general (the central goal of the ERP) the reform plan also included the program to provide such essential educational facilities as library, laboratory, multipurpose room, and workshop for vocational education. Since limited resources allocated for each program do not allow provision of all the facilities to all schools, criteria and priorities have to be defined to identify and select the schools that best deserve the provision of new facilities listed above.

The search for admissible criteria to select deserving schools to be provided with additional essential facilities under the ERP brought the issue of school size to our notice. Initially we started analyzing the school size variable in the academic basic and secondary schools of the Ministry of Education (MOE) with intent to identifying schools to be provided with specialized facilities and to demonstrate how the information available in the database can be used to make policy decisions.

Preliminary examinations of the analyses soon revealed that school size phenomenon in Jordan is compounded with yet another phenomenon, the fragmentation of schools, while both phenomena are causally related to the Governments' policy of accommodating students in rented buildings and double shift schools. Since the above mentioned policy measures were adopted to meet the demand for student places due to increased enrollment rates which is a function of growth and density of population which vastly differ from one region to another and between rural and urban areas in each region, the data analyses further revealed that school size, fragmentation, and ownership (rental phenomenon) are all nested in the location factor.

While these investigations were going on, a review of recent school size research opened a pandora's box.

Although not explicitly divided into parts there are four distinct parts a reader would discern while going through it. After the executive summary, the first part deals

with the background of the study, review of recent related literature, and overall conceptualization of the problem. Then follows an overview of the school size and grade structure of schools in Jordan in the context of ownership and location of schools. School size distribution is detailed with respect to location and ownership factors across all directorates. In the third part one directorate (Balqa) is selected and analyzed as a case study with intent to demonstrate how data could be analyzed and interpreted to guide school construction policy decisions in Jordan. The last part of the study offers a new school construction policy perspective and suggests practical guidelines for formulating new school construction policy and recommends a shift in the current school construction policy.

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Background

Jordan like many other countries has launched upon an Educational Reform Program (ERP) to improve the quality of school education with intent to enhance the achievement levels of school graduates.

Providing building facilities to accommodate 434,000 students (157,000 presently studying in the rented buildings; 37,000 under double shift arrangement; and 240,000 due to projected 4% population growth) and such specialized facilities as library, laboratory, prevocational workshop, and multipurpose rooms to existing basic and secondary schools are vital components of the 10 - year - long ERP.

In this context a careful scrutiny of existing schools with respect to their size and class structure is an essential prerequisite to making policy decisions related to constructing new school buildings as well as to providing essential educational facilities to existing basic and secondary schools.

Importance of School Size Related Economies for Developing Countries

Under the constraint of stringent budgets and scarce resources, developing countries can hardly afford to provide even the bare necessities to all schools. Strictly limited budget has to be allocated in a way that can make the most mileage in the way of cost-effectiveness and utilization of the available facilities.

Therefore, in countries like Jordan policy makers have little option but to take heed of the recommendation derived form theory and research on economies of school size. Both theory and empirical research consistently suggest certain advantages that invariably accrue, under normal circumstances, due to the size of an establishment, the school, in this case. Some of those advantages waiting to be availed of by increasing the school enrollments to certain levels are enumerated below:

1. Building plant facilities are utilized more frequently in larger than in smaller schools.

2. Specialized school facilities such as libraries, laboratories, sports equipment, instructional aids etc. are better afforded and more frequently utilized by large schools than by small schools.

3. Administration and specialized staff are more frequently utilized in large schools than small schools.

4. Provision of specialized individual student services such as guidance and counseling is more feasible and economical in larger than in smaller schools.

5. Small schools cannot afford providing a variety of course offerings or enrichment program to their students.

6. Also, a small school cannot provide variety of extra curricular activities for the students while a large school can do it easily.

7. Larger schools can maintain optimal student teacher ratio and thus decrease costs per pupil substantially at minimal or no decrease in student achievement.

8. In smaller schools there is less specialization by teachers in their teaching assignments, which decreases teacher effectiveness; also specialized classes enrol fewer students and consequently become more costly.

9. Because larger schools can command better resources and more effective utilization of available facilities it implies that children in larger schools learn more than children in small schools, other things being equal.

10. Indeed, the optimal size model implies that the total cost of any level of effective schooling input is minimized by operating the school in a region of increasing returns to school inputs. Thus the degree of exploitation of the scale economies is higher in larger schools than in smaller ones. Very small schools are definitely an economic disaster and educational waste.

Overview of School Size and Fragmentation

The analyses of the 1990 school data of Ministry of Education (MOE) reveal a sad reality that Jordanian school system suffers from a compounded problem of small size and fragmentation of schools.

Small size and fragmentation problems, in Jordan, are embedded in the location of schools (urban/rural) and ownership of the school buildings (owned by the Ministry of Education, part owned + part rented, rented).

Location and ownership factors, both, individually, as well as interacting with each other influence certain policy decisions and administrative actions. Some of these actions in the past, have resulted and some still result in creating dwarf size fragmented schools. In most such schools linear or horizontal growth of number of classes was thwarted by the limited accommodation capacity of the small school buildings. In most cases, as the student enrollments outgrew the buildings holding capacity, the authorities found it rather more convenient to meet the increasing demand for student places by creating new schools in rented buildings than by expanding the existing school buildings. This manner of coping with the increasing demand for more student places not only stumped the growth of schools in terms of number of students but also deprived them from having full range of grades. As a result one can find schools with almost every theoretically possible grade range (e.g., 29 schools have only grades 4 to 6; 11 schools have grades 5-7; 53 schools have grades 5-9; and so on and so forth).

These, however, are not the only reasons for the occurrence of the phenomena under consideration. School size in sparsely populated rural areas is not limited due to lack of classrooms in school buildings. On the contrary, in some remote rural areas, one can easily find schools having half-filled or unused classrooms. This is caused by lack of school-age children which, of course, is a function of population size in the catchment area.

Yet another factor contributing to the prevalence of dwarf schools phenomenon in Jordan is statutory provision which entitles every village community, however small, to have a school if it has as few as 10 school-age children. The same statute also obliges the Ministry of Education to provide a school on demand from the community. The practical implementation of this statute has resulted in existence of schools that have only six pupils. In fact, according to 1990 database, two schools have enrollments of 6 students, four schools have only 7 students each, and another four schools have

enrollments of 8 students, and thus the narrative goes on. As a matter of fact, 79 (just over 3%) of the MOE's academic schools have enrollments ranging from the maximum of 20 down to 6 students.

Size

Looking from the school size viewpoint alone one cannot help reaching the unavoidable conclusion that Jordanian school system is afflicted with a chronic malady of too many too small schools.

Just to offer a synoptic view, 10% of the MOE schools (260 schools) have less than 41 students. One third (33.3%) i.e., 844 of all the MOE's basic and secondary academic schools have no more than 129 students. The median enrollment value of 221 clearly shows that at least 1,267, that is, 50% of the MOE's basic and secondary academic schools have enrollments less than 221 students each.

Both theory and common sense buffered by empirical evidence strongly dictate that schools to be economically cost-effective and educationally efficient must operate within the range of 300 to 400 students, at least, the more the better.

Judging from the prospects of either educational quality or cost-effectiveness. 69%, i.e., 1,751 of all the 2536 MOE - administered basic and secondary academic schools in Jordan have enrollments anything less than 350 students. Even if we assume 300 size as benchmark for marginal cost-effectiveness or minimal education quality, approximately 63% of the MOE - controlled basic and secondary academic schools, numbering 1,597 fall below the line of acceptable levels of quality or cost-effectiveness.

Indeed, on the basis of these facts it would only be fair to conclude that at least 70% (1774) of the MOE schools with enrollments of less than 360 students need to be enlarged by increasing student enrollments to varying degrees to bring them up to the survival levels of cost-effectivness and functional efficiency. This, however, by no means implies that the remaining 30%, that is, 762 schools have no room for enlargement. Actually 483 of the remaining 762 schools which have enrollments ranging from 360 to 600 can substantially benefit in terms of increased efficiency and decreased costs per student by further increasing their size to varying degrees

depending upon existing conditions and other situational factors operating in each school.

Fragmentation

Fragmentation refers to the composition of schools in terms of classes or grades the school covers from the lowest through the highest class. Ideally, under the basic (Grades 1 - 10) and secondary (Grades 11 - 12) cycle system of education in Jordan one would expect schools to fall in recognizable patterns of basic or secondary cycle.

Basic schools by definition should have classes from Grade 1 through Grade 10. Secondary schools, though, may have classes either only grades 11 and 12 or full range of grades 1 through 12. The reality, however, as depicted by Table A is quite different. To put it mildly, it is rather astounding.

As Table A shows there are schools in almost every theoretically possible category that can be defined within the inclusive range from grades 1 through 12.

To start with, the first row of the Table A has all the 1654 (65.2%) of the MOE's schools that start with the first grade. But only 81 of them which is 4.9% of all schools starting from grade 1 and only 3.2% of all the 2536 basic and secondary academic schools of the MOE, finish with grade 12. Twenty-three of them end up at grade 11; 134 at grade 10; 325 at grade 9; and so on. The surprizing fact is that 27 schools have only grades 1 and 2; 133 (5.2% of all MOE schools) have only three grades 1-3; whereas, 268 schools (10.6% of all MOE schools) have grades 1-4.

The second row of the Table A shows 66 schools (2.6% of all MOE schools) that start from grade 2 instead of grade 1 and end up any where from grade 4 to grade 12. One may find it hard to understand what made these schools to start from grade 2 and where do the grade 1 children of those areas go for schooling? In a similar manner, 136 schools (5.4%) start from grade 3, while 180 schools (7.4%) start from grade 4.

Each row of Table A tells the same uncomprehensible tale. There are schools starting from all grades 1 through 12 and schools ending up at all grades 2 through 12. There are even single grade schools. There are 2 schools that have only grade 10 and another one has only grade 12. In the same view 51 schools (2% of all MOE schools) have only two grades. The question keeps on nagging why?

On the positive side, there are 81 (3.2 %) full-fledged (grades 1-12) secondary schools and 134 (5.3%) full-fledged (grades 1-10) basic schools, whereas, there are only 5 (.2%) exclusively secondary (grades 11-12) schools in the country which are controlled by the MOE. These three categories collectively account for only 220, i.e., 8.7% of all MOE schools. The remaining 2316 (91.3%) of the MOE schools are lopsided or fragmented; as if they had been lopped off either from the bottom or from the top.

Moreover, this phenomenon is equally and perhaps even more pervasive in the rural areas of Balqa Directorate where there are no double-shift schools at all.

More particularly, there are hardly any full-fledged schools covering the entire basic and secondary grade range in the rural areas; nearly all the schools are fragmented and the majority of them is very small sized and housed in completely or partly rented buildings.

School-Building Construction Policy Perspective

Caveat

The type of simple analysis of the school size data of Balqa Directorate's urban and rural schools presented in this respect will not substitute the need for on-the -spot multiple perspective examination of schools in each precinct, in conjunction with prevalent trends of other socioeconomic and demographic factors in the area. This, however, would undoubtedly provide the policy-makers some definite policy perspectives and lines of action ensuing from each perspective . In spite of valuable preliminary or secondary level information this type of data can be used to yield, we must hasten to caution that one should not be mislead into thinking that these data, and for that matter any kind of data, would provide definitive fool-proof solutions to policy problems or dictate policy makers cut-and-dried decisions, because policy decisions are, generally, far more complex in nature, and are often influenced more by a multitude of invisible forces than by fallible data and cold statistics that could be marshalled to justify or defend a policy decision.

At the same time, when utilized judiciously with proper caution, these data provide direction and much needed objectivity to the policy making process.

In our case, the main objective of this paper is to lay out a demonstration how simple MOE data could be brought to bear on policy-making for constructing school buildings. To make policy decisions, a tough job that policy makers have to take on themselves, is certainly not the objective of this paper.

Policy Considerations for Urban and Rural Schools

Since schools are constructed for students, an essential prerequisite for school construction policy is to determine the present and future estimates (allowing for predictable fluctuations) of students for whom school accommodation will be required. In this regards, the data in Table 16 can be interpreted as follows:

1. Assuming that all the MOE-owned buildings are utilized to their full capacity, it follows that the MOE has to provide purpose-built school buildings for all the students who are at present housed in either the rented buildings (both shifts) or the second shift of the owned buildings.

2. For example, in Balqa Directorate's urban area there are 4,721 students studying in the MOE-rented school buildings, and 1,589 students in three of the MOE- owned school buildings under double shift system. Thus, altogether, proper school accommodation needs to be provided for 6,310 students in Balqa Directorates' urban area alone. Besides, additional facilities need to be provided for the 7,854 students studying in MOE-owned school buildings with inadequate educational facilities.

3. This, however, does not include provision for the normal annual increment of student enrollments due to 4% (crude approximation) per annum population growth of the country, an important factor that could not be ignored if realistic projections of demand for school accommodation are to be made.

4. Long term school planning, however, should take into consideration both short term and long term expected demographic changes due to urbanization and a host of other foreseeable factors.

Now, even without obtaining on-the-spot information regarding availability of space and other relevant facts required for adding new construction to existing school buildings, and information about regional and local development planning and foreseeable demographic trends, one can reasonably derive the following tentative guidelines for school construction policy for urban areas which have characteristics similar to those found in urban region of the Balqa Directorate.

1. Expansion of Existing School Buildings

Whenever existing school buildings allow horizontal and/or vertical extension, priority should be given to expanding the capacity of the existing buildings as much as possible rather than constructing new buildings on new sites because it would not only be initially economical, but more importantly it would increase the educational efficiency, enhance the potential of school effectiveness, and simultaneously lower the cost as well as boost the quality of education in general, both in the short run and in the long run. These benefits are expected to occur on account of the following:

(i) To start with, in most cases it would save the costs of new sites and their development.

(ii) As a result, a substantial decrease in the number of schools would significantly cut down the administration, maintenance and various other overhead costs.

(iii) Larger schools because of their increased overall capacity on the whole can enpool educational resources and facilities superior in terms of both quality and quantity which are vital elements for enhancing student achievement levels.

(vi) Larger schools lead to maximal utilization of available school facilities and resources.

(v) Feasibility and chances for flexible and creative redeployment of the teaching staff, necessary to increase educational efficiency and

student achievement levels, are better in larger schools than in smaller ones.

(vi) Introducing innovative educational technologies is easier and better cost-effective in larger than in smaller schools.

(vii) Larger schools provide for increasing student/teacher ratios to optimal levels (student-teacher ratios in some small schools are woefully low). Increased student-teacher ratios lead to optimal utilization of teaching force, which in turn produces reduction in overall cost of education as well as cost per student without actually jeopardizing the quality of education.

(viii) Larger schools are more cost effective as costs per student are lower in larger schools due to scale economies. Also maintenance and operation costs per student are lower in larger schools.

2. School Sites

When it is not possible to solve the problem by extending existing school buildings then new building sites should be chosen with great care in such locations as would be easily accessible to students from a number of rented and/or double shift schools; this strategy entails designing a few conveniently placed medium or large size schools rather than a large number of small schools.

In respect of choosing school locations, the MOE has already set the following criteria:

a. Priotiry to replacing crowded rented facilities.
b. Basic schools within two or three kilometers walking distance from the catchment area.
c. Secondary schools within 5 km. walking distance from the catchment area.

3. Maximal Grade Range

Regarding the range of grades from lowest to highest, schools should have full range of grades (1 - 12); or Basic Cycle range (1-10) and Secondary Cycle range (11 - 12); or (1 - 6), because coeducation is acceptable within that range, and (7-12) range; or some other combination considered logistically important and pedagogically sound. This, however, is a different but related issue, important in planning the design and requirements of school buildings, which needs thorough investigation in its own proper context before suggesting guidelines for using this variable in policy making.

4. Consolidation of Small Schools into Larger Central School Units

For rural areas with thinly scattered population, planning for school size and location can be far more complex than it appears at the surface. Although, by and large, the eight assertions enumerated in subsection I, in principle, apply to all regions but rather conservative social values and local political considerations in some rural areas, especially when each and every village in Jordan has statutory right to have a school, further complicate the matter.

This usually happens because of lack of clear understanding, misplaced sense of personal prestige, and clash of vested interests. For instance, while consolidation of small schools is necessary to create at least medium size schools in the interest of economic and educational efficiency, it is easy to see that no village would be readily willing to sacrifice the modicum of school it has and commute their children to another village.

Nevertheless, in the long run, the gains accrued over time due to improvements in cost-effectiveness,student learning, and overall educational quality produced by economies of scale would far outpay the little inconvenience and cost incurred for transportation of pupils to central schools.

Moreover, in medium size schools the lower instructional costs per student, increased learning of pupils, and enhanced satisfaction of teachers and parents (because both pupils and teachers prefer larger schools) would lessen the resistance of parents and win the support of politicians.

5. Malady of Too Many Too Small Schools

Although it is merely a hypothesis, it seems that sparesly populated rural areas of Jordan are suffering from a strange malady of too many too small schools. The symptoms are too few students, low student-teacher ratios, high costs per student, and yet disappointingly low levels of achievement; perhaps, because small village schools are poorer in learning resources, better quality teachers prefer larger city schools, usually underqualified inexperienced teachers are sent to remote village schools generally against their will where dissatisfied with their assignment and unmotivated to teach they serve their time merely waiting to be transferred to larger city schools with richer resources.

Moreover,the incredibly small size, and unreliable means of communication and transportation compounded with cumbersome remoteness further contribute to lack of facilities, poor administration, and ineffective supervision in many a rural area school.

It may not be applicable to all rural areas, but wherever feasible the concept of medium or large size, better equipped and more efficient central school serving a group of neighboring villages deserves serious consideration.

Conclusions

In conclusion, once more, we should like to emphasize that luxury of providing each village with its own little school in fact may impose heavy penalties on children's education as well as on public exchequer. For developing countries with severe budget constraints, a necessary prerequisite for being able to afford good schools is that they must be of the size that is economically viable as well as pedagogically sound. However, there will be some cases in very remote areas where a small school is the only way out, in such cases construction of small school should be considered, and flexible school planning policy should be adopted to suit the specific conditions of each remote area.

Linkage Between School Size and Construction Policy

Now what is the linkage between school size and school construction policy in Jordan? As stated at the very beginning of this paper the Government of

Jordan under the auspices of Education Reform Program has undertaken to construct and equip approximately 400 new school buildings to provide accommodation for 434,000 students. This includes students presently studying in either rented buildings which are generally unsuitable for schooling or under double shift system which is considered an impediment in the way of school effectiveness. In addition, this also includes the provision for increased demand for school places due to the natural growth in population. The analysis of school size and grade structure has clarified the linkage between school size, fragmentation, renting and double shift phenomenon.

Renting and double shift system clearly arose because of increased demand for student places in the face of shortage of accommodation capacity in the existing schools in particular localities. Both of these measures contributed to the problems of small size and fragmentation. The current policy of constructing new schools to provide places for students presently housed in rented or double shift buildings has left the size and fragmentation problems untouched.

Recommendation for Policy Shift

The current school construction policy does not address any one of these issues at all. Evidently, even when the students from rented and double shift schools are housed in new school buildings, the size and fragmentation problems as they presently stand in the MOE-owned schools will essentially stay the same.

A slight shift in the new school construction policy, however, can address all these issues simultaneously and more comprehensively. The policy shift can be epitomised in a simple statement.

Wherever the situation allows priority should be given to enlarging the existing school buildings instead of constructing whole new school buildings.

As explained earlier in cases of most rented schools, buildings were rented to accommodate increased enrollments where existing school buildings did not have enough capacity and ran out of classroom space. This type of action usually resulted in fragmenting the school into two, both having different grades, both staggered and small. Had it been possible to expand the existing school buildings to accommodate the additional grades, the schools would have developed in size and their grade structure would have become more comprehensive.

Now the reform program has provided an opportunity to rectify the past actions by adding required number of rooms to the existing school buildings and thus integrating the fragmented schools into wholesome units. Of course, this does not mean to add room to any schools, haphzardly. The existing schools, candidates for expansion, have to be in the right places within easy access to students studying in rented or double shift schools and they have to have room for extension and finally they have to fullfil any other conditions required for expansion.

The suggestion does not, however, imply that no new school should be constructed at all, there will always be some situations which have no other solution but to construct a new school.

Finally, it must be clear that no single policy measure by itself is going to solve the school size and fragmentation problems or educational quality and efficiency problems of all the schools in the country. But, all the same, the suggested policy measure would be an important step in the right direction.

ANALYSIS OF SCHOOL SIZE AND GRADE STRUCTURE IN THE PUBLIC SCHOOLS OF JORDAN: POLICY IMPLICATIONS

INTRODUCTION

Background

Jordan like many other countries has launched upon a Reform Program to improve the quality of its basic and secondary education system with intent to enhance the achievement levels of school graduates.

Providing building facilities to accommodate 434,000 students (157,000 presently studying in the rented buildings; 37,000 under double shift arrangement; and 240,000 due to projected 4% population growth) and such specialized facilities as library, laboratory, multipurpose prevocational workshop, and AV/TV rooms to existing basic and secondary schools are vital components of the 10 - year - long Education Reform Program.

Since it has been agreed upon that Education VII design standards will be applied to all new school buildings, the average school will accommodate 1,000 students and each indiviual classroom will have 40 students places.

Assuming 1,000 as the average school size, to accommodate 434,000 students would require about 434 new schools to be constructed over the period of ten years.

Phase I of the three implementation phases of the ERP aims to construct 90 purpose-built schools accommodating 88,670 students: 52,300 (59%) replacements form rented classrooms and 36,370 (41%) about one fourth of the estimated annual growth in enrollments.

Need

In this context a careful scrutiny of existing schools with respect to their size and class structure is an essential prerequisite to making policy decisions related to constructing new school buildings as well as to providing essential educational facilities to existing basic and secondary schools.

Moreover, in the non-oil-rich developing countries like Jordan the present time educational reform being implemented under stringent budgetary constrains obliges the policy makers to allocate the limited resources in the most cost-effective way to maximize the educational output, that is, to increase the quality of education and enhance student achievement levels at the lowest costs or with the deployment of least amount of resources. As Levin (1988) puts it, "the time has probably never been more propitious for incorporating cost-effectiveness analysis into educational policy".

THEORY AND RESEARCH

School Size and Unit Cost

There exists ample theoretical support coming from the scale economies theory as well as convincing empirical evidence to demonstrate that small schools and small school districts are more expensive to operate, on the basis of cost per pupil, than the larger ones, other things being the same. School size economy research shows a U-shaped curvilinear relationship between school size and per unit (student) school operating costs. (Densau, 1975; Fox, 1980; Kenny, 1982; McGuffey and Brown, 1978; McLure, 1951; Morris, 1964; NCPEA, 1952; Walberg and Fowler, 1987).

For example Kenny (1982) using two "rich" data sets developed a model for optimal school size. The model predicts that "schools will minimize total costs by operating in a region of increasing returns to school inputs". Kenny (1982) demonstrated that effective schooling inputs were 17 to 37 percent more expensive in a high school of 300 students than in a high school of 1,448 students holding teacher quality, teacher salary and student-teacher ratio constant. Evidence presented by Kenny (1982) and several other studies investigating economies of scale in schooling implies that children in large high schools learn more than children in small high schools, other things being equal. In reality, this implication may be much stronger since other things, resources and facilities, that really matter, are normally found in larger proportions in large schools than in small schools. Optimum high school size according to Cohn (1975) based on cost factors is 1,653 students.

School Size and Plant Utilization

Also, research findings show significant and substantial positive correlations between school size and plant utilization and high negative correlations between plant utilization rate and maintenance and operation costs in both elementary and secondary school samples. Whereas, the correlations in both samples between school size and plant

utilization are generally positive and substantial (McGuffy and Brown, 1978). Furthermore, there appears to be a positive association between school size and the presence of such secondary resources as physical facilities, specialized school facilities (library, labs, AV/TV rooms, gymnasiums), variety of course offerings, teacher credentials, and provision of individual student services (guidance and counseling etc.) (McGuire, 1989; Slater, 1989).

Thus, from the policy perspective there is every reason why policy makers should be interested in school size economies.

School Size and Comprehensiveness

One can argue that size is a global concept which in and of itself is not a determinant of quality. But, in the culture of comprehensiveness created, fostered and legitimized by James Conant (1959, 1967) and the Crowther Report (1956) both size and quality were assumed to be common effects of comprehensiveness but somehow size became confounded with both quality and comprehensiveness.

School Size and Quality Education

Because both Conant (1959) and Crowther (1956) asserted that only the high schools that have 100 or more students in their graduating classes could afford to offer the kind of comprehensive program required for quality education in contemporary society , under Conant's influence large size became sine qua non for quality.

According to Conant's notion of quality education in a comprehensive high school, the range of educational opportunities deemed important can be provided most effectively and efficiently in a 3-or 4-year high school that enrolls at least 700 students (Conant. 1967).

Size, Structure and Culture

Along yet another dimension, as Slater (1989) posits, "Education culture, structure. and scale, then, exist as a triad". School size, class size, and district size like size of any group or organization, Slater (1989) argues, do not operate in isolation from structure and culture. Therefore, size, structure and culture are correlated.

Collectively bringing all the above arguments to bear upon the issue of school size only confirms our conviction in the importance of school size. The point is that economies of size, at least up to a certain turning point, do exist. And there also exist

schools that are too small to justify their existence at least from the cost-effectiveness perspective. More important, unique characteristics of each locale must be given appropriate weight in determining not only cost but also social and political implications of a given policy decision.

Importance of School Size Related Economies for Developing Countries

In the face of nation-wide education reform envisioned to improve quality, reviewing a relatively large amount of school size research, makes one concur with the conclusion of McGuire (1989) that "Size is probably a necessary but not sufficient condition for truly expanding educational opportunity".

In developing countries where resources are scarce and economies are crumbling it is absolutely necessary to make use of the economies of size by deploying the resources in reconstructing schools that promise the potential of maximal cost-effectiveness and educational efficiency. Even in the case of affluent countries (developing or developed) educational efficiency demands that a public school must have a certain minimum number of students below which it would not only be economically wasteful to operate but more important, it would also be pedagogically baneful to education quality and wholesome development of students (the very purpose for which schools are created). In other words, schools to be able to provide quality education ought to have necessary building plant, good quality staff, administration, essential facilities and equipment. To justify their cost, there must be a certain minimal number of students below which it would be simply impractical to run the schools.

Moreover, for a country like Jordan, committed to raise the quality of public school education, it is absolutely necessary to incorporate school size factor into its school construction policy, especially when the education system is acutely suffering from carrying the unbearable burden of maintaining a large proportion of public schools that are too small to justify their existence on any grounds, economic or pedagogical.

ize Controversy

It is not that we are not aware of the heat generated by school size controversy in e USA and a host of research generated by myriad vested interests on a variety of mensions of the school size issue. Nor are we unaware of the research studies that ve attempted to discredit the "bigger is better" hypothesis and create a new cult of mall is beautiful".

Size may be a concrete concept but the value judgement about better or worse cannot be given in vacuum devoid of its cultural/ educational/ philosophical/ social/ geographic/ economic/ political dimensions. The nagging question arises, "butter for what purpose"? In the U.S.A., district size, school size, and class size issues are intertwined and size debate stirred up when several state legislatures passed bills for consolidation of schools and districts into larger size units to make them more cost-effective to operate and more efficient (educationally) to meet the nation's call for educational reform. Since these policies of school and district consolidation threatened the very existence of a large number of small community schools and education districts, particularly in rural areas, the consolidation issue engendered strong emotions. Because of high stakes, some research seems to have become partizan in which objectivity has become clouded with steam of vested interests.

Some studies have reported negative relationships between school size and participation in extracurricular activities (Barker and Gump, 1964; Barker, 1978), and school size and measures of student satisfaction, attitude, and attendance (Lindsay, 1982). Smithson (1977), however, is highly critical of Barker and Gump's (1964) widely quoted study (popularly known as the Kansas study). Smithson has pointed out serious flaws in the design and analyses of Kansas study and challenged the validity of its results and their interpretations.

More recently, Pittman and Haughwout (1987) reported direct positive influence of high school size on the diversity of academic course offerings and direct negative influence on school social climate but indirect negative influence on high school dropout rate.

Largeness: A Relative Concept

Nevertheless, one should bear in mind what is designated as small size in some USA studies would pass for a giant size in Jordan. For example, Lindsay (1982) defines schools with 100 or less students in the senior class as small, 101 - 400 in the senior class as medium and more than 400 students in the senior class as large.

Assuming a high school having full range of grades 1 - 12, it should have at least 6,000 students; 100 students in grade 12 presupposes larger numbers in the preceding grades. Lindsay (1982) was, perhaps, sampling three-year and four-year high schools; even then following the preceding logic a four-year high school with 500 students enrollment according to Lindsay's scheme would be classified as a small school.

Thus, the absence of consensus of opinion about 'how large is large?' and, 'how small is small?' has further confounded the pervasive controversy about the size issue. The situation demands that the findings of size-research studies should be understood and interpreted in their proper contexts. For instance, the largest school in Jordan according to size-classification of schools in some studies, would be classified at most as medium size, while in some other studies it would fall only in small-size category.

School Size in Jordanian Context

This should suffice to make it transparent that school size politics such as currently debated in the USA, or in Australia or Canada for that matter, does not legitimately apply to Jordanian conditions. Notwithstanding, the findings of Canadian researchers Coleman and Laroque (1986) showing that the problems of small districts are confounded with and attributable to small schools because very small schools cost more on account of the very fact that no matter how small the schools, they require a principal, a building and certain other fixed costs, are more analogous to Jordanian realities. There is no denying the harsh realities of the real world that very small schools seldom have the resources and facilities such as equipment, teaching aids, libraries, laboratories, workshops, consultants, ancillary staff, curriculum variety, supplies, and specialized teaching staff to do as good a job as the larger schools (which naturally command better resources and consequently have the ability to provide better quality education) can do.

Moreover, under the constraint of stringent budgets and scarce resources, developing countries can hardly afford to provide even the bare necessities to all schools. Strictly limited budget has to be allocated in a way that can make the most mileage in the way of cost-effectiveness and utilization of the available facilities.

Therefore, in countries like Jordan policy makers have little option but to take heed of the recommendations derived form theory and research on economies of school size. Both theory of economics and school-size-economies related empirical research consistently suggest certain advantages that invariably accrue, under normal circumstances, due to the size of an establishment, the school, in this case. Some of those advantages waiting to be availed of by increasing the school enrollments to certain levels are enumerated below:

1. Building plant facilities are utilized more frequently in larger than in smaller schools.
2. Specialized school facilities such as libraries, laboratories, sports equipment, instructional aids etc. are better afforded and more frequently utilized by large schools than by small schools.

3. Administration and specialized staff are more frequently utilized in large schools than in small schools.
4. Provision of specialized individual student services such as guidance and counseling is more feasible and economical in larger than in smaller schools.
5. Small schools cannot afford to provide a variety of course offerings or enrichment programs to their students, but large schools can.
6. Also, a small school cannot provide variety of extra curricular activities for the students while a large school can do it easily.
7. Larger schools can maintain optimal student-teacher ratio and thus decrease costs per pupil substantially at minimal or no decrease in student achievement.
8. In smaller schools there is less specialization by teachers in their teaching assignments, which decreases teacher effectiveness; also specialized classes enrol fewer students and consequently become more costly.
9. Because larger schools can command better resources and more effective utilization of available facilities it implies that children in larger schools learn more than children in small schools, other things being equal.
10. Indeed, the optimal size model implies that the total cost of any level of effective schooling input is minimized by operating the school in a region of increasing returns to school inputs. Thus the degree of exploitation of the scale economies is higher in larger schools than in smaller ones.
11. Very small schools are definitely an economic disaster and educational waste.

For countries with stringent budgets and recessing economies engaged in education reforms aiming at expanding curricula and methods to enhance student higher order cognitive skills and innovative applications of learned knowledge and skill to novel situations, it seems, it is paramount to take advantage of the economies of scale, wherever feasible, for cutting down wastage and increasing educational efficiency and cost effectiveness while allocating scarce resources to various fields, particularly to school construction.

OVERVIEW

The analyses of the 1990 school data of the Ministry of Education (MOE) reveal a sad reality that Jordanian school system suffers from a compounded problem of small size and fragmentation of schools.

The sections that follow, first give an expose´ of the general nature of the school size and fragmentation problems and then present more detailed analyses of the school size data in relation with the location and ownership factors. After presenting a general picture of school size distribution in the whole country and across and within

directorates, one of the 22 eligible directorates is examined in more detail to get a microscopic view of the general situation. Finally, implications for new school construction policy are derived and amendments in the current school construction policy are suggested.

Small size and fragmentation problems, in Jordan, are embedded in the location of schools (urban/rural) and ownership of the school buildings (owned by the Ministry of Education, part owned + part rented, rented).

Genesis of the Problem

Location and ownership factors, both, individually, as well as, interacting with each other influence certain policy decisions and administrative actions. Some of these actions in the past, have resulted and some still result in creating dwarf-size fragmented schools. In most such schools linear or horizontal growth of number of classes was thwarted by the limited accommodation capacity of the small school buildings. Also in most cases, as the student enrollments outgrew the buildings' holding capacity, the authorities found it rather more convenient to meet the increasing demand for student places by creating new schools in rented buildings than by constructing annexes and adding new rooms to existing school buildings. This manner of coping with the increasing demand for more student places not only stumped the growth of schools in terms of number of students but also deprived them from having full range of grades. As a result one can find schools with almost every theoretically possible grade range (e.g., 29 schools have only grades 4 to 6; 11 schools have grades 5-7; 53 schools have grades 5-9; and so on and so forth).

These, however, are not the only reasons for the occurrence of the phenomena under consideration. School size in sparsely populated rural areas is not limited due to lack of classrooms in school buildings. On the contrary, in some remote rural areas, one can easily find schools having half-filled or unused classrooms. This is caused by lack of school-age children which, of course, is a function of population size in the catchment areas.

Yet another factor contributing to the prevalence of dwarf-school phenomenon in Jordan is a statutory provision which entitles every village community, however small, to have a school if it has as few as 10 school-age children. The same statute also obliges the Ministry of Education to provide a school on demand from the community. The practical implementation of this statute has resulted in existence of schools that have only six pupils. In fact, according to 1990 database, two schools have enrollments of 6 students, four schools have only 7 students each, and another four schools have enrollments of 8

students, and thus the narrative goes on. As a matter of fact, 79 (just over 3%) of the MOE's non-KG academic schools have enrollments ranging from the maximum of 20 down to 6 students.

Size

Looking from the school size viewpoint alone one cannot help reaching the unavoidable conclusion that Jordanian school system is afflicted with a chronic malady of too many too small schools.

Just to offer a synoptic view, 10% of the MOE schools have less than 41 students, and the number of such schools is no less than 260. One third (33.3%) i.e., 844 of all the MOE's basic and secondary academic schools have no more than 129 students. The median enrollment value of 221 clearly shows that at least 1,267, that is, 50% of the MOE's basic or secondary academic schools have enrollments less than 221 students each.

Both theory and common sense buffered by empirical evidence strongly dictate that schools to be economically cost-effective and educationally efficient must operate within the range of 300 to 400 students, at least, the more the better.

Judging from the prospects of either educational quality or cost-effectivess 69%, i.e., 1,751 of all the 2536 MOE-administered basic and secondary academic schools in Jordan have enrollments anything less than 350 students. Even if we assume 300 size as benchmark for marginal cost-effectiveness or minimal education quality, approximately 63% of the MOE - controlled basic and secondary academic schools, numbering 1,597 fall below the line of acceptable levels of quality or cost-effectiveness.

Indeed, on the basis of these facts it would only be fair to conclude that at least 70% (1774) of the MOE schools with enrollments of less than 360 students need to be enlarged by increasing student enrollments to varying degrees to bring them up to the survival levels of cost-effectivness and functional efficiency. This, however, by no means implies that the remaining 30%, that is, 762 schools have no room for enlargement. Actually 483 of the remaining 762 schools which have enrollments ranging from 360 to 600 can substantially benefit in terms of increased efficiency and decreased costs per student by further increasing their size to varying degrees depending upon existing conditions and other situational factors operating in each school.

Fragmentation

Fragmentation refers to the composition of schools in terms of classes or grades the school covers from the lowest through the highest class. Ideally, under the basic (Grades 1 - 10) and secondary (Grades 11 - 12) cycles system of education in Jordan one would expect schools to fall in recognizable patterns of basic or secondary cycles.

Basic schools by definition should have classes from Grade 1 through Grade 10. Secondary schools, though, may have classes either only grades 11 and 12 or full range of grades 1 through 12. The reality, however, as depicted by Table A is quite different. To put it mildly, it is rather astounding.

Table A

Distribution of The MOE's Basic and Secondary Academic Schools According to Grade-Range Defined by the Lowest and the Highest Class in Each School.

Lowest Class		Highest Class											
		2	3	4	5	6	7	8	9	10	11	12	Row Total
1	Count	27	133	268	97	432	54	80	325	134	23	81	1654
	Row Pct	1.6	8	16.2	5.9	26.1	3.3	4.8	19.6	8.1	1.4	4.9	65.2
	Col Pct	100.0	100.0	97.1	86.6	85.9	61.4	67.2	59.6	56.3	46.9	18.2	
	Tot Pct	1.1	5.2	10.6	3.8	17.0	2.1	3.2	12.8	5.3	0.9	3.2	
2	Count			6	4	11	4	2	17	13	3	6	66
	Row Pct			901	6.1	16.7	6.1	3.0	25.8	19.7	4.5	9.1	2.6
	Col Pct			2.2	3.6	2.2	4.5	1.7	3.1	5.5	6.1	1.3	
	Tot Pct			0.2	0.2	0.4	0.2	0.1	0.7	0.5	0.1	0.2	
3	Count			2	10	23	7	4	46	24	4	16	136
	Row Pct			1.5	7.4	16.9	5.1	2.9	33.8	17.6	2.9	11.8	5.4
	Col Pct			0.7	8.9	4.6	8.0	3.4	8.4	10.1	8.2	3.6	
	Tot Pct			0.1	0.4	0.9	0.3	0.2	1.8	0.9	0.2	0.6	
4	Count				1	29	12	15	41	30	5	47	180
	Row Pct				0.6	16.1	6.7	8.3	22.8	16.7	2.8	26.1	7.1
	Col Pct				0.9	5.8	13.6	12.6	7.5	12.6	10.2	10.5	
	Tot Pct				0.0	1.1	0.5	0.6	1.6	1.2	0.2	1.9	
5	Count					8	11	13	53	22	8	73	188
	Row Pct					4.3	5.9	6.9	28.2	11.7	4.3	38	7.4
	Col Pct					1.6	12.5	10.9	9.7	9.2	16.3	16.4	
	Tot Pct					0.3	0.4	0.5	2.1	0.9	0.3	2.9	
6	Count								21	1		24	49
	Row Pct								42.9	2.0		49.0	1.9
	Col Pct								3.9	0.4		5.4	
	Tot Pct								0.8	0.0		0.9	
7	Count								38	10	4	70	124
	Row Pct								30.6	8.1	3.2	56.5	4.9
	Col Pct								7.0	4.2	8.2	15.7	
	Tot Pct								1.5	0.4	0.2	2.8	
8	Count								4	2		21	27
	Row Pct								14.8	7.4		77.8	1.1
	Col Pct								0.7	0.8		4.7	
	Tot Pct								0.2	0.1		0.8	
9	Count											32	32
	Row Pct											100.0	1.3
	Col Pct											7.2	
	Tot Pct											1.3	
10	Count									2	2	70	74
	Row Pct									2.7	2.7	94.6	2.9
	Col Pct									0.8	4.1	15.7	
	Tot Pct									0.1	0.1	2.8	
11	Count											5	5
	Row Pct											100.0	0.2
	Col Pct											1.1	
	Tot Pct											0.2	
12	Count											1	1
	Row Pct											100.0	0.0
	Col Pct											0.2	
	Tot Pct											0.0	
Column Total		27	133	276	112	503	88	119	545	238	49	446	2536
		1.1	5.2	10.9	4.4	19.8	3.5	4.7	21.5	9.4	1.9	17.6	100.0

As Table A shows there are schools in almost every theoretically possible cateogry that can be defined within the inclusive range from grades 1 through 12.

As Table A shows there are schools in almost every theoretically possible category that can be defined within the inclusive range from grades 1 through 12.

To start with, the first row of the Table A has all the 1654 (65.2%) of the MOE's schools that start with the first grade. But only 81 of them, which is 4.9% of all schools starting from grade 1 and only 3.2% of all the 2536 basic and secondary academic schools of the MOE, finish with grade 12. Twenty-three of them end up at grade 11; 134 at grade 10; 325 at grade 9; and so on. The surprizing fact is that 27 schools have only grades 1 and 2; 133 (5.2% of all MOE schools) have only three grades 1-3; whereas, 268 schools (10.6% of all MOE schools) have grades 1-4.

The second row of the Table A shows 66 schools (2.6% of all MOE schools) that start from grade 2 instead of grade 1 and end up any where from grade 4 to grade 12. One may find it hard to understand what on earth made these schools to start from grade 2 and where do the grade 1 children of those areas go for schooling?

Each row of Table A tells the same uncomprehensible tale. There are schools starting from all grades, 1 through 12, and schools ending up at all grades 2, through 12. There are even single grade schools. There are 2 schools that have only grade 10 and another one has only grade 12. In the same vein 51 schools (2% of all MOE schools) have only two grades, any two. The question keeps on nagging, why?

On the positive side, there are 81 (3.2 %) full-fledged (grades 1-12) secondary schools and 134 (5.3%) full-fledged (grades 1-10) basic schools, whereas there are only 5 (.2%) exclusively secondary (grades 11-12) schools in the country which are controlled by the MOE. These three categories collectively account for only 220 i.e., 8.7% of all the MOE schools. The remaining 3216 (91.3%) of the MOE schools are lopsided or fragmented; as if they had been lopped off either from the bottom or from the top.

MOE'S BASIC AND SECONDARY ACADEMIC SCHOOLS

According to 1990 MOE statistics, there are 2536 basic and secondary academic schools under direct control of the MOE. Of these, 1618 (64%) have buildings completely owned by the MOE, 181 (7%) have owned buildings extended by some rented rooms, and 737 (29%) of them are housed in completely rented buildings. Since partly rented schools have MOE-owned buildings augmented by rented rooms which need to be replaced by adding new rooms wherever feasible, and since they constitute only 7% of the total number of school buildings, to simplify the argument we have counted partly rented schools as rented. However, in passing, we note that this partial renting phenomenon has been confined, primarily, to rural schools. Only 10 (6%) out of 181 partly rented schools are located in urban areas, 171 (94%) of them are found in rural areas.

Location By Ownership Distribution

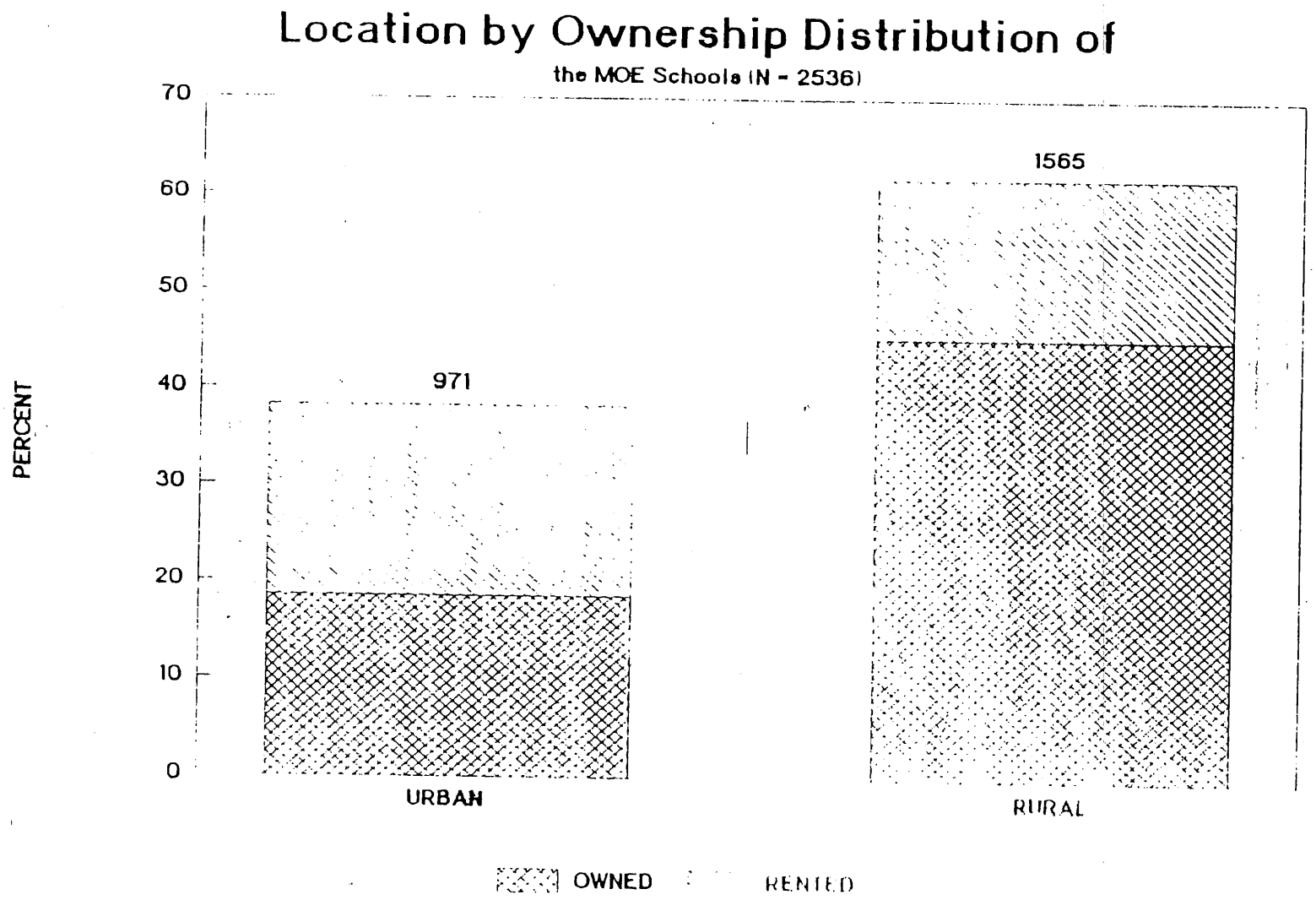
Table 1 shows the Location by Ownership fourfold classification of the 2536 MOE schools. According to ownership, 1618 (64%) of the 2536 MOE controlled schools are housed in the MOE owned buildings while 918 (36%) of them are meeting in the wholly or partly rented buildings. Location-wise, 1565 (62%) of all MOE post-KG academic schools are situated in the rural areas whereas only 971 (38%) of them are in the cities.

Table 1
Location by Ownership Distribution of the MOE's Basic and Secondary Academic Schools

LOCATION		OWNERSHIP		Row Total %
		Owned	Rented	
Urban	Count	470	501	971
	Row %	48.4	51.6	38.3
	Col. %	29	54.6	
	Total %	18.5	19.8	
Rural	Count	1148	417	1565
	Row %	73.4	26.6	61.7
	Col. %	71	45.4	
	Total %	45.3	16.4	
Col. Total		1618	918	2536
Col. %		63.8	36.2	100

From the very outset it should be recognized that, whether decisions are made at the directorate level or at the national level, three crucial factors cannot be ignored.

Figure 1


Location by Ownership Distribution of
the MOE Schools (N = 2536)
PERCENT
70
60
50
40
30
20
10
0
971
1565
URBAN
RURAL
OWNED
RENTED

One is the **Location** factor; whether the school is situated in an urban (city) or a rural (village) region determines some vital school characteristics.

The second is the **Ownership** factor; although embedded in and , to some extent, confounded with location factor, the fact whether the school building is owned or rented by the MOE gives rise to certain distinct school features.

The third, and perhaps the paramount, factor largely determined by both the preceding factors (location and ownership) is **School Size**. Many important characteristics directly related to school quality and cost effectiveness are, to some extent, determined by the size of the school.

Figure 1 presents the graphic display of the Table 1 data about the distribution of MOE's academic, basic, and secondary schools along the location and ownership dimensions at the national level. The following facts conspicuously emerge:

1. With respect to the location factor, 1565 (62%) of all the MOE schools are located in rural areas, i.e., the villages; whereas, only 971 (38%) of them are located in urban areas, i.e., the cities.

2. Along the owned/rented dichotomy, 1618 (64%) school buildings are owned by the MOE. 918 (36%) of them, however, are rented.

3. Within urban schools the proportion of owned to rented is about the same, that is, nearly one half (50%) of the urban area schools are rented and one half owned by the MOE.

4. Within the rural schools, in contrast, roughly three fourths (73.4%) are owned and only one fourth (26.6%) are rented.

5. Of all the 1618 MOE-owned schools, 1148 (71%) belong to rural areas, whereas only 470 (29%) of them are in urban areas.

6. For the 918 rented schools, however, the urban/rural ratio is quite different from that of the owned ones. Nearly one half (54.6%) of the rented schools are in urban areas while the other half (45.4%) of them are in rural areas.

7. Forty-five percent (45%) of all the 2536 MOE schools are owned-rural, eighteen percent (18%) are owned-urban,twenty percent (20%) are rented urban, and sixteen percent (16%) are rented-rural.

SCHOOL SIZE

Determining Factors

Other things remaining the same, the school size (number of students enrolled in a school) will be determined primarily by the availability of students, that is, growth of school-age population in the catchment areas and then by the availability of classroom pace students in the school for students. Considering the impact of these two factors a *prima facie* argument can be made as follows:

(a) Urban schools housed in MOE-owned (purpose-built) buildings, because of larger classrooms in purpose-built school buildings, are expected to be of larger size.

(b) Rented urban schools, however, due to limited room capacity in rented buildings are bound to remain relatively smaller in size.

(c) Rural owned schools, in general, will remain small-sized due to limitations imposed by availability of students particularly in sparsely populated rural areas.

(d) Rural rented schools, though not so common, are exposed to thwarting impact from both constraints; lack of pupils and lack of classroom space. Therefore, such schools are expected to be of very small size.

Policy Implications of School size

The most important implication of school size stems from relationship of school size to such crucial concepts as economy, cost-effectiveness, utilization of resources and educational efficiency.

Applying commonsense criteria alone, one can easily see that it would be uneconomical, if not totally wasteful, to provide a library room, a labroom, a multipurpose workshop and an AV/TV room to the school which does not have even as little as fifty students. On the other hand, the probability that these facilities and other school resources are optimally utilized would increase as the number of students in a school increases up to a certain level. Moreover, it does not need empirical data to show that it would not be possible to provide even the necessary facilities to tiny schools with

6 to 41 pupils (260, i.e., 10% of MOE schools belong to this category) even though politically or socially it had been expedient to create such schools. Nevertheless, on the grounds of cost effectiveness and educational efficiency, it may be equally expedient to take a fresh look on these matters and adopt a policy of consolidation of small schools into reasonably sized units wherever and/or whenever it is feasible. On tentative basis one can easily conceive of several measures which could be incorporated in new school construction policy and adopted and implemented selectively to suit the unique conditions of each school precinct.

Distribution of Schools According to Size

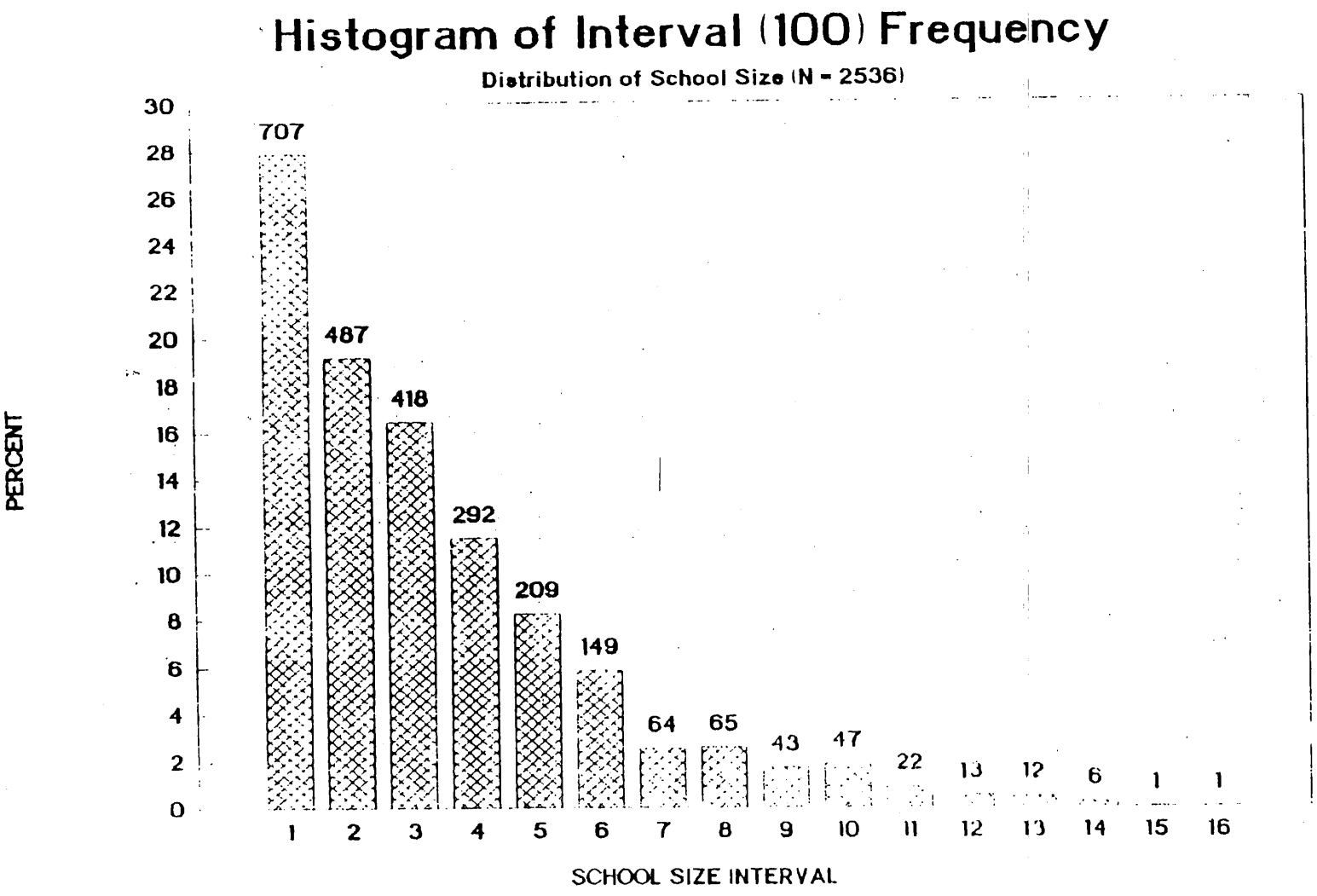
The size of MOE schools as defined by school enrollment ranges from 6 to 1562 students with an average of 290 students per school. To present some benchmarks, at least 20 schools have eleven students or less. Three percent of the MOE schools (75) have total enrollment of less than 20 students in each school. Thirteen percent (331) of all MOE schools have less than 50 students. One fourth (636) of all schools have less than 93 students in every school. The median value 221 shows that one half (50%) of the MOE schools have number of students ranging from 6 to 221.

Table 2 shows the deciles, school size value of each decile , cumulative frequency of schools falling below each decile value and the number of schools within the range of each decile interval.

Table 2
Percentile, Decile Boundary Values, Decile Value, Interval Frequency and Cumulative Frequency at Each Decile

Percentile	Boundary Values	Decile Value	Interval Frequency	Cumulative Frequency
10	(6-41)	41	260	260
20	(42-73)	73	251	511
30	(74-115)	115	251	762
40	(116-165)	165	253	1015
50	(166-221)	221	252	1267
60	(222-284)	284	261	1528
70	(285-359	359	246	1774
80	(360-459)	459	254	2028
90	(460-628)	628	254	2282
100	(629-1562)	1562	254	2536

Figure 2


Histogram of Interval (100) Frequency
Distribution of School Size (N = 2536)
PERCENT
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
707
487
418
292
209
149
64
65
43
47
22
13
12
6
1
1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
SCHOOL SIZE INTERVAL

Frequency Distribution of the MOE Schools in 16 Intervals

Distribution of MOE schools into 16 equi-length 100-interval categories as detailed in Table 3 and Figure 2 highlight the school size phenomenon in the MOE's basic and secondary academic schools. Obviously, the distribution is extremely skewed in the positive direction with 64% of the cases concentrated in the first three categories on the left end in Figure 2 while the rest of them (36%) are thinly spread over the remaining 13 categories. As a matter of fact, the last two (15th and 16th) categories have only one school each, even the 14th category has only 6 schools ranging in student enrollment from 1309 to 1363. Anyway, these six schools together with the last two with their respective enrollments of 1445 and 1562 students account for the 8 largest MOE schools in the country. Judging against the criteria of optimal size required for comprehensiveness and educational efficiency (Conant, 1959; Jackson, 1981; Monk, 1987; Smithson, 1977), and for cost-effectiveness (Kenny, 1982) these largest 8 schools may be considered just crossing the lower threshold of the optimal size range.

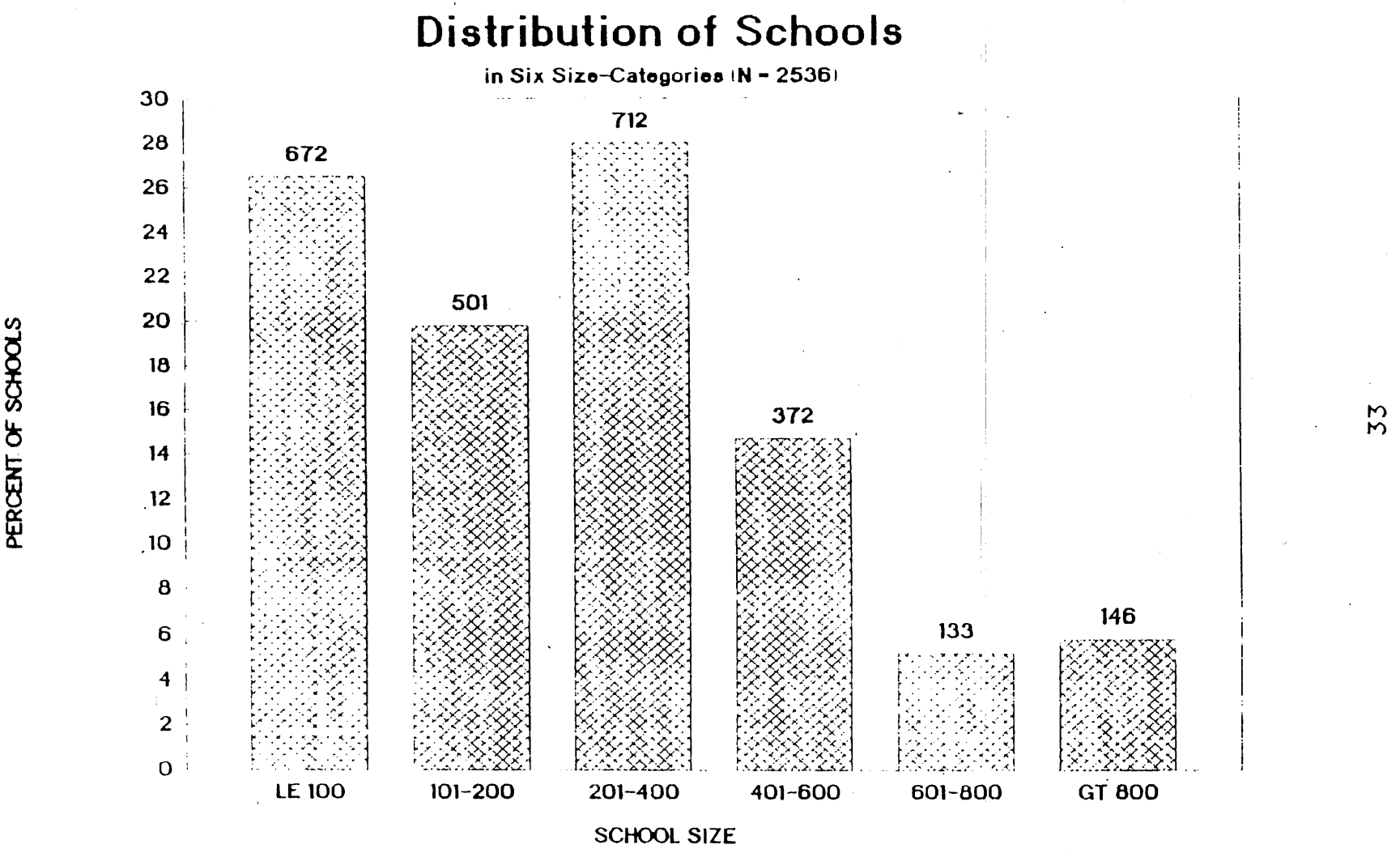
Table 3
Size interval (100) Frequency Distribution of the MOE Academic Schools (N=2536; Interval-Length=100)

Interval	Range	Freq.	Freq.%	Cu. Freq.	Cu. %
1	6-105	707	28	707	28
2	106-205	487	19	1194	47
3	206-305	418	16	1612	64
4	306-405	292	12	1904	75
5	406-505	209	8	2113	83
6	506-605	149	6	2262	89
7	606-705	64	3	2326	92
8	706-805	65	3	2391	94
9	806-905	43	2	2434	96
10	906-1005	47	2	2481	98
11	1006-1105	22	1	2503	99
12	1106-1205	13	1	2516	99
13	1206-1305	12	0	2528	100
14	1306-1405	6	0	2534	100
15	1406-1505	1	0	2535	100
16	1502-1562	1	0	2536	100

However, our major concern here centers around the smaller schools rather than the larger ones, particularly the schools concentrated in the first few categories on the extreme left end of Figure 2 accounting for the largest bulk of the MOE schools in Jordan.

To further simplify the presentation, without loss of information, we collapsed the 16 rather unmanageable categories into six as defined in Table 4 and graphed in Figure 3.

Figure 3


Distribution of Schools
in Six Size-Categories (N = 2536)
PERCENT OF SCHOOLS
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
672
501
712
372
133
146
LE 100
101-200
201-400
401-600
601-800
GT 800
SCHOOL SIZE

Further discussion in the rest of this paper will be mainly based on these six categories referred to as Size 1, Size 2, ..., Size 6.

Table 4
Distribution of MOE Schools Among Six School Size Categories

Category	Size	Freq.	%	Cu. Freq.	Cu. %
1	6-100	672	26.5	672	26.5
2	101-200	501	19.8	1173	46.3
3	201-400	712	28.1	1885	74.3
4	401-600	314	14.7	2257	89
5	601-800	133	5.2	2390	94.2
6	801-1562	146	5.8	2536	100

Table 4 and Figure 3 both clearly display the stark reality that more than a quarter (672; 26.5%) of the MOE's schools have 100 or less students at the most, amongst them by far the largest number has students much less than 100,trailing down to 6, the smallest enrollment figure reported by no less than two schools . Moreover, nearly one fifth (501; 19.8%) of MOE non-KG academic schools have enrollments within the inclusive range of 101 to 200. Exactly half (1267; 50%) of the MOE school enrollments do not exceed the figure 221, the median value. The next category includes 712 (28.1%) schools which have enrollments ranging from 201 to 400 students. The fourth category ranging from 401 to 600 comprises only 372 or 14.7% of the MOE schools. Actually, 75% of the MOE schools fall below the limit 405, and 90% below 630.The fifth category (Size 5) covering the range of students from 601 to 800, accounts for 133 i.e., about 5% of the MOE schools. The sixth category (Size 6) contains all the schools which have enrollments over 800. Factually, it covers the inclusive range from 801 to 1562, and contains 146 schools, in all, which is 5.8% of the MOE's basic and secondary academic schools.

Now, in the sections that follow, we will first examine how school size varies across the location and ownership dimensions over the country as a whole , and then we will study the school size phenomenon as it occurs in each of the 22 MOE school directorates.

School Size Variation According to Location

Table 5 gives the Location by Size (2x6) cross-classification of the MOE schools. The graphic illustration of this is provided by Figure 4.

Figure 4

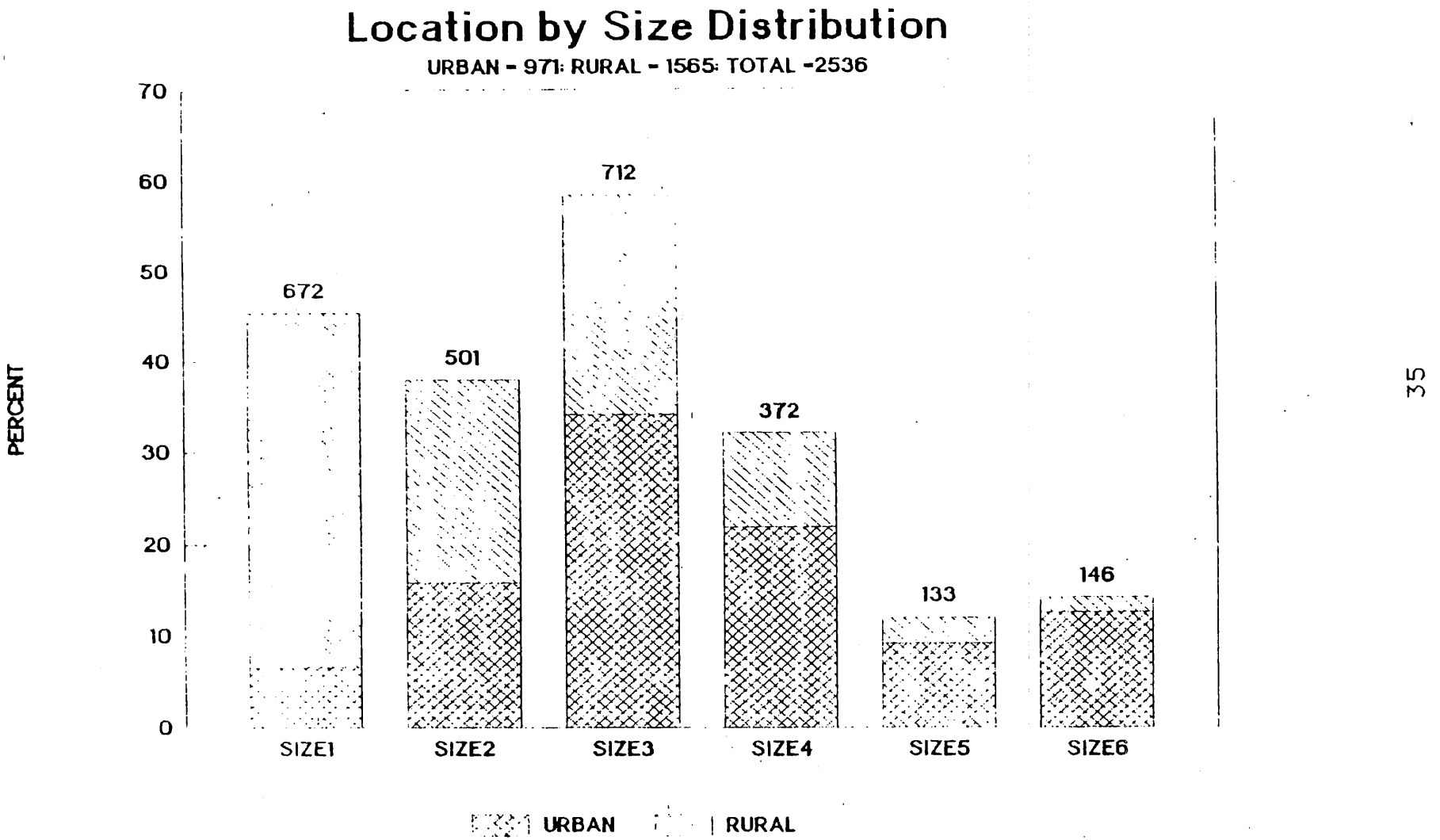

Location by Size Distribution
URBAN - 971: RURAL - 1565: TOTAL -2536
PERCENT
70
60
50
40
30
20
10
0
672
501
712
372
133
146
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
URBAN
RURAL

Table 5
Location by Size Distribution of the MOE Schools

Location	Size1 6-100	Size 2 101-200	Size3 201-400	Size 4 401-600	Size 5 601-800	Size 6 801-1562	Row Total %
Urban	64 6.6 9.5 2.5	153 15.8 30.5 6	332 34.2 46.6 13.1	221 21.8 57 8.4	89 9.2 66.9 3.5	121 12.5 82.9 4.8	971 38.3
Rural	608 38.8 90.5 24	348 22.2 69.5 13.7	380 24.3 53.4 15	160 10.2 43 6.3	44 2.8 33.1 1.7	25 1.6 17.1 1	1565 61.7
Column Total %	672 26.5	501 19.8	712 28.1	372 14.7	133 5.2	146 5.8	2536 100

In the preceding section we described the distribution of schools into six sizes. Now let us see how schools in each size group are divided between urban and rural areas. We make the following observations:

1. There are 672 (26.5%) schools of Size 1; 64 of them , that is, 9.5% are in urban areas and 608 (90.5%) in rural areas. The revealing fact is that more than a quarter of the MOE schools (26.5%) are of the smallest size (100 or less) and most of them (608 which is 90.5% of Size 1 schools and 24% of all schools) are located in rural areas.

2. Size 2 schools have an enrollment range of 101 to 200 inclusive. About 20% or one fifth of all the MOE schools fall into this category. Again, more than two thirds of them (349; 69.5%) belong to rural areas,whereas, only 153, that is, 30.5% of Size 2 schools and 6% of all the MOE schools belong to cities.

3. In Size 3 category, which has school enrollments ranging from 401 to 600 inclusive, out of 712 schools (28% of all schools) 380 (53.4%) are located in rural areas and 332 (46.6%) are in urban areas. We notice, as the size has increased the gap between rural and urban numbers upto this point has tended to narrow down. The next category shows the turning point in this tendency.

4. In Size 4 category, which accounts for 372 (14.7%) of all the MOE schools, the rural/urban gap has taken a reverse turn. Of all the schools in this category, 212 (57%) are in urban areas, whereas, 160 (43%) are in rural areas.

5. Size 5 contains schools with 601 to 800 enrollments. There are 133 schools (5.2% of all schools) in this category, of which 89 (66.9%) are in the urban areas and only 44 (33.1%) are in the rural areas.

Figure 5

Location and Size Relationship

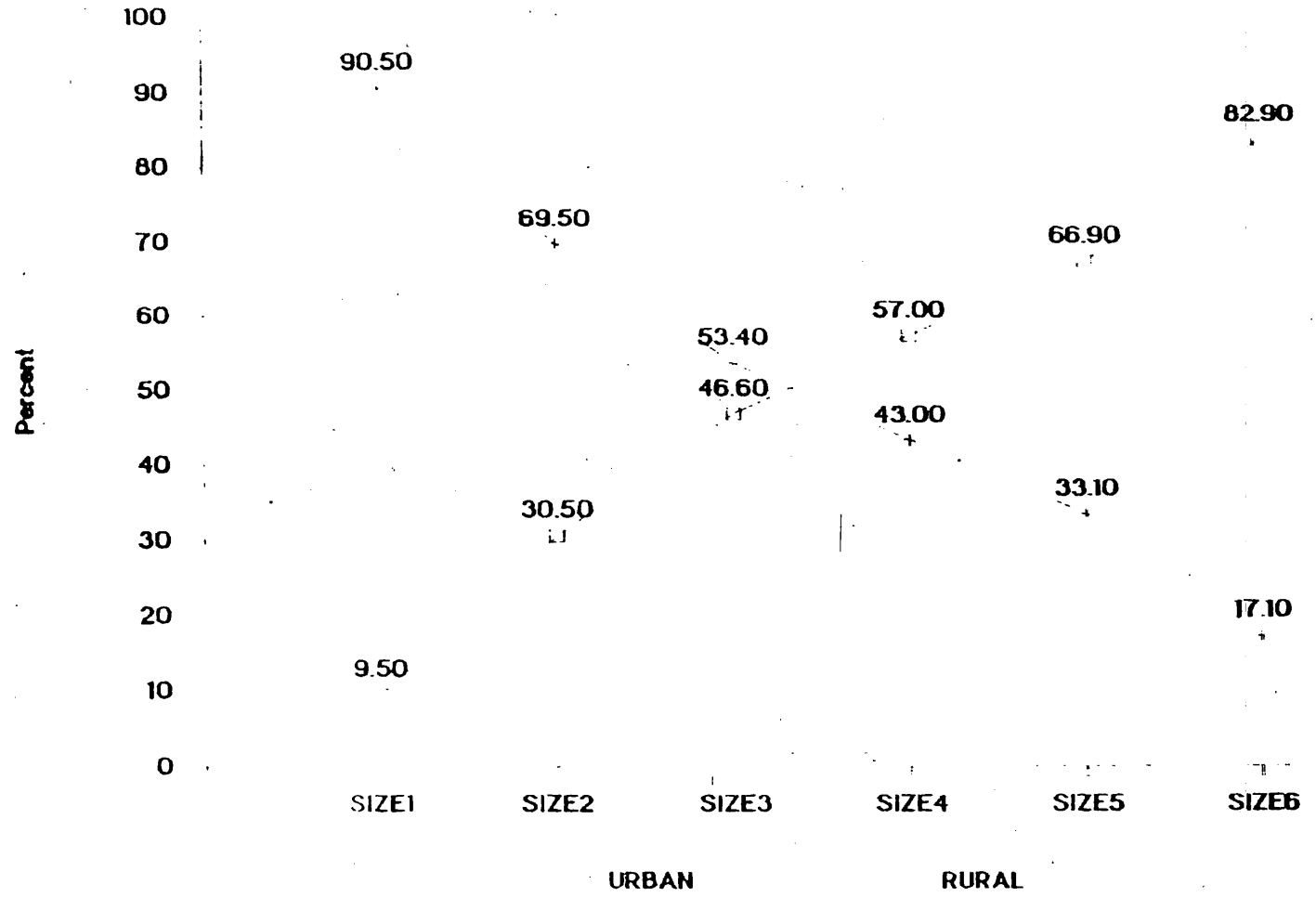
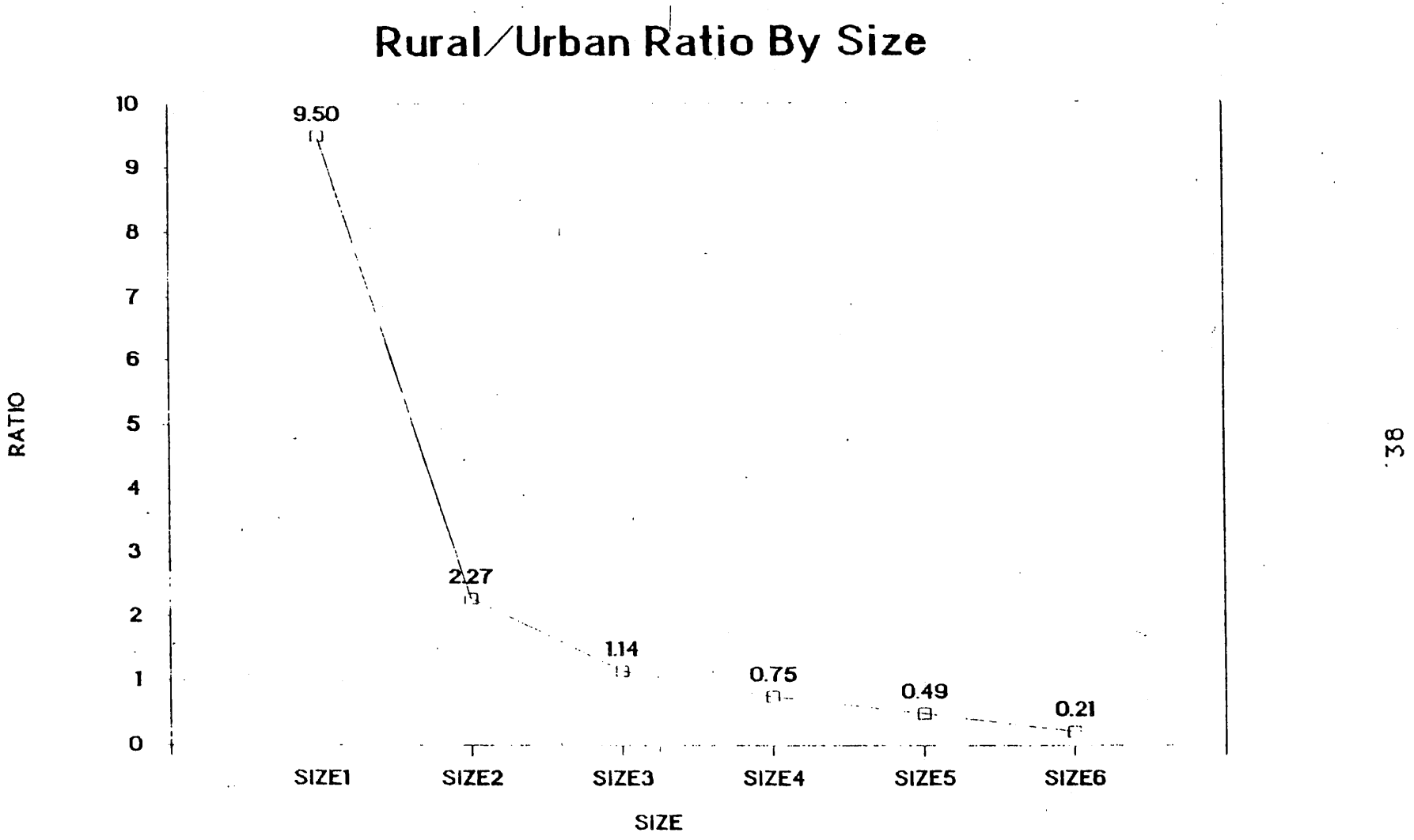


Figure 5a


Rural/Urban Ratio By Size
RATIO
10
9
8
7
6
5
4
3
2
1
0
9.50
2.27
1.14
0.75
0.49
0.21
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
SIZE

6. Finally, Size 6 category consists of all the schools in which the number of students is over 800. Actually, this category covers the widest range, from 801 to 1562 inclusive. There are 146 (5.8%) of all the MOE schools in this category, most of which (121; 82.9%) are located in cities, while, in contrast, only 25 (17.1%) are located in rural areas.

As suggested earlier in this paper, the influence of location factor on school size becomes quite obvious if we look at the third and the seventh rows in Table 5. The order of magnitude of numbers in the two rows runs in opposite directions, in the third it is ascending while in the seventh it is descending. This means that the percentage of urban schools is highly positively correlated with the school size when that of rural schools is highly negatively correlated with school size.

If we define the percentage of urban schools of each category as a variable of interest and school size as another variable of interest then we can easily demonstrate the strong positive relationship between the two variables simply by plotting the percentage of urban schools in each size-category given in the third row of Table 5 against its corresponding size-category value. The line marked by square signs in Figure 5 is a result of such a plotting. It is clear how sharply the urban graph rises as it moves from one size mark to the next.

In the same manner we plotted the column percentages for the rural area given in row 7 of Table 5 against their corresponding sizes. The graph interspersed with '+' signs in Figure 5 shows a strong negative association between percentage of rural schools and the school size variable. It should be clear that rural and urban percentages of each size are complimentary and they add up to 100.

To illustrate this behavior more concisely, we computed the ratio of urban schools to rural schools for each category and plotted them against size, as shown in Figure 5a. The graph in Figure 5a shows that among Size 1 schools ratio of urban schools to rural schools is 1:9.50, this means that in this category for each urban school there are 9.5 rural schools. For Size 2 schools this ratio declines to 1 : 2.27 and keeps on sliding down, though at a slower rate, until it reaches 1 : 0.21 in Size 6 category i.e., for 100 urban schools there are only 21 rural schools in this category.

Variation of School Size Across Ownership

Table 6 and Figures 6, 6a and 6b display the relationship between ownership and size of the schools.

Figure 6

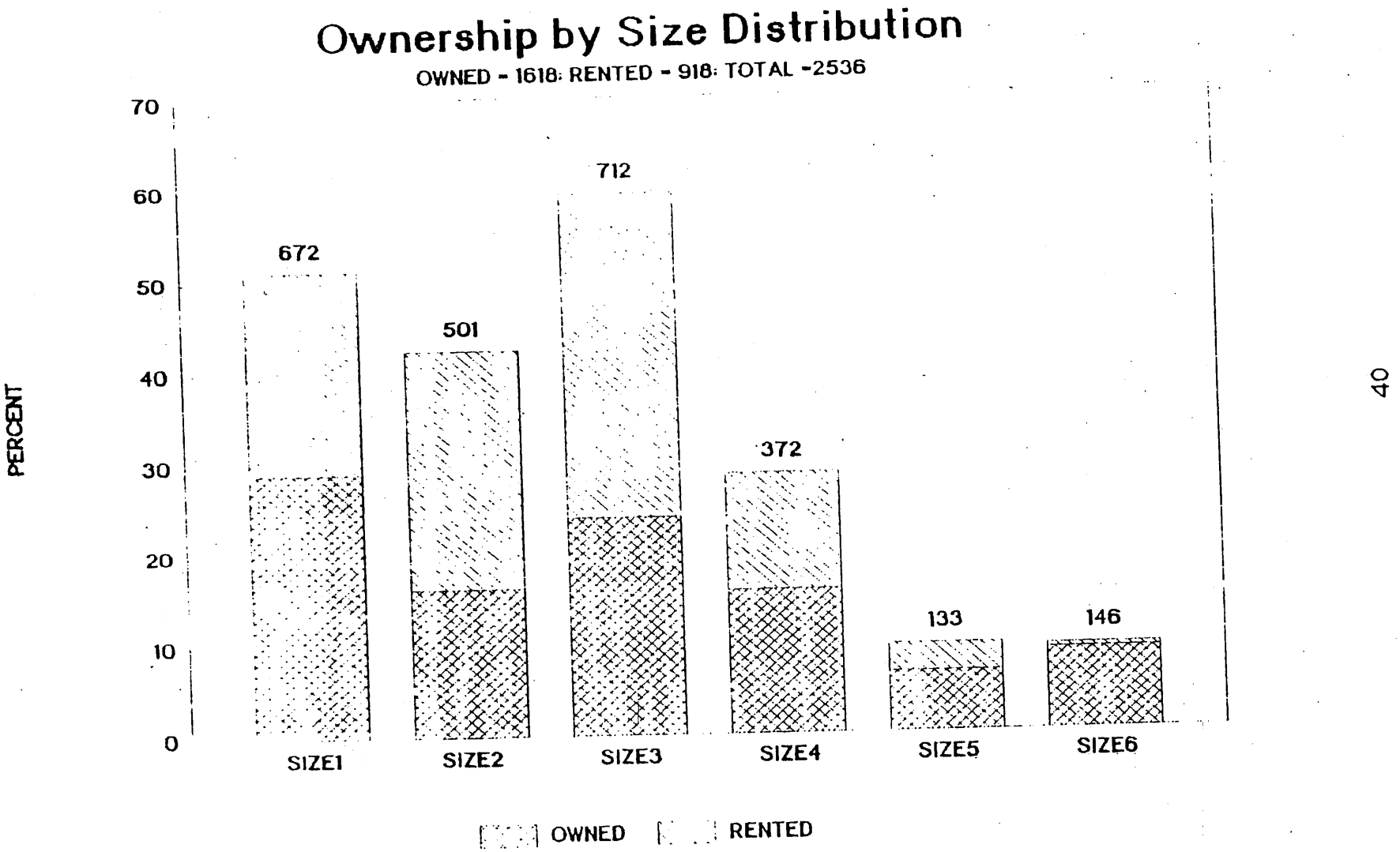

Ownership by Size Distribution
OWNED - 1618: RENTED - 918: TOTAL -2536
PERCENT
70
60
50
40
30
20
10
0
672
501
712
372
133
146
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
OWNED
RENTED

Table 6
Ownership by School Size Distribution of MOE Schools

Ownership		Size 1 6-100	Size 2 101-200	Size 3 201-400	Size 4 401-600	Size 5 601-800	Size 6 801-1562	Row Total %
OWNED	Count	468	261	387	254	106	142	1618
	Row%	28.9	16.1	23.9	15.7	6.6	8.8	63.8
	Col%	69.6	52.1	54.4	68.3	79.7	97.3	
	Total%	18.5	10.3	15.3	10	4.2	5.6	
RENTED	Count	204	240	325	118	27	4	918
	Row%	22.2	26.2	35.4	12.9	2.9	0.4	36.2
	Col%	30.4	47.9	45.6	31.7	20.3	2.7	
	Total%	8	9.5	12.8	4.7	1.1	0.2	
COLUMN	TOTAL	672	501	712	372	133	146	2536
	%	26.5	19.8	28.1	14.7	5.2	5.8	100

An examination of the third and seventh rows of Table 6 reveals the following facts:

1. More than two thirds (69.6% and 68.3%, respectively) of the schools in size 1 and size 4 categories, are owned by the MOE; and approximately one third in each of the two categories (30.4% and 31.7%, respectively) are housed in rented buildings. Schools in Size 2 and Size 3 categories follow more or less the same pattern, approximately 52% and 54% of the schools in these two categories are owned while 48% and 46% respectively are rented.

2. In the larger size categories, namely Size 5 and Size 6, the proportion of owned to rented schools has dramatically increased. Approximately 80% of Size 5 and 97% of Size 6 schools are owned by the MOE, while only 20% and 3%, respectively, are rented.

Relationship between Ownership and Size

Figure 6a shows the relationship between ownership and school size. The relative percentages of owned and rented schools in each size-category were plotted against size. The graph marked by square signs displays the relation between percentage of owned schools of each size and the size variable. This U-type curve shows a curvilinear relation. The proportion of owned to rented schools (69.90: 30.10) is rather high at Size 1. It becomes almost even (54.40: 45.60) at Size 3. It starts rising at Size 4 and keeps on rising steadily until it reaches the peak (97.3% owned against 2.7% rented) at Size 6. The inverted U-shaped rented percentage curve marked by plus '+' signs looks like a mirror reflection of the owned percentage curve. In fact, this is not surprizing, one curve is additive inverse of the other.

Figure 6a

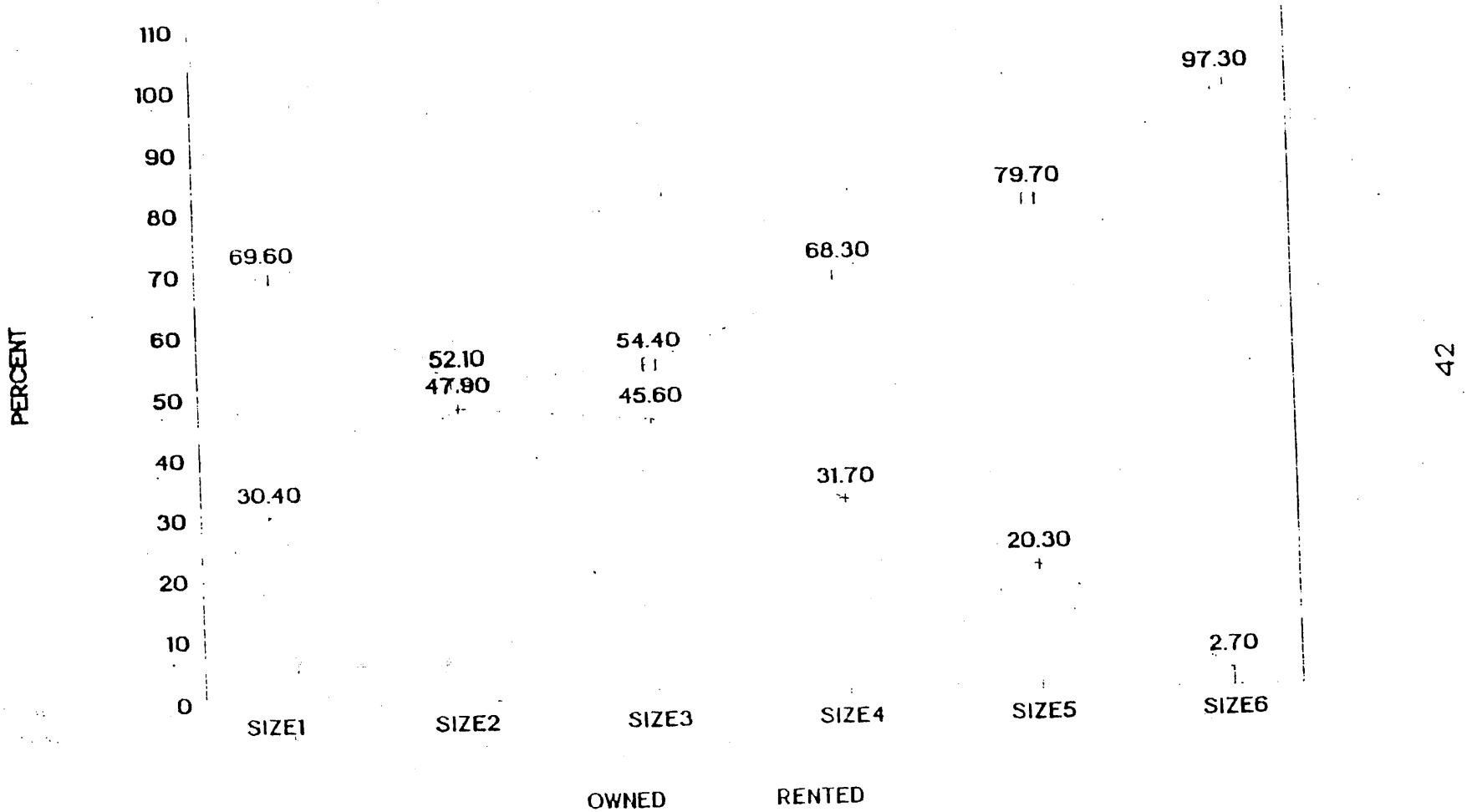

Ownership and Size Relationship
PERCENT
110
100
90
80
70
60
50
40
30
20
10
0
69.60
30.40
52.10
47.90
54.40
45.60
68.30
31.70
79.70
20.30
97.30
2.70
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
OWNED
RENTED

Figure 6b

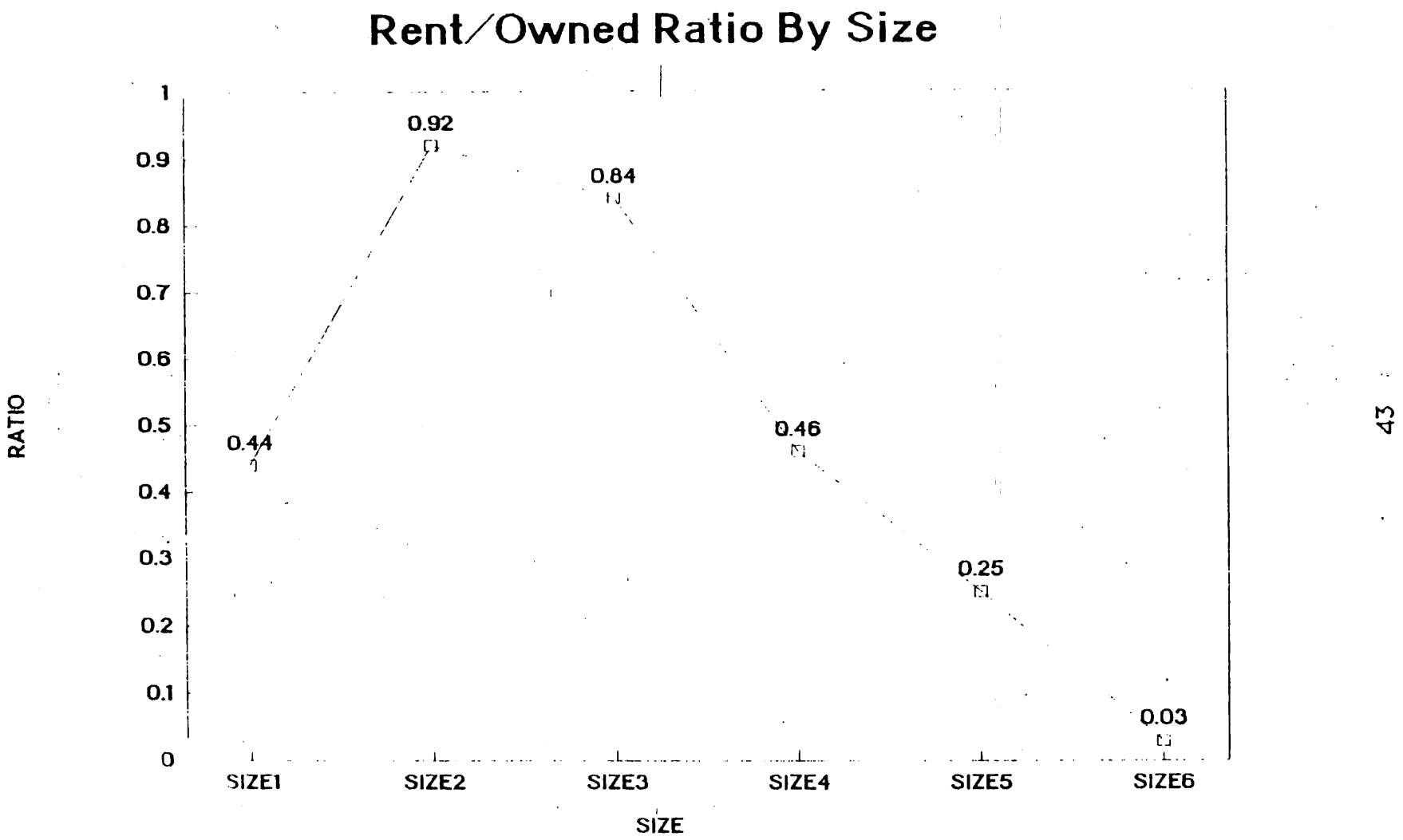

Rent/Owned Ratio By Size
RATIO
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.92
0.84
0.44
0.46
0.25
0.03
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
SIZE

Figure 6b presents a graph of the ratio of owned to rented schools at each size. At Size 1, for each owned school there is .44 (say, roughly less than one half) rented school. In other words we can say, for 44 rented schools there are 100 owned ones. However, at Size 2 this ratio tends to approach unity.

In other words, at Size 2 the number of rented and owned schools is about the same (factually there are 92 rented schools against 100 owned ones). But, as the size of schools increases the ratio of owned to rented plummets to 0.03 at Size 6. This means that among Size 6 schools against 100 owned schools we expect only 3 rented ones.

SCHOOL SIZE ACROSS DIRECTORATES

Having examined how school size varies with location and ownership in the data aggregated over all directorates, now we turn to see how does it vary from one directorate to another irrespective of location and ownership of schools, to start with, and according to location and ownership in selected directorates, later on.

The distribution of schools of each size within each directorate and across all directorates is given in Table7.

Table 7

Directorate by Size Distribution of the MOE Schools

DIRECTORATE		Size 1 6-100	Size 2 101 -200	Size 3 201-400	Size 4 401-600	Size 5 601-800	Size 6 801-1562	Row Total %
GRT. AMMAN 1	Count	19	36	56	48	21	43	223
	Row %	8.5	16.1	25.1	21.5	9.4	19.3	8.8
	Col %	2.8	7.2	7.9	12.9	15.8	29.5	
	Total %	0.7	1.4	2.2	1.9	0.8	1.7	
GRT. AMMAN 2	Count	22	33	56	42	27	24	204
	Row %	10.8	16.2	27.5	20.6	13.2	11.8	8
	Col %	3.3	6,6	7.9	11.3	20.3	16.4	
	Total %	0.9	1.3	2.2	1.7	1.1	0.9	
CAPITAL AMMAN	Count	70	37	31	15	2	4	159
	Row %	44	23.3	19.5	9.4	1.3	2.5	6.3
	Col %	10.4	7.4	4.4	4	1.5	2.7	
	Total %	2.8	1.5	1.2	0.6	0.1	0.2	
MADABA	Count	48	27	27	7	1	4	114
	Row %	42.1	23.7	23.7	6.1	0.9	3.5	4.5
	Col %	7.1	5.4	3.8	1.9	0.8	2.7	
	Total %	1.9	1.1	1.1	0.3	0	0.2	
ZARKA	Count	43	32	87	44	24	41	271
	Row %	15.9	11.8	32.1	16.2	8.9	15.1	10.7
	Col %	6.4	6.4	12.2	11.8	18	28.1	
	Total %	1.7	1.3	3.4	1.7	0.9	1.6	
BALQA	Count	35	37	34	12	9	2	129
	Row %	27.1	28.7	26.4	9.3	7	1.6	5.1
	Col %	5.2	7.4	4.8	3.2	6.8	1.4	
	Total %	1.4	1.5	1.3	0.5	0.4	0.1	
DEIR ALLA	Count	5	11	13	5			34
	Row %	14.7	32.4	38.2	14.7			1.3
	Col %	0.7	2.2	1.8	1.3			
	Total %	0.2	0.4	0.5	0.2			
SOUTH SHOUNEH	Count	4	4	9	3			20
	Row %	20	20	45	15			0.8
	Col %	0.6	0.8	1.3	0.8			
	Total %	0.2	0.2	0.4	0.1			
IRBID	Count	24	52	91	65	21	11	264
	Row %	9.1	19.7	34.5	24.6	8	4.2	10.4
	Col %	3.6	10.4	12.8	17.5	15.8	7.5	
	Total %	0.9	2.1	3.6	2.6	0.8	0.4	
KOUREH	Count	8	6	28	11	6		59
	Row %	13.6	10.2	47.5	18.6	10.2		2.3
	Col %	1.2	1.2	3.9	3	4.5		
	Total %	0.3	0.2	1.1	0.4	0.2		
BANI KANANEH	Count	23	10	38	8			79
	Row %	29.1	12.7	48.1	10.1			3.1
	Col %	3.4	2	5.3	2.2			
	Total %	0.9	0.4	1.5	0.3			
NORTH GHOR	Count	6	10	21	6	3		46
	Row %	13	21.7	45.7	13	6.5		1.8
	Col %	0.9	2	2.9	1.6	2.3		
	Total %	0.2	0.4	0.8	0.2	0.1		
RAMTHA	Count			19	13	3	5	40
	Row %			47.5	32.5	7.5	12.5	1.6

DIRECTORATE		Size 1 6-100	Size 2 101 -200	Size 3 201-400	Size 4 401-600	Size 5 601-800	Size 6 801-1562	Row Total %
	Col %			2.7	3.5	2.3	3.4	
	Total %			0.7	0.5	0.1	0.2	
JERASH	Count	39	26	34	11	3	4	117
	Row %	33.3	22.2	29.1	9.4	2.6	3.4	4.6
	Col %	5.8	5.2	4.8	3	2.3	2.7	
	Total %	1.5	1	1.3	0.4	0.1	0.2	
AJLOUN	Count	20	24	15	16	6	3	84
	Row %	23.8	28.6	17.9	19	7.1	3.6	3.3
	Col %	3	4.8	2.1	4.3	4.5	2.1	
	Total %	0.8	0.9	0.6	0.6	0.2	0.1	
MAFRAQ	Count	132	47	52	20	1	1	253
	Row %	52.2	18.6	20.6	7.9	0.4	0.4	10
	Col %	19.6	9.4	7.3	5.4	0.8	0.7	
	Total %	5.2	1.9	2.1	0.8	0	0	
KARAK	Count	34	32	37	11	1		115
	Row %	29.6	27.8	32.2	9.6	0.9		4.5
	Col %	5.1	6.4	5.2	3	0.8		
	Total %	1.3	1.3	1.5	0.4	0		
SOUTH MAZAR	Count	14	13	16	6	1		50
	Row %	28	26	32	12	2		2
	Col %	2.1	2.6	2.2	1.6	0.8		
	Total %	0.6	0.5	0.6	0.2	0		
QUSER	Count	17	13	10	2			42
	Row %	40.5	31	23.8	4.8			1.7
	Col %	2.5	2.6	1.4	0.5			
	Total %	0.7	0.5	0.4	0.1			
TAFEELEH	Count	25	13	19	12	1	1	71
	Row %	35.2	18.3	26.8	16.9	1.4	1.4	2.8
	Col %	3.7	2.6	2.7	3.2	0.8	0.7	
	Total %	1	0.5	0.7	0.5	0	0	
MA'AN	Count	63	32	9	10	2		116
	Row %	54.3	27.6	7.8	8.6	1.7		4.6
	Col %	9.4	6.4	1.3	2.7	1.5		
	Total %	2.5	1.3	0.4	0.4	0.1		
AQABA	Count	21	6	10	5	1	3	46
	Row %	45.7	13	21.7	10.9	2.2	6.5	1.8
	Col %	3.1	1.2	1.4	1.3	0.8	2.1	
	Total %	0.8	0.2	0.4	0.2	0	0.1	
COLUMN	TOTAL	672	501	712	372	133	146	2536
	%	26.5	19.8	28.1	14.7	5.2	5.8	100

Table 7 contains 22x6 cells i.e., six cells (one for each school size) for each directorate. Each cell entails a column of four numbers. The number at the top inside the cell represents the number of schools in this category; the next number below it, is the row percentage i.e., the number of schools of this size expressed as percentage of the total number of schools of all sizes in the whole directorate. The third number in sequence is the column percentage, i.e., the number of schools of a given size in a particular directorate expressed as percentage of the total number of schools of that size in all the directorates. Finally, the fourth number in a cell is the number of schools in the cell expressed as percentage of the total number of schools in the MOE. Each row of Table 7

represents a particular directorate and each column a particular school size, e.g., the cell defined by Row 1 and Column 1 represents Greater Amman 1 directorates schools of Size 1 (6-100). The top number in the cell is 19; this tells us that in Greater Amman 1 directorate there are 19 schools of Size 1. The number immediately below 19 in the cell is 8.5, this means that 19 is 8.5% of all the 223 schools in this directorate. The next number 2.8 says that 19 is 2.8% of all the 672 Size 1 schools in all the directorates. The fourth number in the cell is 0.7%. This tells us that 19 is 0.7% of 2536, the total number of basic and secondary academic schools under the authority of the MOE.

Short of location and ownership, Table 7 contains all the information about school size in all the directorates. The extreme left column, entitled Row Total, of Table 7 shows two numbers for each directorate. The first is the number of schools in the directorate (the sum of all schools of all sizes in the directorate). For example, Greater Amman 1 has 223 MOE schools. The second number, 8.8%, represents the fact that 223 is 8.8% of 2536. In other words, it indicates that Greater Amman 1 directorate has 8.8% of all the MOE schools. A glance at this column immediately tells us the absolute number of schools as well as the relative percentage of the total number of MOE schools in all directorates. The bottom row of Table 7 on the other hand, gives the number of schools in each size-category summed over all the directorates and the corresponding relative percentage of the total number of the MOE schools. For example, the number 672 at the bottom of the column headed Size 1 and the number 26.5 respectively, indicate that the total number of the MOE's Size 1 schools is 672 and that the number 672 is 26.5% of 2536, all the MOE's schools.

Distribution of Size Across Directorates

In order to present a clearer perspective of the school size phenomenon in the MOE schools, we first present in Figure 7 the distribution of the MOE schools over all the directorates arranged in the increasing order of the number of schools. Then, keeping directorates in the same position, we present in Figures 7a through 7f the distribution of schools of Size 1 through Size 6,respectively, over all the directorates. As an illustration, we pick up the two contrasting Figures 7a and 7f which depict columns 1 and 6 of Table 7 showing the distributions of Size 1 and Size 6 schools, respectively, over all the directorates.

We already know that Size 1 contains schools ranging from 6 to 100 students and that this is the smallest category-size and 672 (26.5%) of all the MOE's schools belong to this category. Now figure 7a clearly brings home the following points :

Figure 7

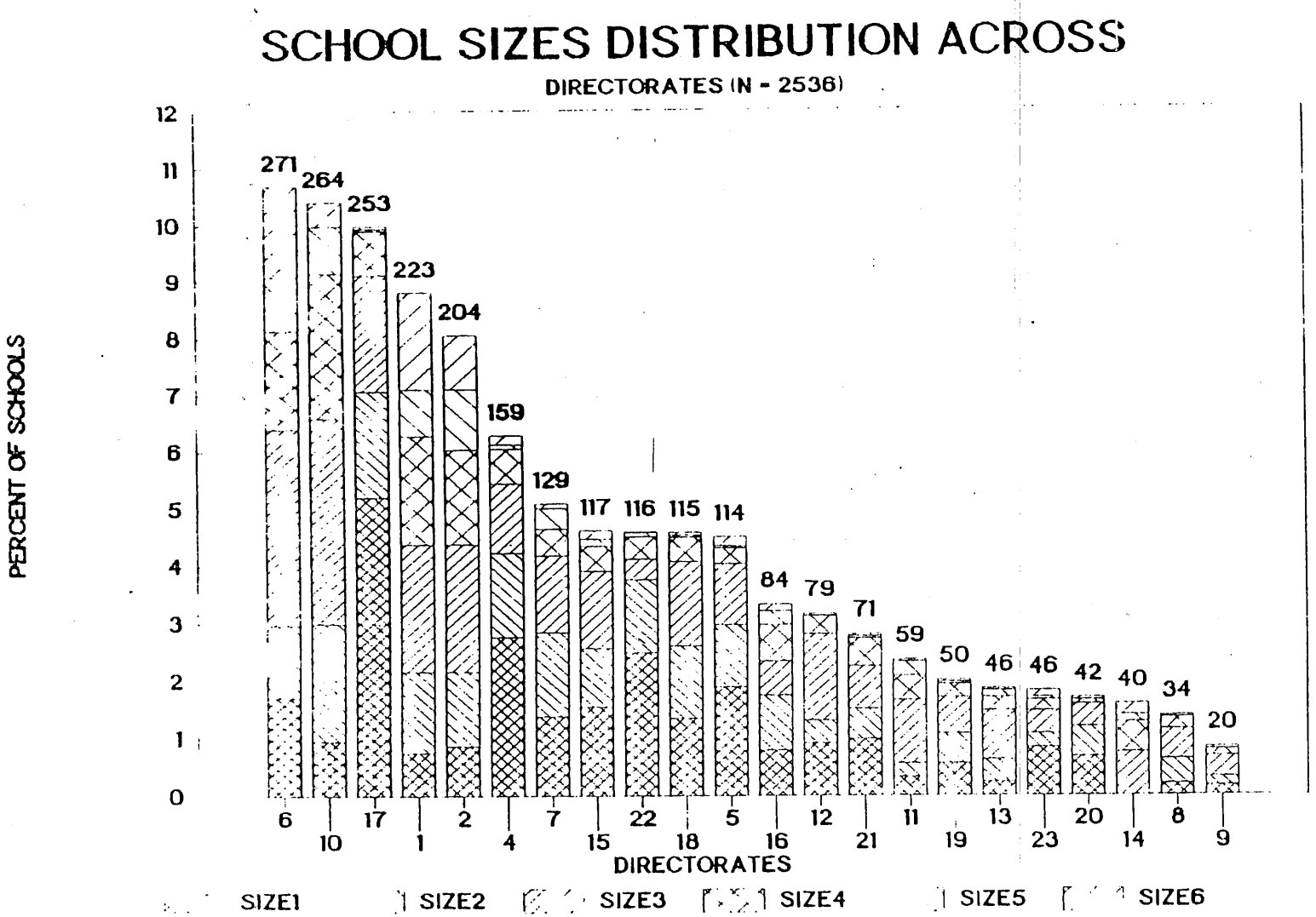

SCHOOL SIZES DISTRIBUTION ACROSS
DIRECTORATES (N - 2536)
PERCENT OF SCHOOLS
0
1
2
3
4
5
6
7
8
9
10
11
12
271
264
253
223
204
159
129
117
116
115
114
84
79
71
59
50
46
46
42
40
34
20
6
10
17
1
2
4
7
15
22
18
5
16
12
21
11
19
13
23
20
14
8
9
DIRECTORATES
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6

Figure 7a

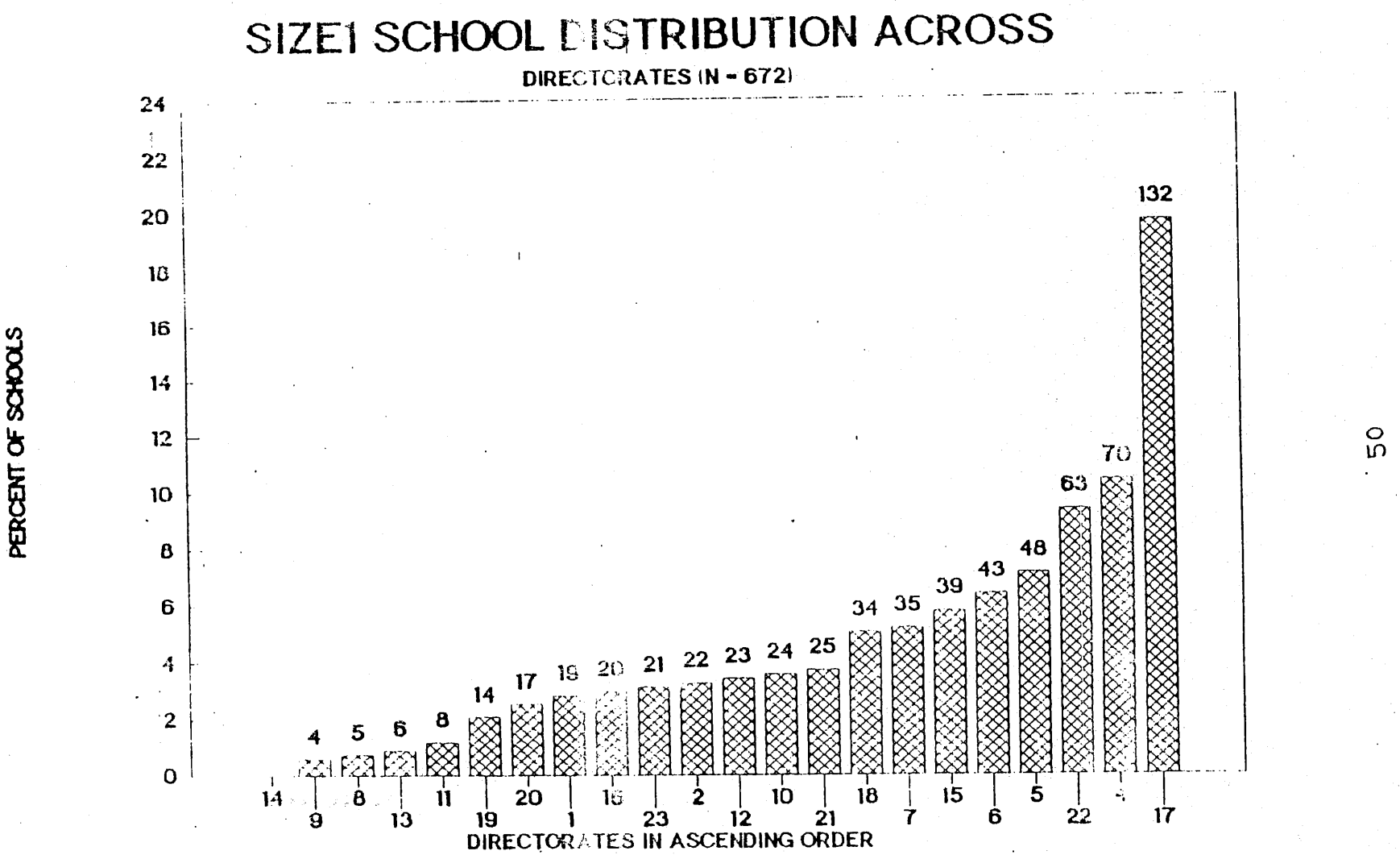

SIZE1 SCHOOL DISTRIBUTION ACROSS
DIRECTORATES (N = 672)
PERCENT OF SCHOOLS
0
2
4
6
8
10
12
14
16
18
20
22
24
14 4
9 5
8 6
13 8
11 14
19 17
20 19
1 20
16 21
23 22
2 23
12 24
10 25
21 34
18 35
7 39
15 43
6 48
5 63
22 70
4 132
17
DIRECTORATES IN ASCENDING ORDER

Figure 7b

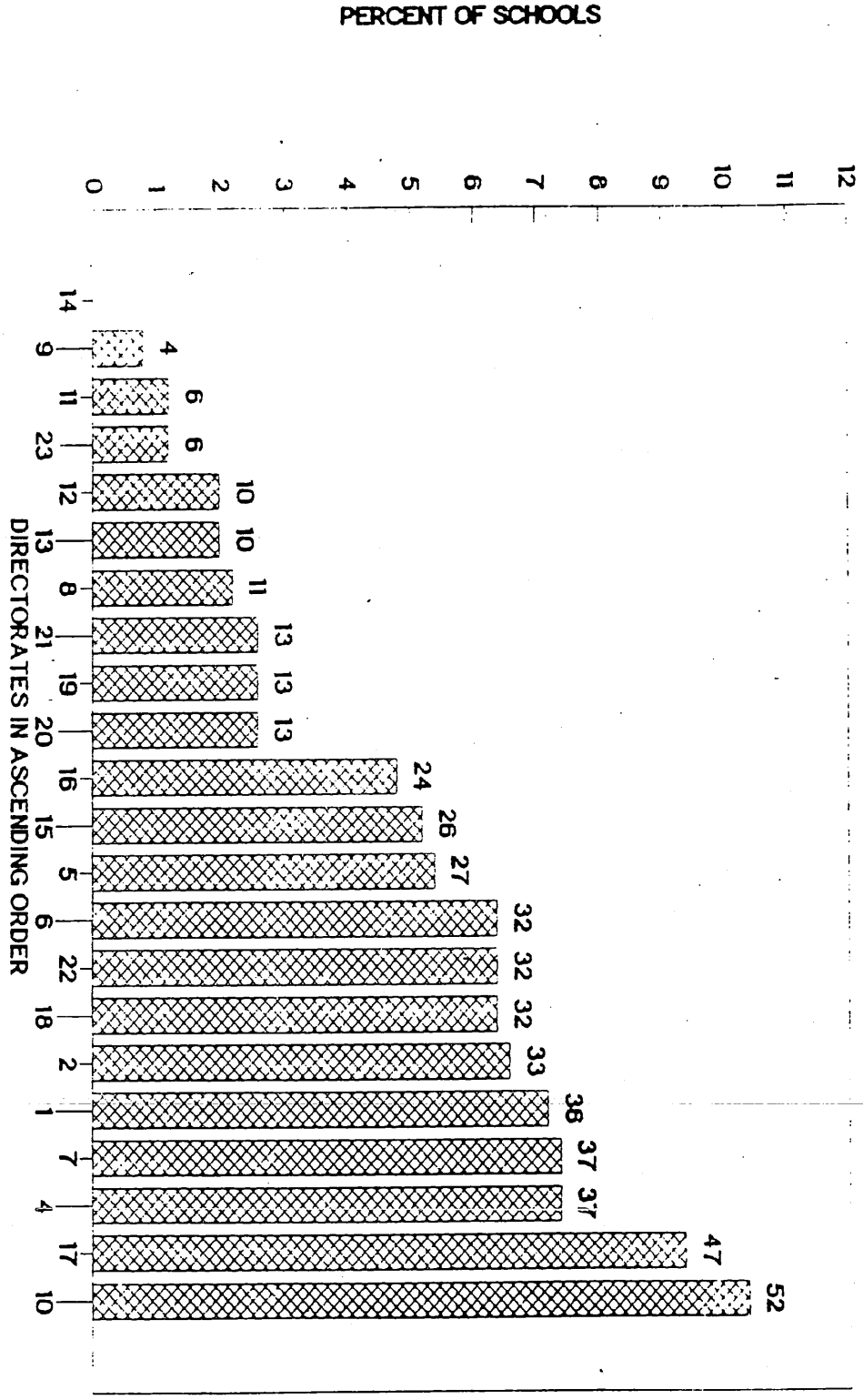

SIZE2 SCHOOL DISTRIBUTION ACROSS
DIRECTORATES (N = 501)
PERCENT OF SCHOOLS
0 1 2 3 4 5 6 7 8 9 10 11 12
DIRECTORATES IN ASCENDING ORDER
14 9 11 23 12 13 8 21 19 20 16 15 5 6 22 18 2 1 7 4 17 10
4 6 6 10 10 11 13 13 13 24 26 27 32 32 32 33 38 37 37 47 52

Figure 7c

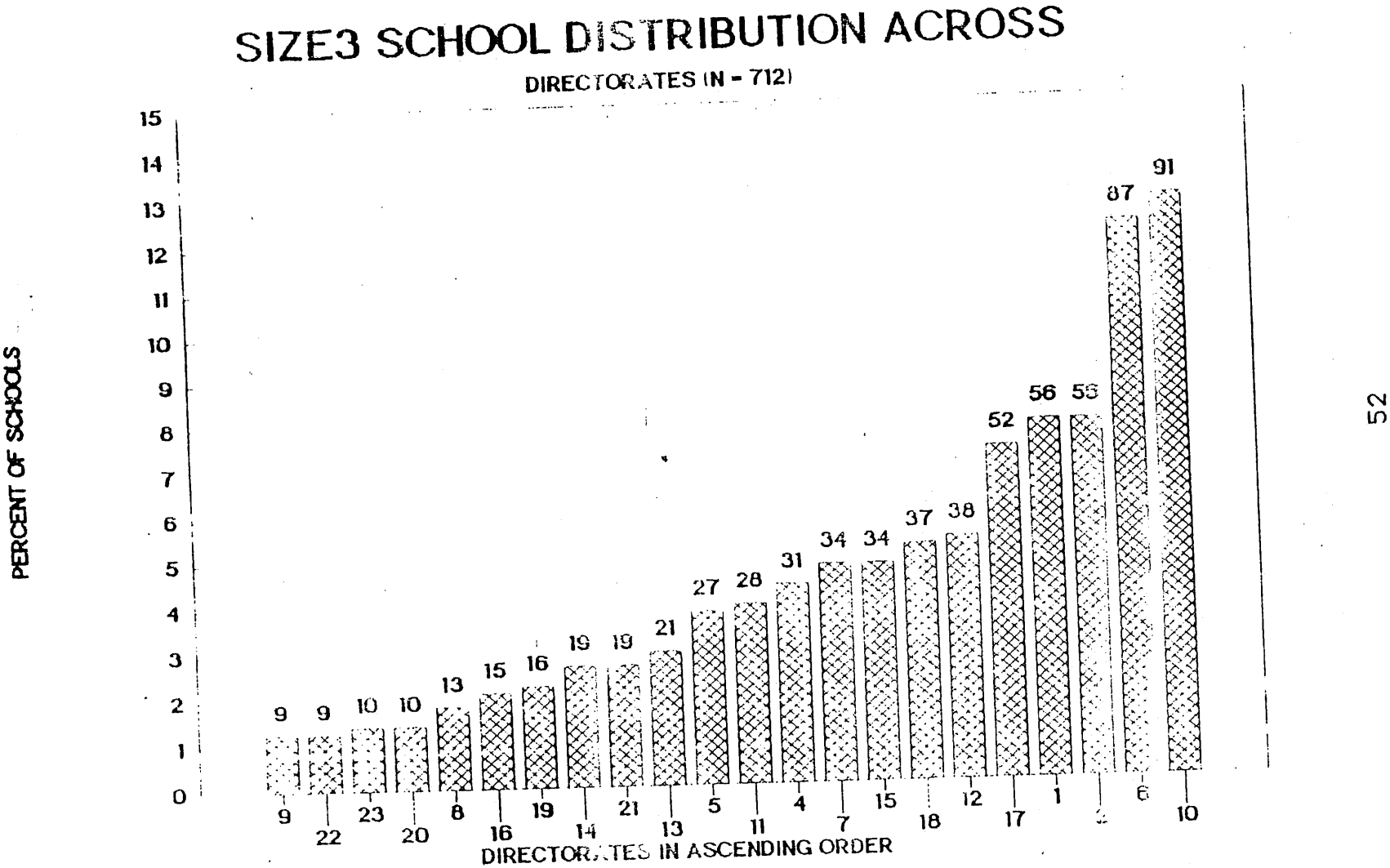

SIZE3 SCHOOL DISTRIBUTION ACROSS
DIRECTORATES (N = 712)
PERCENT OF SCHOOLS
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
9 9 10 10 13 15 16 19 19 21 27 28 31 34 34 37 38 52 56 56 87 91
9 22 23 20 8 16 19 14 21 13 5 11 4 7 15 18 12 17 1 6 10
DIRECTORATES IN ASCENDING ORDER

Figure 7d

SIZE4 SCHOOL DISTRIBUTION ACROSS

DIRECTORATES (N - 372)

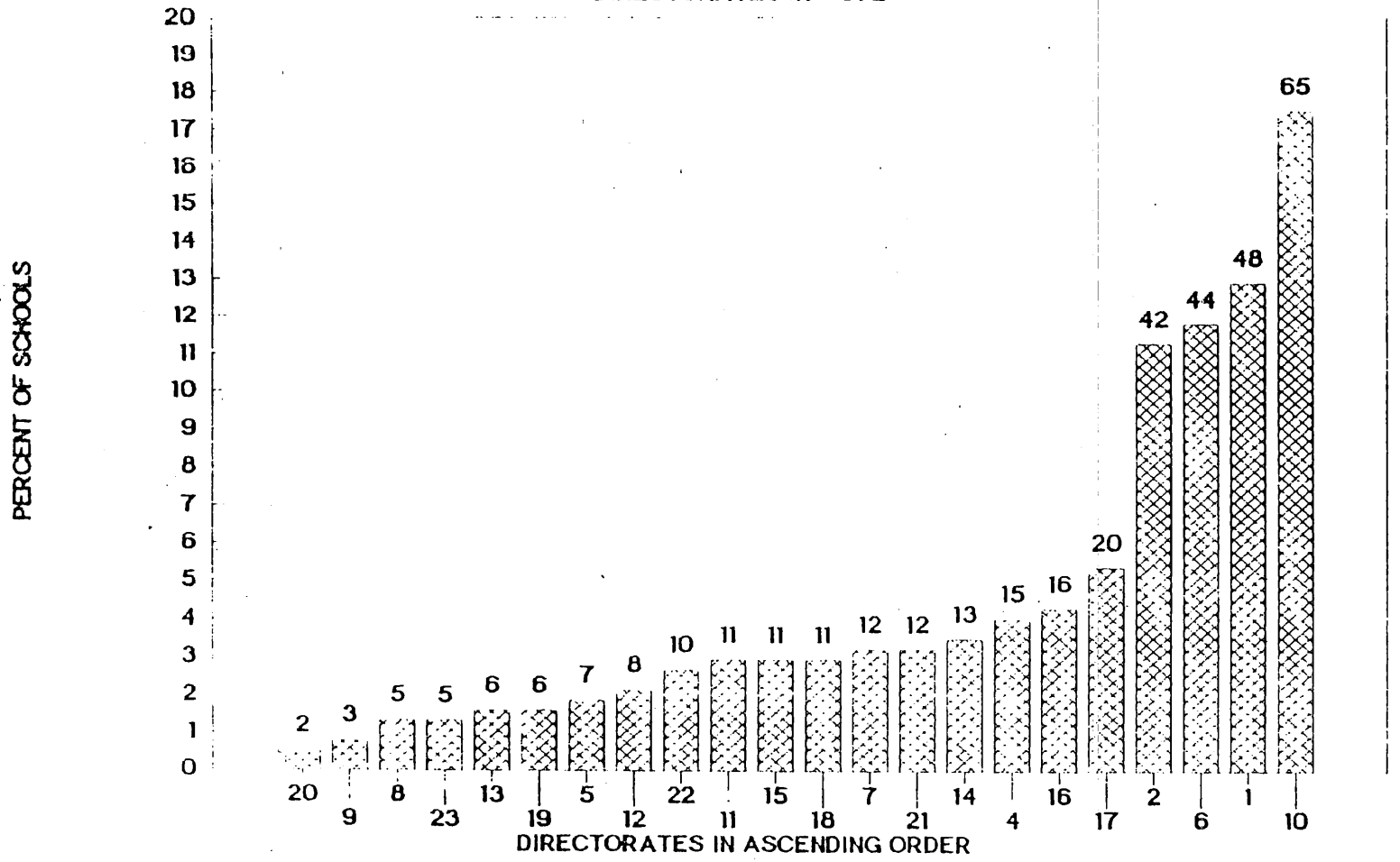


Figure 7e

SIZE5 SCHOOL DISTRIBUTION ACROSS

DIRECTORATES (N - 133)

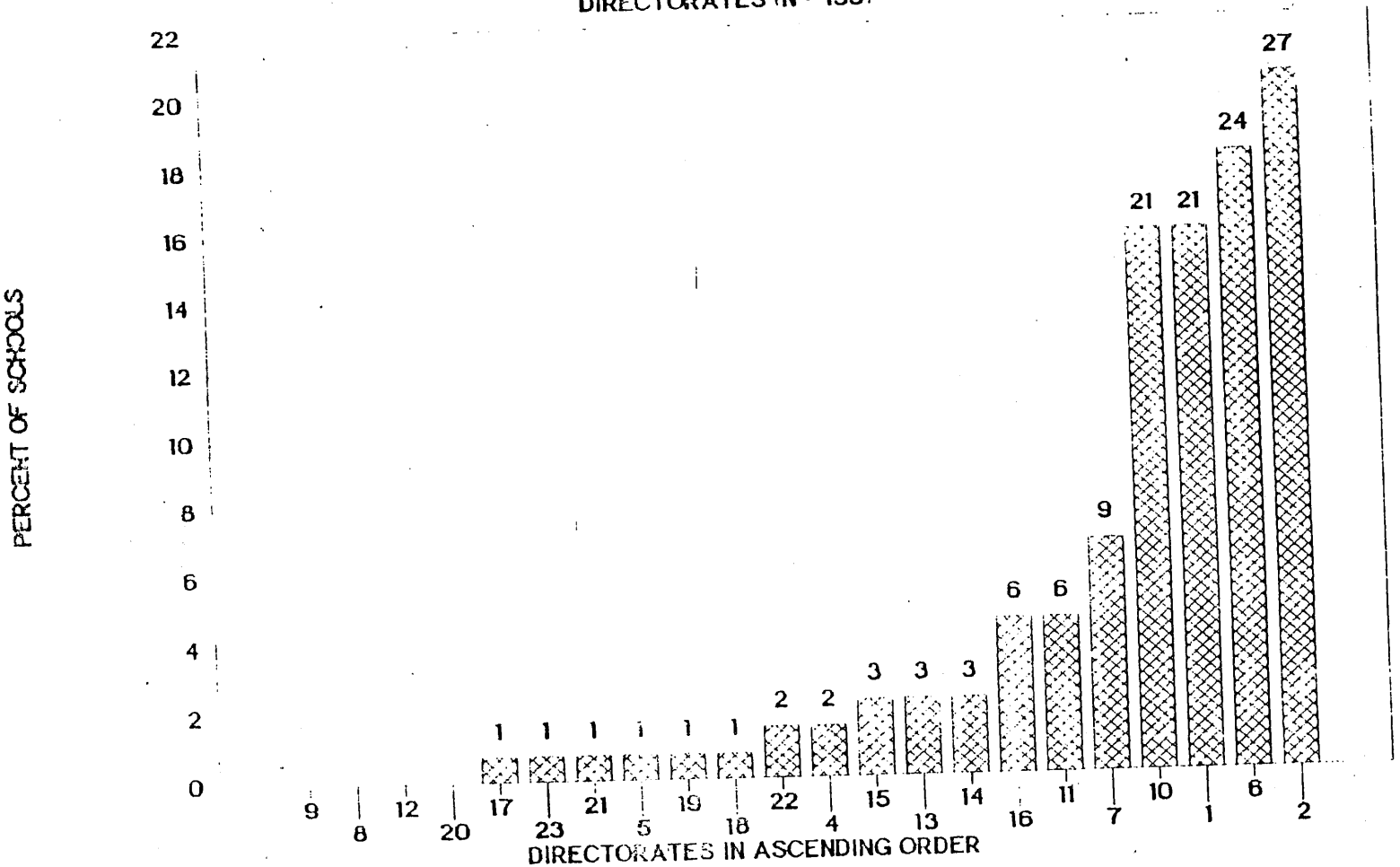
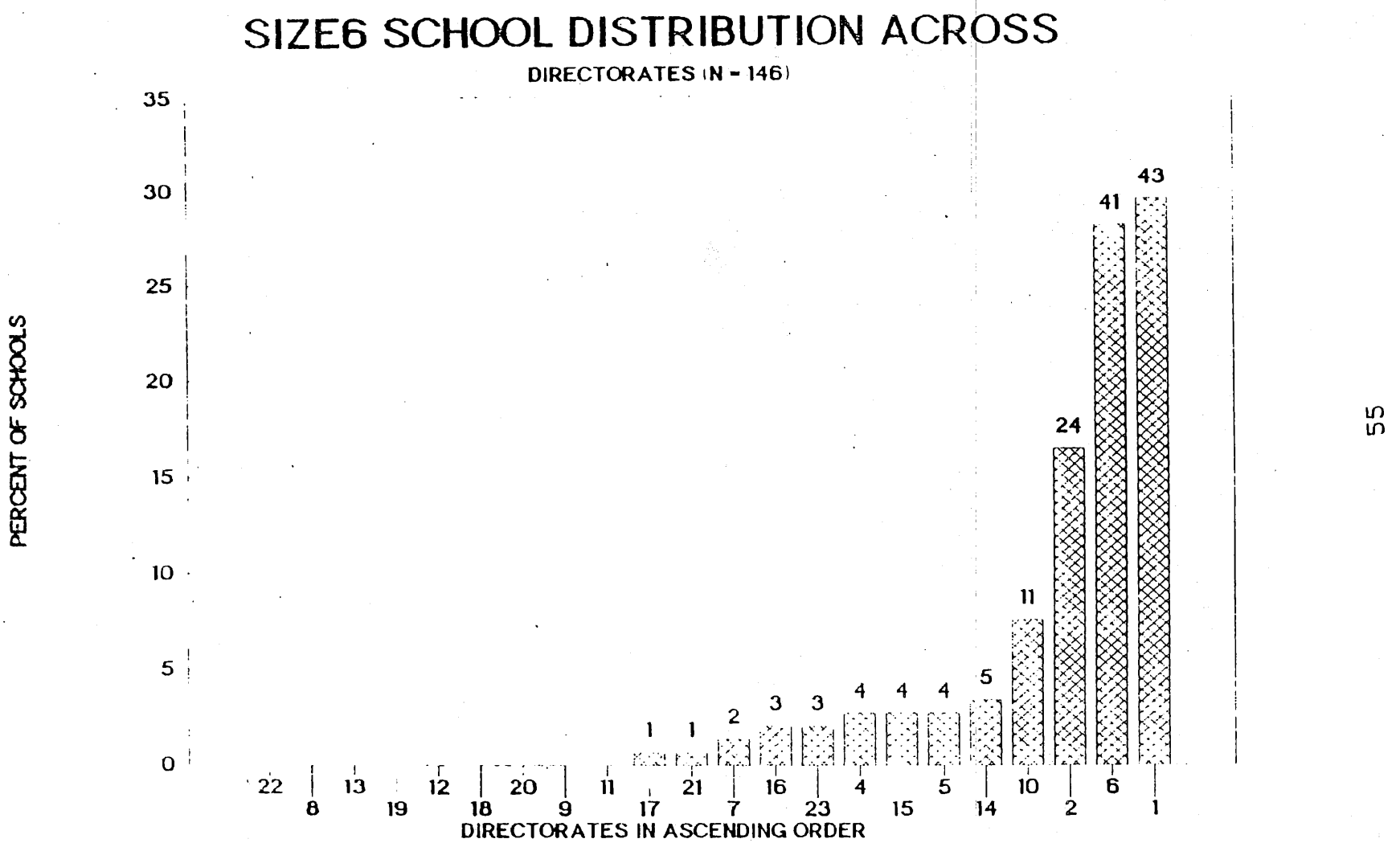


Figure 7f


SIZE6 SCHOOL DISTRIBUTION ACROSS
DIRECTORATES (N = 146)
PERCENT OF SCHOOLS
35
30
25
20
15
10
5
0
1 1 2 3 3 4 4 4 5 11 24 41 43
22 13 12 20 11 21 16 4 5 10 6 1
8 19 18 9 17 7 23 15 14 2
DIRECTORATES IN ASCENDING ORDER

(i) Mafraq directorate has the lion's share of small schools (Size 1); 132 or 19.6% of the 672 Size 1 schools in the country. Capital Amman, Ma'an, Madaba, and Zarka, in decreasing order, follow suit with their respective shares of 70 (10.4%), 63 (9.4%), 48 (7.1%), and 43 (6.4%) of Size 1, schools and rank 2nd, 3rd, 4th, and 5th, respetively. Collectively these five directorates account for 356 (53%) of all the Size 1 schools of the MOE.

(ii) In contrast, the Ramtha directorate has no Size 1 or Size 2 schools at all.

(iii) Next to Ramtha, the directorates of South Shouneh, Deir Alla, North Ghor, and Al-Kourah have, respectively, only 4,5,6, and 8 schools of Size 1. Each one of these directorates accounts for less than 1% of the total number of Size 1 schools in all directorates, and altogether they represent only 3% of all the Size 1 schools in the MOE.

(iv) While the five largest and the five smallest harbors (directorates) of Size 1 schools account , respectively, for 53% and 3% of all Size 1 schools, the remaining 44% of them are distributed over the remaining 12 directorates, their shares ranging from 2.1% through 5.8% with mean value of 3.3%.

(v) On the other extreme, Figure 7f shows the distribution of Size 6 schools (the largest size ranging from 801 to 1562 students). Of the 146 (5.8%) schools in this category, 119, i.e..82% are located in four directorates viz., Greater Amman 1, Greater Amman 2, Zarka, and Irbid. If we add the directorates of the Capital Amman,Madaba, Ramtha, Jerash, Ajloun, and Aqaba to these, then jointly they account for 142 i.e., 97% of all the schools in this wide category, on the other hand, nine of the 22 directorates do not have even a single school of this size. This shows that larger schools are strictly limited to relatively densely populated urban areas.

Interpretation of School Size Distribution

Now, what conclusions can be drawn from ordinary inspection of these simple figures namely, Figure 7a and Figure 7f? Of course, more specific information must be obtained to reach definitive conclusions for making policy decisions. But, since data collection is both arduous and expensive, let us see how much mileage can be drawn from the information presently at hand.

First, we see that maximum concentration of small-size schools occurs in those directorates which cover vast areas with very thinly scattered population. The directorate of Mafraq serves as a case in point.

Second, we find that the directorates with smallest number of Size 1 schools are those which cover relatively smaller but not-so-thinly-populated geographical areas, in this case, Ramtha is a good example.

Third, the directorates of South Shouneh, Deir Alla, North Ghor and Al-Kourah besides being small and relatively compact possess an additional feature of having a substantial number of newly constructed schools.

Fourth, other directorates share the number of small schools proportionate to their share of thinly populated rural areas.

Fifth, in densely populated directorates the most important factor that contributes to the occurrence of small-size schools seems to be the rented school buildings.

Sixth, all the large schools (Size 6) as shown by Figure 7f are mainly confined to those directorates which incorporate large cities like Amman, Zarka and, Irbid.

Finally, simultaneous consideration of the preceding observations tends to support the contention that school size phenomenon is a function of population density which is embedded in the location factor and school accommodation which is embedded in the ownership factor.

BALQA: A CASE STUDY

Introduction:

In spite of interesting information about distribution of schools according to school size across all directorates, it is the distribution of size within each directorate and more importantly, within each rural and urban locale that should be of special interest to designers of policy for constructing new school buildings and adding extensions to old ones. This calls for microlevel investigation of the school size phenomenon within individual directorates.

To illustrate our point, we choose Balqa Directorate for a closer look into the school size situation. To start with, Table 8 presents the Location by Ownership distribution of the MOE's academic basic and secondary schools in Balqa Directorate. Location by School size distribution is given in Table 9 and Ownership by School size in Table 10; and finally, Table 11 presents the Location by Ownership by School Size distribution of the MOE schools in Balqa .

Location by Ownership Distribution

Table 8
Number and Percentages of Owned, Rented, Owend+Rented and Donated MOE Schools in Balqa

Location	Ownership	Owned	Rented	Own+Ren.	Donated	Row Total %
Urban	Count	20	24			44
	Row%	45.5	54.5			34.1
	Col.%	26	68.6			
	Total%	15.5	18.6			
Rural	Count	57	11	16	1	85
	Row%	67.1	12.9	18.8	1.2	65.9
	Col.%	74	31.4	100	100	
	Total%	44.2	8.5	12.4	0.8	
Column	Total	77	35	16	1	129
	%	59.7	27.1	124	0.8	100

As can be seen from Table 8, out of the 129 schools, 44 (34%) are located in the urban zone while 85 (66%) of them are located in the rural zone of the directorate. Ownership-wise, 77 (59.7%) of the 129 schools are owned by the MOE, 35 (27.1%) are rented, 16 (12.4%) are part-owned/part-rented, and 1 school (0.8%) is donated.

Again, of the 77 owned schools only 20 (26%) are urban while 57 (74%) are rural. In contrast, of the 35 rented schools, 24 (68.6%) are urban while only 11 (31.4%) are

Figure 8

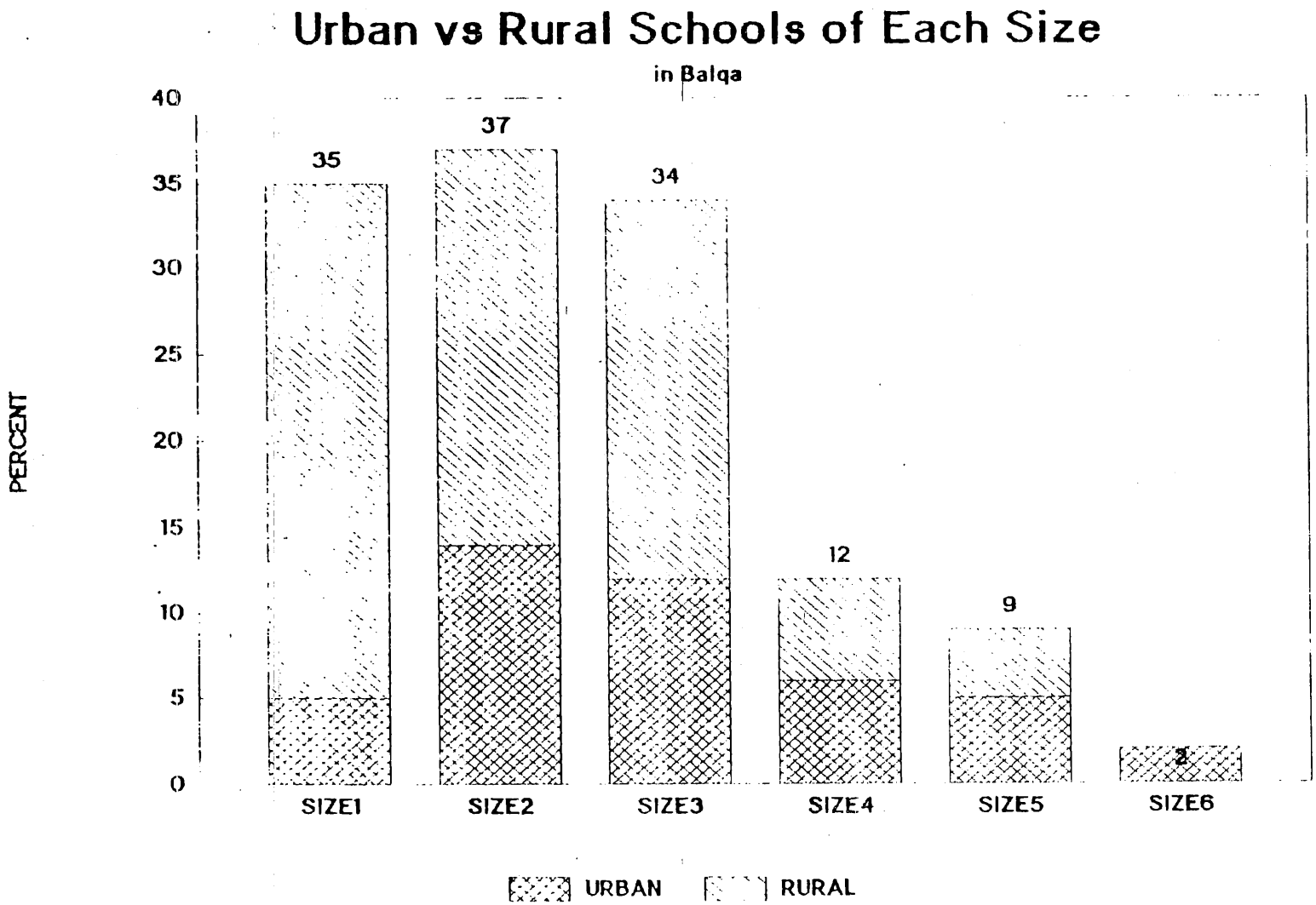
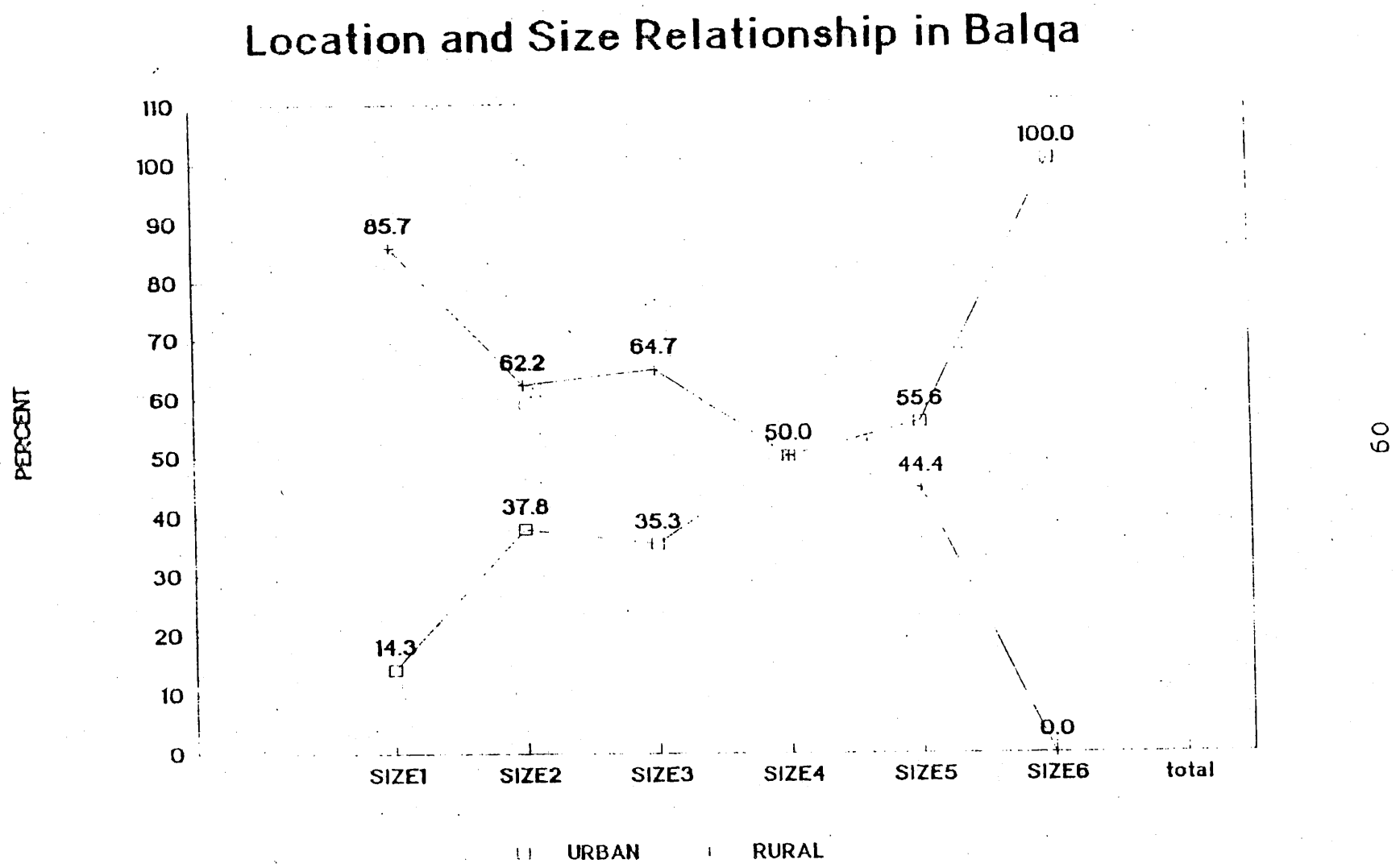

Urban vs Rural Schools of Each Size
in Balqa
PERCENT
40
35
30
25
20
15
10
5
0
35
37
34
12
9
2
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
URBAN
RURAL

Figure 8a


Location and Size Relationship in Balqa
PERCENT
110
100
90
80
70
60
50
40
30
20
10
0
85.7
62.2
64.7
50.0
55.6
100.0
14.3
37.8
35.3
44.4
0.0
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
total
URBAN
RURAL

rural. All the 16 part-owned/part-rented schools and the single donated school are located in the rural areas of the directorate. Of the 44 urban schools 20 (45.5%) are owned and 24 (54.5%) are rented. On the other hand, of the 85 rural schools 57 (67%) are owned, 11 (13%) are rented, 16 (19%) are part-owned/part-rented, and 1 school is donated.

Location by Size Distribution

Table 9
Number and Percentages of Urban and Rural MOE Schools of Each Size in Balqa Directorate

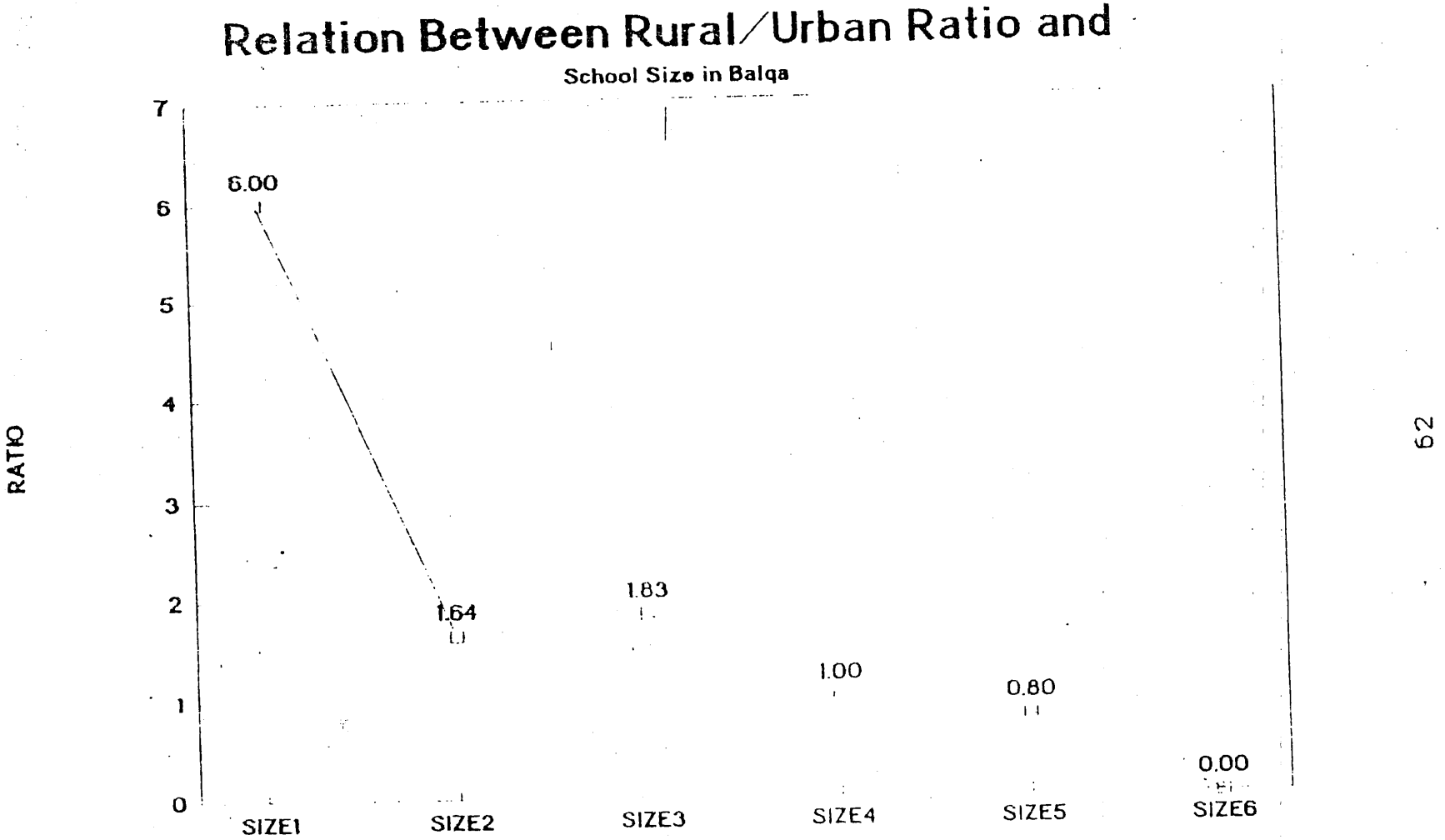
Location	School Size	Size 1 LE 100	Size 2 101- 200	Size 3 201- 400	Size 4 401- 600	Size 5 601- 800	Size 6 GT 800	Row Total %
Urban	Count	5	14	12	6	5	2	44
	Row %	11.4	31.8	27.3	13.6	11.4	4.5	34.1
	Col. %	14.3	37.8	35.3	50	55.6	100	
	Total %	3.9	10.9	9.3	4.7	3.9	1.6	
Rural	Count	30	23	22	6	4		85
	Row %	35.3	27.1	25.9	7.1	4.7		65.9
	Col. %	85.7	62.2	64.7	50	44.4		
	Total %	23.3	17.8	17.1	4.7	3.1		
Column	TOTAL	35	37	34	12	9	2	129
	%	27.1	28.7	26.4	9.3	7	1.6	100

A graphical illustration of the location by size distribution is given by Figure 8. Table 9 presents distribution of the schools of each size over urban and rural areas. Inspection of the third row (column %) across the six size columns from left to right in Table 9 clearly shows the trend how the percentage of urban schools in each column increases as the school size increases. Similarly, a glance from left to right along the 7th row (column %) in the table clearly shows the decreasing trend of the percentage of rural schools with increasing school size. Graphs of these two rows are plotted in Figure 8a. Now, if we compare Figure 8a with Figure 5 we notice parallel trends in the two figures. We should recall that Figure 5 is based upon the whole country's data (N=2536) aggregated over all the directorates while Figure 8a represents only 129 MOE schools in Balqa Directorate. Nevertheless, it is quite interesting to note (at least in this particular case) how the national trend is upheld by data from a particular directorate.

Relation between School Size and Urban/Rural School Ratio

In the data aggregated over all the MOE schools, including the Balqa Directorate schools, the proporation of rural schools to urban schools in each size-category decreases as school size increases and vice versa. Consversely, the proportion of urban schools to rural schools sharply increases with each step-wise increase in the the numerical value of the categorical variable school size. The relationship between urban/rural school ratio and

Figure 8b


Relation Between Rural/Urban Ratio and
School Size in Balqa
RATIO
7
6
5
4
3
2
1
0
6.00
1.64
1.83
1.00
0.80
0.00
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6

school size is depicted in Figure 8b.

In the language of correlation, the presence of a strong positive relationship between school size and urban/rural-school-ratio is quite clear. This means that the chances that a school is located in a city rather than in a village increase rapidly as the school size grows beyond a certain limit, that is, if it is a very large school one can predict with utmost certainty that it would be located in an urban area; this conclusion applies to all the Education Directorates of the MOE . In plain language, large schools are mainly confined to densely populated urban areas, and as it prevails at present, it would not be wrong to say that large schools are generally a city phenomenon.

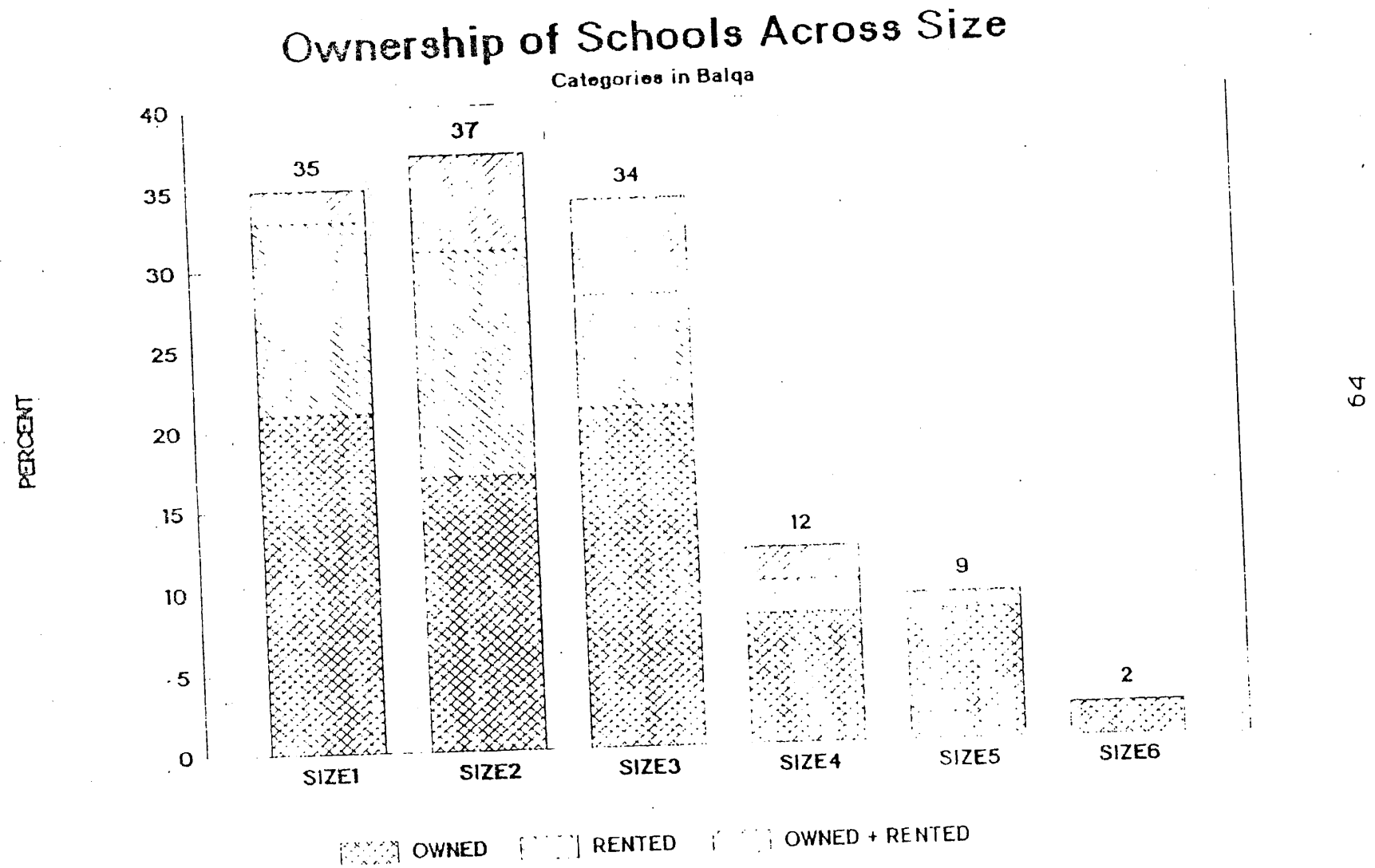
Ownership by Size Distribution of the MOE Schools in Balqa Directorate

Earlier we discussed how ownership of a school building might influence the size of the school. This section presents the actual facts from Balqa Directorate. There are four mutually exclusive categories of ownership of school buildings, viz., owned, rented, owned+rented, and donated. Also, there are six categories of school size. Table 10 presents the Ownership by Size (4x6) crosstabulation of all the MOE's Basic and Secondary Cycle schools coded as academic in Database 1990. A graphical display of Table 10 is given by Figure 9.

Table 10
Number and Percentages of Owned, Rented, Owned+Rented, and Donated MOE Schools of Each Size in Balqa Directorate

Ownership	School Size	Size1 LE 100	Size 2 101- 200	Size 3 201- 400	Size 4 401- 600	Size 5 601- 800	Size 6 GT 800	Row Total %
Owned	Count	21	17	21	8	8	2	77
	Row %	27.3	22.1	27.3	10.4	10.4	2.6	59.7
	Col. %	60	45.9	61.8	66.7	88.9	100	
	Total %	16.3	13.2	16.3	6.2	6.2	1.6	
Rented	Count	12	14	7	2			35
	Row %	34.3	40	20	5.7			27.1
	Col. %	34.3	37.8	20.6	16.7			
	Total %	9.3	16.9	5.4	1.6			
Owned + Rented	Count	2	6	6	2			16
	Row %	12.5	37.5	37.5	12.5			12.4
	Col. %	5.7	16.2	17.6	16.7			
	Total %	1.6	4.7	4.7	1.6			
Donated	Count					1		1
	Row %					100		0.8
	Col. %					11.1		
	Total %					0.8		
Column	TOTAL	35	37	34	12	9	2	129
	%	27.1	28.7	26.4	9.3	7	1.6	100

Figure 9


Ownership of Schools Across Size
Categories in Balqa
PERCENT
40
35
30
25
20
15
10
5
0
35
37
34
12
9
2
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
OWNED
RENTED
OWNED + RENTED

The Col. % row of owned category shows in Table 10 that 60% of all the Size 1 schools and 46% of all the Size 2 schools in Balqa Directorate are owned by the MOE. Combining Size 1 and Size 2 schools we see that only 53% of the small schools are owned while 62% of Size 3, 67% of Size 4, 89% of Size 5 and 100% of Size 6 schools are owned by the MOE. Conversely not a single school of Size 5 or Size 6 is either rented or owned+rented. Of all the 35 rented schools 26 (74%) are of small size, while seven are of moderate size (Size 3), and only two are of medium size (Size 4). A solitary donated school in the whole directorate is rather an oddity which reminds us that donated schools are treated as rented.

Location by Ownership by Size Distribution of the MOE Schools in Balqa Directorate

From the frequency distribution of the total number of students in each school we know the following facts:

1. School size in Balqa varies from 15, the smallest, to 982, the largest.

2. The average school enrollment is 240.

3. The median value is 163, that is, 50% of the MOE schools in Balqa Directorate have student enrollments of less than 163 which dwindles down to 15 students, in the smallest school.

4. At least 13 schools (10%) have enrollments of less than 40 students.

5. Seventy percent (70%) of all schools have less than 300 enrollments, and 82% below the 400 mark.

6. Only 11 schools (8.6%) in Balqa Directorate have enrollments exceeding 600 students, the largest school is reported to have 982 students.

Role of Location

Since location seems to play a more dominant role in school construction policy, Table 11 presents the distribution of schools by size in each location (urban, rural) individually for each type of ownership (owned, owned+rented, and rented) as well as jointly for all types of ownership.

Table 11
Location by Ownership by School-Size Distribution of the MOE Schools in Balqa Directorate

Location	Ownership	School-Size	Small 15 - 100 Size1	Small 101 -200 Size 2	Moderate 201 -400 Size 3	Medium 401 -600 Size 4	Large 601 -800 Size 5	Large 801 -982 Size 6	Row Total
Urban	Owned	Count	2	1	6	4	5	2	20
		Col. Urb. %	40	7.1	50	66.7	62.5	100	45.5
		Col. Tot. %	5.7	2.7	17.6	33.3	55.6	100	15.5
	Own.+Rent.	Count							
		Col. Urb. %							
		Col. Tot. %							
	Rented	Count	3	13	6	2			24
		Col. Urb. %	60	92.9	50	33.3			54.5
		Col. Tot. %	8.6	35.1	17.6	16.7			18.6
	Urban Total	Count	5	14	12	6	5	2	44
									34.1
Rural	Owned	Count	19	16	15	4	3		57
		Col. Rur. %	63.3	69.6	68.2	66.7	75		67.1
		Col. Tot. %	54.3	43.2	44.1	33.3	33.3		44.2
	Own.+Rent.	Count	2	6	6	2			16
		Col. Rur. %	6.7	26.1	27.3	33.3			18.8
		Col. Tot. %	5.7	16.2	17.6	16.7			12.4
	Rented	Count	9	1	1		1		12
		Col. Rur. %	30	4.3	4.5		25		14.1
		Col. Tot. %	25.7	2.7	2.9		11.1		9.3
	Rur. Total	Count	30	23	22	6	4		85
									65.9
	Total	Count	T1 = 35	T2 = 37	T3 = 34	T4 = 12	T5 = 9	T6 = 2	T.. = 129
		Total %	27.1	28.7	26.4	9.3	7	1.6	
		Cumu. %	27.1	55.8	82.2	91.5	98.4	100	

Note: T1 , . . . , T6 stand for total number of schools of Size1 , . . . , Size 6 , respectively.

Assuming that feasibility of coordination, adjustment, amalgamation or integration among schools, under normal circumstances, will largely depend upon physical proximity, our propositions would mainly apply to clusters of schools situated within the limits of reasonable distance and accessible to students living in different parts of the catchment area. We further assume that reshuffling adjustments would be more conveniently implementable among schools within each location rather than among those situated across locations although there may be cases where two schools, one classified as rural, and the other classified as urban, may be nearer to each other than to any of the schools within the same location. Also, it is quite possible to find a school which is nearer to a school belonging to another village or municipality than to any school within the limits of its own village or municipal boundary. Just for the sake of argument, however, we attempt to list policy choices that could be made depending, of course, on a host of other factors within each location.

Figure 10

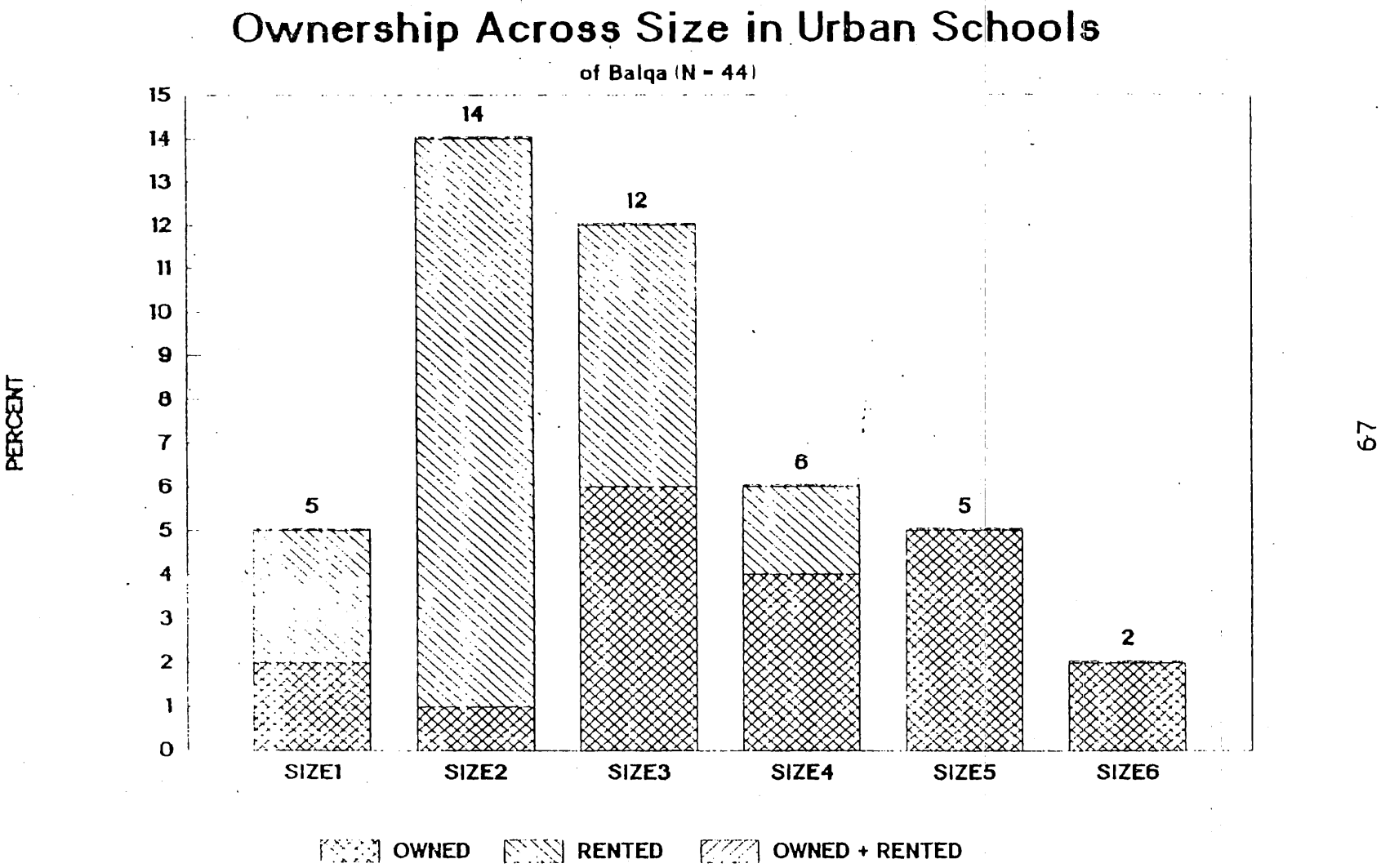
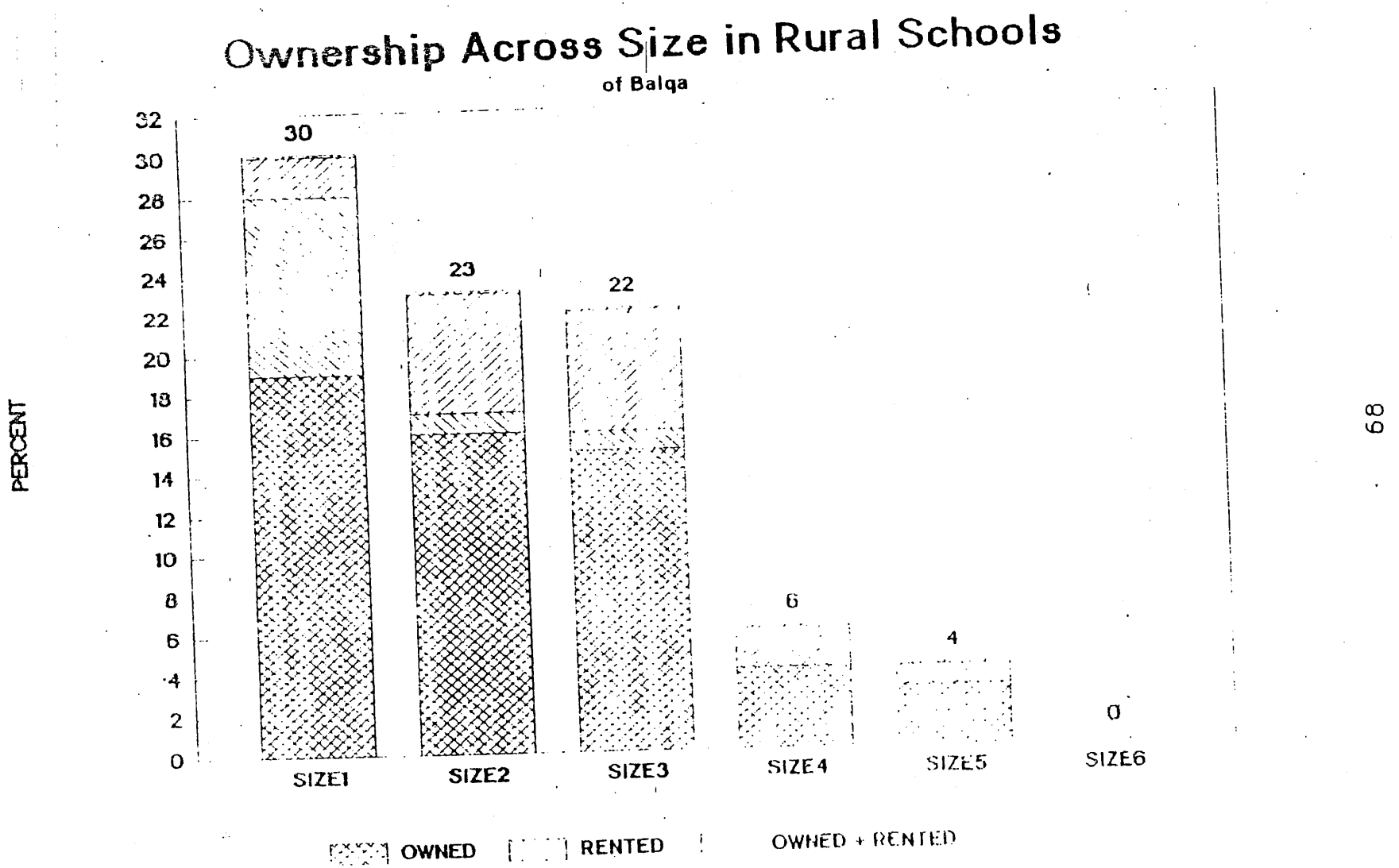

Ownership Across Size in Urban Schools
of Balqa (N = 44)
PERCENT
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
5
14
12
6
5
2
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
OWNED
RENTED
OWNED + RENTED

Figure 11


Ownership Across Size in Rural Schools
of Balqa
PERCENT
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
30
23
22
6
4
0
SIZE1
SIZE2
SIZE3
SIZE4
SIZE5
SIZE6
OWNED
RENTED
OWNED + RENTED

Urban Schools of Balqa

Figure 10 presents the ownership status of schools in each size-category in the Urban schools of Balqa Directorate. Forty-four (34.1%) of all 129 MOE's basic and secondary academic schools in Balqa Directorate are located in the urban areas. Nineteen of them (44), that is, (43%), are of Size 1 or Size 2, in other words, these schools have number of students varying from as little as 15 to the maximum of 200. We may, for the sake of convenience, label them as small schools, actually too small to be economically viable or pedagogically sound.

We have another 12 (27%) schools which have number of students ranging from 201 to 400 and again, for the sake of convenience, we call them as schools of moderate size. There are 6 (14%) schools which have enrollments ranging from 401 to 600. We refer to them as medium-sized schools.

Then , we have 7 schools which enroll more than 600 students each; five of them have 600 to 800 students while the other two have over 800 but less than 1000; we call them large schools.

We note that there are no urban schools in Balqa which are both owned and rented. More importantly, we note that out of the 19 small schools only 3 (16%) are in MOE-owned buildings, by far the largest portion of them (84%) are housed in rented buildings. In contrast, exactly half (six out of twelve) of the moderate-sized schools and one-third (two out of six) of the medium-sized schools operate in rented buildings, but all the seven large schools, are housed, fortunately, in the MOE-owned buildings.

Rural Schools of Balqa

A graphic presentation of the ownership status of Balqa's rural schools in each size-category is given by Figure 11. Eighty-five (65.9%) of all the 129 schools in Balqa are located in rural areas. Thirty out of 85, i.e., 35% of the rural schools have less than 100 students. Another set of 23 schools (27% of the rural schools) belongs to Size 2 category (101 - 200 students). Adding Size 1 and Size 2 schools together the small schools number 53, that is, 62% of the rural schools and 41% of all the schools in the directorate. Out of these 53 small rural schools, 35 are owned, 8 owned+rented, and 10 wholly rented.

There are 22 (26%) moderate size (201 - 400 students) and 6 (7%) medium size (401 - 600 students) schools among the 85 rural schools in Balqa. Out of the 22 moderate size schools 15 are owned, 6 owned+rented and one wholly rented; while

among the 6 medium size schools 4 are owned and two owned+rented.

Finally, there are four large size schools having student enrollments ranging from 601 to 800 students; three of them are owned and one is rented. There are no Size 6 schools in the rural areas of Balqa Directorate.

TOWARDS POLICY GUIDELINES

ntroduction

Since the major thrust of this exercise is to suggest how the MOE's educational latabase can be utilized to assist policy-makers in their school-construction-policy lecisions, in the sections that follow we suggest some general policy guidelines which merge from our examination of the Balqa directorate's data.

As it presently stands the MOE is committed to replace all the rented school uildings as well as to solve the problem of double shift schools. Besides, the MOE has ecided to enhance the quality of existing schools by providing adequate library, aboratory, multipurpose workshop, and AV/TV room facilities to all the basic and econdary schools within the ten-year education reform period.

In theory the policy sounds very good and the intentions commendable, but to put he policy into practice and deliver the promised goods is fraught with formidable roblems and intractable dilemmas. There are many hazy zones which need to be seen hrough more clearly before practicable policy decisions can be adopted.

Vhat is Basic School?

Let us take, for example, the concept of Compulsory Basic Education Cycle. It is ear-cut. ten years of education from the beginning of Grade 1 to the end of Grade 10. ow, extend this concept to Basic School. Obviously a basic school is the one which rovides schooling from Grade 1 through Grade 10. But is that so in reality? For the ame country the grim situation of fragmented lopsided schools was shown in Table A nd discussed earlier. Let us have a look at schools in the directorate of Balqa. To do so e will examine three types of information related to two distinct but related facets of the ame coin.

The first is the lowest grade in the school which is vital to answer the questions: o all basic schools start from Grade 1? Perhaps anybody who has anything to do with ur schools would tell you that the answer is No. But, that is besides the point.

The second is the highest grade in the school which in compliance with the Basic nd Secondary Cycles should be either 10 or 12.

The third type of information derives from the preceding two types. Following the elementary-, primary-, and secondary-stage classification of pre-university education, prevalent in Jordan so far, we constructed cycle variable multicotomized into 6 mutually exclusive categories or cycles as follows:

1. Cycle 1 contains schools with all possible combinations of Grades 1 through 6. A Cycle 1 school may have all the six grades or any number of them from 1 through 6, for instance only Grades 2 and 3, or Grades 2, 5 and 6, or only Grade 6 and so forth.

2. Cycle 2 contains all schools with all combinations of grades from 7 through 9 inclusive.

3. Cycle 3 contains all schools with all combinations of grades from 1 through 9 excluding schools which have been included in the former cycles, 1 and 2.

4. Cycle 4, like cycles, 1 and 2, contains all schools with all combinations of grades from 10 to 12 inclusive.

5. Cycle 5 contains schools with all combinations of grades, 7 through 12, excluding schools which have been included in cycles 2, 3, and 4.

6. Finally, Cycle 6 includes all schools having any combinations of grades, 1 through 12, which have not been included in any one of the preceding five cycles.

Relevant information pertaining to frequency distributions of schools according to the lowest class , highest class and cycle for Balqa Directorate is given in Tables 12,13, and 14, respectively.

Table 12
Frequency Distribution of the Lowest Class Among Balqa's MOE Schools

Lowest Class	Frequency	Percent	Valid Percent	Cum. Percent
1	83	64.3	64.3	64.3
2	2	1.6	1.6	65.9
3	7	5.4	5.4	71.3
4	13	10.1	10.1	81.4
5	9	7	7	88.4
6	1	0.8	0.8	89.1
7	4	3.1	3.1	92.2
8	2	1.6	1.6	93.8
9	1	0.8	0.8	94.6
10	6	4.7	4.7	99.2
11	1	0.8	0.8	100
Total	129	100	100	-

Table 13
Frequency Distribution of the Highest Class Among Balqa's MOE Schools

Highest Class	Frequency	Valid Percent	Cum Percent
2	2	1.6	1.6
3	5	3.9	5.4
4	13	10.1	15.5
5	7	5.4	20.9
6	24	18.6	39.5
7	3	2.3	41.9
8	3	2.3	44.2
9	25	19.4	63.6
10	17	13.2	76.7
11	5	3.9	80.6
12	25	19.4	100
Total	129	100	-

Table 14
Distribution of Balqa's MOE Schools Among Six Cycles

Grade Range	Cycle	Frequency	Valid Percent	Cum Percent
grade 1 to 6	1	51	39.5	39.5
grade 7 to 9	2	3	2.3	41.9
grade 1 to 9	3	28	21.7	63.6
grade 10 to 12	4	7	5.4	69
grade 7 to 12	5	4	3.1	72.1
grade 1 to 12	6	36	27.9	100
	Total	129	100	-

First we examine Table 12 and find that in Balqa Directorate we have schools starting from every possible grade from 1 through 11. It is encouraging, however, to see that 83 (64%) of the 129 schools start from Grade 1. On the other hand, 7 (5%) of the schools start from Grade 3; 13 (10%) start from Grade 4; 9(7%) start from Grade 5; 4 (3%) from Grade 7 and so on.

In the same vein Table 13 shows the frequency of schools with highest Grade varying from Grade 2 through Grade 12. For example, 51 (40%) of the MOE schools in Balqa provide schooling only up to Grade 6 or less; in fact , two schools have Grade 2 as the highest grade, five schools have Grade 3, and as many as 13 schools have Grade 4 as the highest grade. Of all the 129 MOE schools in Balqa 82 (approx. 64%) or nearly two thirds provide schooling at the highest up to Grade 9 or less, in most cases much less.

Table 14 presents the frequency distribution of the 129 Balqa schools with respect to the six categories of the previously defined variable Cycle. This gives a clearer picture of the situation by telling us the exact number of schools belonging to each of the six cycles. For example, we can see that 51 schools have classes only up to Grade 6 and 36 schools have classes starting anywhere from Grade 1 through Grade 6 and ending at either Grade 10 or Grade 11 or Grade 12. Table 14, however, cannot tell us how many of the 36 secondary schools have what range of grades. For this type of breakdown we compute Lowest Class by Highest Class cross-tabulation of schools as given in Table 15.

Distribution of Schools With Respect To Grade Range

The numbers in the 31 cells of Table 15 clearly show that according to grade-range Balqa directorates' MOE academic schools can be classified into 31 distinct categories . In each cell there are four numbers . The number at the top is the count of schools in a particular category. The second number from the top tells the row percentage , the third tells the colunm percentage, and the fourth gives the total percentage. As an illustration

we take the cell defined by Row 4 and Column 11. The Digit 2 at the top in the cell tells us that there are 2 schools which have Grade 4 as the lowest class and Grade 11 as the highest class. The next figure below 2 is 15.4 . This tells us that these 2 schools make 15.4% of all the 13 schools that start from grade 4 irrespective of their highest classes . The third number in the cell is 40.0 . This says that the 2 schools in this cell make 40% of the 5 schools which have grade 11 as their highest class . The last number in the cell is 1.6 which tells us that the 2 schools in this category make 1.6% of all the 129 schools in Balqa Directorate .

Table 15

Distribution of Balqa's MOE Schools According to Grade-Range Defined by the Lowest and the Highest Class in Each School.

Lowest Class		Highest Class											
		2	3	4	5	6	7	8	9	10	11	12	Row Total
1	Count	2	5	13	7	22	3	2	18	5	1	5	83
	Row %	2.4	6	15.7	8.4	26.5	3.6	2.4	21.7	6	1.2	6	64.3
	Col %	100	100	100	100	91.7	100	66.7	72	29.4	20	20	
	Tot %	1.6	3.9	10.1	5.4	17.1	2.3	1.6	14	3.9	0.8	3.9	
2	Count									2			2
	Row%									100			1.6
	Col%									11.8			
	Tot%									1.6			
3	Count								2	5			7
	Row%								28.6	71.4			5.4
	Col%								8	29.4			
	Tot%								1.6	3.9			
4	Count					2			1	4	2	4	13
	Row%					15.4			7.7	30.8	15.4	30.8	10.1
	Col%					8.3			4	23.5	40	16	
	Tot%					1.6			0.8	3.1	1.6	3.1	
5	Count								1		2	6	9
	Row%								11.1		22.2	66.7	7
	Col%								4		40	24	
	Tot%								0.8		1.6	4.7	
6	Count							1					1
	Row%							100					0.8
	Col%							33.3					
	Tot%							0.8					
7	Count								2	1		1	4
	Row%								50	25		25	3.1
	Col%								8	5.9		4	
	Tot%								1.6	0.8		0.8	
8	Count								1			1	2
	Row%								50			50	1.6
	Col%								4			4	
	Tot%								0.8			0.8	
9	Count											1	1
	Row%											100	0.8
	Col%											4	
	Tot%											0.8	
10	Count											6	6
	Row%											100	4.7
	Col%											24	
	Tot%											4.7	
11	Count											1	1
	Row%											100	0.8
	Col%											4	
	Tot%											0.8	
	Column Total	2 1.6	5 3.9	13 10.1	7 5.4	24 18.6	3 2.3	3 2.3	25 19.4	17 13.2	5 3.9	25 19.4	129 100

Now, having confronted a wide variety of schools defined in terms of grade range , we return to the question raised earlier ; what is a basic school ? Is it the school that has all the grades , 1 through 10 ? If we accept this definition then we have only 5 full

fledged basic schools in Balqa . But what about schools which do not have Grade 1 , instead their grades range from 2 to 10? It seems reasonable to include them too . We have 2 such schools . Then,there is a group of 5 schools which have grades ranging from 3 to 10, while yet another set of 4 schools has grades ranging from 4 to 10, and finally, there is one school which has grades from 7 to 10 . This is about the schools which do have grade 10 as their highest class.

Furthermore, what about the schools that have 9th grade as the highest class? The bottom row of table 15 under Column 9 shows that there are 25 (19.4%) such schools in Balqa, of them one school has only 2 grades , 8th and 9th . Two of them have only 3 grades , 7th to 9th , and so the picture goes on . However, at least 18 out of 25 schools in this category do start from the first grade.

On the other side , at the bottom of the ladder we have schools that have only the first two grades (1 and 2) ; schools that end up at Grade 3, Grade 4 and so on . As a matter of fact, 49 (38%) of all the 129 MOE schools in Balqa Directorate end up at grade 6 or below.

The crux of the matter is that we are not concerned here with the polemics of the theoretical definition of Basic School as one might get the impression from the preceding discussion, on the contrary, our principal interest revolves around the practical applications of the definition as might arise in policy decisions about construction of new school buildings or adding annexes and facilities to the old ones . The classification of schools in Table 15 makes the picture quite clear and brings each detail in focus.

Above all, Table 15 makes one thing startlingly clear . That is the fact that due to some reason or the other there are very few full-fledged basic or secondary schools covering complete range of grades, 1 through 10, or 1 through 12 . As discussed earlier in the context of the fragmentation problem in the whole country it seems that in Balqa also almost all the schools, with a few exceptions of course , have been subjected to some sort of mutilatory process ; some schools have their stem chopped off, others their crests, and yet others have been indiscriminately lopped off from both ends.

Whatever the factors that gave rise to this unsavory phenomenon one cannot deny the fact that wherever there is a small fragmented school e.g., 6 to 8, or 8 to 9, or 1 to 3 classes only, there must be other complementary fragmented schools to accommodate the other grade-classes because it is awfully hard to find a populated area where all the children are of the same age.

MICRO-ANALYSIS OF BALQA'S SCHOOLS

In order to take a closer look at the school size phenomenon in Balqa Directorate we tabulated the urban and rural schools separately according to the following characteristics of interest :

1. The gender of the school, whether it is boys school or girls school or coed school.

2. Ownership of the school building, whether it is owned or rented by the MOE, or owned+rented i.e., MOE-owned building augmented by some rented rooms.

3. The shift , if the shift code is 2 then the school building is used by two schools under the double shift conditions.

Table 16

Gender, Ownership, Grades, Enrollment, and Shift of the 44 Urban Schools in Balqa's Directorate

	Male				Female				Co-ed			
	Owned N = 9		Rented N = 5		Owned N = 8		Rented N = 9		Owned N = 3		Rented N = 10	
	Grades	Enrol.	Grades	Enrol.	Grades	Enrol.	Grades	Enrol.	Grades	Enrol.	Grades	Enrol.
	(1-10)	560	(1-3)	128	(1-7)S	419	(1-3)	106	(1-5)S	428	(1-3)	147
	(2-10)	797	(1-3)	137	(8-9)	73	(1-4)	177	(1-6)	80	(1-4)	54
	(4-10)	251	(1-4)	124	(1-12)	852	(1-4)	175	(1-8)	279	(1-4)	31
	(7-10)	732	(1-4)	127	(1-12)	982	(1-6)	201			(1-5)	67
	(4-11)	714	(4-6)	527	(8-12)	360	(1-7)	341			(1-6)	181
	(1-12)	501			(9-12)	235	(1-9)	334			(1-6)	192
	(4-12)	317			(10-12)	117	(6-8)	147			(1-6)S	194
	(10-12)S	742			(10-12)	386	(7-9)	127			(1-6)	241
	(11-12)	618					(7-9)	202			(1-6)	481
											(1-8)	280
Total	5232		1043		3424		1810		787		1868	
X	581.33		208.6		428		201.11		262.33		186.8	
Md.	618		128		373		177		279		186.5	

Note : S indicates a second shift school.

Micro-Ananlysis of the Urban Schools of Balqa Directorate

Table 16 shows the specific information about the gender, ownership , grades , enrollment, and shift of each of the 44 urban area schools in the Balqa Directorate. The following facts emerge:

1. Only one boys school and two girls schools have full rage of grades (1-12). All the three meet in owned buildings under single shift conditions. The girls schools have enrollments 852 and 982 while the boys school has enrollment of 501 students.

2. All the owned male schools have either 10th or 11th or 12th grade as the highest class but their lowest classes vary from Grade 1 to Grade 11.

3. There are five rented male schools; two have grades (1-3) and two grades (1-4), while one school has grades (4-6) . The student enrollment in the first four of the rented schools is limited within a narrow range (124-137) ; the enrollment of 527 in the fifth school , however, considering that it has only grades (4-6) is quite substantial.

4. Two of the nine owned male schools share the same building under double shift conditions , therefore, actually there are only eight owned male school buildings.

5. Of the eight owned female schools, six are up to Grade 12, one up to Grade 9, and one up to Grade 7 only . Two of them start from Grade 10, one from Grade 9, two from Grade 8, and three from Grade 1.

6. Two of the eight owned female schools share the same building , therefore, there are only seven school buildings.

7. With the exception of two large schools, all the owned girls schools are of small or moderate size.

8. Six of the nine rented female schools start from Grade 1 , one from Grade 6, and two from Grade 7; their highest grades vary from Grade 3 to Grade 9. Most of the rented schools are of small or moderate size.

9. There are 13 coeducation schools, only three of them meet in the MOE owned buildings, two of the three meet in the same building under double shift conditions so, there are only two owned coed school buildings.

10. All the 13 coed schools start from Grade 1 but their last grades vary from 3 to 8.

11. All the coed schools are of small size, except two , one housed in a double shift owned building and the other in a rented building. They have enrollments of 428 and 481 students respectively . The former of the two has grades (1-5) and the latter grades (1-6).

Micro-Analysis of the Rural Schools of Balqa Directorate

The detail about the gender, ownership, grade range, enrollment, and shift characteristics of each of the 85 rural schools are given in Table 17.

Table 17

Gender, Ownership, Grades, Enrollment, and Shift of the 85 Rural Schools in Balqa Directorate

	Male			Female			Co-ed		
	Owned N = 19	Rented N = 0	Ow.+Ren. N = 6	Owned N = 11	Rented N = 3	Ow.+Ren. N = 3	Owned N = 27	Rented N = 9	Ow.+Ren. N = 7
	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.	Grades Enr.
	(1-4) 308		(1-5) 463	(1-4) 138	(1-9) 129	(1-12) 390	(1-2) 144	(1-2) 81	(1-4) 82
	(1-10) 329		(1-9) 129	(1-4) 462	(4-10) 224	(3-10) 162	(1-4) 308	(1-3) 100	(1-9) 102
	(2-10) 232		(1-9) 169	(1-6) 394	(10-12) 717	(5-12) 509	(1-4) 246	(1-5) 37	(1-9) 135
	(3-9) 58		(1-11) 353	(1-9) 66			(1-4) 238	(1-5) 42	(1-9) 126
	(3-9) 161		(4-6) 46	(4-9) 538			(1-5) 44	(1-5) 52	(1-9) 220
	(3-10) 252		(5-12) 362	(4-12) 152			(1-6) 163	(1-6) 31	(1-10) 226
	(3-10) 118			(4-12) 349			(1-6) 130	(1-6) 27	(1-12) 264
	(3-10) 120			(5-11) 193			(1-6) 76	(1-6) 30	
	(3-10) 102			(5-12) 271			(1-6) 15	(1-9) 58	
	(4-10) 137			(7-12) 296			(1-6) 57		
	(4-10) 109			(10-12)635			(1-6) 26		
	(4-11) 635						(1-6) 41		
	(4-12) 310						(1-6) 29		
	(5-9) 76						(1-6) 28		
	(5-11) 208						(1-6) 26		
	(5-12) 323						(1-6) 39		
	(5-12) 620						(1-7) 34		
	(5-12) 386						(1-9) 27		
	(10-12)552						(1-9) 75		
							(1-9) 83		
							(1-9) 87		
							(1-9) 128		
							(1-9) 158		
							(1-9) 113		
							(1-9) 118		
							(1-10) 97		
							(1-10) 429		
Total	5036	0	1522	3494	1070	1061	2959	458	1155
Mean	265.1	0	253.7	317.6	356.7	353.7	109.6	50.9	165
Md.	232	0	261	296	224	390	83	42	135

Each individual column of Table 17 is defined by the gender and ownership status of schools. Within each column each school is characterized by two characteristics:

grade composition and enrollement. A close look at the columns of Table 17 leads to the following conclusions:

1- The number of schools in the rural areas of Balqa Directorate is twice as much as in the urban areas.

2- With notably few exceptions most schools are of small size.

3- Only two of the 85 rural schools have full range of classes (1-12), both of them are co-ed schools; one is housed in a rented building and the other in owned+rented.

4- Owned+rented is the dominant mode of ownership; half of the rural schools (43 out of 85) belong to this category.

5- Only 25 out of 85 schools (29%) are in completely owned buildings while the rest of them (60; 71%) are in either rented or owned+rented buildings.

6- None of the girls schools is housed in completely MOE-owned buildings.

7- Of the 16, 755 students enrolled in rural schools only 6558 (39%) are accommodated in the owned buildings; of the remaining 61% students, 5625 (34%) are in rented buildings and 4572 (27%) in owned+rented buildings.

8- The phenomenon characterized by fragmentation, renting, and small size seems to be a general rule rather than an exception in Balqa's rural schools.

DISCUSSION

As suggested in the earlier part of this paper, one might argue that intact schools have been lopped off and fragmented in the interest of accommodating outgrowth of students new schools created to meet in the same buildings under double-shift system or in rented buildings.

In the places and situations where the number of students have outgrown the existing school buildings' accommodation capacity and where alternative accommodation is either unavailable or unviable, it may be the only course of action to divide the school into two shifts in a way that the younger children (Junior classes) meet in one shift and

the older ones (Senior classes) in the other . This assertion though seems to be partially borne out by data at hand, does not explain fully the pervasiveness of the fragmented school phenomenon in the urban schools of Balqa Directorate.

Yet another argument which seems to have more explanatory power and at the same time seems to be upheld by the data under study is related to the rental school phenomenon. As is evident from Tables 16 and 17, almost all the rented schools are fragmented and small sized. It seems that as the demand for student places has increased the MOE has been attempting to accommodate the elementary and or primary classes in the rented buildings while maintaining the upper primary and secondary classes in the owned school buildings. This might have been driven by the fact that the secondary students are more in need of laboratory , library and other such facilities than are the elementary pupils.

This may be so, but it certainly does reflect an implicit bias against the quality of elementary education in preference to the quality of secondary education. The preference that cannot be defended by theoris and principles of educational or developmental psychology.

Moreover, this phenomenon is equally and perhaps even more rampantly pervasive in the rural areas of Balqa Directorate where there are no double-shift schools at all.

More particularly, there are hardly any full-fledged schools covering the entire basic and secondary grade range in the rural areas; nearly all the schools are fragmented and the majority of them is very small sized and housed in completely or partly rented buildings.

SCHOOL-BUILDING CONSTRUCTION POLICY PERSPECTIVE

Caveat

The type of simple analysis of the school size data of Balqa Directorate's urban and rural schools presented in the preceding sections will not substitute the need for on-the-spot-multiple perspective examination of schools in each precinct in conjunction with prevalent trends of other socioeconomic and demographic factors in the area. This, however, would undoubtedly provide the policy-makers certain definite policy perspectives and lines of action ensuing from each perspective . In spite of valuable preliminary or secondary level information this type of data can be used to provide, we must hasten to caution that one should not be mislead into thinking that these data, and

for that matter any kind of data, would provide definitive fool-proof solutions to policy problems or dictate policy makers cut-and-dried decisions because policy decisions are, generally, far more complex in nature and are often influenced more by a multitude of invisible forces than by fallible data and cold statistics that can be marshalled to justify or defend a policy.

At the same time, when utilized judiciously with proper caution, these data provide direction and much needed objectivity to the policy making process.

In our case , as stated in an earlier section, the main objective of this paper is to lay out a demonstration how simple MOE data could be brought to bear on policy-making for constructing school buildings and not to make policy decisions which is a tough job that the policy makers have to take on themselves.

Policy Considerations for Urban and Rural Schools

Having flagged the caveat we would now examine what suggestions related to policy guidelines can be derived from the data displayed in Tables 16 and 17.

Since schools are constructed for students, an essential prerequisite for school construction policy is to determine the present and future estimates (allowing for predictable fluctuations) of students for whom school accommodation will be required. In this regards, the data in Table 16 can be interpreted as follows:

1. Assuming that all the MOE-owned buildings are utilized to their full capacity, it follows that the MOE has to provide purpose-built school buildings for all the students who are at present housed in either the rented buildings (both shifts) or the second shift of the owned buildings.

2. In Balqa Directorate's urban area there are 4,721 students studying in the MOE-rented school buildings, and 1,589 students in three of the MOE-owned school buildings under double shift system. Thus, all together proper school accommodation needs to be provided for 6,310 students in Balqa Directorate's urban area alone. Besides , additional facilities need to be provided for the 7,854 students studying in MOE-owned school buildings with inadequate educational facilities.

3. This, however, does not include provision for the normal annual increment of student enrollments due to 4% (crude approximation) per annum population

growth of the country, an important factor that could not be ignored if realistic projections of demand for school accommodation are to be made.

4. Long term school planning, however, should take into consideration both short term and long term expected demographic changes due to urbanization and a host of other foreseeable factors.

POLICY GUIDELINES

Now, even without obtaining on-the-spot information regarding availability of space and other relevant facts required for adding new construction to existing school buildings, and information about regional and local development planning and foreseeable demographic trends, one can reasonably derive the following tentative guidelines for school construction policy for urban areas which have characteristics similar to those found in urban region of the Balqa Directorate.

1. Expansion of Existing School Buildings

Whenever existing school buildings allow horizontal and/or vertical extension, priority should be given to expanding the capacity of the existing buildings as much as possible rather than constructing new buildings on new sites because it would not only be initially economical, but more importantly it would increase the educational efficiency, enhance the potential of school effectiveness, and simultaneously lower the cost as well as boost the quality of education in general, both in the short run and in the long run. These benefits are expected to occur on account of the following:

(i) To start with, in most cases it would save the costs of new sites and their development.

(ii) As a result, a substantial decrease in the number of schools would significantly cut down the administration, maintenance and various other overhead costs.

(iii) Larger schools because of their increased overall capacity on the whole can enpool educational resources and facilities superior in terms of both quality and quantity which are vital elements for enhancing student achievement levels.

(vi) Larger schools lead to maximal utilization of available school facilities and resources.

(v) Feasibility and chances for flexible and creative redeployment of the teaching staff, necessary to increase educational efficiency and student achievement levels, are better in larger schools than in smaller ones.

(vi) Introducing innovative educational technologies is easier and better cost-effective in larger than in smaller schools.

(vii) Larger schools provide for increasing student/teacher ratios to optimal levels (student-teacher ratios in some small schools are woefully low). Increased student-teacher ratios lead to optimal utilization of teaching force, which in turn produces reduction in overall cost of education as well as cost per student without actually jeopardizing the quality of education.

(viii) Larger schools are more cost effective as costs per student are lower in larger schools due to scale economies. Also maintenance and operation costs per student are lower in larger schools.

2. School Sites

When it is not possible to solve the problem by extending existing school buildings then new building sites should be chosen with great care in such locations as would be easily accessible to students from a number of rented and/or double shift schools; this strategy entails designing a few conveniently placed medium or large size schools rather than a large number of small schools.

In respect of choosing school locations, the MOE has already set the following criteria of:

a. Priotiry to replacing crowded rented facilities.
b. Basic schools within 203 k.m. walking distance from the catchment area.
c. Secondary schools within 5 k.m. walking distance from the catchment area.

3. Maximal Grade Range

Regarding the range of grades from lowest to highest, schools should have full range of grades (1 - 12); or Basic Cycle range (1-10) and Secondary Cycle range (11 - 12); or (1 - 6), because coeducation is acceptable within that range, and (7-12) range; or some other combination considered logistically important and pedagogically sound. This, however, is a different but related issue, important in planning the design and requirements of school buildings, which needs thorough investigation in its own proper context before suggesting guidelines for using this variable in policy making.

4. Consolidation of Small Schools into Larger Central School Units

For rural areas with thinly scattered population, planning for school size and location can be far more complex than it appears at the surface. Although, by and large, the eight assertions enumerated in subsection I, in principle, apply to all regions but rather conservative social values and local political considerations in some rural areas, especially when each and every village in Jordan has statutory right to have a school, further complicate the matter.

This usually happens because of lack of clear understanding, misplaced sense of personal prestige, and clash of vested interests. For instance, while consolidation of small schools is necessary to create at least medium size schools in the interest of economic and educational efficiency, it is easy to see that no village would be readily willing to sacrifice the modicum of school it has and commute their children to another village.

Nevertheless, in the long run, the gains accrued over time due to improvements in cost-effectiveness,student learning, and overall educational quality produced by economies of scale would far outpay the little inconvenience and cost incurred for transportation of pupils to central schools.

Moreover, in medium size schools the lower instructional costs per student, increased learning of pupils, and enhanced satisfaction of teachers and parents (because both pupils and teachers prefer larger schools) would lessen the resistance of parents and win the support of politicians.

5. Malady of Too Many Too Small Schools

Although it is merely a hypothesis, it seems that sparesly populated rural areas of Jordan are suffering from a strange malady of too many too small schools. The symptoms are too few students, low student-teacher ratios, high costs per student, and yet disappointingly low levels of achievement; perhaps, because small village schools are poorer in learning resources, better quality teachers prefer larger city schools, usually underqualified inexperienced teachers are sent to remote village schools generally against their will where dissatisfied with their assignment and unmotivated to teach they serve their time merely waiting to be transferred to larger city schools with richer resources.

Moreover,the incredibly small size, and unreliable means of communication and transportation compounded with cumbersome remoteness further contribute to lack of facilities, poor administration, and ineffective supervision in many a rural area school.

It may not be applicable to all rural areas, but wherever feasible the concept of medium or large size, better equipped and more efficient central school serving a group of neighboring villages deserves serious consideration.

CONCLUDING REMARKS

In conclusion, once more we should like to emphasize that luxury of providing each village with its own little school in fact may impose heavy penalties on children's education as well as on public exchequer. For developing countries with severe budget constraints, a necessary prerequisite for being able to afford good schools is that they must be of the size that is economically viable as well as pedagogically sound. However, there will be some cases in very remote areas where a small school is the only way out, in such cases construction of small school should be considered, and flexible school planning policy adopted to the specific conditions of each remote area.

Linkage Between School Size and Construction Policy

Now what is the linkage between school size and school construction policy in Jordan? As stated at the very beginning of this paper the Government of Jordan under the auspices of Education Reform Program has undertaken to construct the equip approximately 400 new school buildings to provide accommodation for 434,000 students. This includes students presently studying in either rented buildings which are generally unsuitable for schooling or under double shift system which is considered an impediment in the way of school effectiveness. In addition, this also includes the provision for increased demand for school places due to the natural growth in population. The analysis of school size and grade structure has clarified the linkage between school size, fragmentation, renting and double shift phenomenon.

Renting and double shift system clearly arose because of increased demand for student places in the face of shortage of accommodation capacity in the existing schools in particular localities. Both of these measures contributed to the problems of small size and fragmentation. The curent policy of constructing new buildings to provide places for students presently housed in rented or double shift buildings has left the size and fragmentation problems untouched.

Needed Policy Shift

The current school constructions policy does not address any one of these issues at all. Evidently, even when the students from rented and double shift schools are housed in new school buildings, the size and fragmentation problems as they presently stand in

the MOE-owned schools will essentially stay the same.

A slight shift in the new school construction policy, however, can address all these issues simultaneously and more comprehensively. The policy shift can be epitomised in a simple statement.

Whereever the situation allows priority should be given to enlarging the existing school buildings instead of constructing whole new school buildings.

As explained earlier in most cases of rented schools, buildings were rented to accommodate increased enrollments where existing school buildings did not have enough capacity and ran out of classroom space. This type of action usually resulted in fragmenting the school into two, both having different grades, both staggered and small. Had it been possible to extend the existing school buildings to accommodate the additional grades, the schools would have developed in size and their grade structure would have become more comprehensive.

Now the reform program has provided an opportunity to rectify the past actions by adding required number of rooms to the existing school buildings and thus integrating the fragmented schools into wholesome units. Of course, this does not mean to add room to any schools, willy nilly. The existing schools, candidates for expansion, have to be in the right places within easy access to students studying in rented or double shift schools and they have to have room for extension and finally they have to fullfil any other conditions required for expansion.

This suggestion does not however, imply that no new school should be constructed at all, there will always be some situations which have no other solution but to construct a new school building.

Finally, it must be clear that no single policy measure by itself is going to solve the school size and fragmentation problems or educational quality and efficiency problems of all the schools in the country. But, all the same, the suggested policy measure would be an important step in the right direction.

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