

**AN INTERIM EVALUATION OF THE JORDAN VALLEY
DEVELOPMENT EFFORT: 1973-1980**

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PREFACE

This study was conducted in Jordan during the spring and summer of 1980, by a team of four professionals, who have worked closely with the staff of the Planning and Analysis Unit of the Jordan Valley Authority (JVA). While every attempt has been made to comprehensively describe and evaluate the impacts of the Jordan Valley development effort during the past seven years, it should be emphasized that this objective had to be frequently compromised, either because of the fact that some of the projects involved were not yet fully operational, or because not enough time has elapsed since their completion to allow a rigorous evaluation. The usual complaints of lack of time, resources and data apply as much to this study as they do to any other similar effort.

This study would not have been possible without the support, cooperation and involvement of many organizations and individuals. First and foremost among those are the management and staff of the Jordan Valley Authority. Special acknowledgments are due to Mr. Omar Abdallah, President; Dr. Munther Haddadin, Senior Vice President; Dr. Mohammad Adwan, Vice President for Administration; and Dr. Ahmad Abu-Shaikha, Assistant to the President for Planning and Programming. The staff of JVA's Planning and Analysis Unit, especially Mr. Isam H. Ali and Miss Maysoon Kahoosh, have provided significant assistance and made major contributions to the completion of this study. Support and unlimited assistance were also offered to the team by the staff of the USAID mission in Amman, Jordan. Our particular appreciation goes to Miss Lois Richards, whose unrelentless support was vital to the timely completion of this study. The diligent and careful typing of Mrs. Duc Wong has rendered the arduous task of putting together a manuscript of this size, a real pleasure.

Needless to say, the members of the team have contacted many individuals during their stay in Jordan. These include many central and local government officials, university professors, businessmen, private entrepreneurs, farmers, laborers, and others in many walks of life. To all of them, we are indebted for their hospitality, cordiality, frankness, and assistance. Any errors or oversights remain, of course, to be the responsibility of the authors.

Jarir S. Dajani
Team Leader

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August 1980

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CONCLUSIONS AND RECOMMENDATIONS

This report has reviewed the development of the East Jordan Valley over the period, 1973 to 1980. The findings are intended to provide a basis for evaluating seven projects which were funded by USAID: East Ghor Canal Extension, Zarqa Triangle Irrigation, Sprinkler Irrigation Equipment, Three Village Development Projects and the Yarmouk-Dead Sea Road. The general conclusions and recommendations of the study are presented below.

1. DEVELOPMENT PLANNING

Conclusions

The development plan for the East Jordan Valley (Stages I and II) is based on an estimated 420,000 dunums of irrigable land (assuming sprinkler irrigation). Available water under full development, however, is estimated to be sufficient to irrigate only 360,000 dunums. Moreover, a decision to divert irrigation water to municipal and industrial uses in the highlands has further reduced the amount of land that can be irrigated under full development to 300,000 dunums.

In 1976, a total of 186,590 dunums were under irrigation in the East Jordan Valley. Projects included in Stage I Development would increase the total irrigation capacity to 247,060 dunums, of which 106,470 dunums would be connected to a pressure system suitable for sprinkler irrigation. By the Fall of 1979, 242,860 dunums had been brought under irrigation by the completion of Stage I Development projects, of which 93,970 dunums were to be irrigated from the pressure system.

Thus, between 1976 and 1979, there was about a 30 percent increase in irrigation capacity in the East Jordan Valley. Approximately half of this increase was due to the 18 km East Ghor Canal Extension and the Zarqa Triangle Irrigation projects. However, because of the severe droughts of 1978 and 1979, and delays in completing the land redistribution programs for some of the Stage I Development projects, most of the new lands were not brought under irrigation in the 1979-80 crop season and the pressure system was not activated. Therefore, it is not possible to evaluate the impact of the Stage I projects (including the East Ghor Canal Extension, the Zarqa Triangle Irrigation, and Sprinkler Irrigation Equipment projects) on farm output, employment, and income.

The development plan for the East Jordan Valley projects a population (adjusted downward for the loss of irrigated land due to diversion of irrigation water) of 122,500 or 21,491 families, of which 15,919 would be farm families. Farm holdings would total 9,031 and the average size would be 21.3 dunums in the area of the original East Ghor Canal Project and 49.6 dunums in the area included in Stage I and Stage II Development. Thus, the average number of farm families per holding would be 1.65.

The development plan for the East Jordan Valley projects an increase in cropping intensity in the Valley from 106 to 131.6 to be accompanied by changes in the cropping pattern, placing more emphasis on field crops and fodder and less emphasis on vegetables, and a sharp rise in yields. These changes are projected to result in an increase in total agricultural output of 939,260 tons by the end of the projection period (1998) of, of which 24 percent would be due to the projected increase in yields, 33 percent to the projected increase in irrigated area, and 43 percent to the projected change in the cropping pattern.

The decision to divert irrigation water to municipal and industrial uses in the highlands will, of course, alter the capacity of agriculture in the Valley to fulfill the plan goals. In addition, as described below, important changes have been taking place in the Valley in response to market forces, including an increased emphasis on the production of vegetables and the adoption of drip irrigation and cultivation under plastic covers. These changes also need to be analyzed in terms of their impact on the plan.

Recommendations

There needs to be a careful reworking of the development plan for the East Jordan Valley to incorporate the expected impact of changes that have already taken place in Valley agriculture. These include the decision to divert irrigation water to municipal and industrial uses in the highlands, thus reducing the potential irrigable area from 360,000 to 300,000 dunums, as well as the adoption of drip irrigation and cultivation under plastic covers which have been made in response to market forces and which will impact the cropping pattern, yields, and input requirements.

2. LAND REDISTRIBUTION

Conclusions

The legal basis for the program of land redistribution mandated to accompany the completion of irrigation projects in the East Jordan Valley is set forth in a series of laws culminating in Law 19 of 1977. The redistribution program seeks to limit the minimum size of holdings in project areas to 40 dunums in the Stage I and II Development areas and to 30 dunums in the area of the original East Ghor Canal project, and to restrict the maximum size of holdings in these areas to 200 dunums. In addition, the program seeks to consolidate holdings to avoid fragmentation and to increase the number of landowners in the project areas to the extent feasible.

Data pertaining to land holdings were examined for the original East Ghor Canal project area and for the area of the 18 km Extension to the East Ghor Canal. It was concluded that the land redistribution program is being carried out in an efficient manner in accordance with the provisions of the law, and is resulting in: (1) a reduction in the average size of holdings; (2) the creation of a modest number of new holdings, giving ownership of irrigated land to previously landless farmers; and (3) elimination of fragmentation of holdings by consolidating previously dispersed holdings into a

single contiguous area. Thus, it was concluded that the land redistribution program is addressing both the efficiency and equity concerns which gave rise to it. One indication of the impact of the program is that the percentage of farm holdings in the Valley of more than 40 dunums in size fell from 27.8 percent in 1975 to 21.7 percent in 1978.

It was also concluded that the transfer of ownership of holdings into the names of individual family members in anticipation of the redistribution program has substantially lessened the impact of the program in reducing the concentration of ownership by families. Such transfers not only have reduced the amount of "excess" holdings (i.e., holdings above 200 dunums), limiting thereby the land available for redistribution, but have also increased the number of holdings below the minimum size farming unit (i.e., 30 or 40 dunums), thus creating more rights to additional land allotments than can be fulfilled.

The 1975 freeze on the transfer of land titles in the East Jordan Valley eliminated this option, but not before many holders in the Stage I Development projects areas had taken advantage of the opportunity provided to reduce the impact of the land redistribution program. In the southern portions of the Valley, however, the 1975 freeze on land transfers took place before many holders realized that their lands might be included in Stage II Development projects. Thus, if the freeze is maintained and enforced, there may be many more opportunities in the future for the land redistribution program to be effective in creating new ownerships.

Finally, it was found that the land redistribution program for several of the Stage I Development projects was not completed even though the irrigation works were finished. This resulted in a delay in bringing the new lands under irrigation.

Recommendations

The 1975 freeze on transfer of title to land in the East Jordan Valley should be maintained and enforced. Every effort should be made to complete the land redistribution program as soon as possible after the project has been finished to avoid inordinate delays in bringing the new lands under irrigation.

3. LAND TENURE

Conclusions

Between 1975 and 1978, census data reveal that the tenancy pattern in the middle sub-region of the East Jordan Valley, where the Stage I Development projects were underway, changed to resemble more closely the tenancy pattern found in the north, where development had already occurred. The existing pattern in the north and the emerging pattern in the middle sub-region is one of predominant owner-operation, with fixed fee rental being more prevalent in the remaining area in the north and sharecropping being more prevalent in the remaining area in the middle sub-region. The south continues to be dominated by sharecropping, although there has been a slight increase in the incidence of owner-operation. Fixed fee rental appears to be on the decline in the south.

An owner has four basic options in the use of his land: resident owner-operation; nonresident owner-operation (employing a professional manager); operation by sharecropping; and operation under a fixed fee rental contract. Each option is distinguished by the degree of involvement in the farming operation, the potential returns, and the degree of risk assumed.

The analysis of tenancy in the East Jordan Valley showed that the land-holding group includes a number of functionally distinctive groups: non-cultivating owners who supervise and may assist in cultivation but who do not necessarily reside on the farm, but rather commute from elsewhere in the Valley or the nearby highlands; owners who reside on their farm at least during the cultivation periods and farm their own land with their families; and owners who cultivate their own land and lease or sharecrop the land of others. (The last two groups often spend at least a portion of the year in nonfarm work in or outside of the Valley.)

The complexity of tenancy patterns in the East Jordan Valley also is indicated by the fact that one individual may sharecrop, work as a seasonal farm worker for wages, work as a non-agricultural laborer part of the year, and cultivate a small holding of his own. Thus, it is misleading to think of work and ownership categories as people. They are not necessarily people, but instead are functional relationships which each individual selects to suit his own needs.

The study examined the characteristics of sharecropping as found in the Valley. It was concluded that: (1) sharecroppers and their landlords have a close working relationship; (2) sharecropping arrangements do not result in a misallocation of resources; (3) sharecropping does not appear to retard investment in new farming technology; and (4) sharecropping does not result in lower returns to the farm enterprise.

However, it was concluded also that the equity implications of sharecropping in the East Jordan Valley are less clear than the efficiency implications. While sharecropping does not appear to lead to inefficiency, equity under sharecropping may be impaired not by the dependence upon the landlord for access to land (as is commonly believed), but by dependence on the landlord, the commission agent, or others for access to the inputs required for modernized farming.

Transition from a traditional to a modernized agriculture gives rise to the need for working capital and investment credit. While there is no overall lack of credit availability in Jordan, there is evidence that small farmers, particularly tenants, have difficulty in gaining access to credit or are forced to rely on non-institutional, unsupervised sources.

Credit policy was found to play a major role in restricting the availability of institutional credit to small farmers and tenants. The major barrier to the participation of small farmers in existing institutional credit programs (e.g., the Agricultural Credit Corporation and the Jordan Valley Farmers Association) is the collateral requirement, including either a pledge of real estate or co-signatures. Inability to secure a written lease (an alternative to the pledge of real estate or obtaining co-signatures)

and the certification of farm management responsibility (required for membership in the JVFA) prevents tenants from gaining access to credit and other input services.

Given the tight labor situation in Jordan and the relative scarcity of knowledgeable and capable farmers, the benefits from public investment in irrigated agriculture should go to those with the knowledge and ability to realize the full potential of the land and water resources. Realization of these benefits, however, will require that the farmer be able to gain access to credit and other inputs (including knowledge of how best to utilize these inputs) required for modernized farming. If tenants are forced to rely on their landlords to obtain such access, their bargaining power will be reduced and the benefits they receive will be diminished.

Recommendations

Every effort should be made to ensure that tenants, as well as small owner-operators, have access to supervised, institutional credit and to other inputs required for modernized agriculture. One means of accomplishing this objective is for the Jordan Valley Authority to enforce, by withholding of water if need be, the existing requirement that tenants be given a written lease. In addition, as soon as possible, arrangements should be made which would permit farmers to obtain seasonal credit on the basis of crop collateral. The written lease, rather than the certification of management responsibility, should be a condition for membership in the JVFA and for participation in its services, including access to modern farm inputs.

4. CULTIVATION TECHNIQUES

Conclusions

In the past few years, there has been a rapidly expanding use of drip irrigation in the East Jordan Valley, particularly in the southern portion which is irrigated from privately owned wells and lies outside of the areas included in the Stage I Development projects. The principal crop grown under drip irrigation is tomato, which is often intercropped with other vegetables. The major advantage of drip irrigation is that it provides for greater water control and more efficient utilization of water. This accounts for the fact that drip irrigation is found mainly in the south where water comes from wells and is scarce relative to irrigable land.

Drip irrigation also makes possible much higher yields, although the increase in yields may result as much from the fact that the use of drip irrigation is accompanied by the use of plastic mulch as it does from the impact of drip irrigation per se. Drip irrigation also enables the application of fertilizer in solution directly to the roots of the plant, providing for more efficient and effective fertilization.

The pressure system being developed in connection with Stage I and II Development can be used with other types of irrigation systems. As noted previously, the development plan for the Valley calls for the introduction of overhead sprinkler irrigation, and the USAID assistance has enabled the

Jordan Valley Authority to purchase portable sprinkler equipment sufficient to irrigate 93,100 dunums. However, to date there has been very limited use of sprinklers in the East Jordan Valley. There have been reports of farmer resistance to the use of sprinklers. The primary concern appears to stem from fears that sprinkling of tomatoes, cucumbers, and squash will result in fungus and disease problems and cracking of tomato skins. The concerns of farmers have been substantiated in the reports of consultants who have visited the Valley.

While the potential problems created by sprinkler irrigation have been recognized for several years, only limited efforts have been made to conduct field research in the Valley on the impact of sprinkling on the principal vegetable crops being grown. Little progress has been made in developing the production package required to make sprinkler irrigation successful. The results of a limited crop trial of sprinklers as compared with surface and drip irrigation showed sprinklers to give poorer results in terms of yield. While this test was quite limited, it demonstrates the need for more extensive field research.

In short, Valley farmers have reason to be skeptical of sprinkler irrigation. In the absence of convincing evidence of the merits of sprinklers, it is unlikely that Valley farmers will move rapidly to adopt sprinkler irrigation. One might take the position adopted by the Jordan Valley Authority, that farmers are free to adopt whatever irrigation system they desire. However, it should be recognized that the attainment of several goals in the development plan is conditioned on the adoption of sprinkler irrigation. For example, the changes planned for the cropping pattern, in particular, greater emphasis on cultivation of field crops and fodder, will require a move to sprinkler irrigation. In addition, sprinklers may be required to leach soils threatened by salinity buildup.

The most visible change in agriculture in the East Jordan Valley has been the rapid adoption of cultivation under plastic cover, which provides a number of advantages. It permits the production of weather sensitive crops during the winter, reducing the risk of frost damage, and enabling the produce to be marketed when prices are at their highest, thus increasing returns. It also extends the growing season, thus increasing yields.

In the 1979-1980 crop season, it is conservatively estimated that the area under plastic houses was about 1,000 dunums and the area under plastic tunnels was about 8,000 dunums. Over 90 percent of the area under plastic houses was devoted to cucumber production and over 70 percent of the houses were located in the middle sub-region of the Valley. About 44 percent of the area under plastic houses was irrigated by drip systems. Over 74 percent of the area planted under tunnels was devoted to cucumber production and the tunnels were used almost exclusively in the southern area of the Valley. About 70 percent of the area under tunnels was irrigated using surface systems.

It is evident that while cultivation under plastic tunnels more than doubles yields as compared with open field cultivation using surface irrigation, the primary advantage of tunnels is the ability to grow vegetables in the early winter season with less danger of frost damage. Drip irrigation combined with open field cultivation gives yields which are about double

those obtained from cultivation under tunnels, while cultivation under plastic houses makes possible yields which are more than three times as high.

Average prices received from vegetables grown under plastic covers are about twice those obtained from open field cultivation, with tunnels giving marginally higher prices than houses. The combination of higher yields and higher average prices means that plastic houses provide the highest gross revenue. Gross revenue from cultivation under plastic tunnels is about one-third of that obtained from cultivation under houses, due to the lower yields realized. Open field cultivation with surface irrigation gives the lowest gross revenues, while open field farming combined with drip irrigation increases yields about three-fold.

Production costs per ton under the different technologies does not vary as much as average price and yields. Drip irrigation provides the lowest production costs per ton with cultivation under tunnels having lower production costs than cultivation under houses. The lowest production costs per ton are obtained from open field cultivation with drip irrigation.

Differences in marketing costs per ton among the alternative technologies are due entirely to the differences in gross revenues per ton.

The alternative technologies yield widely varying net revenues. The differences in net revenue per ton are due almost entirely to variations in average prices realized, while the differences in net revenue per dunum reflect the additional impact of differences in yield.

Cultivation under plastic tunnels with drip irrigation gives net revenue per ton which is about 9 percent higher than that obtained from cultivation under plastic tunnels using surface irrigation or cultivation under plastic houses using either drip or surface irrigation. Cultivation under open field conditions with surface irrigation gives net revenue per ton which is only one-fifth to one-sixth as high as cultivation under plastic covers and about half that obtained from the use of drip irrigation with open field cultivation.

Net revenue per dunum for vegetables grown under plastic houses is as much as three times higher than under plastic tunnels, and drip irrigation appears to provide net revenue per dunum which is 40 to 50 percent higher than that realized using surface irrigation. Thus, the combination of cultivation under plastic houses using drip irrigation provides very high net returns per dunum, i.e., as much as JD 1,500 (\$5,600).

Investment costs for drip irrigation in 1977-1978 prices amount to JD 2,800 (\$9,500) per hectare, for tunnels about JD 867 (\$2,950) per hectare, and for houses about JD 17,180 (\$58,400) per hectare. It is conservatively estimated that costs today are about 20 percent higher than two years ago. However, investment in drip irrigation can be repaid (from net revenues per dunum) in one to two years, in plastic tunnels in one year or less, and in plastic houses in two to three years.

The study notes that cultivation practices in the East Jordan Valley are generally poor. Plant seed bad preparation is sub-standard. Irrigation ditches are dug to conform to the contours of the land rather than having the

land leveled so that the more efficient straight furrows can be used. Herbicides are not used. While fertilizer application is widely practiced, there is some concern that farmers may be applying inappropriate amounts of fertilizer or uneconomic nutrient source materials.

The effectiveness of pesticide application has been a matter of some concern in the East Jordan Valley. There is evidence of widespread serious plant disease problems in the Valley. While a considerable amount of pesticides are used in cultivation, the spraying programs are felt to be ineffective because the pesticides are applied using hand-pump, back-pack sprayers which reach only the upper surfaces of the leaves. In addition, the most effective compounds are not being used. Finally, the ineffectiveness of the pest control program also presents a potential problem of pesticide poisoning.

In summary, the intensification of agriculture in the East Jordan Valley including the adoption of cultivation under plastic covers and the use of drip irrigation, as well as the expansion in irrigated area, has occurred with little change in farming practices. As a result, the Valley now faces a number of serious problems which could threaten the long-term viability of the agricultural sector. Among the more serious problems are plant infestation and increasing soil salinity. The incentives provided by the market mechanism may not be sufficient to solve these problems, and, in some cases, may make such problems worse. Clearly, much remains to be done in terms of research on cultivation practices, on pest control, and on other cultural problems. In addition, the results of this research need to be disseminated to farmers.

Recommendations

Immediate attention should be given to the development of a production package for use with sprinkler irrigation in the cultivation of the principal vegetable crops grown in the Valley. This will involve an expansion in field research. The adoption of this package, once it is developed, by farmers will require the establishment of an effective demonstration and extension program.

Expanded research and extension is also required for improvement of cultivation practices in the Valley. There are a number of alternative institutional arrangements under which a research and extension program could operate. Involvement of both the public and private sectors, as well as voluntary associations is desirable, and reflects recognition of the fact that there is a good deal to be gained from differentiating the role of each of these agents of change according to their strengths and weaknesses.

Actions which would be desirable in the short-run include: (1) identification of the most serious production problems facing farmers and assignment of priorities for research; (2) expansion of educational programs for Valley farmers, perhaps using the existing school facilities in the summer following the growing season to disseminate the results of research; (3) periodic meetings for extension agents in the Valley with representatives from the private sector and the Faculty of Agriculture at the University of Jordan to discuss problems and proposed solutions; (4) creation of special

task forces to address the most serious problems facing farmers; and (5) expansion of existing research programs of the Faculty of Agriculture and the Ministry of Agriculture.

One difficulty with demonstration programs is that they frequently attempt to introduce a large number of changes simultaneously. Often, one or more of these changes requires materials or knowledge that is not readily available from within the country. It should be recognized that improvement of cultivation practices in the Valley is a long run objective which can be addressed in increments. Thus, the initial cultivation package should require only modest changes in existing practices. More extensive changes can be introduced over time.

Consideration might be given to the establishment of a farmer information center in the Valley. The center could serve as a clearing house for farmers, providing information directly, if possible, but also directing the farmer to where assistance can be obtained or calling the attention of those responsible to the existence of the problem. Use of radio messages and newsletters should also be explored as a means of disseminating information to farmers.

The incentive structure for those involved in research and extension work in the Valley needs to be examined. The problems facing the Valley are serious and require immediate and intense attention. While it may not be possible to provide higher incentives across the board, consideration should be given to establishing awards and other means for recognizing those who are making an outstanding contribution.

5. PRODUCTION

Conclusions

The cropping pattern in the East Jordan Valley has undergone significant changes in recent years. The area devoted to field crops has fallen significantly, while the area planted to vegetables has increased substantially and that devoted to fruits has expanded moderately. The trends in cropping pattern were mirrored in both the north and the south, but, as might be expected, the changes have been greatest in the north where the major completed irrigation projects are located.

There has been a significant increase in cropping intensity, from 106 at the time of the 1975 plan to about 120. Thus, the Valley has gone a long way to achieving the level of intensity of cultivation projected in the plan, but the change has been due to more intensive cultivation, rather than a large expansion in cultivated area, and increases in yields.

Yields appear to have been stagnant in the Valley from the time of completion of the East Ghor Canal project in the mid-sixties until the mid-seventies. However, the production data for the most recent two years suggests a sharp rise in yields, particularly for the principal crops,

i.e., tomatoes, eggplants, and cucumbers. It is too early to tell if this is the beginning of an upward trend in yields, although it is reasonable to believe that the recorded rise reflects the increasing intensification of farming in the Valley through the adoption of drip irrigation and cultivation under plastic covers.

The available data also suggest that there has been a modest increase in total output in the Valley in the past two years. Again, however, it is too soon to tell if this is the start of an upward trend.

Recommendations

Attention should be given to the question of whether the changes in the cropping pattern in the Valley in recent years will give rise to cultivation problems in future years, e.g., does expansion of vegetable production in response to market forces pose a likelihood of more serious pest infestations?

Attention should also be given to developing a better information system for Valley agriculture. The annual sample surveys are inadequate to reveal the true situation with regard to area, yield, and production for the various crops. There is also a need for better information on market prices and for prospective information on potential levels of demand and supply, so that farmers can plan their cropping pattern to more accurately reflect market incentives.

6. EMPLOYMENT AND INCOME

Conclusions

Employment in agriculture accounts for about two-thirds of total employed labor in the East Jordan Valley. However, nonfarm employment is growing more rapidly than farm employment.

The agricultural census data for 1975 and 1978 show an increase in paid employment, with paid female employment rising more rapidly than paid male employment. The use of unpaid (i.e., family) farm workers appears to be decreasing rapidly. This reflects the availability of better jobs and higher wages in the highlands and in the oil-producing Arab countries, as well as increased educational opportunities. The gap left by this change has been filled by the importation of foreign largely Egyptian, farm labor.

Agricultural employment growth has been concentrated largely in the southern portions of the Valley. It is estimated that foreign laborers, mainly Egyptians, now constitute 80 to 90 percent of all hired labor in the Valley, numbering about 5,000 full-time workers.

While information on income distribution in the East Jordan Valley is not available, it is possible to make inferences from sample data relating to hourly wages and returns per dunum to enable a rough estimate of annual income for different categories of workers. However, it should be recognized that an individual may be included in more than one category of farm

operation, and may also be employed in a nonfarm capacity during the year.

Non-Jordanian farm workers are estimated to make about JD 50 to 55 (\$170-190) per month. Jordanian farm workers are paid higher wages and are preferred by farmers. The monthly wage paid to Jordanian farm workers is estimated at JD 75 to 90 (\$255-300) giving an annual income of about JD 1,000 (\$3,400).

The income of farm operators, both tenants and owner-operators, depends on the type of technology used in farming. However, only about 0.2 percent of the holdings and 9.4 percent of the area in the Valley is farmed using drip irrigation or cultivation under plastic covers. Therefore, income computations for farm operators can be based on average earnings per dunum from traditional forms of cultivation, i.e., open field farming with surface irrigation.

Assuming a net return per dunum on the average of JD 100 (\$340), cultivation of an average of 22 dunums, and a 50-50 division of expenses (other than labor) and income between the landlord and the sharecropper, the annual income of sharecroppers can be estimated to be about JD 1,100 (\$3,750).

Assuming the same net revenue per dunum, a fixed cash rent averaging JD 20 (\$68) per dunum, and cultivation of 31 dunums on the average, the annual income of a fixed rent tenants can be estimated at JD 2,480 (\$8,400).

Finally, assuming the same net revenue per dunum, i.e., JD 100 (\$340), and cultivation on the average of 42 dunums, the annual income of an owner-operator can be estimated at JD 4,200 (\$14,300).

Recommendations

Existing information reveals an extremely wide variation in net returns per dunum from different farms, even when the same technology is being employed. It would be desirable to conduct a regular series of farm budget studies to gain a better understanding of trends in agricultural income and their determinants. Consideration should be given to including income information on the agricultural census form.

7. MIGRATION AND THE DISTRIBUTION OF SERVICES

Conclusion

Employment growth tends to stimulate immigration (or reduce outmigration) and thus contributes to population growth. Employment and population growth in the Valley has been concentrated in the Deir Alla area, the Middle section of the Valley. This relatively rapid population growth is expected to continue. When new irrigation infrastructure in this area begins to deliver additional water, agricultural labor demand will expand leading to additional immigration and population growth. Thus, future population growth in the Valley is expected to be concentrated in the Middle Subarea of the region. This conclusion has a number of implications for future demand for services in this area.

Demand for services will grow more rapidly in the Middle area than in other parts of the Valley. It is appropriate that the 1888 new housing units and newly constructed schools are more heavily concentrated in the Middle section of the Valley. It is also appropriate that 6 of the 13 new clinics under Village Development I and II are located in the Middle area.

Recommendations

The next Valley Development Plan should be based on the fact that employment and population growth is likely to be concentrated in the Middle Subarea during the 1980's. Consequently, the Plan must allow for more rapid expansion of public services in this area. It appears that the Middle area will be the first to outgrow existing social infrastructure; therefore new infrastructure will be needed in this area before other areas in the Valley. The South Subarea is also growing fairly rapidly, so it will need additional social infrastructure. Existing and currently planned social infrastructure in the north should be adequate for some years to come. Future new school facilities should be concentrated in the Middle and South because these areas have more rapidly growing populations and smaller percentages of children currently enrolled in school.

8. UTILIZATION OF PUBLIC BUILDINGS

Conclusions

Six of the ten new health clinics were completed by March 1979; the remaining four were completed by June 1979. Unfortunately, most of the health clinics remained vacant for about one year before they were occupied and started to deliver health care. By March 1980 the type 'B' and 'C' centers were operating; they seemed to be functioning satisfactorily during the summer of 1980. The one year delay between the completion of construction and the actual operation however, is unfortunate, and is probably attributed to staffing difficulties. By July 1980, the three large type 'A' clinics were still vacant, although a year has elapsed since the completion of construction. This is a serious problem because these large centers are capable of providing a level of health care which heretofore has not been available in the Valley.

Construction of the seven administration buildings was completed in March 1979. Unfortunately, these buildings are not being fully utilized. Three of the buildings have apparently remained virtually vacant until the summer of 1980. For two of the buildings, only two or three of the ten rooms were being used and these only on a part-time basis. While occupied, the remaining two are not being fully utilized. Several governmental agencies have been allocated, and accepted, offices in these administration buildings; however they have not moved into these offices for a variety of reasons. The administration buildings can potentially improve access of Valley residents to governmental agencies by facilitating the decentralization of functions which previously have not been performed in the Valley. This potential, however, has not been completely fulfilled at the time of writing this report.

It seems that the administration buildings are viewed as belonging to the JVA instead of to the local community. This perhaps explains the apparent lack of local involvement in the functioning of the administration centers. The Kreimeh Administration Building appears to be an exception to this general impression. In Kreimeh, the local population appears to have taken an active interest in the administration building. Furthermore, the administration building in Kreimeh appears to be more fully utilized than any of the other administration buildings constructed under the project.

The community center at Kreimeh appears to be operating quite well. Though the center was completed in March 1979, it is still not being utilized fully. Despite its slow start, activity at the center is accelerating and beginning to have a positive social impact on the community. Current activities include a sewing class, a 105 child kindergarten, an adult education class, community volunteer efforts to landscape the site, organization of a local youth club, and meetings with local representatives to identify priority local social needs. Planned activities include carpentry classes, plumbing and electrical classes, and possibly typing classes.

Of the 26 schools constructed under Village Development I, 14 were completed by August 1978 and 7 more were completed by October 1978. Four of the remaining five schools were completed by February 1979; the last school was completed by May 1979. It appears that the Ministry of Education has staffed and put into operation the new schools shortly after construction was completed. By May 1980 all new schools were operating. Piped water connections, however, were only available in 12 of these new schools.

The new schools appear to have had a very positive impact on education in the Valley. Enrollments in the Valley have increased very rapidly, about 20% per year between 1977-78 and 1979-80. Female enrollments have been increasing about twice as fast as male enrollments in recent years. The new schools also have had a positive impact on the morale of pupils, teachers, and communities in general. There is also some evidence that pupils' performance on examinations has improved at the new schools. Furthermore, the new schools have experienced fewer absences and drop-outs. School maintenance appears satisfactory.

Recommendations

Top priority should be given to the staffing and operation of the three large type 'A' health centers. Constraints to accomplishing this objective must be identified and overcome. The longer these centers remain vacant, the greater the loss of potential benefits. Operation of the type 'B' and 'C' clinics should be monitored and methods to improve their operation should be identified and put into operation.

Reasons for the underutilization of the administration buildings should also be identified. If government agencies do not occupy and utilize the office space that has been allocated to them, the space should become available for other purposes. Perhaps an investigation is needed of the proposed, actual, and anticipated future use of the administration buildings. Efforts should be made to encourage the participation of local councils and communities in decision making concerning the utilization of these buildings.

The activities of the community center under the Ministry of Social Development should be continued and supported by other governmental agencies where appropriate. The ability of the center to correctly identify local social needs, as well as meet these, should be monitored. Assessments also should be made of the center's ability to engender constructive local participation. If the center activities during the next year or year and a half are judged successful, serious consideration should be given to building and establishing similar community centers in other communities in the Valley. Initial experience with the existing center seems to strongly indicate a high potential for success. The center will probably fill a major community need during the following stages of development.

The schools are operating very well; only a few minor recommendations are offered concerning the new schools constructed under the Village Development I Project. The experience gained from the project implies that additional investment in new schools in other rural areas of Jordan is probably warranted. For the new schools in the Valley, paved access should be provided and perhaps the school boundaries should be walled-in to prevent improper intrusion. Efforts should be made to overcome the water shortages at schools located in Manshiya, Waqqas, Wadi El Yabis, and Twal. Attention should also be given to assuring adequate housing for teachers who, are sometimes forced to live in the school structures, because of the difficulty of finding appropriate housing.

9. HOUSING

Conclusions

Construction was completed on all of the 300 rental houses for government employees by June 1979. These houses have all been allocated to governmental agencies. However, over a year after the completion of construction, only about 20% of the units are occupied. The fact that about 80% have remained vacant for at least one year represents both an underutilization of resources and a loss of considerable rental income.

The first of the 1,888 houses for public sale were completed in November 1979. About 70 percent of these housing units were completed by May 1980. Though only a small percentage had been sold and occupied by July 1980, sales and occupations were increasing rapidly at that time. The relatively short delay between completion of the housing units and their sale and occupation seems quite reasonable.

Rental payments have not yet been determined for the government employees' housing. Monthly mortgage payments for public housing are set at JD 19.400 (\$68). This figure seems to be a reasonable and affordable amount to most of the target population. This is especially true in cases where the resident saves on transportation costs, by not having to continue to commute from the highlands. It also seems that the requirement that 70% of those obtaining USAID mortgage funds be of low income is being satisfied. Although the new housing will represent a significant improvement in living conditions for most of these low income people, some dissatisfaction with these housing units has and will continue to surface. The dissatisfaction is based on the

size and the design of these units. In many cases the typically large families will find the houses too small for their need. This is especially true since all the houses are of equal size. The possibility exists, of course, for the provision of house improvement loans to such families, which could then expand their units. This has not been done yet, it raises the question of affordability, since most large households are poor. Complaints also exist regarding the extent of privacy afforded by these units and the area of land on which they are built.

Another issue which has not yet been addressed in the housing project, is that of continued maintenance and servicing. In some cases, the housing tracts are within an existing city limit, or could be annexed by such a city. Presumably, such services as solid waste management, street repairs and lighting, and landscaping, would be provided by the municipality. In many other cases, however, the location of the tracts preclude such an arrangement, and it becomes imperative that some community organization be set up to attend to such activities.

The worse housing situation in the Valley is that of foreign workers, especially Egyptians and Pakistanis. These laborers are in the Valley on a seasonal basis in order to save money, and thus try to spend the minimum possible. The result is that they either reside in very crowded and substandard housing, or live in tents, shacks, or green houses on the farm. Although no major problem presently exists, a significant increase in the numbers of these foreign laborers can trigger the types of health and social problems which are usually associated with crowded slum living.

Recommendations

Government agencies should determine their rental policies and prices, and to allocate the rental units to their employees. Further delays in accomplishing this task will continue to reduce the benefits of this component of the Village Development I Project.

Concerning the 1,888 houses for public sale, efforts should be continued to grant mortgages and accelerate the rate of occupation of these houses. Confusion in the eyes of the public concerning the prices, terms and policies of the houses should be clarified. Prior to embarking on any further housing development, a serious effort should be undertaken to redesign the units, their spatial arrangements, and their construction materials, in order to render them more acceptable to the residents of the Valley. It is also imperative, at this stage, that the residents of each tract be encouraged to set up a neighborhood or community association, which would be entrusted with providing the multiplicity of functions which arise with a new community. These include solid waste management, street lighting and repair, landscaping, and parks and recreational facilities. They may also include the construction and operation of commercial outlets and perhaps the provision of public transportation in the less accessible tracts.

It is also imperative that the living and housing conditions of foreign workers be closely monitored, especially as their numbers grow, in order to avoid the development of a situation where major health and social problems might arise.

10. QUALITY OF LIFE IN THE JORDAN VALLEY

Conclusions

Available information suggests that the quality of life in the Jordan Valley has improved considerably since 1973. It appears that agricultural as well as nonagricultural real incomes have increased rapidly. Improvements in access to schools, health clinics, improved water, electricity, and other public services have been dramatic. In addition, improvements have also been made in access to private services. Literacy rates and levels of educational attainment increased very considerably since 1973.

Recommendations

Efforts to improve access to education, health care, potable water, electricity should be continued. Consideration might be given to encouraging or supporting the expansion of private services in the Valley. Existing activities designed to improve agriculture, and thus increase farm incomes, should be continued and improved upon where possible. Such activities include the delivery of additional irrigation water, development and demonstration of improved cultivation techniques, improvement in the supply and pricing of farm inputs, and betterment of marketing systems. In addition, consideration should be given to activities which encourage local pride and involvement in community activities.

11. LOCAL GOVERNMENT

Conclusions

During the period studies in this report, and pursuant to Article 3 of Temporary Law No. 18 for the year 1977, the Jordan Valley Authority has become responsible for the total development of the Valley. This mandate has resulted in the provision of many services such as schools, clinics, administrative building, water supply and other services which would have usually been the direct responsibility of village and municipal councils, who, in other parts of Jordan, have to at least share in their cost. As a result of this policy, settlements in the Jordan Valley have made a quantum jump, in as far as the levels of provision of basic needs are concerned. In parallel with this jump, however, these settlements have lagged in the development of local governmental structure and capability. Local leadership has become completely dependent on the JVA for the supply of all services, and expect the flow of assistance to continue uninterrupted. Not only have these communities lost their independence and initiative, but they also lack the technical and financial capabilities which are needed for the management of their growth, and for the development of aggressive self-initiated development projects.

Recommendations

It is recommended that any further assistance to local government, beyond that needed for the provision of basic human needs, be provided on the basis of an analysis of the resources and priorities of municipal and village councils. These councils should be encouraged to seek funding from

other sources, such as the Municipal and Village Development Bank. They should also be required to share in the cost, and to participate in the planning, implementation and operation of any further facilities, provided by the JVA. It is also recommended that these settlements maintain their corporate structure and their relationship with other governmental agencies in the country. The possibility of establishing a "technical assistance corporation" which would provide technical services for Valley settlements, including the setting of priorities, financial planning, engineering and maintenance services, and the design of joint services commissions, should be explored. Such a corporation, however, should be set up under the joint ownership of the communities involved.

12. THE ROLE OF WOMEN

Conclusions

It is clear that as a result of the impressive increases in the number of females in preparatory and secondary schools, the increases in the prices of agricultural produce, and the availability of relatively cheap foreign labor, less women are involved in unpaid occasional agricultural employment. Also, more women with an education are now available to fill teaching and other government jobs. Indications are, that there is a more ready acceptance of women in non-agricultural jobs, which provide equal pay for men and women. The experience during the experimental season of the Arda grading and marketing center is the only case in point. The attitudes of both men and women towards this shift in the economic role of women in the Valley seems to be positive, and changing slowly, although highest levels of acceptance are among the young and the poor.

Recommendations

The environment seems to be conducive to the further training of women for both agricultural and non-agricultural skilled work in the Valley. Special types of activities should be identified and training programs designed to train and employ women who are presently occasionally employed in unpaid family work. At pay scales similar to those of men, this will lead to improve overall family incomes. Not all women will accept this change immediately, but it is expected that the young, with limited family responsibilities, as well as the needy, single or divorced, will be a ready and accepting target.

13. SOCIO-ECONOMIC INFORMATION NEEDS

Conclusions

Much of the data discussed and analyzed in this report are from preliminary returns of the 1978 census pretest in the Valley and from the 1979 nation-wide population census. These preliminary returns are incomplete; consequently, several of the findings of this study should be regarded as tentative. Data from the 1978 pretest are being processed during 1980. Unfortunately, this processing has been interrupted on several occasions. An attempt is being made to process a 2% sample from the 1979 census; however, this sample will include households from all areas of Jordan. Consequently, the sample may provide only limited information relevant to analysis of the Jordan Valley.

Though it is unclear when the full 1979 census will be processed, efforts were being made in the summer of 1980 to overcome some data entry problems. Completion of processing of the 1978 pretest and 1979 census will provide an excellent opportunity for understanding the socioeconomic situation in the Valley, for assessing change since the 1973 census, and for planning for the future development of the Valley.

Recommendations

The Planning and Analysis Unit of the Jordan Valley Authority should carefully analyze the final results of the 1978 census pretest and 1979 census. In order to identify areas of rapid population growth and immigration, attention should be focused on the following:

- Changes in sub-district and village population between 1978 and 1979 exclusive of those members of Valley households who live outside the Valley.
- Place of usual residence.
- Place of birth.
- Duration of present residence.
- Place of previous residence.

These data should provide a comprehensive picture of immigration to the Jordan Valley. To assess outmigration, persons living outside the Valley with "place of previous residence" in the Valley, should be identified.

An analysis should be made also of "citizenship" and "reason for residence in Jordan for non-Jordanians" in the 1979 census. This could possibly provide additional insights into foreign labor in the Valley. However, the results might be as unrealistic as the preliminary findings from the 1978 pretest which indicated that there were only 628 Egyptians in the Valley.

Analysis of employment variables from both the 1978 pretest and 1979 census should provide a clearer picture of the changing structure of employment in the Valley. It would be particularly interesting to assess changes in the occupational structure of females since the 1973 census. Census variables dealing with employment include: "type of activity", "principal occupation", "principal industry", and "employment status".

Comparison of housing characteristics from the censuses of 1973, 1978, and 1979 should provide insights to improvements in housing, housing need, and quality of life. The most relevant housing variables from the censuses appear to be:

- Type of building
- Occupancy status
- Sources of drinking water
- Sewage system

- Material of building's outer walls
- Tenure
- Type of illumination
- Availability of telephone

In summary, analysis of final results from the 1978 and 1979 censuses should provide very useful information for assessing recent changes in the Valley and more importantly, for planning future changes.

1. INTRODUCTION

1.1 THE SETTING

The Jordan Valley, a down faulted rift, lies in the westernmost part of the East Bank of Jordan, and extends from Lake Tiberias (Sea of Galilee) at 200 meters (650 ft) below sea level to the Dead Sea, lowest spot on earth at 400 meters (about 1,300 ft) below sea level. The Valley is approximately 105 km (about 63 miles) long and 4-16 km (2.5-10 miles) wide. See Figures 1-I and 1-II. The Government of Jordan (GOJ) recently declared that the rift land area from the north end of the Dead Sea down the Wadi Araba to Aqaba is also a part of the Jordan Valley (see Figure 1-III). The JVA has been made responsible for its development as well. However, for the purposes of these evaluations, the term Jordan Valley will refer to the area from the Yarmouk River to the north end of the Dead Sea, unless otherwise specified in the Project Paper. The Southern Ghors and Wadi Araba are shown in Figure 1-II.

Agriculture, including livestock production, accounts for about 14 percent of the Gross Domestic Production in Jordan, and it is the main source of livelihood for about 20 percent of the country's labor force. Nevertheless, local agricultural products meet only 40 percent of the country's food needs; the rest is imported. With its temperate climate, good soils and availability of water through irrigation, the Jordan Valley is the richest potential source of agricultural production in Jordan and offers great opportunities for varied and intensive agricultural production.

Prior to 1948, the Jordan Valley was sparsely populated and of minor significance in term of agricultural production, although its potential had already been noted in several studies. Lack of irrigation needed to bring additional Valley land under cultivation held the population level at about the 37,000 mark (many of them Palestinian refugees) from the early 1950's until the mid-1960's. Without question, the most important factor in opening the Jordan Valley to both greater population and greater productivity was the construction of the GOJ/AID-financed 70 kilometer East Ghor irrigation canal in the northern sector of the Valley in the 1960's. Also playing a role was a major, totally successful malaria control program mounted by the GOJ with AID assistance. By 1967 some 90,000 people were living in 53 scattered settlements in the Valley.

Progress toward development was halted in the Valley when the area became a battlefield during the 1967 war with Israel and the following period of internal strife, which lasted through 1971. Most of the civilian population left the Valley. It is estimated that more than 60 percent of the homes in the Valley were destroyed during that time, some 7,000 dwellings. As people gradually returned and began to rebuild, major development projects were planned and put into operation.

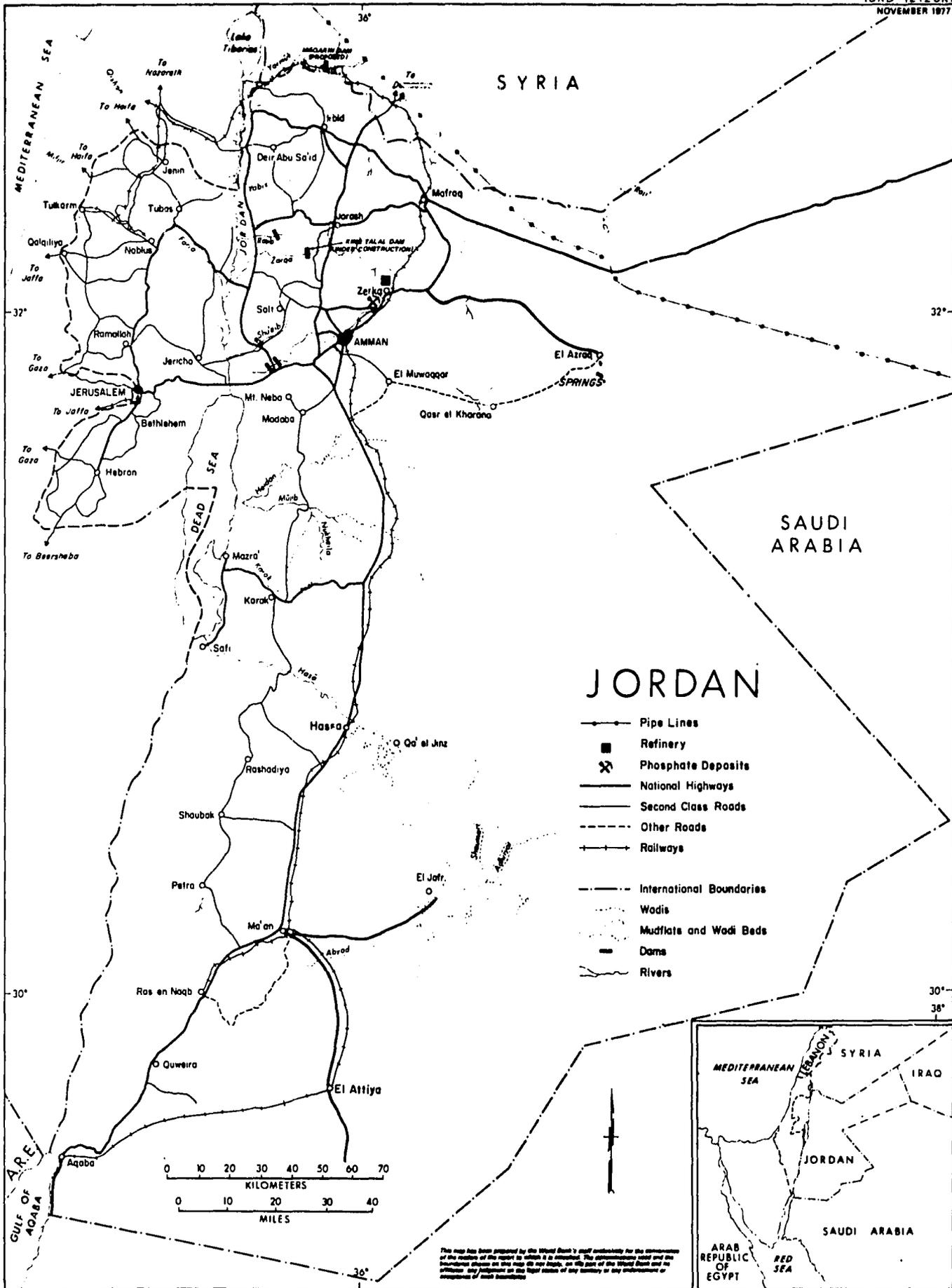


Figure 1-1
THE HASHEMITE KINGDOM OF JORDAN

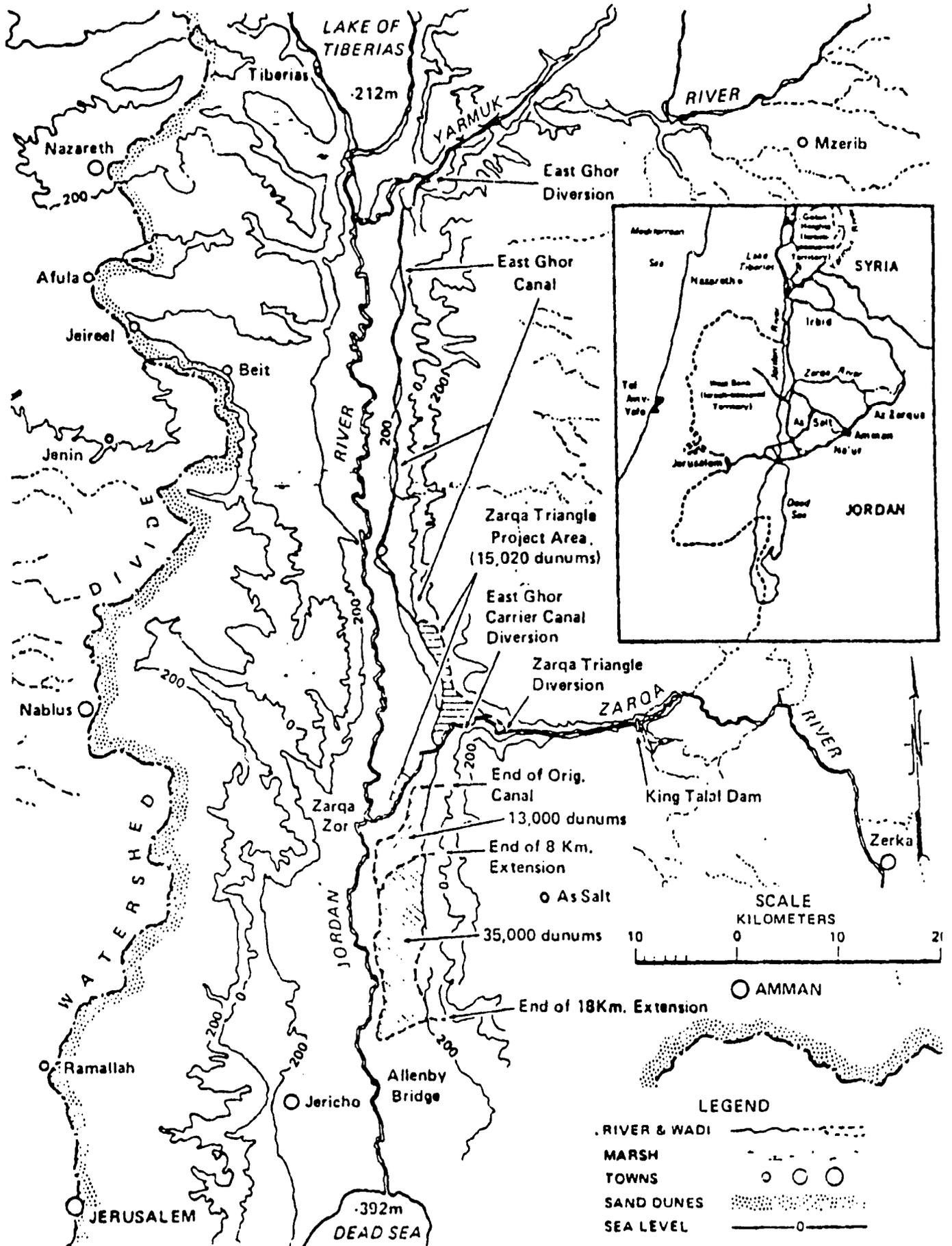


Figure 1-II
JORDAN VALLEY

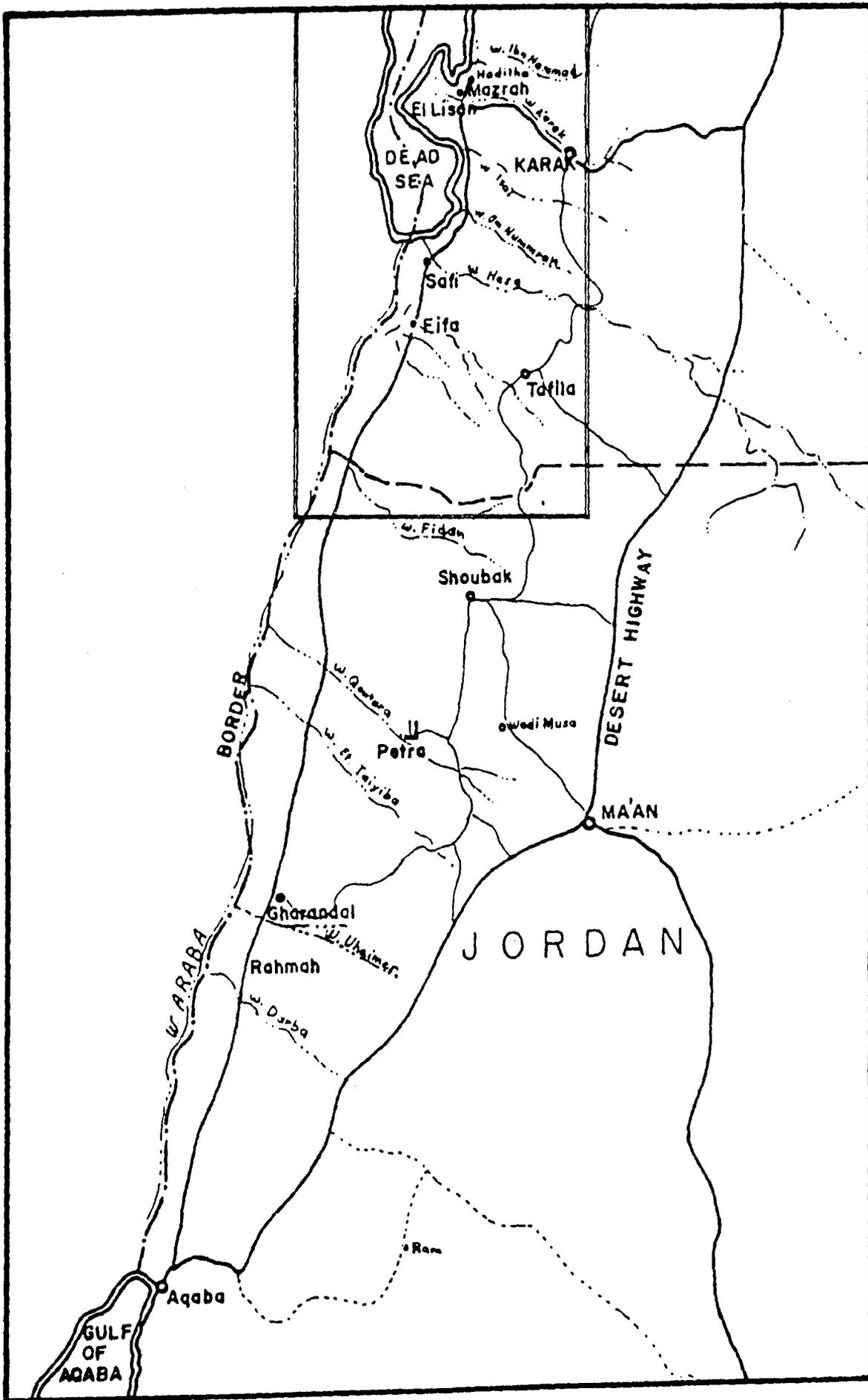


Figure 1-III
 THE SOUTHERN GHORS & WADI ARABA
 23

1.2 DEVELOPMENT PLANS AND PROJECTS/ALL DONORS

In an effort to realize the substantial agricultural production potential of the Valley envisioned by a number of studies, and to raise farmers' incomes and living standards, which are low in comparison to national averages, the Government of Jordan (GOJ) in 1972 established the Jordan Valley Commission, granting it a mandate for "economic and social development of the Jordan Valley". With increased powers, personnel and responsibilities, that organization became the Jordan Valley Authority in May, 1977. To avoid confusion, the term JVA will be used throughout this document in discussing activities of that agency or its predecessors.

A three-year plan for the "Rehabilitation and Development of the Jordan Valley (East Bank), 1973-75, was proposed by the JVA in 1972. A number of donor governments and agencies were attracted, and the plan led directly to the design and implementation of many development projects, currently underway or recently completed. It soon became evident that achievement of the ambitious objectives of Valley development should require a much longer time-frame than originally envisioned. Therefore a follow-on plan, "Jordan Valley Development Plan, 1975-1982" was prepared to incorporate both the activities of the three-year plan (stage one) and a scheme for construction of Maqarin Dam and irrigation facilities (stage two).

Projects of the first stage are estimated to cost nearly 240 million, with Maqarin Dam and the remainder of stage two expected to add more than one billion dollars. Donor organizations have so far contributed more than 139 million to projects in Stage I. A list of all projects included in this stage, together with their cost and source of funds is shown in Table 1-1. The U.S. investment through AID is about 32 percent of this total. A detailed description of these projects is given in Appendix I.

Project activities devised to carry out Jordan Valley development plans can perhaps best be described in the aggregate as one large, integrated rural development program with numerous donors, each of whom supports discrete projects which contribute directly to the others. Objectives for Valley development as a whole are to increase agricultural production and improve and quality of life. These plans begin with two "givens": land capable of being irrigated and water availability. While both of these factors may be altered by development projects and changing technology (e.g., construction of dams and irrigation works, and introduction of sprinkler and drip irrigation), the economic and social development of the Valley inevitably rests on the level of economic activity capable of being supported by the land and water resource base. Thus, development planning for the Valley seeks to link agricultural development with social and economic development. The aim is to increase agricultural production and to improve the quality of life in the Valley by:

- (1) constructing the physical infrastructure for irrigated agriculture, including dams, canals, and irrigation works, needed to expand the irrigated area and increase the intensity and efficiency of cultivation;

Table 1-1

STAGE I PROJECTS

Project	Cost in Dollars	Loans in Dollars	Source of Loan
King Talal Dam	46.0 m	22.4 m	Kuwait Fund
East Ghor Canal 18 km Extension	15.0 m	10.0 m	AID
Zarqa Triangle	5.8 m	4.5 m	AID
Northeast Ghor Irrigation	13.0 m	7.65 m	IDA, OPEC
Wadi Arab Dam and Irrigation	52.0 m	33.0 m	OECF
Hisban - Kafrein Irrigation	9.6 m	7.2 m	GCA (KFW)
Portable Farm Equipment	5.5 m	4.5 m	AID
Subsurface Drainage	3.0 m	-	-
Subtotal	149.9 m	89.25 m	
Electrification	12.2 m	8.3 m	GCA (KFW)
Domestic Water Supply	8.3 m	3.4 m	GCA (KFW)
Subtotal	20.5 m	11.7 m	
Yarmouk-Dead Sea Road	6.4 m	3.9 m	AID
Operation and Maintenance and Farm Roads	1.2 m	.6 m	AID
Subtotal	7.6 m	4.5 m	
Grading, Packing and Marketing Centers	11.85 m	7.0 m	Netherlands
Village Development			
Phase I	16.0 m	11.55 m	AID
Phase II	17.2 m	6.0 m	AID
Subtotal	33.2 m	17.55 m	
Housing Program	22.0 m	9.34 m	AID, GCA (KFW)
Grand Total	245.05 m	139.34 m	

Abbreviations:

AID or USAID	The United States Agency for International Development
EGMC	East Ghor Main Canal
GCA	German Capital Aid
IDA	International Development Association
KFW	kreditanstalt fuer Wiederaufbau
ODA	Overseas Development Administration of the U.K.
OECF	Overseas Economic Co-operation Fund of Japan
OPEC	Organization of Oil Producing Countries

- (2) constructing the physical infrastructure for utilities and social services, including potable water, electricity, housing, schools, clinics, roads, etc., required to make the Valley a pleasant, desirable place to live and to attract the population needed to make optimum use of the land and water resources; and
- (3) organizing the institutional infrastructure needed to promote efficient use of the land and water resources and equitable distribution of the benefits of development.

Any assessment of the evolution of agriculture in the East Jordan Valley in recent years must take into consideration the substantial public investments being made in the Valley and the plans which provide the rationale for such investments. The strategies underlying plans for agricultural development and the resulting economic and social development of the Valley and the linkages between them are described below.

1.2.1 Land, Water, and the People

Agricultural development plans for the East Jordan Valley begin with an estimation of the number of dunums* of land that can be brought under irrigation and the spatial configuration of this land. The estimate of irrigable land in the Valley is based on the topography and soil characteristics and the availability of water from all sources.

Initially, 364,084 dunums were classified as arable, i.e., capable of producing crops by tillage (Baker and Harza, 1955). This classification was based on U.S. Bureau of Reclamation standards designed to be applied for surface irrigation. Additional soil surveys were later conducted (Dar Al Handasah-Nedeco, 1969). Plans were then developed to introduce overhead sprinkler irrigation which would make it possible to irrigate most of the lands which were previously considered too rough or sloping to be amenable to surface irrigation methods. Thus, the estimate of irrigable land was increased to approximately 420,000 dunums (Jordan Valley Commission, 1975). The remaining lands are either required for physical infrastructure (i.e., roads, canals, utilities, towns, etc.) or are unsuited for irrigation due to isolation from lands of an arable nature or to undesirable topography and soils.

The Jordan River emerges from Lake Tiberias and flows into the Dead Sea, following a meandering course of about 104 kms. Flowing into the Jordan River is a network of eleven rivers and wadis (streams) originating in the eastern foothills. These tributaries, which drain an estimated 11,401 square kilometers, provide an average annual flow of 635 million cubic meters, the minimum recorded flow being 312 million cubic meters and the maximum 1,190 million cubic meters (Jordan Valley Commission, 1975). The Jordan River below Lake Tiberias is unfit for irrigation due to its high salinity. Thus, these tributaries provide the available water for irrigation in the East Jordan Valley.**

*One dunum equals 0.1 hectares or about one-fourth of an acre.

**The flow from the Jordan tributaries provides the source of irrigation water for all development projects in the East Jordan Valley. However, private wells provide irrigation water for many farms in the southern portions of the Valley.

The maximum feasible amount of land that can be irrigated in the East Jordan Valley with full utilization of known water supplies and currently available technology (i.e., sprinkler irrigation) is estimated to be 360,000 dunums (Jordan Valley Commission, 1975). The remaining 60,000 dunums of irrigable land, given water supply limitations, would have to be farmed using rainfed cultivation methods. However, a recent decision by the Government of Jordan to divert water from Valley irrigation to municipal and industrial uses in the highlands will reduce the maximum irrigable area with full development to about 300,000 dunums, thus increasing the amount of rainfed cultivation on irrigable lands to about 120,000 dunums.

In 1976, approximately 137,500 dunums were under irrigation in the northern and central parts of the Valley from the East Ghor Canal, utilizing water from the Yarmouk and Zarqa Rivers and from wadis north of the Zarqa River. An additional 27,220 dunums were being irrigated from primitively constructed earth canals, utilizing water from side wadis, and 21,800 dunums were being irrigated from on-farm wells, mostly in the south (Harza, 1978). Thus, in 1976, a total of 186,590 dunums in the East Jordan Valley were under irrigation. However, due to wide variations in water availability, much of this land was receiving only partial irrigation. In addition, about 33,010 dunums were in dryland cultivation, the amount varying from year-to-year depending on rainfall conditions.

Table 1-2 summarizes the existing and on-going irrigation projects in the East Jordan Valley, according to the 1978 feasibility study for Stage II Development (Harza, 1978). These include the original 70 km. East Ghor Canal completed in 1966 and the 8 km extension added in 1969. The remaining projects, known collectively as Stage I Development, will bring the total project irrigation capacity to about 225,740 dunums, of which 106,470 dunums (47 percent) will be irrigated from a pressure system suitable for sprinkler or drip irrigation.

By the Fall of 1979, all but the Wadi Arab project had been completed, resulting in a total project irrigation capacity of 221,450 dunums, of which 93,970 dunums are to be irrigated from the pressure system. It is estimated that an additional 21,320 dunums are being irrigated from on-farm wells (Harza, 1978), bringing the total irrigated capacity of the East Jordan Valley to approximately 242,860 dunums.

However, irrigation from the Stage I Development projects cannot begin until the land redistribution programs in these project areas have been completed (as required by successive Jordan Valley Development laws culminating in Law 18 of 1977, see Appendix III). The process of farm land redistribution can commence only after the irrigation project is completed and the "as-built" drawings area is superimposed on the drawings of land ownership before the project was begun. As of October 1979, the status of the land redistribution program in the various project areas was as follows:

East Ghor Canal Extension - Redistribution began in September, 1978. Of the 944 farm units included in the project, 826 had been distributed, and a number of them had gone into operation

Table 1-2

SUMMARY OF EXISTING AND ON-GOING IRRIGATION
PROJECTS IN THE EAST JORDAN VALLEY

Project	Completion Date	Area Irrigated (Dunums)	Method of Irrigation
East Ghor Canal ^a	1969	119,270	Surface
18 km Extension	1978	35,500	Sprinkler
Zarqa Triangle	1978	15,270	Sprinkler
North East Ghor ^b	1979	27,600	Sprinkler
Wadi Arab ^c	d	12,500	Sprinkler
Hisban-Kafrein	1978	15,600	Sprinkler
Projects Total		225,740	
Individual Farms		21,320	Surface
Valley Total		247,060	

- NOTE:
- a. Consists of the initial 70 km East Ghor Canal area of 123,000 dunums plus the 8 km extension area of 14,570 dunums, less the area being converted from surface to sprinkler irrigation by the North East Ghor project of 10,000 dunums and by the Wadi Arab project of 8,300 dunums.
 - b. Includes 10,000 dunums being converted from surface to sprinkler irrigation in the East Ghor Canal project area.
 - c. Includes 8,300 dunums being converted from surface to sprinkler irrigation in the East Ghor Canal project area.
 - d. Planned but not completed.

Source: Harza, 1978.

in the 1978 farming season. Zarqa Triangle Irrigation - of the 411 farm units included, 387 farms had been distributed.

Hisban-Kafrein - Redistribution began in August 1979. Of the 560 farm units included, 140 had been distributed, and some were expected to commence operation in the 1979 farming season.

North East Ghor - The conversion area of 10,000 dunums was redistributed in 1963. Redistribution of the new area did not begin until October 1979.

Wadi Arab - Project is planned but not completed.

Because of the severe droughts of 1978 and 1979, the introduction of sprinkler irrigation was delayed, water allocations by the Jordan Valley Authority were reduced, and most of the Stage I Development area was not brought under irrigation. However, with the heavy rains of 1979-1980 and the completion of much of the land redistribution program, it is expected that irrigation of many of the Stage I Development project lands will commence in the Fall of 1980*.

In summary, between 1976 and 1980, there was about a 30 percent expansion in irrigation capacity in the East Jordan Valley. Approximately half of this increase was due to the 18 km extension of the East Ghor Canal and the Zarqa Triangle Irrigation projects. While sprinkler irrigation equipment has been acquired by the Jordan Valley Authority, and a few units were in operation in 1979, operation of the pressure system on the Stage I Development project lands has not commenced.

Construction of the proposed Maqarin Dam on the Yarmouk River and a 14 km extension of the East Ghor Canal to near the northern end of the Dead Sea, collectively known as Stage II Development, would enable an increase in irrigation capacity in the East Jordan Valley to 300,000 dunums, all under a pressure system suitable for sprinkler or drip irrigation. This area would be comprised of 106,740 dunums that are currently developed for sprinkler irrigation (including Wadi Arab); 119,270 dunums of the East Ghor Canal project area currently being supplied by a gravity surface irrigation system; 21,320 dunums currently being supplied by wells and the base flow of side wadis; and 52,970 dunums of lands, located mainly in the southern part of the Valley, which are not now irrigated**

Given the estimated area which can be brought under irrigation in the East Jordan Valley with full water utilization, the maximum number of farming units can be determined based on an assumed minimum size unit. In

*Since the new lands in the Stage I Development projects will be irrigated from the pressure system using sprinkler or drip irrigation, land leveling is not required. However, in many areas rock removal will be required and in some area, due to the presence of salts, leaching may be necessary. Thus, full production from these areas is not to be expected in 1980.

** This assumes that the 60,000 irrigable dunums lost to development because of the diversion of water for municipal and industrial uses in the highlands would be totally in the south, i.e., in the 14 km extension area.

the initial planning for the Valley, which assumed surface irrigation, the minimum size farm unit was established at 30 dunums. This standard was applied in implementing the land redistribution program accompanying the construction of the East Ghor Canal. Under the most recent law, however, the minimum size farm unit has been increased to 40 dunums, reflecting in part the shift from surface to sprinkler irrigation. This standard is being applied to the Stage I Development projects, except for the conversion lands which were redistributed in the 1960's. This standard will also be applied to all future land brought under irrigation in the Valley.

Using these standards, the 137,570 dunums in the East Ghor Canal project area would yield potentially about 4,586 thirty-dunum units, while the 141,110 dunums remaining (i.e., 360,000 dunums less 60,000 dunums lost through diversion of water for municipal and industrial uses, the 137,570 dunums in the East Ghor Canal project, and the estimated 21,320 dunums being irrigated from one-farm wells) would yield potentially about 3,525 forty-dunum units, for a total of 8,111 potential farming units in the East Jordan Valley assuming full development*.

The 1975-1982 development plan for the East Jordan Valley, which assumed that all 360,000 dunums of irrigable land would be developed, estimated that the total number of farm holdings in Stage I and Stage II Development project areas would be 6,197, or an average size holding of about 36 dunums. Given the 60,000 dunum reduction in Stage I and Stage II Development resulting from the diversion of water for municipal and industrial uses, the estimated number of holdings should be adjusted downward to 4,524**. To this number should be added the number of holdings in the area of the East Ghor Canal project, 4,507. This gives an estimated total number of holdings for the East Jordan Valley, assuming full development, of 9,031.

* It should be noted that there are two offsetting factors which make it difficult to determine a priori the number of holdings, i.e., units of farm operation, that will be created. On the one hand, because the land redistribution law permits farm holdings which encompass multiple farming units up to a maximum of 200 dunums (5 farm units), the actual number of farm holdings would be less than the maximum number that potentially could exist if each holding were to be of minimum size (i.e., one unit). On the other hand, while the land redistribution provisions of the Jordan Valley Development law specify the minimum size for a farming unit, the Jordan Valley Authority in implementing these provisions has in many instances allocated a unit to more than a single individual. (This practice is discussed in detail in the following chapter.) The allotment of a single farm unit to several individuals means that the number of holdings could be in excess of the potential number of farming units.

** The area covered by the original estimate of 6,197 holdings was about 222,430 dunums (360,000 dunums less the 137,570 dunums in the East Ghor Canal project area). Dividing the 60,000 dunums reduction by 222,430 yields an estimated percentage reduction of 27 percent.

The estimated number of agricultural holdings can be compared to the estimated number of families engaged in agriculture. The 1975-1982 development plan for the East Jordan Valley estimated the population after completion of Stage II Development at 147,000, and assumed an average family size of 5.7 persons and a service-base ratio (i.e., the number of service families expressed as a percentage of the number of base, i.e., farm, families) of 0.35. The estimated population of 147,000 should be adjusted downward to reflect the loss of 60,000 dunums to development due to the diversion of water to municipal and industrial uses. The adjusted population projection for the Valley would be 122,500 (i.e., five-sixths of 147,000). Thus, the development plan for the East Jordan Valley implicitly calls for approximately 21,491 families (i.e., 122,500 divided by 5.7), of which 15,919 would be farm families and 5,572 would be service families (i.e., service families would equal 35 percent of the number of farm families).

In summary, the 1975-1982 development plan for the East Jordan Valley projects a population of 122,500 or 21,491 families. Farm families would total 15,919. The total number of farm holdings, however, would equal 9,031. The average size of farm holding in the East Ghor Canal project area would be 21.3 dunums, while the average size of farm holding projected for the Stage I and Stage II Development project areas would be 49.6 dunums. The average number of farm families per holding would be 1.65.

The 1975-1982 development plan for the East Jordan Valley assumed that the pattern of land tenancy existing in the East Ghor Canal Project area after its completion, i.e., the pattern shown in a 1973 survey of the East Jordan Valley, of 40 percent owner-operation and 60 percent share-cropping, would be the pattern for the entire Valley upon full development. This is consistent with the fact that the projected number of farm families, 15,919, exceeds the projected number of farm holdings, 9,031. It may, however, be invalid due to changes in the labor situation in the Valley and to changes in technology.

The projected population level and its spatial distribution provide the foundation for social planning in the East Jordan Valley. The quantity of social infrastructure, i.e., houses, schools, medical centers, community centers, utilities, etc., is directly related in the plan to the expected levels of population. The spatial distribution of population is derived by assuming that farm families will locate in villages within walking distance of their farm holdings, while service families will be located proportionately with farm families. This provides the basis for the distribution of the projected population of the Valley after completion of Stage II Development among 36 existing new towns and villages.

1.2.2 Agricultural Production

Projected growth in base activity, i.e., irrigated agriculture, results directly from the investment in dams, canals, laterals, etc. which provide water to bring new lands into irrigation or to intensify production on lands which are already being irrigated. It is expected that the availability of additional water for irrigation will lead to an increase in cropping intensity, i.e., a greater incidence of double-cropping, and a shift in the cropping pattern.

The 1975-1982 Development plan for the East Jordan Valley projected an increase in cropping intensity from 1.06 (i.e., a cropped area of 124,020 dunums divided by a cultivated area of 117,000 dunums) to 1.31 (i.e., a cropped area of 350,860 dunums divided by a cultivated area of 266,700 dunums). The more recent feasibility study for Stage II Development projects an increase in cropping intensity to 1.28.

The increase in cropping intensity would be accompanied by changes in the cropping pattern. The 1975-1982 Development plan for the East Jordan Valley projected that new crops, such as alfalfa, clover (Egyptian berseem), and maize for fodder would be introduced, while some of the less important vegetables and melons would be excluded from the rotation. Thus, the plan projected a decrease in the area devoted to vegetable production from 70 percent to 58 percent, and an expansion in the area used for fodder from near zero to 33 percent of the total cropped area. As shown in Table 1-3, the feasibility study for Stage II Development projects a slightly different cropping pattern with less emphasis on field crops, particularly fodder, and more emphasis on vegetables, particularly melons, and fruits.

The 1975-1982 Development plan projected that yields and cropping intensities would be identical on the land currently irrigated by surface irrigation after its conversion to sprinkler irrigation and on the new lands at full development. Table 1-4 compares the current and projected (i.e., 1990 with full Stage II Development) yields as presented in the feasibility study for Stage II Development with the projected (1998 with full development) yields as contained in the 1975-1982 Development plan.

The changes in the area under irrigation, cropping intensity, cropping pattern, and yields were projected in the 1975-1982 development plan to result in an increase in total agricultural production in the East Jordan Valley from 170,264 tons (estimated for 1975 on the 117,000 dunums of irrigated land in the East Ghor Canal project area) to 1,109,524 tons (projected for 1998 on the 350,860 dunums of irrigated land at full development). The equivalent increase projected in the more recent feasibility study for Stage II Development is to 1,066,000 tons (projected for 1990 on 359,990 dunums of irrigated land), plus an additional 66,000 tons of milk production and 2,000 tons of beef and veal production. Both sets of projections would have to be adjusted downward to take into account the reduction in irrigated area of 60,000 dunums due to diversion of water for municipal and industrial uses.

The 1975-1982 Development plan estimated that 33 percent of the projected increase in production would result from the increase in irrigated area, 24 percent from the increase in yields, and 43 percent from the change in cropping pattern. Fodder would account for the largest increase in production, about 67 percent, while vegetables would account for 24 percent, fruits for 7 percent, and cereals for 2 percent. It is interesting to note, however, that in terms of increase in gross and net value of product, vegetables would account for the largest percentage, about 50 percent, followed by fruits, about 25 percent, fodder, about 20 percent, and cereals, about 5 percent.

Table 1-3

CROPPING PATTERN INTENSITY FACTORS IN
THE EAST JORDAN VALLEY

Crop	1975 Intensity (Percent) ^a	Projected Intensity (Percent) ^a	Projected Intensity (Percent) ^b
Field Corps:			
Wheat	15.0	8.1	5.0
Barley			15.0
Maize	1.0	12.1	3.0
Sorghum	-	-	-
Berseem	-	9.4	13.0
Alfalfa	-	14.1	-
Fodder Maize	-	9.4	-
Total	16.0	53.1	39.0
Vegetables:			
Tomato	24.3	23.3	17.0
Eggplant	12.7	10.4	8.0
Peppers	3.0	2.4	4.0
Squash/Cucumbers	8.7	4.9	5.0
Beans	5.6	7.5	4.0
Cauliflower/Cabbage	6.0	5.6	5.0
Onions	+	2.8	4.0
Potatoes	+	3.4	6.0
Watermelon	4.7	-	12.0
Other Vegetables	5.0	-	2.0
Total	70.0	60.3	67.0
Fruit Crop:			
Bananas	2.8	5.3	2.0
Citrus	17.2	12.9	11.0
Other Fruits	-	-	9.0
Total	20.0	18.2	22.0
Total	106.0	131.6	128.0

Note: + = Included in other vegetables.

Sources: a = Jordan Valley Commission, 1975.

b = Harza, 1978.

Table 1-4

CURRENT AND PROJECTED YIELDS IN THE EAST JORDAN VALLEY
(Tons per hectare)

Crop	Present Yields ^a	Projected Yields for 1990 ^a		Projected Yields for 1998 With Project ^b
		Without Project	With Project	
Wheat	1.4	3.0	5.0	3.5
Barley	1.5	3.0	5.0	
Maize (grain)		6.5	7.5	5.0
Sorghum (forage)		35.0	40.0	50.0
Alfalfa/Berseem		50.0	60.0	80.0
Tomato	20.0	35.0	45.0	25.0
Eggplant	20.0	32.0	40.0	25.0
Squash	15.0	32.0	35.0	14.0
Cucumber	14.0	20.0	30.0	
Peppers	10.0	12.5	15.0	15.0
Green Beans	10.0	12.5	15.0	15.0
Cauliflower/Cabbage	20.0	27.0	30.0	20.0
Onions	+	20.0	25.0	17.0
Potatoes	+	15.0	30.0	21.0
Other Vegetables	20.0	25.0	30.0	
Watermelon	18.0	22.0	25.0	
Bananas	22.0	30.0	35.0	20.0
Oranges	20.0	30.0	40.0	
Lemons	15.0	30.0	35.0	25.0
Grapefruit	17.0	40.0	50.0	
Other Fruit	20.0	25.0	30.0	

Note: + = Included in other vegetables

Sources: a = Harza, 1978.

b = Jordan Valley Commission, 1975.

1.3 STUDY OBJECTIVES

The objective of the this study is to evaluate seven (7) USAID-funded projects, within the context of the overall Valley Development effort.

These projects are all part of stage I of the Valley Development Plan. They are (a) East Ghor Canal Extension (Project Number 278-0193), (b) Zarqa Triangle Irrigation (278-0194), (c) Sprinkler Irrigation Equipment (278-0195), (d) Yarmouk-Dead Sea Road (278-0176), (e) Three Village Development Projects (278-0183, 278-0205, and 278-0221). The evaluation is to review, not only the separate activities of each project, but also the interrelationships among the projects and their contribution to the overall Jordan Valley Development effort. A description of each of these seven (7) projects, and a copy of its Logical Framework, whenever such exists, are provided in Appendix II. This evaluation is intended to emphasize the socio-economic impacts of the projects, as expressed at the "Goal" and "Purpose" levels of the Logical Frameworks.

The seven (7) projects listed above are at different stages of development. The physical works involved in the Canal Extension, Zarqa Triangle, and the Yarmouk-Dead Sea Road are virtually complete. Village Development I is close to completion, while the other two Village Development Projects have just started. The Sprinkler Irrigation project has also not been completed. With the exception of the Yarmouk-Dead Sea Road, sufficient time has not elapsed to allow an evaluation of the final socio-economic impacts of these projects. Neither have projects undertaken by other donors or by GOJ been completed within a time-frame allowing for a final assessment. It is thus clear that this evaluation is of an interim nature, providing (i) an initial assessment of the projects' impacts to date, (ii) a baseline for future evaluations, (iii) suggestions for benefitting from lessons learned to date in order to implement mid-path corrections to these projects, (iv) suggestions and lessons learned to date in order to affect change in ancillary organizational and institutional factors influencing, but not included in the project, (v) the expected impacts of projects which have not yet been completed, in the light of more recent developments; and (vi) lessons to be learned for future and similar AID projects.

1.4 A CONCEPTUAL FRAMEWORK

All seven projects which are included in the proposed evaluation, like all other Valley Development projects, have as their goals one or both of the frequently stated goals of increasing agricultural production and improving and quality of life. These two goals will be taken as the point of departure for the evaluation. The "Quality of Life" goal is defined to subsume all the "equity" considerations, including equitable access to income, services, and opportunities. Three of the projects under consideration are explicitly designed to increase agricultural production. These are the Zarqa Triangle Irrigation project, the East Ghor Canal Extension, and the Sprinkler Irrigation project. Three other projects, namely the Village Development series, are directed toward improving the general quality of life in the Valley, although their farm road component contributes to the production goal. The Yarmouk-Dead Sea Road project addresses both

of these goals, since it improves both farm-market access and resident mobility. The contributions of the various projects, however, to the attainment of one goal or another not mutually exclusive. This is true since (1) the projects themselves are interrelated, (2) they are inter-related with other development activities in the Valley, and (3) strong feedbacks between the two goals exist. This last reason is indeed at the heart of the comprehensive rural development strategy.

Figure 1-IV is a graphic representation of the Conceptual Framework which is proposed for the evaluation of the projects under study. It shows the four major parts of the exercise which relate to the extent of achievement of each goal, at both the "project" and "Valley" levels. The latter refers to the overall development effort. This evaluation is concerned with changes which have occurred since the initiation of the Development Plan in 1973, or since the subsequent initiation of the particular project being considered. Each of these four parts (Numbers 1, 2, 3 and 4 in Figure 1-IV) can be related to particular indicators measuring the extent of goal achievement. The Figure also shows four (4) feedback and/or interaction linkages between these four major components. They generally represent how projects interrelate with each other, with projects of the GOJ and other Donors, and how the two basic goals reinforce each other. Linkages 5 and 7, for example, relate to the contribution of the project to overall Valley Development and to conflict and/or complementarity with other projects. Linkages 6 and 8 relate to the mutual interaction between the two expressed goals, at the "project" and "Valley" levels, respectively. These two pairs of linkages are designed to address and organize the host of questions which are frequently raised in the context of the Jordan Valley Development Plan.

The objectives of this evaluation exercise which does spelled out earlier above reiterated in Figure 1-IV. This is done in order to emphasize the fact that the proposed evaluation is of an interim nature, that it is directed toward the assessment of a number of uncompleted projects, and that it will thus have to provide baseline data for future evaluations. The evaluation does nevertheless, provide lessons to be learned for both the future path of the Valley development effort and for projects elsewhere.

Figure 1-IV also emphasizes that the success of the projects to be evaluated is often dependent on the materialization or success of a variety of ancillary activities which are not necessarily part of these projects. Such activities are often taken as assumptions at the project development stage, and thus may affect the outcomes of both the project and the overall development scheme in a variety of ways. These include such activities as the availability of, and eligibility for, credit; marketing mechanisms and institutions; maintenance of facilities; availability of water; effectiveness of extension services; assumptions concerning the staffing and equipping of facilities; assumptions about local entrepreneurship and technological change, economic and residential attractiveness of other agricultural and urban parts of Jordan; and activities of other donors. Any evaluation of valley projects must be undertaken with particular attention to the role and impact of these contextual factors and assumptions.

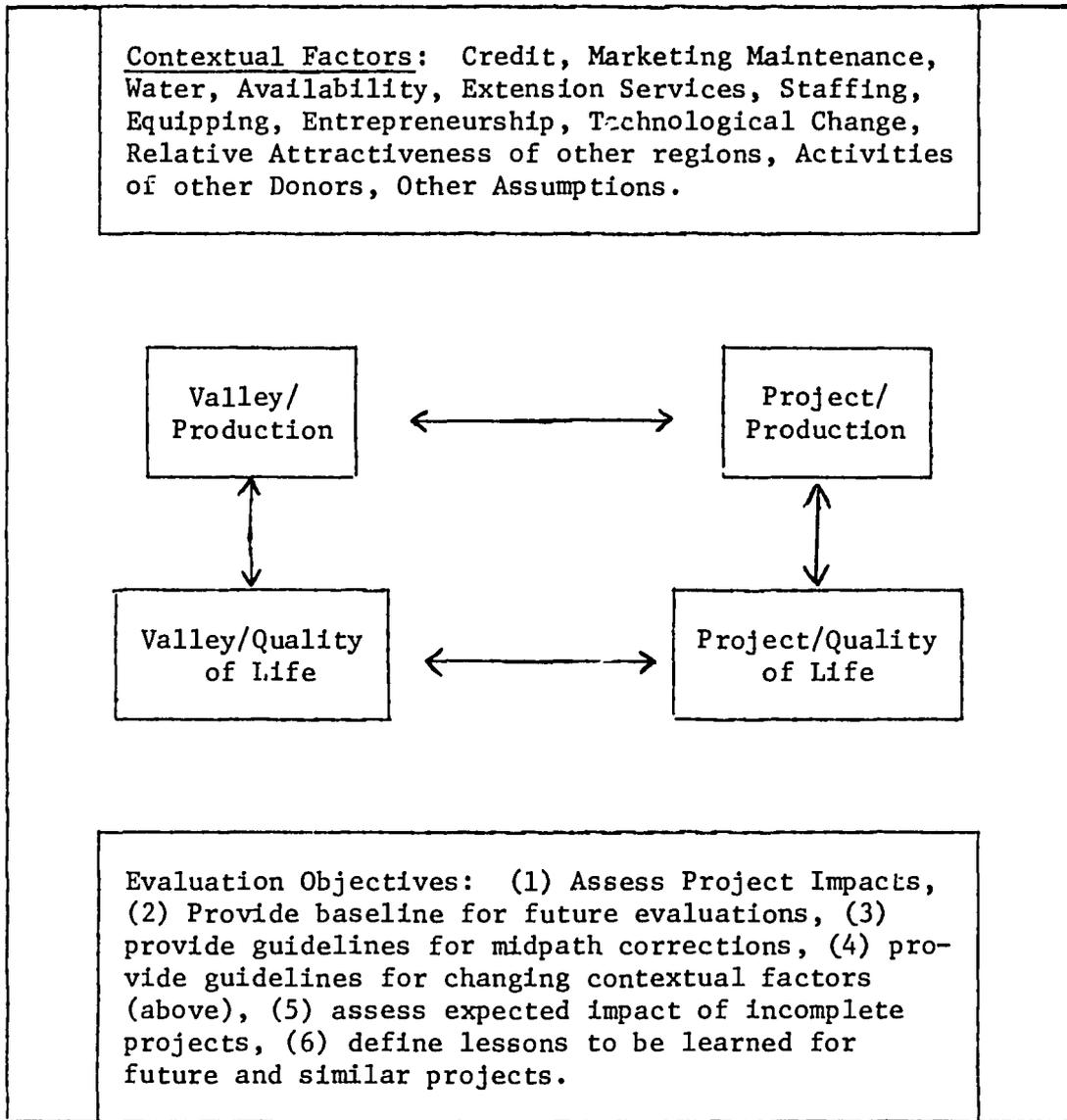


Figure 1-IV

A CONCEPTUAL FRAMEWORK

Chapter 2 of this report will address issues dealing with Agriculture, the basic component of the Valley's economy. Chapter 3 will deal with changes which have occurred in the Valley, with respect to the quality of life. It focuses on demographic change and on developments in the provision of basic social and economic services. Chapter 4 discusses selected issues dealing with participants in, and the beneficiaries from, the various development activities.

2. THE AGRICULTURAL ECONOMY

2.1 INTRODUCTION

This Chapter will address questions dealing with agriculture, the backbone of the economy of the Jordan Valley. A number of major questions which bear on the agricultural economy of the region will be discussed in the following sections. These include the questions of land redistribution, land tenure, cultivation techniques, and agricultural production.

2.2 LAND REDISTRIBUTION

Of all the issues associated with the development of the East Jordan Valley, none has generated more concern or confusion than the issue of land redistribution. The concern stems from a desire to ensure that both the efficiency and equity goals of development are met. The confusion arises because of: (1) differences in understanding and interpreting the land redistribution law which lead to false expectations; (2) data discrepancies in published reports which raise questions about the effectiveness of the implementation of the land redistribution program, and (3) differences in value judgments concerning the desirability of particular land holding patterns.

The distribution of agricultural land may be viewed in two ways, each primarily related to a different issue of policy. First is the distribution of ownership, which is related to the issue of equity. Second is the distribution of holdings, i.e., units of farm operation, which concerns mainly the issue of efficiency in production.

Before analyzing land redistribution in the East Jordan Valley, it is necessary to describe the legal basis for land redistribution. Having gained an understanding of the purpose and form of the law, its implementation can be examined.

2.2.1 The Legal Basis for Land Redistribution

The legal basis for land redistribution in the East Jordan Valley dates to Law 14 of 1959 which initiated the East Ghor Canal project. Law 31 of 1962 provided authorization for the land redistribution activities carried out by the East Ghor Canal Authority. Law 12 of 1968 shifted responsibility for land redistribution to the Natural Resources Authority and extended the provisions to all areas of future irrigation projects in the East Jordan Valley. Law 2 of 1973 created the Jordan Valley Commission which assumed the responsibility for the land redistribution program. Law 18 of 1977 again shifted the responsibility for development of the East Jordan Valley, creating the Jordan Valley Authority (JVA). It is the latter law which is providing the basis for the land redistribution activities associated with the Stage I Development projects, including the East Ghor Canal Extension and the Zarqa Triangle Irrigation projects. This law will also govern land

redistribution in the areas included in the proposed Stage II Development of the East Jordan Valley. The provisions of Law 18 of 1977 pertaining to land redistribution are included in Appendix III.

All of these laws share a common genesis and contain similar basic provisions relating to land redistribution. A principal purpose of the land redistribution effort is to rationalize the layout, i.e., the shape and relative location, of farming units so they can be served at a reasonable cost by water from an efficiently designed distribution system. From the beginning, however, the necessity for reallocation of farming units to facilitate efficiency in the distribution of irrigation water was viewed as an opportunity to ensure wide participation by owner-operators in the benefits of development. Thus, an early adviser to the East Ghor Canal project stated (Spencer, 1958):

"...a stated purpose of the East Ghor Canal Scheme is to provide an opportunity for a large number of farmers to participate in the benefits that will derive when a firm water supply is available for good lands in the valley of the Jordan River.... Long experience reveals that an irrigation economy is far more sound and successful when the landowners live on the project and operate their farms. Landowners must be owner-operators and not absentee landowners renting their land to tenants or farming them by 'proxy'.... The ultimate objective of the project is to create a class of owner-operators with economic size holdings."

To achieve these efficiency and equity objectives, the laws limit the minimum and maximum size of holdings on irrigated land. They seek to consolidate holdings to avoid fragmentation and to increase the number of landowners in the project areas to the extent feasible, i.e., as much as possible given the constraints posed by the minimum and maximum holding requirement and the availability of irrigable land. Thus, the land redistribution program provides a means of addressing equity issues by providing expanded access to the land and water resources being developed by public investment in irrigation, as well as a way of improving the efficiency of farming operations on irrigated lands.

Regulations governing the size of land holdings are based in part on a categorization of the land in the East Jordan Valley into five classes, based on a 1954 systematic appraisal of the soil, topography, irrigation, and drainage characteristics (Baker and Harza, 1955). This detailed classification was carried out in accordance with standards developed by the United States Bureau of Reclamation, modified to reflect local conditions. Lands classified as essentially productive lands (classes 1 and 2) constituted about 30 percent of the total Jordan Valley (i.e., east and west banks), while another 25 percent of the Valley was classified as potentially productive (classes 3 and 4).

In addition to the land classification, regulations governing the size of land holdings are also based in part on the recommendations of an IBRD mission to Jordan in 1955, which concluded (IBRD, 1961):

"In the opinion of the mission, therefore, a 20 dunum holding on good land and a 30 dunum holding on inferior land will provide a hard-working family with a subsistence which in its assurance will be envied by peasant farmers in the rainlands, and with sufficient cash to enable the purchase of necessities not produced on the farm, again at a level not always enjoyed by the rain-dependent cultivator."

The mission went on to reason that since the topography of the cultivable lands of the Valley required intricate canalization and a multiplicity of miniature basins at varying levels, there would be little scope for mechanized operations. "It follows that family farming will not detract from the efficiency of production, and full weight can be given to the social advantages of peasant settlement, whereby the project is farmed in units of a size giving full occupation to industrious families" (IBRD, 1961). Given regulation of holdings to between 20 and 30 dunums, the mission estimated that the total number of Valley (i.e., east and west banks) farmers could be increased from 3,825 to 15,825.

It was recognized, however, that the determination of the optimum sized farm was a judgment based on a number of factors (Spencer, 1958):

"There is no completely scientific means of arriving at the minimum or maximum size of farm units in the East Ghor Canal Scheme or elsewhere, because there is no way to measure accurately the abilities of human beings and the demands of the future. Factors such as crops to be grown, estimated yields, family living requirements, estimates of crop values to prevail in the future, hazards of crop production, all must be weighed."

The minimum size unit was thus stipulated to be large enough to ensure a decent standard of living for a farm family averaging six persons, to support livestock, and to assure efficient production, but to also be small enough to ensure that the managerial ability of the average farmer would not be taxed.

The 1962 law which was used to redistribute the lands in the East Ghor Canal project called for the following allotments:

<u>Number of Irrigable Dunums Held Prior To The Project</u>	<u>Number of Irrigable Dunums To Be Allotted To Holder</u>
30 - 50	To be allotted in full.
51 - 100	50 dunums plus 25% of the area exceeding 50 dunums.
101 - 500	62 dunums plus 17% of the area exceeding 100 dunums.
501 - 1000	130 dunums plus 12% of the area exceeding 500 dunums.
Over 1000	200 dunums.

The 1968 and 1973 laws maintained the same allotment requirements. However, the 1977 law (which is applicable to all land redistribution for Stage I and II Development projects) increased the minimum size holding to 40 dunums. The reason cited for this increase is that 40 dunum farm units are more compatible with the technical requirements of a sprinkler irrigation system.

The procedures to be followed in land redistribution have remained essentially unchanged since the initial law of 1959. The general approach could be termed "expropriation with compensation followed by redistribution." A three member Land Evaluation Committee, composed of a high ranking Government employee as chairman and two other experienced members appointed by the Council of Ministers at the recommendation of the JVA, appraises all land and water rights and the value of all other assets in the project area. These appraisals are done in accordance with regulations developed by the JVA. If not objected to within 15 days after the valuations are made public, the evaluation becomes final. Contested evaluations are submitted to an Appeals Committee, composed of a judge as chairman delegated by the Judicial Council, and two other members appointed by the Council of Ministers at the recommendation of the JVA. The decisions of the Appeals Committee are considered final.

The law also established three member Farmers Selection Committees, composed of a JVA employee as chairman and two other members, one of whom is a farmer with experience in the region or town or village where farm units are to be allocated. The function of the Farmers Selection Committees is to select the eligible farmer-owners for the new agricultural units and to redistribute land according to the minimum and maximum size holding requirement. In allotting farm units, the following priorities were established in the 1962 law: first, owners cultivating their own land in the project area; second, professional farmers living in the project area; third, professional farmers residing in the same district; fourth, professional farmers living in other districts; and fifth, holders utilizing their lands by lease or sharecropping within the project area. The same priorities were contained in the 1968 and 1973 laws.

Significantly, the 1977 law contained a major change in the priorities for allotting farm units. First priority was assigned: (a) to holders residing in the Kingdom who operate their lands by themselves for areas that were irrigated at the time of expropriation; and (b) to holders residing in the Kingdom whose lands were unirrigated at the time of expropriation. In second priority were holders residing in the Kingdom who exploit their land through leasing or sharecropping. Third priority was assigned to professional farmers residing in the Jordan Valley, fourth priority to professional farmers who are not from the Valley population, and fifth priority to holders residing outside of the Kingdom. Thus, the 1977 law upgraded holders exploiting their lands by lease or sharecropping from fifth to second priority, and, for the first time, assigned priority, albeit fifth, to holders residing outside of the Kingdom.

An important provision, introduced in amendments to the basic legislation in 1960, broadened the definition of "holder." In the initial legislation, for purposes of allotting farm units, the holder was "the person or

persons in whose name or names the land or water or both is/are registered in accordance with a registration deed," and one farm unit could be allotted to this "person or persons." However, the 1960 amendment gave the implementing Authority the right "to consider them all or any of them as one holder' (emphasis added). Thus, the Authority was empowered to make separate allotments of farm units to individual members of a single family, circumventing in effect the intent of limiting the maximum size of family land holdings. Subsequently, holders in the Valley took advantage of this provision to transfer ownership of their holdings to members of their family, each of whom then became eligible for allotment of a farming unit (Hazleton, 1974).

In 1975, the Authority froze all land transfers, thus closing this loophole. However, in the announced project areas in the central and northern portions of the Valley, the damage has been done. Many holders had reallocated ownership of their holdings among individual members of their family, in anticipation of the completion of the projects and the accompanying land redistribution. It is significant, however, that in the southern portion of the Valley, where no project was yet underway in 1975, many large holdings remain in the name of the head of the family. Given the freeze on land transfers, these holders are not able to transfer ownership of their holdings to individual family members. Thus, the implementation of the land redistribution law in the south during Stage II Development should have more of an impact in reducing the size of family holdings and more potential for providing farming units of new owners.

The procedures call for holders owning more than the prescribed maximum amount of land to select the land which they will retain in accordance with the provisions of the law. The law gives the holder, whenever possible, priority in retaining the farm unit twenty percent of which is from his expropriated land. The lands retained must be in a single contiguous holding, thus eliminating fragmentation of holdings. Where possible, holders owning less than the prescribed minimum are allotted land required to bring their holdings up to the minimum size. After the rights of existing holders have been exercised, any excess land is distributed to new holders in accordance with the priorities established in the law.

The law provides that in no circumstances is the farm unit to be less than the minimum size prescribed, i.e., 30 dunums in the East Ghor Canal project area, and 40 dunums elsewhere. In practice, however, the Authority has allotted a single farm unit to more than one individual. This has had the effect of making the average size holding in both the East Ghor Canal project area and the State I Development areas less than the minimum size farming unit. The practice is justified on the grounds that the area in excess holdings, i.e., holdings above maximum size permitted, has been insufficient to enable the allotment of minimum size holdings (i.e., one farming unit) to all of the holders whose holdings are less than the minimum size. Rather than dispossess these small holders, the decision was made to allot them less than a farming unit. However, the Authority requires that for purposes of allocating irrigation water, these holders be treated as a single holding.

2.2.2 Implementation of the Land Redistribution Program

The land redistribution program for the East Ghor Canal project area was completed in two stages. Allocation of land in Hods 1-18 occurred in 1963, while land in Hods 19-24 was allocated in 1967. (A Hod is a geographic land registration zone; literally translated as "Basin".) Land redistribution in the Stage I Development areas began in 1978. While land redistribution in the Zarqa Triangle Irrigation, Hisban-Kafrein, and North East Ghor projects is nearing completion, the only project for which redistribution is completed and for which data are available is the East Ghor Canal 18 km Extension project. The results of the redistribution program in the East Ghor Canal project area and the 18 km Extension area are presented below.

East Ghor Canal Project Redistribution: The records indicate that there were 5,304 owners in Hods 1-24 prior to the commencement of the land redistribution program. Of these, 1,297 have paid for their lands but did not choose to select new units in the project area. Jordan Valley Authority officials note that it was difficult in the 1960's to get owners in the East Ghor Canal project area to exercise their right to retain land during the initial redistribution. However, 4,007 of the original land owners did opt to receive farm units in the project area. In addition, about 500 previously landless farmers or laborers received nearly 11,000 dunums of land as a result of the redistribution program. While there were some failures among these as farmer-owners, less than 5 percent of those receiving land were financially forced to give up the lands they had been allocated due to mismanagement or other personal reasons. (Arthur D. Little, 1979).

In the East Ghor Canal project area, land was appropriated and then resold at JD 40 (\$135) per dunum for Class 1 and Class 2 land (i.e., the best agricultural lands) and JD 8 (\$27) per dunum for Class 6 land (i.e., the least suitable agricultural land). Farmers receiving land were able to pay for it over 20 years at 4 percent interest. A farmer-landowner also had to pay JD 20 (\$68) per dunum for water rights.

Table 2-1 shows the results of the land allocations made in the area of the East Ghor Canal project. It indicates that the largest farm in the project area after redistribution was only 210 dunums, and only 6 holdings fell into this category. (The area in excess of 200 dunums may have been planted in trees, since such lands are excluded from redistribution.) Over 90 percent of the holdings were 90 dunums or less. It should be noted that while the minimum size farm unit in the project area was 30 dunums by law, 2,708 holders, more than 60 percent of the total, were given holdings of less than the minimum size. Thus, the average size holding in the project area following redistribution was only 21.3 dunums. By comparison, a 1960 survey of ownership in the East Ghor Canal project area had indicated 3,668 holdings on 158,296 dunums, or an average size holding of 43.1 dunums (Department of Statistics, 1961).*

Before leaving the topic of the redistribution program in the East Ghor Canal project area, it should be noted that the results reported above differ in some respects from those indicated earlier in a study published by the Royal Scientific Society (Hazleton, 1974). This study was based on

*The large area included in the 1960 survey indicates that a substantial amount of land outside of the eventual project boundaries was included.

Table 2-1

ALLOCATION OF LAND IN THE EAST GHOR CANAL PROJECT AREA
(Hods 1-24)

Size of Holding*	Number of Owners	Percent of Owners	Area (dunums)	Percent of Area
5.15 dunums	1,312	29.1	6,750	7.1
10.0 dunums	486	10.8	4,860	5.1
15.0 dunums	9 910	20.2	13,650	14.2
30.0 dunums	1,425	31.6	42,750	44.5
60.0 dunums	262	5.8	15,720	16.4
90.0 dunums	74	1.6	6,660	7.0
120.0 dunums	19	0.4	2,280	2.4
150.0 dunums	9	0.2	1,350	1.4
180.0 dunums	4	0.1	720	0.8
210.0 dunums	6	0.1	1,260	1.3
Total	4,507	100.0	96,000	100.0

*The size classes are based on approximately 30 dunum farm units. Thus, 5.15 dunums means each unit was divided among 5.8 holders on the average; 10.0 dunums implies an average of 3 holders per farm unit, 15.0 dunums implies an average of 2 holders per unit; and the remaining size classes are based on one holder and 1 thru 7 units.

Source: Jordan Valley Authority.

an August 1971 survey of the records of the Lands and Surveys Department, and covered 3,393 farming units, 5,388 owners, and 130,125 dunums. While the survey indicated that there were no holdings below 20 dunums in size, in sharp contrast to the pattern of small holdings found in the JVA records, the average size of ownership was 24.2 dunums, only slightly above that indicated by the JVA records. While it is not possible to reconcile completely the two sets of findings, part of the difference between the two probably results from the fact that the Royal Scientific Society survey covered almost a third more area. However, both sets of data support the conclusion that the redistribution program in the East Ghor Canal project area succeeded in narrowing the size-range of holdings, in reducing the average size of ownership, and in reducing significantly the incidence of joint ownership and fragmentation of holdings. The JVA records provide the additional insight, supported by field observations, that the redistribution program conferred ownership of less than a farm unit (i.e., less than 30 dunums) to over 60 percent of those receiving land in the project area.

18 km Extension Redistribution: Redistribution in the 18 km Extension project area began in September 1978. Table 2-2 shows the distribution of holdings in the area prior to the commencement of redistribution. There were 1,140 owners holding 35,300 dunums, with the average size holding being about 31 dunums. The 23 holders owning more than 200 dunums accounted for about 2.0 percent of the total number of holders, but for about 23 percent of the total project area. At the other end of the spectrum, 887 holders owning less than 40 dunums accounted for about 78 percent of the total number of holders, but for only about 32 percent of the total project area. The existence of a large number of small holders probably reflects the action taken by many holders in distributing through transfer of ownership some of their lands to members of their family in anticipation of the redistributing program. (The freeze on such transfers did not occur until 1975, long after plans for the project had become final and public.)

Table 2-3 presents the results of the redistribution program in the 18 km Extension project area. After redistribution, there were 1,221 owners holding 35,200 dunums in the project area, with the average holding being about 29 dunums. Only two holders owned more than 180 dunums, and these represented cooperative rather than individual holdings. On the other end of the distribution, 687 holders owning less than 40 dunums accounted for about 59 percent of the total number of holders, but about 27 percent of the project area.

Thus, the impact of the redistribution may be summarized as follows: the average size of ownership fell only slightly, i.e., from 31 dunums to 29 dunums; the size-range of holdings was narrowed by the virtual elimination of individual holdings in excess of 200 dunums; the number of holders increased by 81 or about 7 percent; and the number of holders owning less than 40 dunums decreased, reducing the percentage of such owners from 78 percent to 59 percent. The redistribution program in the 18 km Extension project area created proportionately fewer new ownerships than the earlier redistribution effort in the East Ghor Canal project area. The reason for this result is easy to see. If each holder who owned less than 40 dunums before redistribution were to be given a minimum size holding of

Table 2-2

LAND OWNERSHIP IN THE 18 KM EXTENSION PROJECT AREA
BEFORE REDISTRIBUTION

Size of Holding (Dunums)	Number of Holders	Percent	Area (Dunums)	Percent
Less than 5 dunum	178	15.6	511.4	1.4
5 - 10 dunums	300	26.3	2,084.0	5.9
10 - 20 dunums	204	17.9	2,759.9	7.8
20 - 30 dunums	103	9.0	2,558.2	7.3
30 - 40 dunums	102	9.0	3,343.4	9.5
40 - 50 dunums	101	8.9	4,663.8	13.3
50 - 100 dunums	92	8.1	5,972.7	17.0
100 - 200 dunums	37	3.2	5,342.3	15.2
200 - 300 dunums	11	1.0	2,499.6	7.1
300 - 400 dunums	4	0.3	1,399.7	4.0
400 - 500 dunums	2	0.2	996.2	2.8
500 - 1000 dunums	6	0.5	3,075.7	8.7
Total*	1,140	100.0	35,200.0	100.0

* Totals may not add due to rounding.

Source: Jordan Valley Authority, Planning and Analysis Unit.

Table 2-3

LAND OWNERSHIP IN THE 18 KM EXTENSION PROJECT AREA
AFTER REDISTRIBUTION

Size of Holding (Dunums)	Number of Holders	Percent	Area (Dunums)	Percent
Less than 5 dunums	20	1.6	79	0.2
5 - 10 dunums	142	11.6	1,069	3.0
10 - 20 dunums	291	23.9	3,628	10.3
20 - 30 dunums	229	18.7	4,756	13.5
30 - 40 dunums	5	3.4	159	0.4
40 - 50 dunums	436	35.7	17,504	49.7
50 - 120 dunums	87	7.2	6,330	18.1
120 - 180 dunums	9	0.7	1,240	3.5
More than 180 dunums	2	0.2	440	1.3
Total*	1,221	100.0	35,200	100.0

*Totals may not add due to rounding.

Source: Jordan Valley Authority, Planning and Analysis Unit.

one farm unit (40 dunums), it would have required the allotment of 35,480 dunums, or more than the project area. The elimination of all holdings in excess of 200 dunums would have freed less than 5,672 dunums (assuming that the 23 holders in this category were given 100 dunums on the average) for redistribution to other holders.

2.2.3 Assessment of the Land Redistribution Effort

Based on the evidence provided by the redistribution program results in the East Ghor Canal and 18 km Extension Project areas, it can be concluded that the land redistribution provisions of the various Jordan Valley Development laws (1959, 1962, 1968, 1973, and 1977) are being implemented. The redistribution program is resulting in: (1) a reduction in the size of holdings on irrigated lands in the project areas; (2) the creation of a modest number of new holdings, giving ownership or irrigated land to previously landless farmers; and (3) a reduction in the degree of fragmentation of holdings, i.e., consolidation of previously dispersed holdings into a single contiguous holding. Thus, the redistribution program is addressing both equity and efficiency concerns.

The impact of the redistribution efforts associated with the Stage I Development projects is confirmed by the changes in the size distribution of agricultural holdings in the Valley between 1975 and 1978, as indicated by the census of agriculture in each of these years. Table 2-4 shows that the percentage of holdings of more than 40 dunums in size fell from 27.8 percent in 1975 to 21.7 percent in 1978. The table also shows a corresponding increase over these years in the percentage of holdings of less than 20 dunums in size.*

As noted before, the transfer of ownership of holdings into the names of individual family members in anticipation of the redistribution program has substantially lessened the impact of the program in reducing the concentration of ownership by families. Such transfers have not only reduced the amount of "excess" holdings, limiting thereby the land available for redistribution to those owning small holdings and to the landless, but have also increased the number of holdings below the minimum size farming unit (30 dunums in the East Ghor Canal project area and 40 dunums elsewhere), thus creating more rights to additional land allotments than can be fulfilled.

The 1975 freeze on land transfers eliminated this option to transfer ownership to individual members of one's family, but not before many holders in the State I Development project areas had taken advantage of the opportunity in anticipation of the projects. In the south, however, the 1975 freeze on land transfers probably occurred before many holders realized that their lands might be included in Stage II Development projects. If the freeze is maintained, there may be more opportunity in this area for the land redistribution program to be effective in creating new ownerships.

*It should be emphasized that the 1975 agricultural census boundaries included much of the Eastern Highlands, while the 1978 agricultural census included only the land up to sea level. This could account for part of the changes in the size distribution of ownership as well as for the indicated decline in the total number of holdings.

Table 2-4

SIZE DISTRIBUTION OF AGRICULTURAL HOLDINGS IN
THE EAST JORDAN VALLEY, 1975 AND 1978*

Size of Holding (Dunums)	1975		1978	
	Number	Percent	Number	Percent
Less than 5 dunums	342	5.9	479	9.1
5 - 10 dunums	494	8.6	485	9.2
10 - 20 dunums	1,342	23.2	1,339	25.4
20 - 40 dunums	1,997	34.6	1,820	34.6
40 - 100 dunums	1,235	21.4	896	17.0
100 - 200 dunums	261	4.5	155	2.9
More than 200 dunums	108	1.9	92	1.8
Total	5,779	100.0	5,266	100.0

* Data include the land holding distribution both in areas receiving water from irrigation projects and in those areas irrigated privately. In addition, data include land holding distribution for unirrigated (rain-fed) lands.

Sources: 1975 - Department of Statistics, The Agricultural Sample Survey in the Ghors, 1976 (reporting data collected during the agricultural census of 1975).

1978 - Department of Statistics, Agricultural Census, 1978 (developed from printouts provided by the Jordan Valley Authority)

It should also be recognized that the breakup of large family ownerships into individual ownerships by members of the family should contribute to a lessening of concentration of ownership among families in the longer run. The forces of modernization in Jordan, as elsewhere, probably are resulting in a weakening of family ties. Individual family members having title in their own names may in fact become individual decision-makers regarding the use of their land. The social and agricultural impact of individual ownership replacing family ownership should not be ignored.

2.3 LAND TENURE

Tenancy refers to the form of farm holding and relates to both equity and efficiency. An agricultural unit may be owned, rented, or held under a combination of the two (i.e., mixed form of tenancy). The rent may be fixed in cash, in kind, or in both, or it may be variable based on a percentage share of the output.

2.3.1 Tenancy Conditions in the East Jordan Valley

Table 2-5 presents an overview of the tenancy situation in the East Jordan Valley in 1975, based on the results of the agricultural census of that year. For the Valley as a whole, about 35 percent of the holdings (37 percent of the area) were owner-operated, 22 percent of the holdings (15 percent of the area) were sharecropped, and 34 percent of the holdings (33 percent of the area) were rented for a fixed fee. The remaining 9 percent of the holdings (15 percent of the area) were in mixed tenancy (i.e., partly owned and partly rented) or were operated by squatters or under unspecified conditions of tenancy.

The 1975 census of agriculture also showed distinct differences in tenancy conditions among the sub-regions of the Valley. In the north, in the area which includes most of the East Ghor Canal project, a higher proportion of the holdings were under owner-operation and a much lower proportion were being sharecropped. In the middle region, which includes only the lower portion of the East Ghor Canal project but most of the Stage I Development lands, the percentage of holdings that were owner-operated, sharecropped, and rented for a fixed fee were approximately the same. In the south, which lies outside of most of the Stage I Development area and where irrigation is from privately owned wells, the most common form of tenancy was sharecropping, followed by rental for a fixed fee and owner-operation.

The tenancy patterns in the Valley in 1975 thus closely followed the stages of development. In the north, where development had taken place in the sixties with the construction of the East Ghor Canal and the accompanying land redistribution, owner-operation was the most common form of tenancy, followed closely by fixed rental with a small proportion being sharecropped. In the south, where little in the way of development had taken place, sharecropping was the most common form of tenancy, followed closely by fixed rental with a relatively small proportion being owner-operated. In the middle, where development in 1975 was in its initial

Table 2-5

LAND TENURE IN THE JORDAN VALLEY - 1975

Region and Type of Tenure	Holdings		Area	
	Number	Percent	Dunums	Percent
North				
<u>Aghwar Shamaliya</u>				
Fully Owned	1,366	43.2	60,106.8	45.3
Fully Rented:				
Share Basis	344	10.6	9,581.5	7.2
Other Basis	1,093	34.6	41,056.0	31.0
Total Rented	1,427	45.2	50,637.5	48.2
Mixed:				
51-99% Owned	102	3.2	7,991.0	6.0
51-99% Rented	189	6.0	12,120.9	9.1
Other*	78	2.5	1,712.0	1.3
Total**	3,162	100.0	132,568.2	100.0
Middle				
<u>Dier Alla</u>				
Fully Owned	519	30.2	19,063.5	32.7
Fully Rented:				
Share Basis	520	30.2	14,020.5	24.0
Other Basis	550	32.0	18,608.1	31.9
Total Rented	1,070	62.2	32,628.6	55.9
Mixed:				
51-99% Owned	43	2.5	1,954.5	3.4
51-99% Rented	74	4.3	3,813.0	6.5
Other*	14	0.8	845.0	1.4
Total**	1,720	100.0	58,304.6	100.0
South				
<u>Shuna Janubiya</u>				
Fully Owned	196	17.4	8,754.0	18.9
Fully Rented:				
Share Basis	470	41.8	13,004.5	28.1
Other Basis	417	37.1	19,055.9	41.1
Total Rented	887	78.9	32,060.4	69.2
Mixed:				
51-99% Owned	11	1.0	2,046.0	4.4
51-99% Rented	26	2.3	3,384.5	7.3
Other*	5	0.4	114.0	0.2
Total**	1,125	100.0	46,358.9	100.0
Total Valley				
Fully Owned	2,081	34.6	87,924.3	37.1
Fully Rented:				
Share Basis	1,324	22.0	36,606.5	15.4
Other Basis	2,060	34.3	78,720.0	33.2
Total Rented	3,384	56.3	115,326.5	48.6
Mixed:				
51-99% Owned	156	2.6	11,991.5	5.1
51-99% Rented	289	4.8	19,318.4	8.1
Other*	97	1.6	2,671.0	1.1
Total**	6,007	100.0	237,231.7	100.0

* Includes squatters, land under tribal form of tenure, and other single or multiple forms of tenure.

** Percentage totals may not sum to 100 due to rounding.

Source: Department of Statistics, General Results of the Agricultural Census, 1975 (Amman: Dept. of Statistics, April 1977), Tables 0.8/A, 0.9/A, and 0.10/A.

stages, holdings were about equally divided among owner-operation, sharecropping, and fixed rental. Thus, the middle area clearly appeared to be in transition, moving from the tenancy pattern found in the south, predominantly sharecropping, to the tenancy pattern found in the north, predominantly owner-operation*

Table 2-6 shows the tenancy situation in the East Jordan Valley as disclosed by the 1978 agricultural census**. For the Valley as a whole, the percentage of owner-operated holdings had increased to 40 percent, the percentage of holdings being sharecropped also had increased, rising to 27 percent, while the percentage of holdings being rented for a fixed fee had declined to 29 percent. About 4 percent of the holdings were still under mixed tenancy or other forms of tenancy.

The 1978 census of agriculture data indicate that the differences in tenancy patterns among the sub-regions of the Valley found in the 1975 census remain, but that the differences between the northern and middle sub-regions have diminished. In the north, the 1978 pattern of tenancy is almost identical to that found in the 1975 census, with a slight increase in owner-operation and fixed fee rental. In the middle, the percentage of owner-operators increased from 30 percent in 1975 to 44 percent in 1978. There was a corresponding decline in the proportion of holders renting for a fixed fee, from 32 percent in 1975 to 13 percent in 1978, and a slight

** It should be noted, however, that the higher proportion of owner-operators in the north reflects not only the impact of the East Ghor Canal project and the accompanying land redistribution, but also the fact that the climatic conditions in this area are most suitable for citrus, a crop that requires fixed investment and is generally associated with owner-operation rather than sharecropping or rental for a fixed fee.

** The results of the 1978 census of agriculture in the Valley should be viewed with caution. The total holdings are shown to have fallen from 6,007 in 1975 to 4,966 in 1978, with a corresponding decrease in the total area from 237,232 dunums to 180,177 dunums. The majority of this decline occurred in the north, where the number of holdings is shown to have declined from 3,162 to 2,546 and the area to have decreased from 132,568 dunums to 87,066 dunums. Several factors may account for this decline. The Coverage of the 1978 census was designed to conform to the Jordan Valley Authority definition of the Valley, i.e., all land lying below sea level, and to exclude the Valley highlands lying above sea level. The 1975 census included these highlands. In addition, 1978 was an extremely dry year in which there was a sharp decline in both rainfed and irrigated cultivation. While these two factors would contribute to the decline indicated in the number of holdings and area by the 1978 census, they appear to be insufficient to account for the magnitude of the decline shown.

Table 2-6

LAND TENURE IN THE JORDAN VALLEY - 1978

Region and Type of Tenure	Holdings		Area	
	Number	Percent	Dunums	Percent
North				
<u>Aghwar Shamaliya</u>				
Fully Owned	1,202	47.2	41,455.4	47.6
Fully Rented:				
Share Basis	256	10.1	6,747.5	7.7
Other Basis	992	39.0	33,265.0	38.2
Total Rented	1,248	49.1	40,012.5	45.9
Mixed:				
51-99% Owned	16	0.6	1,530.0	1.8
51-99% Rented	64	2.5	3,872.2	4.4
Other*	16	0.6	196.0	0.2
Total**	2,546	100.0	87,066.1	100.0
Middle				
<u>Dier Alla</u>				
Fully Owned	534	43.7	16,906.9	38.8
Fully Rented:				
Share Basis	441	36.8	10,757.2	24.7
Other Basis	158	13.2	4,549.5	10.5
Total Rented	599	50.0	15,206.7	35.2
Mixed:				
51-99% Owned	20	1.7	742.0	1.7
51-99% Rented	53	4.4	10,410.8	23.9
Other*	4	0.3	155.0	0.4
Total**	1,200	100.0	43,521.4	100.0
South				
<u>Shuna Janubiya</u>				
Fully Owned	293	23.4	26,678.8	53.2
Fully Rented:				
Share Basis	648	51.8	12,632.5	25.2
Other Basis	279	22.3	6,766.3	13.5
Total Rented	927	74.1	19,399.3	38.7
Mixed:				
51-99% Owned	12	1.0	2,167.6	4.3
51-99% Rented	17	1.4	1,877.5	3.7
Other*	1	0.1	6.0	0.1
Total**	1,250	100.0	50,129.2	100.0
Total Valley				
Fully Owned	2,019	40.4	85,041.1	47.1
Fully Rented:				
Share Basis	1,345	26.9	30,137.2	16.7
Other Basis	1,429	28.6	44,581.3	24.7
Total Rented	2,774	55.5	74,718.5	41.4
Mixed:				
51-99% Owned	48	1.0	4,439.6	2.5
51-99% Rented	134	2.7	16,160.5	8.9
Other*	21	0.4	357.0	0.2
Total**	4,996	100.0	180,716.7	100.0

* Includes squatters, land under tribal form of tenure, and other single or multiple forms of tenure.

** Percentage totals may not sum to 100 due to rounding.

Source: Dept. of Statistics, Agricultural Census, 1978, Tables 0.8/A, 0.9/A, and 0.10/A (developed from printouts provided by the Jordan Valley Authority).

increase in the percentage of holdings being sharecropped, from 30 percent in 1975 to 37 percent in 1978. In the south, the proportion of holdings being sharecropped also rose, increasing from 42 percent in 1975 to 52 percent in 1978. In addition, there was a modest rise in the percentage of holdings under owner-operation, from 17 percent in 1975 to 23 percent in 1978, and a substantial decline in the proportion of holdings being rented for a fixed fee, from 37 percent in 1975 to only 22 percent in 1978.

In summary, between 1975 and 1978, census data show that the tenancy pattern in the middle sub-region of the Valley, where Stage I Development projects were underway, changed to resemble more closely the tenancy pattern in the north, where development has already taken place. The existing tenancy pattern in the north and the emerging pattern in the middle zone is one of predominant owner-operation, with fixed fee rental being more prevalent in the remaining area in the north and sharecropping being more prevalent in the remaining area in the middle sub-region. The south continues to be dominated by sharecropping, although there has been a slight rise in the incidence of owner-operation. Fixed fee rental appears to be on the decline in the south.

2.3.2 Analysis of Tenancy Types

The significance assigned to the trends in tenancy in the East Jordan Valley, as described above, depends on the characteristics of owner-operation, sharecropping, and fixed fee rental as actually practiced in the Valley, as well as on the expected impact of tenancy conditions on efficiency and equity. This section discusses the types of tenancy found in the Valley, while the following section analyzes the nature of sharecropping in this region.

The actual operation of farms in the East Jordan Valley is considerably more complex in structure than the tripartite division into owner-operation, sharecropping, and fixed fee rental categories used in the census of agriculture. This complexity raises some question about the validity of the census responses, as well as the significance that should be attached to them.

There are four common types of farm operation in the Valley. Each may involve one or more of the conventional forms of tenancy.

The first type of farming operation may be termed resident owner-operation, under the usual assumption that the owner resides on the farm with his family and participates actively in all phases of farming activity. If the farm is large enough to require labor beyond the capacity of the owner and his family to provide, the owner may hire wage labor. In some cases, the owner may contract with a professional farmer on either a share or a fixed fee basis (or some combination of the two) to farm a portion of the owner's holding.

The second type of farming operation also involves owner-operation, but is distinguished from the first type by the fact that the owner does not reside on the farm, at least not full time, and generally does not engage in cultivation. For lack of a better term, this type of tenancy may be

termed nonresident owner-operation . The nonresident owner-operator generally resides within an hour's drive of the farm and is actively involved in making farming decisions. At critical times in the farming cycle, the nonresident owner-operator may make daily visits to the farm. At other times, the visits may be made only weekly or bi-weekly. To supervise the cultivation activities, the nonresident owner-operator employs a professional farmer to manage the farm. The manager may be paid a fixed wage or may receive a share of the output (or some combination of the two). The manager, in turn, employs labor to carry out the cultivation activities. The labor may be employed on a daily wage basis, or on a sharecropping basis.

The third type of farming operation in the East Jordan Valley is a sharecropping arrangement in which an absentee owner enters into a contractual agreement with a professional farmer to farm the land in return for a fixed share of the crop**. Far from being a homogeneous category of tenancy, however, sharecropping arrangements differ widely throughout the Valley depending on the nature of the farming operation (e.g., type of crop being grown, technology being employed, etc.), the degree of involvement of the owner in the management of the farming operation, and the terms of the sharecropping contract. The sharecropper generally employs family labor, but increasingly hires supplementary wage labor.

The fourth type of farming operation is fixed fee rental. The lessee may be a professional farmer who does not own land in the Valley, or an owner-operator who is renting in additional land. In recent years, a number of professional men have entered farming in the Valley by leasing land for a fixed fee. The lessee rents the land generally for three years (with the rent normally being paid in advance and the written contract filed with the Jordan Valley Authority as required by law). He employs labor to perform the cultivation activities. Usually the labor is employed on a daily or monthly wage basis, but in some instances, labor is employed on a share basis. The most distinguishing feature of the fixed fee rental form of tenancy is that it requires minimal involvement of the owner in the farming operation.

It can be seen from the above description of the types of farm operation in the East Jordan Valley that an owner has four basic options in the use of his land. Each option is distinguished by the degree of involvement in the farming operation required of the owner, the potential returns to the owner, and the degree of risk assumed by the owner. Figure 2-I presents an overview of these options and the nature of the tradeoffs implied. It should be recognized that an owner may sell his farm only to the Jordan Valley Authority, and that the price he can receive is equal only to the initial amount he paid the Jordan Valley Authority for the farm unit. This price is considerably below the market value of the farm based on the potential returns given today's technology and prices. Thus, it is extremely unlikely that the owner will opt to sell his farm unit.

* The literature on land tenancy generally refers to such an owner as an absentee owner. However, this term implies much less involvement in the farming operation than is actually the case in the East Jordan Valley

** While the term absentee owner is used here, it should be recognized that the owner probably lives either in the Jordan Valley or in the nearby highlands.

As indicated in Figure 2-I, the greatest involvement of the owner in the operation of the farm occurs under resident owner-operation, while the least involvement occurs with fixed fee rental. Nonresident owner-operation requires less involvement than owner-operation, but still demands regular and continuing contact with the farm enterprise. It also requires that the owner be able to find a professional farmer to manage the farm. The degree of involvement of the owner will depend upon the perceived competence of the manager and the trust placed in him by the owner. Sharecropping offers another alternative, which usually requires less involvement of the owner in the actual operation of the farm. The degree of involvement, however, will again depend upon the perceived competence of the sharecropper and the trust placed in him by the owner.

The potential returns to an owner will also depend on the type of farm operation he selects. The highest returns will come from resident owner-operation, since the owner receives the entire net income from the farming operation. The lowest returns will come from fixed fee rental, since the rental fee is generally quite modest, i.e., on the order of JD 15 to JD 30 (\$50-100) per dunum, with a minimum three year lease and with the rent generally required to be paid in advance. Nonresident owner-operation will also yield relatively high returns, although the owner will have to pay the salary of the manager. The salary will depend not only upon the qualifications of the manager but also upon the size of the farm. Where the manager receives a share of the output (e.g., half of the owner's share when the farm is rented on a share basis to several sharecroppers), the returns from nonresident owner-operation could approach those of sharecropping or be even less. A sharecropping arrangement provides good returns -- the usual formula is a 50-50 sharing of expenses (other than labor) and output. Where new technology, e.g., plastic houses or tunnels, drip irrigation, is used, the owner generally must pay the capital costs, but charges the sharecropper a fixed fee for the use of the facilities.

Figure 2-I also indicates that the degree of risk assumed by the owner varies inversely with the potential returns, as might be expected. Resident owner-operation requires the owner to bear all of the risks, while nonresident owner-operation requires him to not only bear all of the risks, but also the additional risk imposed by the commitment to pay the manager's salary. The degree of risk assumed by the owner under sharecropping is modest, since he in effect divides the risk 50-50 with the sharecropper. The degree of risk under fixed fee rental, given that the rent is paid in advance, is zero.

In summary, the landholding group in the East Jordan Valley includes a number of functionally distinctive groups: non-cultivating owners who give tenants total responsibility; owners who supervise and may assist in the cultivation but who do not necessarily live in the Valley but rather commute from the highlands; owners who live in the Valley at least during the cultivation periods and cultivate their own land with their families; and owners who cultivate their own and lease or sharecrop the land of others. (The last two groups also spend part of the year in non-agricultural work in or outside of the Valley.)

Type of Farm Operation	Degree of Involvement of the Owner	Potential Returns to Owner*	Degree of Risk Assumed by the Owner**
Resident Owner-Operation	High	High	High
Nonresident Owner-Operation	Substantial	High	Highest
Sharecropping Arrangement	Moderate to Substantial	Moderate	Moderate
Fixed Fee Rental Contract	Minimal	Low	None

* The return will, of course, vary according to the type of farm and the type of technology employed. Returns will be highest for plastic houses with drip irrigation and lowest for open field surface irrigation.

** The degree of risk assumed depends on the degree of capital intensity of the farming operation. Thus, plastic houses with drip requires the greatest investment and confers the greatest risk. The least risk would come from open field surface irrigation.

Figure 2-I

OWNER ALTERNATIVES IN THE EAST JORDAN VALLEY

2.3.3 Analysis of Sharecropping in the Jordan Valley

The Conventional Wisdom About Sharecropping: Economic theory from Adam Smith to Alfred Marshall held that: (1) sharecropping is inefficient when compared to either owner-operation or fixed fee rental; and (2) sharecropping provides the farmer with insufficient motivation or incentive for investment in the land and technological innovation. In addition, sharecropping is believed to be inequitable. Thus, the contrast frequently is drawn between the sharecropper tied by tradition, poverty, and ignorance to the avaricious absentee landlord, and the idyllic life of the sturdy yeoman happily farming his own land.

The presumed inefficiency of sharecropping in comparison to other forms of tenancy arises from the fact that the returns from any marginal input must be shared with the landlord. The contrast between decisions regarding variable inputs under sharecropping and under owner-operation or fixed fee rental is illustrated in Figure 2-II.

An owner-operator or cash tenant would find it profitable to apply S amount of inputs, thus equating marginal factor cost (MFC) with the marginal value of output (MVP). Under conditions of share tenancy, however, the sharecropper would find it profitable to apply only R amount of inputs, i.e., the sharecropper equates marginal factor cost (MFC) with the marginal value of output to him, $(1 - r)MVP$, where r is the percentage share of output paid to the landlord as rent. Thus, the marginal product of labor and other inputs under sharecropping is higher than under cash rent or owner-operation, leading to the conclusion that the quantity of inputs and the quantity of output obtained is less.

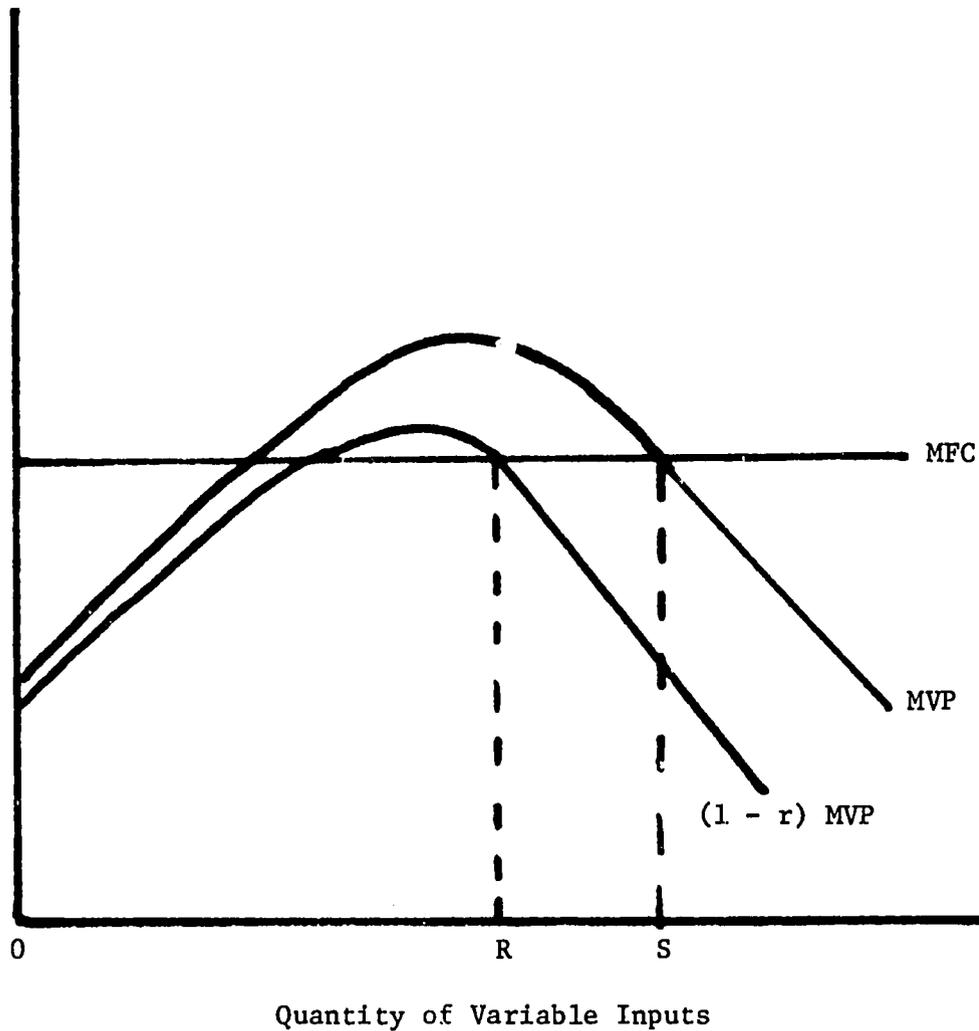
In addition to the inefficiency of share tenancy, studies have also shown that sharecropping leads to a system of relationships which retards investment and innovation in agriculture (e.g., Echestein, 1975; Long, 1961; and Warriner, 1962). The sharecropper is reluctant to make investments in the farm because of the insecurity of his tenure and the uncertainty of his being able to capture the benefits of such investments.

The general problems created by the sharecropping system have been summarized quite succinctly (FAO, 1967):

"The shortcomings of the sharecropping arrangements that are common in Jordan and, indeed, in the whole of the Middle East, stem from the unequal relation between the tenant and the landlord. The strength of the latter is increased because of the services he can provide. Aside from the use of land, he supplies credit, seed, water, even labor and ploughing facilities under varying combinations, and charges heavily for these services.

Furthermore, the tenant has generally no written contract so that, although the individual tenancy arrangement may be of long term, the power of termination of the arrangement is totally in the landlord's hand.... The insecurity of tenure and the absence of protective legislation have serious implications for agricultural production. The relations of the tenant with the landlord cannot be easy, and the tenant is not likely to invest in the land.

Cost and Returns



Notes:

MFC = Marginal factor cost

MVP = Marginal value of product

r = Percentage share of output paid as rent to the landlord

$(1 - r)MVP$ = Marginal value of product to the tenant

R = Amount of variable input under share tenancy

S = Amount of variable input under owner-operation or cash rent tenancy

Figure 2-II

QUANTITY OF VARIABLE INPUTS UNDER SHARE TENANCY AND
OWNER-OPERATION OR CASH TENANCY

Indeed, his attitude to the land becomes that of the miner who tries to get as much out of it as he possibly can during his stay, not mindful of the future, since he has no assurance that his association with the land will be long."

A Countervailing View: The view that sharecropping is inherently inefficient has been strongly challenged on theoretical grounds in recent years (Cheung, 1968, 1969; Reid, 1976; and Roumasset, 1976). The new school of thought begins by asking why the landlord and tenant would voluntarily adopt an inefficient contractual arrangement, and observes that empirical studies often show that sharecropped farms are equally efficient when compared with farms operated under alternative tenure arrangements.

The new school of thought does not argue that sharecropping is invariably the most efficient form of tenure, but rather that tenurial contracts generally are made by economically rational persons, and in circumstances where sharecropping contracts are chosen, they generally are the most efficient form of contract available.

A variety of factors have been cited as affecting the relative attractiveness of sharecropping. Sharecropping arrangements may be developed to permit different forms of cost sharing for inputs between the sharecropper and his landlord. In some arrangements, the sharecropper and the landlord provide certain inputs in the same proportion that they share in output. In other arrangements, the proportion of inputs provided by each party varies according to the type of input and sometimes the agreement may specify the level of certain inputs to be supplied by the parties.

In contrast to a fixed rent tenancy, sharecropping permits the tenant to reduce his risk from crop failure or market fluctuations by sharing the risk with the landlord. (Risk may also be shifted completely from the farmer to the landowner if the landowner hires the farmer as a wage laborer. However, inefficiencies of managing wage labor in agriculture often make this option unattractive.) Sometimes it is efficient for the tenant and the landlord each to specialize in different managerial functions; the provision of a share in output to each party gives each an incentive to improve performance. One economist argues that sharecropping may permit better adjustment to unforeseen circumstances during the year than would fixed rent tenancy (Reid, 1976).

The "sharecropping can be efficient" view is not held universally (e.g., Bardhan and Srinivasan, 1971). Nonetheless, there is sufficient force to the argument that it cannot be presumed that sharecropping in the East Jordan Valley is inefficient, without bringing to bear information on the specific form of share tenancy found in the Valley, and examining empirical studies on the net returns from alternative forms of tenure.

Sharecropping Conditions in the East Jordan Valley: The most thorough study of tenancy conditions in the East Jordan Valley was carried out by Hisham Sharab of the Royal Scientific Society of Amman (Sharab, 1975). The study was based on data collected from a random sample of owner-operated and tenant farms in the East Jordan Valley for the 1973-1974 crop season. Data were collected in the three major sub-regions, i.e., north, middle, and south.

The first stage of the research involved the collection of socioeconomic data from 209 tenants and their 166 corresponding landlords. This sample represented about 7.1 percent of the total population of farms in the Valley and was distributed proportionally according to the total number of share-cropped holdings by sub-region. Stage two of the research involved the collection of data concerning costs and returns from a sample of 143 farms, again distributed proportionally by sub-region and according to tenancy status. The following paragraphs summarize some of the major findings of this and other studies relating to tenure arrangements in the Jordan Valley:

1. Characteristics of Landlords: The study found that only 37.3 percent of the landlords surveyed resided outside of the East Jordan Valley. Thus, the proportion of "absentee" landlords was relatively low. Most of the landlords living outside of the Valley resided in Amman or in other communities in the nearby highlands and made relatively frequent visits to the Valley. The percentage of absentee landlords was found to be higher in the north, where land redistribution had been implemented in connection with the East Ghor Canal project, than in the south, which had yet to undergo land redistribution. Also, the percentage of absentee landlords was found to be higher among large farms than among small farms in the sample.

Of the two-thirds of the landlords surveyed who lived in the Valley, one-quarter were non-farmers (i.e., employees, merchants, or women who had inherited farms); one-quarter stated that they held land in excess of that which they could farm using only their own family labor; and the remaining one-half stated a number of reasons for preferring share tenancy, including inability to work, preference for share over hired labor because the latter required more supervision, and the belief that leasing would be more profitable than owner-operation.

2. Characteristics of Tenants: Almost two-thirds of the tenants interviewed were found to have been born outside of the Valley, the vast majority of whom had migrated to the Valley from Palestine or the West Bank. Two-thirds were illiterate, and of the remaining one-third who had attended school, 83 percent had received six or less years of schooling. Of the tenants surveyed, 88 percent were landless, while the remainder operated farms of their own and served as a tenant on the farm of another. Almost all tenants in the southern area were landless.

3. Relationship Between Landlord and Tenant: The survey found that about 84 percent of the lease agreements were oral and 99 percent were for one season or for one year. About 65 percent of the tenants and 92 percent of the landlords surveyed expressed a preference for a one-year lease. About two-thirds of the tenants surveyed desired a cash lease. In contrast, about 95 percent of the landlords surveyed stated a preference for the share lease.

The survey indicated that the majority of sharecroppers made the major decisions with regard to the date of planting, the date of harvesting, and the method of harvesting, while the remaining farm decisions, as to type of crop, land preparation, quantity and kind of fertilizers, and sale of produce, were, in most cases, made by mutual agreement. Slightly over half

of the sharecroppers reported that they visited daily by their landlord, and an additional 36 percent reported at least monthly visits.

A more recent survey of tomato farms in the East Jordan Valley bears out this pattern of decision-making. According to each respondent's own evaluation, 18 of the 23 sharecroppers interviewed were independent decision-makers, with three reporting joint decision-making, and two reporting that the management decisions were being made by the landlord. The researcher conducting the study concluded (Hyslop, 1979):

"As a generalization from the survey responses, sharecropping is better interpreted as 'rental on shares', being more closely like that of tenancy in the Corn Belt of the U.S. than like the labor only image the term 'sharecropper' usually creates. When joint decision-making is mentioned the impression usually gained is that of a partnership between the landlord and the tenant "

The 1975 survey found that about 85 percent of the sharecroppers interviewed shared equally in the output with their landlord. Other arrangements found called for the sharecropper to receive as little as 25 percent and as high as 67 percent of the output. The alternative formulas for sharing of output were found mainly in the north, where there are many citrus farms.

In most cases where the output was being shared equally, the landlord and the tenant were also sharing equally the variable costs of production. The two principal exceptions were for the cost of hired labor and irrigation water. In three-fourths of the cases, the sharecropper reported paying all of the costs of hired labor. An additional 20 percent of the sharecroppers stated that they paid 75 to 90 percent of such costs. In about one-third of the cases, the cost of irrigation water was paid completely by the landlord. This percentage was much higher in the south (i.e., 75 percent), where irrigation water is provided from privately-owned wells, than in the northern and central areas, where water is available from the East Ghor Canal. In two-thirds of the cases, the sharecropper and the landlord equally divided the cost of irrigation water (Sharab, 1975).

More recent surveys substantiate the conclusion that the most common formula for sharing output and costs in the East Jordan Valley is a fifty-fifty division between the landlord and the tenant. In the 1979 survey of tomato farms, 21 of the 23 sharecroppers interviewed reported such a division of costs and returns (Hyslop, 1979). A similar pattern was found in a survey of 30 sharecroppers made during the 1978-1979 crop season, although some tenants did report that the landlord paid at least a portion of the labor costs for harvesting (Steitieh and Musa, 1980).

4. Impact of Changes in Farming Technology: Traditional agriculture in the East Jordan Valley was labor intensive. However, as discussed in the following section, in recent years several important changes in farming technology have occurred which have increased capital investment in agriculture. These include the introduction of drip irrigation systems and plastic greenhouses and tunnels.

A survey of 273 holdings where new technology was being used during the 1978-1979 crop season found that more than 90 percent of the land under drip irrigation, or under plastic tunnels with either drip or surface irrigation, continued to be farmed by sharecroppers. In contrast, where plastic greenhouses had been introduced, more than 50 percent of the land was being cultivated by owners, with the remaining area divided equally between sharecroppers and cash renters. The researchers conducting this study concluded that the high investment costs of about JD 2,000 (\$6,800) per dunum of plastic houses probably had led to a higher proportion of owner-operation (Steitieh and Musa, 1980).

The introduction of new technology has led to the development of new relationships between landlords and tenants with regard to their shares in investment, operating costs, and returns. The 1978-1979 survey showed that in farms producing vegetables under open field conditions (i.e., without plastic tunnels or greenhouses) and using drip irrigation, the landlord provided the land and water, the sharecropper provided the labor, and the landlord and sharecropper shared equally in the cost of all inputs, other than the drip system, and in the returns. In 89 percent of the cases, the landlord paid for the investment in pumps, pipes, and filtering equipment as well as the cost of the plastic mulch, while the tenant made a cash payment of JD 20 (\$68) per dunum for the use of this technology. In an additional 7 percent of the cases, the landlord was responsible for the cost of the pumps, pipes, and filtering equipment, but the landlord and the sharecropper shared equally the cost of the plastic mulch.

Similar results were obtained in the study of tomato farms, where it was found that of seven sharecropper farms using drip irrigation, four of the tenants made a cash payment of JD 20 (\$68) per dunum, two paid half the cost of the consumables (i.e., plastic tubing, emitters, and plastic mulch), and one provided additional labor in the care of newly planted citrus trees. In the latter case, the respondent indicated that he would have paid half the cost of the consumables had he not been caring for the trees.

The 1978-1979 study showed that in farms producing vegetables under plastic tunnels, in 58 percent of the cases where drip irrigation was used, the landlord provided the land and water, the sharecropper provided the labor, and the landlord and sharecropper shared equally in the cost of all other inputs, including the cost of the tunnels, and in the returns. In 30 percent of the cases where drip irrigation was used, the same arrangement was found except that the landlord paid the cost of the wires used for the tunnels, but shared equally with the tenant in the cost of the plastic. In farms producing vegetables under plastic but using surface irrigation, the sharecropper and the landlord divided returns in the same proportion that they divided the costs of labor, plastic tunnels, and all other inputs.

There were three types of sharecropping arrangements in use where vegetables were being produced under plastic houses using drip irrigation. In 60 percent of such cases, the sharecropper and the landlord shared equally the cost of labor, other inputs, the houses, the drip system, and the returns. In the remainder of the cases, in about half the sharecropper paid the costs of labor and other inputs, but the landlord paid the cost of the houses and the drip system, and they shared equally the returns. In the other half, the sharecropper paid 40 percent of the cost of labor, other inputs, and houses, contributed JD 20 per dunum to the cost of the drip system, and received 40 percent of the returns.

Where vegetables were being grown under plastic houses using surface irrigation, in 44 percent of the cases the sharecropper paid 30 percent of the cost of labor and other inputs, the landlord paid the cost of the houses, and the sharecropper received 30 percent of the returns. In about 38 percent of the cases, the sharecropper paid 30 to 75 percent of the cost of labor, other inputs, and greenhouses, and received a like percentage of the returns (Steitieh and Musa, 1980).

In summary, the introduction of new technology in farming in the East Jordan Valley resulted in alterations in sharecropping arrangements. The available data indicate that where the landlord bears the entire cost of the new technology, the sharecropper pays for the use of this technology by making a fixed cash payment per dunum. Where the sharecropper bears a portion of the cost of the new technology, the sharecropper and the landlord also share the costs of all other inputs, including labor, and returns in the same proportion. It should be stressed that given the recent nature of the adoption of drip irrigation and cultivation under plastic in the East Jordan Valley, it can be expected that further adjustments in sharecropping arrangements may occur as both the landlords and sharecroppers learn from experience about the impact of such technology on costs and returns.

5. Costs and Returns: The 1975 study indicated mixed results with regard to net returns per dunum for several crops grown under owner-operation, sharecropping, and fixed rent tenancy. However, there was no evident difference between any of the tenure forms (Sharab, 1975). In another study made of an irrigated area in the highlands, the highest returns were found on the sharecropped farms (Issi, 1975). While both studies failed to standardize for other variables, such as crop mix, farmer attributes (e.g., age and education), size of holding, etc., which might have affected net returns per dunum, there is no evidence that such standardization would have altered the results with regard to the relative net returns from the different forms of tenancy.

Assessment of Sharecropping in the East Jordan Valley: The continued significance of sharecropping in the East Jordan Valley has created some concern because of the alleged inefficiency of this form of tenancy. In addition, the equity implications of sharecropping have been questioned.

The presumed inefficiency of sharecropping in comparison to owner-operation or cash tenancy has been challenged strongly in recent years on both theoretical and empirical grounds. Moreover, the evidence available on the East Jordan Valley both with regard to the specific attributes of sharecropping as practiced in the Valley and to the relative efficiency of sharecropping as contrasted with other forms of tenancy, lends little support to the conventional judgment that sharecropping results in a misallocation of resources. More specifically:

1. Sharecroppers and their landlords appear to have a close working relationship. The available data, which are supported by casual observation, indicate that a majority of the landlords reside in the Valley and the remainder live in the nearby highlands. Landlords make frequent visits to their farms. Decisions relating to farming operations are commonly made by mutual consent of the sharecropper and the landlord.

2. Sharecropping arrangements do not result in a misallocation of resources. The most common form of sharecropping agreement in the Valley calls for the sharecropper and the landlord to equally share the variable costs of production and the resulting output. Under such a contract, decisions as to the amount of variable input to be applied would be the same as under cash tenancy or owner-operation.

3. Sharecropping does not retard investment in new technology. Over 90 percent of the land being farmed in the East Jordan Valley using new technology, i.e., drip irrigation and cultivation under plastic covers, is being farmed under sharecropping arrangements. The alteration of sharecropping arrangements to reflect the adoption of the new technology indicates that the relations between landlords and their tenants are flexible and provides evidence that both parties have some degree of bargaining power. The higher returns from the new technology provide ample incentive for landowners to make the required investment and for tenants to agree to sharing the costs of such technology.

4. Sharecropping does not result in lower returns. Comparative studies in the Jordan Valley and in the highlands of Jordan show that the net returns per dunum under irrigation are as high with sharecropping as with alternative forms of tenancy. Differences in net returns among farms are due to differences in farming technology rather than to differences in tenancy status.

The equity implications of sharecropping in the East Jordan Valley, however, are less clear than the efficiency implication. The sharecropping conditions in the Valley are a reflection of the fact that the country has a relatively tight labor market, agriculture engages less than 15 percent of the labor force, and experienced and capable farmers are in short supply. Thus, the bargaining power of the tenant is enhanced. In addition, the absence of widespread absentee ownership (in the traditional sense characteristic of pre-land reform conditions in Egypt, Iran, and Iraq) and the prevalence of a relatively close working relationship between landlords and their tenants indicates that sharecropping in the East Jordan Valley is not as exploitive as is generally assumed.

However, equity under sharecropping may be impaired not by the dependence upon the landlord for access to land, but by dependence on the landlord, the commission agent, or others for access to the inputs required for modernized farming. Thus, a recent study of the Valley notes (Steitieh and Musa, 1980):

"Financing of all investments and operating costs is mainly the responsibility of the landowner, even in cases where the sharecropper shares in investment costs. This strengthened the landowner's position in deciding what crops to produce, and where and how to market them."

In traditional non-intensive agricultural system, credit needs are small. The major farming input is labor, and with minor exceptions, much of what is consumed on the farm is produced there. In an intensive commercialized agriculture, however, inputs of seed, fertilizer, pesticides, irrigation

equipment, etc., given rise to costs long before proceeds from the same of output are available. In modernizing societies, consumption goods are required or desired which cannot be produced on the farm. Hence, the transition from a traditional to a modernized agriculture gives rise to the need for working capital and credit.

Agriculture in the East Jordan Valley began the transition to intensive farming with the completion of the East Ghor Canal. However, there has been a lag in the establishment of institutions capable of providing credit to meet the needs generated by the transition to more intensive cultivation. There is no overall lack of credit availability in Jordan. To the contrary, capital from the oil-producing states in the region is rapidly finding its way into major investments in Jordan, including investments in agriculture. However, there is evidence that small farmers, particularly tenants, have difficulty gaining access to credit or are forced to rely on non-institutional unsupervised sources. The significance of the problem of providing credit to small farmers is magnified by the small scale of irrigated agriculture in the East Jordan Valley, partly the result of the land redistribution programs which have accompanied public investment in irrigation projects, and by the continued prevalence of sharecropping.

The 1975 tenancy survey in the Valley found that of the 56 percent of the tenants interviewed who received credit, 43 percent obtained the credit from commission agents, 26 percent from their landlord, 26 percent from friends and relatives, and only 7 percent from institutional sources. Thus, institutional credit, from the Agricultural Credit Corporation (ACC) or cooperatives, was a relatively minor source for Valley farmers, while the major sources were non-institutional in nature (Sharab, 1975).

Credit policy plays a major role in restricting the availability of institutional credit to small farmers and tenants. The ACC lends primarily to borrowers who can pledge land as collateral, although a small, but growing, number of loans are being made to farmers who can secure two co-signers. Cooperatives also give loans to their members who can find two co-signers, but non-guaranteed loans require land as collateral.

Recently, in recognition of the credit problem, USAID provided assistance to the Jordan Valley Farmers Association (JVFA) to support the creation of a credit program for its members. Membership in the JVFA includes each farmer who exploits one or more farm units in the irrigated area of the East Jordan Valley and "takes himself all decisions relating to production and marketing of its agricultural products, whether land terms are on the basis of ownership or rent-farming or sharecropping" (JVFA Law 19 of 1974). The JVFA credit program is designed to provide 80 percent of the number of loans and 58 percent of the volume of loans to owner-operators with 40 dunums or less, tenants, and sharecroppers (Hazleton, 1978).

As noted above, the major barrier to the participation of small farmers in existing institutional credit programs is the collateral requirement, including either the pledge of real estate or co-signatures. The JVFA credit program proposed to overcome this difficulty by making loans without requiring a pledge of real estate or co-signatures, but on the basis of crop

collateral. The JVFA intended to rely on its control of the marketing of produce to ensure repayment of the loan.

The rules governing membership in the JVFA, however, require that a tenant have at least a three year written lease. Tenants must also have a statement from their landlord certifying that they have the farm management responsibility on the farm. Under current conditions, almost without exception landlords have been unwilling to provide the written lease and the certification to sharecroppers because of a fear that it might be used to support a further program of land redistribution at a later date. Regardless of the merits of this concern, inability to secure a written lease and the required certification has restricted the access of sharecroppers in the Valley to the services provided by the JVFA. In addition, the delayed opening of the El Arda marketing center and its removal from JVFA supervision means that the basis for providing credit on crop collateral does not exist. It is not surprising then that a recent report on the first two years of operation of the JVFA credit program indicates that only about 10 percent of the loans have gone to tenants (Quashair, 1980). Even where tenants are able to gain access to credit from the JVFA by securing the agreement of their landlord, their dependence on the landlord is increased rather than diminished and their bargaining power is thereby weakened.

Given the tight labor situation in Jordan and the relative scarcity of knowledgeable and capable farmers, the benefits from public investment in irrigated agriculture should go to those with the knowledge and the ability to realize the full potential of irrigated farming. Realization of these benefits, however, will require that the farmer be able to obtain access to credit and other inputs required for modernized farming. If tenants must rely on landlords to obtain such access, their bargaining power will be reduced and the benefits they receive will be diminished. Therefore, high priority should be given to ensuring that tenants, as well as small farmers, have access to such inputs.

2.4 CULTIVATION TECHNIQUES

Perhaps the most significant, and certainly the most visible, feature of agricultural development in the East Jordan Valley in recent years has been the adoption of new cultivation techniques, in particular, drip irrigation and the growing of vegetables under plastic. Table 2-7 shows the number of holdings in a sample of 273, utilizing these new techniques during the 1978-1979 crop season. Less visible, but nonetheless important, has been an increasing use of purchased inputs, including fertilizers, herbicides, fungicides, and pesticides.

The completion of Stage I Development should sharply increase the pace of change in irrigation techniques, since the water conveyance systems being installed are intended to be utilized with sprinkler irrigation. On the other hand, the past few years have seen the widespread adoption of drip irrigation in the Valley, largely on lands which lie outside of the Stage I Development projects area.

It is clear that the future development of irrigated agriculture in the East Jordan Valley will depend to a large degree on the improvement of cultivation techniques. Does the widespread adoption of drip irrigation

Table 2-7

NUMBER OF HOLDINGS USING NEW TECHNIQUES
IN THE EAST JORDAN VALLEY

1978 - 1979

Type of Technique	Number of Holdings	Percent of Sample
Open-farming and Drip Irrigation	67	24.6
Plastic Houses and Surface Irrigation	58	21.3
Plastic Houses and Drip Irrigation	20	7.3
Plastic Tunnels and Surface Irrigation	80	29.3
Plastic Tunnels and Drip Irrigation	20	7.3
Plastic Houses and Tunnels with Surface Irrigation in One Holding	20	7.3
Plastic Houses and Tunnels with Drip Irrigation in One Holding	8	2.9
Total Sample	273	100.0

Source: Steitieh and Musa, 1980.

indicate that plans for sprinkler irrigation will not be fulfilled? What has been the impact of plasticulture on costs and returns in the Valley? Are purchased inputs being used efficiently and effectively? These questions are addressed in this section, which examines the cultivation techniques being used in the Valley.

2.4.1 Irrigation Techniques

Traditionally, irrigation in the East Jordan Valley has relied on wild flooding, furrow, or basin irrigation, depending on the available water supply and the type of crop being grown. Cereals are usually flooded with a wild or semi-wild technique, generally utilizing large heads that tend to cover substantial areas but often with inadequate penetration. Vegetables and fruits commonly are irrigated by short furrows or basins. Water is reasonably well controlled and penetration is adequate. However, because most of the land is uneven and ungraded, farmers employ short or zig zag furrows, or follow the natural contours of the land. Irregular furrowing increases the difficulty of applying plant population inputs, increases hand labor requirements (e.g., zig zag furrowing requires about 4 man-hours per dunum), and diminishes the potential for utilizing machinery for cultivation (Dar Al Handasah-Nedeco, 1969; Steitieh, et al., 1978).

Under the existing surface irrigation system, efficiency of water use is estimated at 55 percent. However, at least one observer has cast some doubt on the validity of this estimate, noting that in the United States even under ideal conditions, with extensive leveling, efficiency of gravity irrigation seldom exceeds 50 percent (Morgan, 1979). Farmers tend to apply numerous shallow irrigations (e.g., once a week for many crops) rather than less frequent applications utilizing larger amounts of water per irrigation. The existing practice is more suited to such shallow rooted crops as cucumbers and green beans, but less suited for irrigating tomatoes and watermelons. Inadequate soil preparation, such as poor plowing and lack of sub-soiling, in many instances encourages soil problems that resist slower, deeper water applications (Morgan, 1979).

The 1975-1982 development plan for the East Jordan Valley called for the widespread adoption of sprinkler irrigation, including both the use of sprinklers on the new lands being brought under irrigation during Stage I and Stage II Development and the conversion from surface to sprinkler irrigation of the existing East Ghor Canal project area. The planned shift from surface to sprinkler irrigation in the Valley is being assisted by USAID through the Sprinkler Irrigation Equipment project, under which portable sprinkler equipment for 93,100 dunums has been procured and stored in three locations in the East Jordan Valley. The intention is for this equipment to be supplied to farmers on a long-term credit basis (e.g., 8 years at 7 percent interest).

To date, very few sprinklers have been purchased by Valley farmers. On the other hand, in the past few years there has been a rapidly expanding use of drip irrigation, particularly in the southern portions of the Valley which are irrigated from privately-owned wells and lie outside of the areas included in the Stage I Development projects. The movement by the private sector to introduce drip irrigation has raised some question about the viability of the publicly-assisted program to introduce sprinkler irrigation. These two alternative irrigation techniques are discussed below.

Drip Irrigation. Drip irrigation has been tested and applied for more than 15 years. In general, its use has been favored where irrigation is constrained by water limitations, land incline, and semi-arid to arid conditions. Under drip irrigation, water is applied to the field through a proliferation of tiny orifices, called emitters. When combined with a low pressure system, the orifices control the application of water at a slow rate, i.e., 0.4 to 0.5 gal./hr./unit emitter. Water transfer is by gravitational and capillary action only and water run-off is eliminated under controlled systems (Morgan, 1979).

Drip irrigation was introduced into the East Jordan Valley about 1975. However, its use did not become significant until 1979. As used in the Valley, the drip system consists of two principal parts, a head system and a piping system. The head system includes the pump, engine, screen and sand filters, and fertilizer mizer. The piping system includes the main pipe and lateral pipes which have the emitters (or drippers) attached to them. The lateral pipes are usually covered with plastic mulch containing holes through which seeds or seedlings are planted.

Table 2-8 shows the distribution of vegetable crop areas under open farming conditions (i.e., without plastic coverings) irrigated by drip in the East Jordan Valley during the 1978-1979 crop season. It can be seen that drip irrigation is mainly used in the southern portion of the Valley, i.e., below the 18 km extension to the East Ghor Canal, where irrigation is primarily from wells. The principal crop grown under drip is tomato, which is often intercropped (i.e., mixed) with other vegetables. During the 1978-1979 crop season, an additional 1,595 dunums were planted with drip irrigation and plastic tunnels, and 324 dunums were planted with drop irrigation and plastic greenhouses (Steitieh and Musa, 1980). The drip/tunnel combination was found almost exclusively in the southern portion of the Valley, where it was used to produce cucumbers, squash, and other vegetables. The drip/greenhouse combination was found mainly in the middle sub-region, where it primarily was used to produce cucumbers.

Table 2-9 shows the distribution by sub-region within the East Jordan Valley of the areas planted in fruit and irrigated by drip during the 1978-1979 crop season. Again, most of the area being irrigated by drip is found in the southern portion of the Valley.

The drip system is believed to offer a number of advantages over surface irrigation. The principal advantage is that it provides for greater water control and more efficient utilization of water. This accounts for the fact that drip irrigation is found mainly in the south where water comes from wells and is scarce relative to irrigable land. The efficiency of the drip system results from the fact that there is no run-off and little if any evaporation. Drip irrigation also makes possible higher yields, although the increase in yields may result as much from the fact that drip irrigation is accompanied by the use of plastic mulch as it does from the impact of the drip system per se. Under the drip system, water is applied directly to the plant, reducing the nourishment given to weeds. This impact is greatly enhanced by the use of plastic mulch which also retards weed growth. Finally, drip

Table 2-8

DISTRIBUTION OF VEGETABLE CROP AREAS UNDER OPEN
FARMING CONDITIONS AND IRRIGATED BY THE DRIP
SYSTEM, EAST JORDAN VALLEY

1978 - 1979

District	Dunums					Total
	Tomato*	Squash	Eggplant	Cucumber	Other**	
Rama	554	394	99	105	3	1,155
Shuna Area	180	-	15	-	30	225
North Nimreen	1,050	33	152	220	83	1,538
Shuna (Town)	1,330	30	40	-	20	1,420
Karamah	3,675	20	96	-	-	3,791
Ghor Kibid	116	41	25	-	7	189
Arda Triangle	45	5	-	-	-	50
Deir Alla	5	8	-	22	15	50
Kreimeh	30	7	-	15	17	69
Mashare	15	-	-	-	12	27
Total Valley	7,000	538	427	362	187	8,514

* Includes 2,605 dunums of mixed tomato and cucumber, 631 dunums of mixed tomato and squash, and 28 dunums of mixed tomato and green beans.

** Includes 116 dunums of green beans, 27 dunums of peppers, 25 dunums of mixed eggplant and squash, and 7 dunums of potatoes plus 12 dunums unidentified.

Source: Akram M. Steitieh and Abdul Hameed Musa, Vegetables Grown Under Plastic Covers and Drip Irrigation Systems in the East Jordan Valley (Amman: University of Jordan, Faculty of Agriculture, 1980) p. 32.

Table 2-9

DISTRIBUTION OF FRUIT TREES AREAS IRRIGATED WITH
THE DRIP SYSTEM, EAST JORDAN VALLEY
1978 - 1979

District	Dunums			
	Citrus	Bananas	Other*	Total
Rama	400	25	-	425
Southern Shuna (town & areas)	365	660	90	1,115
Deir Alla	60	-	-	60
Kreimeh	89	-	-	89
Mashareh	75	-	5	80
Total	989	685	95	1,769

*Includes 80 dunums of mixed olives and grapes and 10 dunums of gawafa in Southern Shuna, and 5 dunums of olives in Mashareh.

Source: Akram M. Steitieh and Abdul Hameed Musa, Vegetables Grown Under Plastic Covers and Drip Irrigation Systems in the East Jordan Valley (Amman: University of Jordan, Faculty of Agriculture, 1980) p. 25.

irrigation makes it possible to apply fertilizer in solution directly to the roots of the plant, providing for more efficient and effective fertilization (Morgan, 1979; Steitieh and Musa, 1980).

Sprinkler Irrigation. Following the completion of the East Ghor Canal, which was designed for surface irrigation, it was observed that most of the projected land leveling in the project area was never accomplished and yields remained low relative to potential. In the 1975-1982 development plan for the East Jordan Valley, it was decided to base the future irrigation of the Valley on the use of sprinklers. Sprinkler irrigation was adopted because of the rather shallow soils of the Valley, the high cost of land grading, the relatively high efficiency of sprinklers as compared to surface methods, and the relative costs of labor and sprinkler equipment*.

It should be stressed, however, that the pressure system being developed under Stage I and Stage II Development can be used with other types of irrigation systems. Thus, the feasibility study for Stage II noted (Harza, 1978):

"Alternative irrigation methods...include surface irrigation, gated pipes, hose and hose-basin irrigation, and trickle and drip irrigation. All these forms can be operated from the conveyance facilities that will be provided, and it is expected that they will be used in some cases. For example, hose-basin and trickle irrigation may be preferred by citrus growers, while drip irrigation may be used for the cultivation of early vegetables under plastic frames. No problems are envisaged in matching these methods to the proposed farm layouts."

To date there has been very limited use of sprinklers in the East Jordan Valley. One can observe a large "big squirt" device being operated in the north to irrigate fruit trees and the use of sprinklers near South Shuna to irrigate tobacco seedlings. A limited number of sprinklers were in experimental use on vegetables during the 1979-1980 crop season.

There have been reports of farmer resistance to the use of sprinkler irrigation (e.g., Keller, 1977; Hyslop, 1979). The primary concern appears to stem from fears that sprinkling of tomatoes, cucumbers, and squash will result in fungus and disease problems and cracking of tomato skins. One observer noted that this concern is based on the experience farmers have had with unusually heavy rains, when these types of problems arose (Keller, 1977).

The concerns of farmers have been substantiated in the reports of consultants who have visited the Valley. One plant pathologist reported (Stevens, 1977):

* For a more detailed discussion and justification of the decision to use sprinklers, see "East Ghor Canal Extension Project - Sprinkler Alternative, 1973", and "Design Notes" of the East Ghor Canal Extension Project (Dar Al Handasah-Nedeco, 1973 and 1974).

"Sprinkler irrigation will increase the frequency and severity of diseases that are promoted by high humidity and free water. Only experience and research will define whether or not the increased incidence of diseases likely to result from sprinkler irrigation can be effectively controlled with proper management procedures. The introduction of improved application techniques and the most effective control compounds will improve chances of controlling and disease."

Another consultant observed (Keller, 1977):

"There is a lack of tested and detailed viable packages for the crops under sprinkle irrigation in the Valley, and at this writing it appears risky to push sprinkling without providing the farmers with very explicit and reliable information on how to handle their three most important crops, tomatoes, cucumbers, and squash. In fact, if for these crops a fool proof production package cannot be put together, then the JVC should advise farmers to hold off sprinkling them.

On the other hand, there is agreement that the root, forage, grain, citrus, and most other vegetable crops (with the exception of eggplant) will produce very well under sprinkler irrigation with no unexpected difficulties."

Assessment of the Future of Sprinkler Irrigation. While the potential problems created by sprinkler irrigation have been recognized for several years, only limited efforts have been made to conduct field research in the Valley on the impact of sprinkling on the principal vegetable crops being grown. To date, little progress has been made on developing the production package required to make sprinkler irrigation successful.

What little evidence exists on the relative merits of different types of irrigation technique for growing vegetables under the conditions found in the Jordan Valley is the result of research sponsored by the Jordan Valley Authority and USAID which was carried out by Dr. George Marlowe and Ms. Laila Sarraf. Marlowe and Sarraf conducted trials on an experimental farm in the northern portion of the Valley during the 1979-1980 crop season. The results of their research are shown in Table 2-10. The crop trials were conducted on tomatoes and involved furrow, drip, and sprinkler irrigation. Data are presented for the crop trial results for the first three harvests (picks) and for the total harvests.

It can be readily seen that furrow and drip irrigation gave similar results during both harvesting periods, while sprinkler irrigation gave much poorer results, particularly during the period of the first three harvests. The first three harvests cover the period when prices are usually the highest (i.e., the early season), and therefore are of economic significance to the farmer.

One reason cited for the lower yields for sprinkler irrigation was that the trials were made using identical times of run (i.e., times of water application), but did not result in the plants receiving the same amount of

Table 2-10

RESULTS OF TOMATO CROP TRIALS USING
DIFFERENT IRRIGATION TECHNIQUES
1979 - 1980

Type of Irrigation Technique	Number of Fruit Per Plant	Total Weight (Kilograms) *
<u>First Three Harvests:</u>		
Furrow Irrigation	20.6	
Drip Irrigation	18.4	
Sprinkler Irrigation	4.4	
<u>Total Harvests:</u>		
Furrow Irrigation	41.0	4.7
Drip Irrigation	40.0	5.1
Sprinkler Irrigation	27.0	3.7

* Assuming an average of 1,000 plants per dunum, the total weight shown gives a reasonable approximation of the yield in tons per dunum.

Source: Results of research sponsored by the Jordan Valley Authority and USAID conducted by Dr. George Marlowe and Ms. Laila Sarraf.

water. The sprinkler heads used were of the 180 degree rotating type, which resulted in a good deal of water being applied not to the small trial plot but to the areas on the boundary of the plot. For small vegetable plots it would be desirable to use 90 degree rotation heads in order to increase the amount of water being applied to the cultivated area and to reduce the spillover across the plot boundaries.

It is significant that furrow irrigation appeared to provide as high a yield as drip irrigation. This runs counter to the conventional belief that drip irrigation leads to increased yields. In part this may be due to the fact that the furrows were regularly laid out in a linear configuration, as contrasted with the zig zag furrows usually found on farms in the Valley. It is interesting to note that the yields shown, i.e., 3.7-5.1 tons per dunum, are considerably higher than those reported for the Valley, i.e., 2.0 tons (Harza, 1978), and compare favorably with the projected yield with Stage I and Stage II Development.

It should be stressed that the number of trials was limited and that much more research of this type is required before one can draw firm conclusions regarding the relative merits of different types of irrigation technique for growing vegetables in the East Jordan Valley. However, the results of the crop trials, when coupled with the warnings of consultants cited above, help to explain the skepticism of Valley farmers regarding the benefits to be gained by shifting to sprinkler irrigation. In the absence of convincing evidence, it is unlikely that Valley farmers will move rapidly to adopt sprinkler irrigation.

However, if the planned changes in the cropping pattern for the East Jordan Valley are to occur, in particular the expansion in cultivation of fodder crops, then it will be necessary to adopt sprinkler irrigation for use with the pressure system being installed under Stage I and Stage II Development. Drip irrigation is unsuited to the cultivation of field crops, and insufficient water will be available from the pressure system to support surface irrigation of field crops.

Sprinkler irrigation may also be required for periodic leaching of soils. In the southern portion of the Valley, where drip irrigation has been most widely adopted, there is evidence that salinity is becoming an increasingly important problem in vegetable production.

The Jordan Valley Authority has taken the position that farmers are free to adopt whatever irrigation technique they desire on the Stage I Development lands now being brought under irrigation. The reasonableness of this position does not negate the fact that farmers need to have a factual basis for making their decision. Commercial enterprises are promoting the use of drip irrigation in the Valley, and farmers are able to witness first hand the results obtained from drip irrigation already installed on farms. While sprinkler irrigation will be required if plans for increased fodder production are to be realized and problems of salinity are to be mitigated, adoption of sprinkler irrigation will likely await the convincing demonstration of its relative merits.

2.4.2 Plasticulture in the East Jordan Valley

While the Jordan Valley can be considered a "natural greenhouse" which favors the production of winter vegetables, the months of January and February often have presented some production risks due to frost. Demand for vegetables, particularly in the Arab oil-producing countries, is quite high during the months of December through March. This favorable market has led to the introduction of plastic greenhouses and tunnels for added protection of early season vegetables. Due to the warm climate in the Valley, artificial heating has not been required for growing vegetables under plastic covers (Morgan, 1979).

Growing vegetables under plastic cover provides a number of advantages (Morgan, 1979; Steitieh and Abbas, 1978):

1. It permits the production of weather sensitive crops during the winter, reducing the risk of frost damage.
2. It gives a longer production and harvest period, thus increasing crop yields.
3. It enables production and marketing of vegetables during the early winter season when prices are highest, thus increasing returns.

There are two basic types of plasticulture in the East Jordan Valley: plastic greenhouses and plastic tunnels. These cultivation techniques are described below:

1. Cultivation Under Plastic Houses. The plastic houses used in the East Jordan Valley are mostly imported, although local production in Jordan is underway. The houses are seven to witht meters in width, about three meters in height, and of varying length depending on the manufacturer. The houses frequently are ventilated by keeping apart the plastic sheets in some locations on the side walls. However, increasingly houses with windows are being imported. The vegetables are planted in straight furrows and the plants are allowed to grow on strings or nets so that more plants per dunum can be grown with this technique than with any other type of farming. The primary disadvantages of houses are their high cost of JD 2,000 (\$6,800) or more per dunum, and the high humidity inside them which increases the probability of plant disease.

The first survey of plastic houses in the East Jordan Valley indicated a total of only 285.5 dunums cultivated under houses in the 1977-1978 crop season (Steitieh and Abbas, 1978). In the next crop season, the area cultivated under plastic increased to 741.3 dunums (Steitieh and Musa, 1980) While survey data for the 1979-1980 season are not available, a conservative estimate of the area under plastic houses in this period would be 1,000 dunums.

Table 2-11 shows the area distribution of plastic houses according to crop, irrigation system, and sub-region in the East Jordan Valley during 1978-1979. It can be seen that over 90 percent of the area planted under

Table 2-11

AREA DISTRIBUTION OF PLASTIC HOUSES ACCORDING TO
VEGETABLE CROP, IRRIGATION SYSTEM, AND REGION*
IN THE EAST JORDAN VALLEY
1978 - 1979

Crop	Area in Dunums								Total of all Regions
	Drip Irrigation				Surface Irrigation				
	North	Middle	South	Total	North	Middle	South	Total	
Cucumber	14.8	204.0	50.0	268.8	80.6	273.3	48.7	402.6	671.4
Tomato	-	15.0	5.9	20.9	-	4.4	2.5	6.9	27.8
Pepper	1.4	14.2	2.5	18.1	-	0.5	0.5	1.0	19.1
Muskmelon & Watermelon	-	5.0	3.5	8.5	-	-	1.0	1.0	9.5
Other**	2.8	2.8	2.0	7.6	2.8	3.0	-	5.8	13.4
Total	19.0	241.0	63.9	323.9	83.4	284.6	52.7	417.3	741.2

* The north region lies between Adassiyah and Wadi Kufranja; the middle region lies between Wadi Kufranja and the Arda Triangle; and the south region lies between the Arda Triangle and the Dead Sea.

** Includes: eggplant - 2.3 dunums; greenbeans - 1.5 dunums; flowers - 2.8 dunums; squash - 1.0 dunums; strawberry - 0.6 dunums; and jews mallow - 5.2 dunums.

Source: Akram M. Stetieh and Abdule Hameed Musa, Vegetables Grown Under Plastic Covers and Drip Irrigation Systems in the East Jordan Valley (Amman: University of Jordan, Faculty of Agriculture, 1980), p. 27.

plastic houses was devoted to cucumber production. Over 70 percent of the houses were located in the middle sub-region, i.e., between Wadi Kufranja and the Arda Triangle, with the sub-regions to the north and south accounting for 14 percent and 16 percent, respectively. About 56 percent of the area under plastic houses was cultivated using drip irrigation, with surface irrigation being used on the remainder.

2. Cultivation Under Plastic Tunnels. The plastic tunnels used in the East Jordan Valley are usually 50 to 70 cms in width and approximately half a meter in height, with varying lengths. The plastic sheets used on the tunnels are locally produced but the wires that hold the sheets in place must be imported. While tunnels are relatively inexpensive, as compared to houses, they require that the farmer open the tunnels by turning over the plastic sheets, i.e., lifting up one side of the sheets, whenever he wishes to spray, weed, irrigate, ventilate, or harvest the crop. Given the design of the tunnels used in the Valley, gaining access to the plants for cultivation is thus labor consuming and exposes the crop to unfavorable climatic conditions which may affect plant growth and yields. (It should be noted that alternative tunnel configurations are in use in the United States which could alleviate this problem.)

The first survey of plastic tunnels in the East Jordan Valley indicated a total of 3,795 dunums cultivated under tunnels during the 1977-1978 crop season (Steitieh and Abbas, 1978). In the next crop season, the area planted under plastic tunnels had increased to 6,015 dunums (Steitieh and Musa, 1980). A conservative estimate of the area under tunnels in the 1979-1980 crop season would be 8,000 dunums.

Table 2-12 shows the area distribution of plastic tunnels according to crop, irrigation system, and sub-region in the East Jordan Valley during 1978-1979. It can be seen that about 74 percent of the area planted under tunnels was devoted to cucumber production. Plastic tunnels were used almost exclusively in the south, i.e., between the Arda Triangle and the Dead Sea. About 70 percent of the area under plastic tunnels was cultivated using surface irrigation.

2.4.3 Costs and Returns of the New Technology

Given the rapid introduction of new technology into irrigated agriculture in the East Jordan Valley in recent years, it would be expected that the net returns on vegetables produced using this technology would be higher than the net returns from traditional, i.e., open field cultivation using surface irrigation. Evaluation of net returns requires examination of the investment costs, production costs, marketing costs, yields, and prices experienced under each alternative form of cultivation, i.e., open field cultivation using surface irrigation, open field cultivation using drip irrigation, cultivation under houses using both surface and drip irrigation, and cultivation under tunnels using both surface and drip irrigation. Fortunately, a series of studies undertaken by the members of the Faculty of Agriculture at the University of Jordan provide a basis for such examination.

Three sets of cost computations related to the production of vegetables in the East Jordan Valley using different cultivation techniques are available. The first set pertains to the production of vegetables using traditional

Table 2-12

AREA DISTRIBUTION OF PLASTIC TUNNELS ACCORDING TO
VEGETABLE CROP, IRRIGATION SYSTEM, AND REGION*
IN THE EAST JORDAN VALLEY
1978 - 1979

Crop	Area in Dunums								Total of all Regions
	Drip Irrigation				Surface Irrigation				
	North	Middle	South	Total	North	Middle	South	Total	
Cucumber	-	56.0	392.0	448.0	-	221.0	3,785.0	4,006.0	4,454.0
Mixed Tomato & Cucumber	-	-	315.0	315.0	-	-	53.0	53.0	368.0
Muskmelon & Watermelon	-	-	205.0	205.0	-	-	180.0	180.0	385.0
Squash	-	5.0	246.0	251.0	-	3.0	-	3.0	254.0
Pepper	-	-	158.0	158.0	-	-	5.0	5.0	163.0
Eggplant	-	-	131.0	131.0	1.0	-	-	1.0	132.0
Other**	-	5.0	81.0	87.0	21.0	55.0	96.0	172.0	259.0
Total	-	67.0	1,528.0	1,595.0	22.0	279.0	4,119.0	4,220.0	6,015.0

* The north region lies between Addassiyah and Wadi Kufranja; the middle region lies between Wadi Kufranja and the Arda Triangle; and the south region lies between the Arda Triangle and the Dead Sea.

** Includes: tomatoes - 90 dunums; greenbeans - 12 dunums; jews mellow - 37 dunums; mixed cucumbers and watermelon - 40 dunums; mixed cucumber and greenbeans - 8 dunums; mixed tomato and squash - 3 dunums; mixed okra and muskmelon - 10 dunums; mixed tomato and greenbeans - 8 dunums; okra - 11 dunums; and mixed tomato and eggplant - 20 dunums.

Source: Akram M. Stetieh and Abdule Hameed Musa, Vegetables Grown Under Plastic Covers and Drip Irrigation Systems in the East Jordan Valley (Amman: University of Jordan, Faculty of Agriculture, 1980), p. 26.

farming techniques (Steitieh, et al., 1978). The data were collected during the 1975-1976 and 1976-1977 crop seasons from 43 farmers, and included information on each of the major crops grown in the Valley. Detailed information on the nature of farming operations, the timing and intensity levels of such operations, inputs requirements for both materials and labor, and output coefficients including yields and prices was collected.

The second and third sets of computations focus on the production of vegetables grown under plastic covers and drip irrigation (Steitieh and Abbas, 1978; and Steitieh and Musa, 1980). One set is based on data collected during the 1977-1978 crop season, while the other is based on data collected during the 1978-1979 crop season.

The 1977-1978 data were obtained from farms in the middle portion of the Valley, i.e., from Wadi Kufranja to the Arda Triangle. A total of 19 farms producing cucumbers were surveyed including: 8 holdings averaging 10 dunums each, farmed by sharecroppers using traditional techniques; 10 holdings averaging 10 dunums each, farmed by sharecroppers using plastic tunnels with surface irrigation; and one holding of 5.5 dunums farmed by an owner-operator using eleven plastic houses and drip irrigation. In addition, a total of 14 farms producing tomatoes were surveyed including: 12 holdings averaging 10 dunums each, farmed by sharecroppers using traditional techniques; one holding of 25 dunums farmed by sharecroppers using open field cultivation with drip irrigation; and one holding of 2.6 dunums farmed by an owner-operator using six plastic houses and drip irrigation.

The 1978-1979 data were obtained from farms throughout the East Jordan Valley which were growing vegetables under plastic covers and/or using drip irrigation. The sample frame was as follows:

<u>Crop</u>	<u>Technology</u>	<u>Number of Farmers</u>	<u>Area in Dunums</u>
Cucumbers	Plastic Houses and Drip	4	30
	Plastic Houses and Surface	2	8
	Plastic Tunnels and Drip	3	28
	Plastic Tunnels and Surface	3	84
Tomatoes	Open Field and Drip	3	40

Tables 2-13, 2-14, and 2-15 show the computation of net returns from production of cucumbers and tomatoes as given in each of the three studies. Each element of the computation is discussed below.

Yields. Yields varied widely among the different technologies. The highest yields were obtained from cultivation under plastic houses using drip irrigation. This cultivation package gave yields more than double those obtained under open field cultivation using drip irrigation, about four to five times those obtained from cultivation under plastic tunnels using either drip or surface irrigation, and about six to ten times as high as

Table 2-13

COMPUTATION OF NET RETURNS FROM PRODUCTION OF CUCUMBERS AND
TOMATOES UNDER OPEN FIELD CULTIVATION USING SURFACE
IRRIGATION IN THE EAST JORDAN VALLEY
1976 - 1977

Item	Cucumbers				Tomatoes			
	North Region		Middle Region	Middle and South Regions	North Region		Middle Region	South Region
	Fall Season	Spring Season	Fall Season	Spring Season	Fall Season	Spring Season	Fall Season	Fall Season
Yield (tons/du)	0.86	0.86	0.86	0.86	1.52	1.52	1.52	1.52
Average Price (JD/ton)	118.5	159.0	118.5	172.5	153.3	71.0	86.0	116.6
Gross Revenue (JD/du)	101.9	136.7	101.9	148.5	233.0	107.9	130.7	177.3
Production Cost (JD/ton)	52.3	52.3	52.3	52.3	39.7	39.7	39.7	39.7
Marketing Cost (JD/ton)	26.9	30.1	26.9	30.7	26.8	20.5	17.6	24.3
Total Var. Cost (JD/ton)	79.2	82.4	79.2	83.0	66.5	60.2	57.3	64.0'
Total Var. Cost (JD/du)	68.1	70.7	68.1	71.4	101.1	91.4	87.0	97.2
Net Revenue (JD/ton)	39.3	76.6	39.3	89.7	86.6	10.9	28.8	52.7
Net Revenue (JD/du)	33.8	66.0	33.8	77.1	131.9	16.5	43.7	80.1

Source: Steitieh, et al., 1978.

Table 2-14

COMPUTATION OF NET RETURNS FROM PRODUCTION OF CUCUMBERS AND
TOMATOES USING DIFFERENT TECHNOLOGIES
IN THE EAST JORDAN VALLEY
1977 - 1978

Item	Cucumbers			Tomatoes		
	Tradi- tional	Plastic Houses and Drip	Plastic Tunnels and Surface	Tradi- tional	Plastic Houses and Drip	Open Field and Drip
Yield (tons/du)	0.86	9.0	2.0	1.52	10.0	4.5
Average Price (JD/ton)	120	205	230	100	150	120
Gross Revenue (JD/du)	103	1,845	460	152	1,500	540
Production Cost (JD/ton)	61.3	49.6	99.1	45.8	46.7	38.6
Marketing Cost (JD/ton)	25.1	31.2	33.0	23.0	23.8	24.5
Total Var. Cost (JD/ton)	86.4	80.8	132.1	68.8	70.5	63.1
Total Var. Cost (JD/du)	74.3	727.2	264.1	104.6	704.3	284.2
Net Revenue (JD/ton)	33.6	124.2	97.9	31.2	79.5	56.9
Net Revenue (JD/du)	28.7	1,117.8	195.9	47.4	795.7	255.8
Investment (JD/du)	-	1,998.0	86.7	-	1,998.0	280.0
Payback Period (years)	-	1.79	0.44	-	2.51	1.09

Note: Data pertain only to the Middle Region of the East Jordan Valley.

Source: Steitieh and Abbas, 1978.

Table 2-15

COMPUTATION OF NET RETURNS FROM PRODUCTION OF CUCUMBERS AND
TOMATOES USING DIFFERENT TECHNOLOGIES
IN THE EAST JORDAN VALLEY
1978 - 1979

Item	Cucumbers				Tomatoes
	Plastic Houses		Plastic Tunnels		Open Field and Drip
	Drip	Surface	Drip	Surface	
Yield (tons/du)	8.5	6.0	2.2	1.7	3.4
Average Price (JD/ton)	256.0	266.5	283.0	283.0	113.8
Gross Revenue (JD/du)	2,176.0	1,599.0	622.6	481.0	386.9
Production Cost (JD/ton)	39.7	53.4	50.6	65.7	24.2
Marketing Cost (JD/ton)	36.9	37.6	38.8	38.8	26.1
Total Var. Cost (JD/ton)	76.6	91.0	89.4	104.5	50.3
Total Var. Cost (JD/du)	651.0	546.3	196.7	177.6	171.7
Net Revenue (JD/ton)	179.4	175.5	196.3	178.5	63.5
Net Revenue (JD/du)	1,525.0	1,052.7	425.9	303.4	215.8
Investment (JD/du)	1,998.0	1,718.0	366.7	86.7	280.0
Payback Period (years)	1.31	1.63	0.86	0.29	1.30

Source: Steitieh and Musa, 1980.

those obtained from traditional techniques, i.e., open field cultivation using surface irrigation. Yields from cultivation under plastic houses using surface irrigation were about one-third less than those obtained from plastic houses using surface irrigation.

For cucumbers, the use of plastic tunnels appeared to provide a two- to three-fold increase in yields over those obtained from the use of traditional cultivation techniques. There were only marginal differences in yields between cultivation under plastic tunnels using drip irrigation and cultivation under plastic tunnels using surface irrigation. For tomatoes, the use of drip irrigation and open field cultivation resulted in a two- to three-fold increase in yields over those obtained using surface irrigation under open field conditions.

In summary, it is evident that while cultivation under plastic tunnels more than doubles yields as compared with open field cultivation using surface irrigation, the primary advantage of cultivation under tunnels is the ability to grow vegetables in the early winter season with less danger of frost damage. Drip irrigation under open field cultivation provides yields that are about twice those obtained from cultivation under plastic tunnels, while cultivation under plastic houses makes possible yields which are three times or more as high as those obtained from growing vegetables under plastic tunnels and more than twice as high as those obtained from open field cultivation using drip irrigation.

Prices. The price data reported in Tables 2-13, 2-14 and 2-15 are an average of the average monthly wholesale prices in the central markets of Amman, Irbid, and Zarqa for the respective crop seasons. As Table 2-13 indicates, prices vary significantly both by season, e.g., fall and spring, and by sub-region of the Valley. Tables 2-14 and 2-15 clearly show the price advantage to be gained from growing vegetables in the early winter season. Average prices received from vegetables grown under plastic covers are about twice those received from vegetables grown under open field conditions, with tunnels giving marginally higher prices than houses.

Gross Revenue. Differences in gross revenue per dunum under alternative technologies reflect the impact of both yield differences and average price differences. Plastic houses using drip irrigation give the highest gross revenue, reflecting the impact of the higher yields obtained from cultivation under houses and the price advantage of being able to market vegetables in the early winter season. Gross revenue from cultivation under plastic tunnels is about one-third of that from cultivation under plastic houses, indicating that the reduction in yields under tunnels (as contrasted with yields under houses) is not offset by the slightly higher average prices realized. Traditional cultivation techniques give the lowest gross revenue, while the adoption of drip irrigation with open field cultivation increases gross revenue by about three-fold, the rise being due almost entirely to the higher yields obtained from the use of drip irrigation.

Production Costs. Production costs vary widely in the East Jordan Valley depending on the skill of the farmer in managing the enterprise, the crop being grown, the type of technology being used, and the type and

amount of inputs used. While the three sets of cost computations described earlier contain detailed estimates of the cost of producing different crops using alternative technologies, unfortunately the computations are not always consistent, i.e., some computations yield widely varying costs for the same crop grown using identical technological packages. Nonetheless, the computations do provide some indication of the relative costs of production using alternative technologies.

Table 2-16 provides data on production costs per ton for cucumbers and tomatoes grown under open field cultivation using surface irrigation during the 1976-1977 crop season. The cost computations were based on the assumption that machinery is used for two farming operations: ploughing (0.6 hours per dunum) and furrowing (0.2 hours per dunum). Labor requirements were computed on the assumption that zig zag furrowing requires 4 man-hours per dunum, sowing 3 man-hours per dunum, hoeing 20 man-hours per dunum for cucumbers and 15 man-hours per dunum for tomatoes, fertilizer application 4 man-hours per dunum, irrigation 6 man-hours per dunum for cucumbers and 13 man-hours per dunum for tomatoes (due to the fact that it was assumed that tomatoes receive 9 irrigations and cucumbers only 5 irrigations), spraying and dusting 6 man-hours per dunum for cucumbers and 5.5 man-hours per dunum for tomatoes, and harvesting 25 man-hours per dunum for cucumbers and 35 man-hours per dunum for tomatoes. It was also assumed that sowing, planting, and harvesting would be done by women and that hourly wages were JD 0.4 (\$1.40) for men and JD 0.2 (\$0.70) for women. It is significant that traditional agriculture in the East Jordan Valley involved substantial inputs of fertilizers, pesticides, herbicides, and fumigants. Thus, Valley farmers have shown no reluctance to apply modern inputs, although, as discussed in the following section, there is some concern about the types and quantities being used. Cucumbers were estimated to require 400 cubic meters per dunum of irrigation water and tomatoes 595 cubic meters per dunum. Water costs were given at 3 fils per cubic meter. Production costs using traditional farming techniques were estimated at JD 52.3/ton (JD 45 per dunum) for cucumbers and JD 39.7/ton (JD 60.34/dunum) for tomatoes.

Table 2-17 provides data on production costs per ton for cucumbers and tomatoes grown under alternative technologies during the 1977-1978 crop season. The production costs shown for traditional farming are based on identical quantities of inputs as those given in Table 2-16, but reflect higher input prices. It can be seen that production costs per ton were highest for cultivation under plastic tunnels and lowest for open field cultivation under drip irrigation.

For cucumbers, production costs per ton using traditional methods of cultivation were about 23 percent higher than those for cultivation under plastic houses using drip irrigation. Part of this difference appears to reflect the greater efficiency of drip irrigation over surface irrigation, resulting in lower costs for such inputs as machinery, seeds, fertilizers, and water. On the other hand, the pest problems associated with production under the humid conditions found in plastic houses resulted in much higher expenditures for chemical sprays. Traditional cultivation also appears to require more labor both for production and for harvesting than cultivation under plastic houses with drip irrigation. Production costs per ton using

Table 2-16

PRODUCTION COSTS OF CUMCUMBERS AND TOMATOES GROWN UNDER
OPEN FIELD CULTIVATION AND USING SURFACE IRRIGATION
IN THE EAST JORDAN VALLEY
1976 - 1977

Cost Item	JD Per Ton	
	Cucumbers	Tomatoes
<u>Material Inputs:</u>		
Machinery	1.22	0.69
Seeds and Seedlings	7.33	1.65
Manure	-	6.84
Fertilizer	8.24	6.70
Water	1.40	1.17
Chemical Sprays	1.74	1.40
Total	19.95	18.45
<u>Labor Inputs:</u>		
Production	20.76	12.04
Harvesting	11.63	9.21
Total	32.39	21.25
Total Production Costs	52.34	39.70

Source: Steitieh, et al., 1978.

Table 2-17

PRODUCTION COSTS OF CUCUMBERS AND TOMATOES PRODUCED UNDER
DIFFERENT TECHNOLOGIES IN THE EAST JORDAN VALLEY
1977 - 1978

Cost Item	JD Per Ton					
	Cucumbers			Tomatoes		
	Traditional	Plastic Houses and Drip	Plastic Tunnels and Surface	Traditional	Plastic Houses and Drip	Open Field and Drip
<u>Material Inputs:</u>						
Machinery	1.98	0.24	1.35	1.12	0.22	1.47
Seeds and Seedlings	8.37	1.78	4.50	2.37	0.72	0.80
Manure	-	-	11.25	6.84	-	7.78
Fertilizer	8.26	1.43	11.70	6.71	1.32	2.20
Water	1.40	*	0.75	1.18	*	*
Chemical Sprays	1.74	11.64	16.90	1.38	10.71	3.82
Total	21.75	15.11	46.45	19.60	12.97	16.07
<u>Labor Inputs</u>						
Production	25.00	13.60	34.75	14.67	13.62	10.89
Installing Plastic Wires	-	7.93	7.15	-	7.14	-
Harvesting	14.54	13.00	10.75	11.51	12.90	11.67
Total	39.54	34.53	52.65	26.18	33.66	22.56
Total Production Costs	61.29	29.64	99.10	45.78	46.67	38.63

* Negligible.

Source: Steitieh and Abbas, 1978.

traditional cultivation techniques are 38 percent lower than those for cultivation techniques are 38 percent lower than those for cultivation under plastic tunnels using surface irrigation. Cultivation under plastic tunnels appears to require higher expenditures for manure, fertilizers, and chemical sprays, which more than offset the lower costs of machinery, seeds, and water. Labor costs for production activities (i.e., plowing, sowing, and application of plant inputs) are also much higher, although traditional cultivation requires more harvesting labor.

For tomatoes, production costs per ton using traditional cultivation methods are slightly below those for cultivation under plastic houses using drip irrigation. Again, the efficiency of drip irrigation is illustrated by the lower costs for machinery, seedlings, manure, fertilizer, and water which more than offset the higher costs for chemical sprays. Cultivation under plastic houses with drip irrigation appears to require more labor than traditional cultivation techniques, primarily due to the additional costs for installing the plastic. Under open field conditions, the substitution of drip irrigation for surface irrigation results in about a 19 percent reduction in production costs, largely due to savings on seedlings, fertilizers, and water coupled with lower labor requirements for production activities.

Table 2-18 provides data on production costs per ton for cucumbers grown under alternative technologies and for tomatoes grown under open field conditions with drip irrigation for the 1978-1979 crop season. For cucumbers grown under plastic covers, the data show a 20 to 25 percent reduction in production costs per ton when drip irrigation is used rather than surface irrigation. Cultivation under plastic houses also appears to result in about a 20 percent reduction in production costs as compared with cultivation under plastic tunnels. Thus, cultivation under plastic houses using drip irrigation results in the lowest production costs per ton while cultivation under plastic tunnels using surface irrigation results in the highest production costs per ton.

As noted previously, drip irrigation appears to result in a more efficient utilization of material inputs, as indicated by the lower costs for machinery, seeds, manure, fertilizers, and water. While labor requirements for harvesting are quite similar, drip irrigation requires considerably less labor for the production activities than surface irrigation. Table 2-18 also shows that cultivation under tunnels requires more material inputs than cultivation under houses. The labor requirements for both production activities and harvesting, however, under plastic houses and tunnels appear quite similar.

The 1978-1979 data for tomatoes are given only for cultivation under open field conditions with drip irrigation. Thus, they do not provide a basis for comparison among alternative technologies. However, it should be noted that the production cost data given do not appear consistent with the data shown in the 1977-1978 crop season study for cultivation of tomatoes using the same technology.

In summary, the available data on production costs per ton under different cultivation technologies are quite limited and not always consistent. Thus, one should proceed cautiously in accepting these data as a basis for making

Table 2-18

PRODUCTION COSTS OF CUCUMBERS AND TOMATOES PRODUCED UNDER
DIFFERENT TECHNOLOGIES IN THE EAST JORDAN VALLEY
1978 - 1979

Cost Item	JD Per Ton				
	Cucumbers				Tomatoes
	Plastic Houses		Plastic Tunnels		Open Field and Drip
	Drip	Surface	Drip	Surface	
<u>Material Inputs:</u>					
Machinery	0.59	0.75	1.14	1.53	0.74
Seeds and Seedlings	2.06	2.83	4.45	5.18	1.41
Manure	5.47	8.33	7.05	11.12	4.56
Fertilizer	2.12	3.08	2.32	9.00	1.32
Water	*	0.83	*	1.41	*
Chemical Sprays	11.85	10.92	16.09	12.06	3.09
Total	22.09	26.74	31.05	40.30	11.12
<u>Labor Inputs:</u>					
Sowing, Replanting, & Thinning	0.53	1.00	0.82	1.18	1.26
Fertilization	0.35	1.67	1.18	2.06	0.74
Irrigation	-	2.17	-	3.18	-
Spraying & Fumigation	3.33	3.67	2.05	1.77	0.59
Pruning & Trillacing	3.21	5.93	-	-	-
Weeding and Hoeing	0.29	2.37	0.82	2.35	0.88
Ventilation	-	-	2.27	2.29	-
Installing Drippers & Plastic Mulch	0.53	-	1.86	-	1.21
Tunnel Installation & Removal	-	-	1.91	3.06	-
Plastic Removal in Houses	0.62	1.07	-	-	-
Harvesting	8.73	8.80	8.68	9.53	8.44
Total	17.59	26.68	19.59	25.42	13.12
Total Production Costs	39.68	53.42	50.64	65.72	24.24

* Negligible.

Source: Steitieh and Musa, 1980.

comparisons among alternative technologies. However, the data do permit some rough judgments relating to the relative production costs per ton. For cucumbers, the data suggest that cultivation under plastic houses with drip irrigation result in the lowest production costs per ton. Cultivation under plastic houses with surface irrigation, under plastic tunnels with drip irrigation, and under open field conditions with surface irrigation give similar production costs per ton which are roughly 20 percent above those for cultivation under plastic houses with drip irrigation. Cultivation under plastic tunnels with surface irrigation gives the highest production costs per ton. The data for tomatoes are quite limited, but suggest that cultivation under open field conditions using drip irrigation permits the attainment of production costs per ton which are 20 percent or more below those for cultivation under plastic houses with drip irrigation or under open field conditions with surface irrigation. Cultivation of tomatoes using traditional technologies would appear to be capable of achieving as low or lower production costs per ton as cultivation under plastic houses using drip irrigation.

Marketing Costs. Marketing costs were computed by adding the cost of boxes, transportation, and fees. Boxes were estimated to cost JD 0.32 each. Transportation was computed at JD 0.12 per box. Commission fees amount to 5 percent and municipality fees to 2 percent of gross returns minus the cost of empty boxes. Differences in marketing costs per ton among the alternative technologies are therefore due entirely to the differences in gross revenue per ton.

Net Revenue. Net revenue for the alternative technologies used in producing vegetables in the East Jordan Valley is computed by subtracting total variable costs, i.e., production costs plus marketing costs, from gross revenue. As indicated in Table 2-13, net revenue can vary widely between crops, seasons, and sub-regions of the Valley even when traditional methods of open field cultivation with surface irrigation are being used. The differences in net revenue per ton are due almost entirely to variations in average price, while differences in net revenue per dunum reflect the additional impact of differences in yield.

Table 2-14 is based on data taken only from the middle portion of the Valley and covers the entire 1977-1978 crop season. Thus, the differences in net revenues per ton shown in Table 2-14 primarily reflect the impact of alternative technologies on average prices. Table 2-14 clearly shows the advantage gained from producing cucumbers under plastic tunnels rather than under open field cultivation, due to the fact that the crop can be marketed during the early season. The impact of highest average prices more than offsets the higher production costs experienced with cultivation under plastic tunnels. As a consequence, net revenues per ton from cultivation of cucumbers under plastic tunnels are nearly three times those achieved from open field cultivation. Table 2-14 also shows the advantage of drip irrigation which results in production costs about half of those experienced using surface irrigation. While cultivation under plastic houses using drip irrigation also results in higher average prices than those obtained from open field cultivation, the price advantage is not as great as with cultivation under tunnels. The combined impact of lower production costs and higher average prices is that cultivation of cucumbers under plastic houses using drip irrigation results in net revenue per ton which is nearly four times as high as that obtained under traditional cultivation techniques and 27 percent

higher than that obtained by cultivation under plastic tunnels with surface irrigation.

Table 2-14 shows a similar pattern of variation in net revenue per ton for tomatoes grown under alternative technologies. Thus, cultivation of tomatoes under open field conditions using surface irrigation results in net revenue per ton which is about half of that obtained from cultivation under open field conditions using drip irrigation and about 40 percent of that obtained from cultivation under plastic houses using drip irrigation. However, less of the difference in net revenue per ton among the three technologies is due to differences in average prices.

Table 2-14 also shows considerable variation in net revenues per dunum for both cucumbers and tomatoes grown under alternative technologies. This variation is attributable primarily to wide differences in yields. Particularly significant is the extremely high net revenue per dunum for cucumbers and tomatoes grown under plastic houses with drip irrigation - JD 1,118 (\$3,800) per dunum for cucumbers and JD 796 (\$2,700) per dunum for tomatoes.

Table 2-15 presents data for the 1978-1979 crop season from a sample of farms in the East Jordan Valley. Comparative data are given only for cucumbers grown under plastic houses and tunnels using either drip or surface irrigation. (It should be noted that the data given in Table 2-15 for tomatoes grown under open field conditions with drip irrigation are consistent with similar data shown in Table 2-14.) Table 2-15 indicates that the net revenue per ton is quite similar for cucumbers grown under plastic houses with either drip or surface irrigation and under plastic tunnels using surface irrigation, i.e., about JD 180 (\$600). Net revenue per ton for cucumbers grown under plastic tunnels using drip irrigation is about 9 percent higher, i.e., JD 196.3 (\$670), due to slightly higher average realized prices than under houses and slightly lower costs than with surface irrigation.

Net revenue per dunum for cucumbers grown under plastic houses, however, is as much as three times higher than for cucumbers grown under plastic tunnels. Drip irrigation appears to provide net revenue per dunum which is 40 to 50 percent higher than that realized using surface irrigation. Thus, the combination of cultivation under plastic houses and drip irrigation provides very high net revenue per dunum, i.e., JD 1,525 (\$5,200).

Investment Costs. Table 2-19 summarizes the investment costs per hectare (i.e., 10 dunums) for different farming technologies used in the East Jordan Valley during 1977-1978.

Drip irrigation requires an initial investment of JD 1,350 per hectare and includes the pump and engine - JD 800, a screen filter - JD 400, and a fertilizer cylinder - JD 150. The head system would be capable of irrigating up to 50 dunums and has a life of 10 years. Lateral and main pipes require an investment of JD 400 per hectare and emitters an investment of JD 800 per hectare, both needing to be replaced after three years of use. Plastic mulch is a consumable item, costing JD 250 per hectare and needing to be replaced each year. Thus, the total investment required to install a drip system on 10 dunums is JD 2,800 (\$9,500).

Table 2-19

INVESTMENT COST OF DIFFERENT TECHNOLOGICAL PRACTICES
IN THE EAST JORDAN VALLEY
1977 - 1978

(JD Per 10 Dunums)

Equipment Item	Purchase Price	Estimated Life
1. <u>Drip Irrigation</u>		
Head System	1,350	10
Lateral and Main Pipes	400	3
Nozzles (emitters)	800	3
Plastic Mulch	250	1
Total	2,800	
2. <u>Plastic Tunnels</u>		
Plastic Sheets	420	1
Arc Wires	403	3
Pegs	18	3
Upper Wire	24	3
Threads	2	1
Total	867	
3. <u>Plastic Houses</u>		
Plastic Sheets	4,000	2
Frame (Pipes)	13,000	10
Threads & Wires	180	2
Total	17,180	

Source: Steitieh and Abbas, 1978.

Tunnels require an initial investment of JD 420 per hectare for plastic sheets, which must be replaced each year. Arc wires, pegs, and upper wire require an investment of JD 445 per hectare, and have a life of three years. Threads represent a minimal annual cost of JD 2 per hectare. Thus, the total investment required to initiate cultivation under plastic tunnels is JD 867 (\$2,950) per hectare.

The largest investment required for houses is the cost of the frame, which is constructed of pipe, has a life of 10 years, and costs JD 13,000 (\$44,000) per hectare. Each house usually covers about one-half a dunum, so the investment for frames includes 20 houses. Plastic sheets have a life of two years and cost JD 4,000 (\$13,600) per hectare. Threads and wires cost an additional JD 180 (\$600) per hectare and also have a life of about two years. Thus, the total investment required to begin cultivation of one hectare under plastic houses is JD 17,180 (\$58,400).

It should be stressed that the costs outlined above were calculated for the 1977-1978 crop season. Prices of plastic and other equipment items have risen in recent years. A conservative estimate would be that the costs shown in Table 2-19 have increased by 20 percent in the intervening two years.

Return on Investment. Table 2-14 and 2-15 present return on investment from alternative technologies in terms of payback period, defined as net revenue per dunum divided by investment per dunum and expressed in years. In general, for investments of this type, the shorter the payback period, the higher the return on investment. The tables show that investment in drip irrigation can be repaid in one to two years, in plastic tunnels in one year or less, and in plastic houses in two to three years. Thus, return on investment for all three technologies is quite high, with the highest return being earned from investment in plastic tunnels.

2.4.4 Farming Technique and Purchased Inputs

In addition to cultivation under plastic covers and the use of drip irrigation, returns from farming in the East Jordan Valley also depend on farming technique and the use of purchased inputs.

Farming Technique. Existing cultivation techniques in the East Jordan Valley have been described as follows (Morgan, 1979):

"Plant bed preparation is sub-standard and the method of plowing and fallow plowing is destroying the soil character. Generally, the farm unit is plowed in one direction with a 3 disc plow. Followed by hand labor using a mattock to break up clods and rough level the field, which now becomes the plant bed. In some cases water is introduced to the field and the soil smoothed in this manner. Only the upper mould is turned over creating a plow sole which is restrictive to an extensive root system and good yield support. Some growers stated that plowing was done three times prior to planting and yet the fields were in very poor condition regardless. No discing, field rolling is done. An offset disc is unknown. Post harvest plowing turns up large clods that bake out during the high summer temperatures. Humus content is very low and soils are in poor tillage condition.

Following 'plant bed preparation', farmers hand furrow out the irrigation ditches. In some cases a straight furrow, but most likely a zig zag pattern where the field is uneven. He will either prefertilize or add fertilizer later.

Planting is usually by direct seeding and/or transplanting to the field. Field seeding is the norm. Weed control is basically accomplished by hand pulling or by hand hoeing throughout the growing cycle.

The use of layby and herbicide banding is not generally used. The effectiveness of any pre-emerge, et al. treatment is not fully understood and the farmer no doubt would constantly cultivate the herbicidal material into non-effectiveness. The need for close extension educational assistance is most definitely required through the cultural stage."

Fertilization. Fertilizer application is widespread in the East Jordan Valley. Table 2-20 shows the general pattern of fertilization for the principal vegetable crops in the Valley by farmers using traditional methods of cultivation, i.e., open field farming and surface irrigation. There is some evidence that farmers may be applying inappropriate amounts of fertilizer or unaconomic nutrient source materials. In particular, concern has been expressed that farmers apply manure instead of urea - a practice which is both ineffective and more expensive per unit of nutrient applied (Hyslop, 1979).

Pesticide Use. The application of pesticides is also widespread in the East Jordan Valley. Here too, concern has been expressed about the effectiveness of pesticide applications (Stevens, 1977):

"The application of fungicides and pesticides in the Jordan Valley at present is not effective. Mostly the spray is put on with low pressure hand-pump backpacks and it is usually applied only on the upper surface of the leaves. Coverage of the foliage must be complete for effective control. The compounds now being used are generally not the most effective ones available."

There is evidence of serious plant disease problems in the East Jordan Valley. One of the more significant problems is the yellow leaf curl virus which affects tomato production (Stevens, 1977):

"The most serious threat to profitable tomato production in the Jordan Valley is the yellow leaf curl virus. Every field we observed was seriously affected with this disease. The earlier plantings, September and October, were essentially 100 percent affected and yields were severely reduced. I was told that the plantings remaining were the ones which had less serious problems with the disease. The more seriously affected fields had been plowed under by the growers. This disease is being managed elsewhere and it should be possible to triple average tomato yields with partial control of this disease."

Table 2-20

FERTILIZER APPLICATION IN THE EAST JORDAN VALLEY
(Per Dunum)

Crop	Super-Phosphate (Kgs)	Ammonium Sulphate (Kgs)	Compound (Kgs)	Manure (Cubic Meters)
Potatoes	150	50	-	1.3
Tomatoes	75	80	50	1.3
Eggplant	85	50	-	1.3
Pepper	-	50	-	1.3
Greenbeans	-	70	-	0.4
Broadbeans	-	25	-	-
Cauliflower & Cabbage	-	50	50	-
Squash	-	75	25	-
Cucumber	100	50	25	-
Onion	-	25	-	-

Source: Steitieh, et al., 1978.

The virus is spread by the whitefly, Bemisia tabaci, and the insect and the virus it transmits are largely uncontrolled. Because of the ineffectiveness of existing spraying programs, most controls directed against the whitefly are probably doing more harm than good (Allen, 1980). It is estimated by Dr. Abdullah Moussa, Assistant Professor of Plant Pathology at the University of Jordan, that the virus reduces tomato yields by more than 90 percent in the worst cases and by about 50 percent on the average. One expert concludes that the virus may be just the tip of the iceberg and foresees continuing disease problems in the East Jordan Valley (Allen, 1980):

"It is my contention that the whitefly problem is just the beginning with other problems such as resistant spider mites coming close behind. Without added emphasis on integrated pest control and better dissemination of information to farmers, agriculture will not reach its potential in the Jordan Valley and may very well decline in productivity in the coming years."

Dr. George Marlowe, whose recent research on yields for vegetables grown using different types of irrigation was cited earlier, has noted a problem with the yellow watermelon mosaic virus number two which affects cucumbers and squash. It is spread by an aphid and the existing control programs are ineffective due to inadequate spray coverage of the plant.

The intensification of irrigated agriculture in the East Jordan Valley is increasing the problem of plant diseases. Cultivation under plastic covers provides an ideal environment for the growth of pests and, by extending the growing season throughout the year, promotes pest survival. As noted previously, the switch from surface to sprinkler irrigation is also likely to lead to additional disease problems.

What little information the Jordan Valley farmer can obtain on combating disease problems comes from the commercial suppliers of pesticides and fungicides. The farmer has little basis for evaluating the effectiveness of the recommendations he receives. There is a noticeable tendency to apply large amounts of chemical sprays without full knowledge of their effectiveness. The result is not only ineffective pest control, but also increasing danger of health impairment to the farmer, his family, and others working in Valley agriculture. As one observer notes (Hyslop, 1979):

"It is apparent that Jordan Valley farmers are not highly skilled in the use of pesticides or fully aware of the dangers associated with their use."

Pesticides poisoning already occurs in the East Jordan Valley and could become more serious if chemical spraying increases without an improvement in application techniques.

The intensification of farming in the East Jordan Valley in recent years has been due to the adoption of drip irrigation and the cultivation of vegetables under plastic covers. The cropping pattern has been altered with increased cultivation of tomatoes, cucumbers, and other vegetables. The traditional two season growing pattern has been disrupted and shows signs of

evolving into year-round cultivation under plastic covers. These changes have occurred with little change in farming technique. The intensification of farming coupled with the almost total emphasis on cultivation of vegetables, while undoubtedly profitable in the short-run, poses a serious threat to the long-run viability of Valley agriculture. The problems of increasing salinity in the southern portion of the Valley and plant infestation throughout the Valley are clear indications of the need for better cultivation practices.

It should be recognized that the incentives provided by the market mechanism may not be sufficient to stimulate better cultivation practices in the East Jordan Valley. In the short run, an individual farmer has an incentive to adopt practices which provide an immediate and noticeable return on the funds invested. However, what is economic for the individual farmer may not be economic for the entire community of farmers. For example, given the existing price structure, farmers have a strong incentive to concentrate on vegetable production to the exclusion of field crops and fodder. However, a more balanced cropping pattern might provide higher returns over the long-run to agriculture in the Valley. The problem is well recognized and is often termed "the problem of the commons." The remedy is more difficult, involving some type of collective recognition and action.

Clearly, there exists a need in the East Jordan Valley for research on cultivation practices, on pest control, and on other cultural problems. The results of this research need to be disseminated to farmers. The task is unlikely to be accomplished by reliance solely on the market, although commercial suppliers of inputs have an important role to play. Government, which can take a long-run perspective applicable to the entire community of farmers, also has an important role, and voluntary associations of farmers can play a role as well. There are a number of institutional models for addressing this type of problem, including research and extension systems, cooperative associations, and government regulations. If agriculture in the East Jordan Valley is to achieve its potential, attention must be given immediately to establishing the institutional mechanisms for improving farming practices. Such mechanisms will have to involve both basic and applied research, as well as a system for disseminating the results of this research to the ultimate consumer, the farmer.

2.5 PRODUCTION

As stated in the first section of this report, the aim of development planning in the East Jordan Valley is to increase agricultural production. To accomplish this goal, the plan includes provisions for expanding the irrigated area and converting from surface to sprinkler irrigation. However, increased production also must involve a change in the cropping pattern and an increase in yields. In this section, the evolution of agricultural production in the Valley between 1973 and 1980 is described in terms of changes in the cropping pattern, changes in yield, and changes in output.

2.5.1 Cropping Pattern

Table 2-21 shows the evolution of the cropping pattern in the East Jordan Valley in the period, 1975 through 1979. The 1975 data are drawn from The Agricultural Census in the Ghors, 1975, while the data for 1976 through 1979

Table 2-21

CROPPING PATTERNS IN THE EAST JORDAN VALLEY
1975 - 1979

Crop Group	North (Irbid)		South (Balqa)		Valley Total	
	Area (ha)	Per- Cent*	Area (ha)	Per- Cent*	Area (ha)	Per- Cent*
<u>Field Crops:</u>						
1975	5,349	44	4,015	41	9,364	42
1976	4,704	39	4,200	42	8,904	41
1977	3,542	32	3,997	43	7,539	37
1978	2,782	23	3,494	35	6,276	28
1979	2,398	23	1,999	39	4,397	28
<u>Vegetables:</u>						
1975	5,697	46	5,740	59	11,437	52
1976	8,862	74	5,670	57	14,532	66
1977	7,833	71	6,789	74	14,622	72
1978	9,413	76	7,434	75	16,847	75
1979	8,635	83	8,242	162	16,877	109
<u>Fruits:</u>						
1975	1,977	16	595	6	2,572	12
1976	1,452	12	755	8	2,207	10
1977	2,402	22	666	9	3,068	15
1978	2,540	21	757	8	3,297	15
1979	2,596	25	695	14	3,291	21
<u>Total Crop Area:</u>						
1975	13,023	106	10,350	106	23,373	106
1976	15,018	125	10,625	107	25,643	117
1977	13,777	125	11,452	124	25,229	125
1978	14,735	120	11,685	118	26,420	118
1979	13,629	131	10,936	215	24,565	158
<u>Cultivated Area:</u>						
1975	12,248	100	9,712	100	21,960	100
1976	11,960	100	9,978	100	21,938	100
1977	10,990	100	9,213	100	20,203	100
1978	12,362	100	9,963	100	22,325	100
1979	10,463	100	5,085	100	15,548	100

* Percent equals crop area divided by cultivated area. Sum equals cropping intensity.

Source: 1975 - Department of Statistics, 1977.
1976 - 1979 - Department of Statistics, 1977, 1978, 1979 and 1980.

are taken from the annual issues of The Agricultural Sample Survey in the Ghors. The sample survey data generally are believed to be much less reliable than the agricultural census data. However, the sample procedures pose less difficulties for determining trends in the general cropping pattern than for determining changes in output and yields.

In 1975, the total area cultivated in the Valley was 21,960 hectares, of which 3,374 hectares was cropped with unirrigated field crops such as wheat. All the remaining crops were irrigated from the East Ghor Canal, side wadis, or wells. As Table 2-21 indicates, the total area of harvested vegetables was 11,437 hectares. However, these were grown on only 10,419 hectares of land, indicating that 509 hectares were double-cropped with spring and summer maturing varieties. By comparing the total harvested area with the total cultivated area for the entire Valley, it can be seen that the former exceeds the latter by 6 percent. Thus, the cropping intensity in the Valley for 1975 is estimated to be 106 percent.

A number of difficulties arise in ascertaining the agricultural situation in the Valley in 1978-1979. Table 2-21 indicates that the total area cultivated in the Valley in 1978 was 22,325 hectares, while the corresponding figure for 1979 was only 15,548 hectares. Most of this reduction is shown to have occurred in the southern portion of the Valley. It should be recognized, however, that these figures were based on a 6 percent sample survey of plots, the frame for which was the 1975 agricultural census. The decline in cultivated area indicated for 1979 was likely the result of unique climatic conditions, the effects of which were magnified by the sample procedures. Thus, a reasonable estimate of the area under cultivation in the Valley in the 1979-1980 crop season would be approximately 22,000 hectares, little changed from 1975**. This finding is consistent with the fact that the Stage I Development projects had not come on line by 1979 and the Jordan Valley Authority had restricted the drilling of new wells in the southern portion of the Valley.

*The winter of 1978-1979 was the worst of five successive years of drought. Water diverted from the Yarmouk River, the principal source of water for the East Ghor Canal, was sharply reduced from an average of 5.0 cms in the summer months to an amount ranging from 2.3 to 2.9 cms in the autumn. The flow from side wadis was reduced to a trickle and storage in the King Talal dam was only 15 million cubic meters, 7 million less than the level for 1977-1978 (the first year of its operation) and only 26 percent of the designed capacity. In the southern part of the Valley, where irrigation water is drawn principally from wells, the water table dropped significantly, to the extent that some of the shallower wells dried up. As a result of these unusual climatic factors, autumn planting was significantly reduced. Much of this reduction occurred in the rainfed areas. In addition, planting of vegetables under irrigation in the autumn was also reduced, although this was offset somewhat by expanded planting in the late winter and early spring. Thus, the sample survey indicated a sharp decline in the area under cultivation, including a nearly 50 percent reduction in the southern portion of the Valley which includes the major portion of the rainfed area.

**The 1978 agricultural census should have provided a basis for evaluating the change in area under cultivation between 1975 and 1978. However, in 1978, only data for the autumn growing season were included in the census (while the 1975 census included data for both the autumn and spring growing seasons). Thus, the census figures for 1975 and 1978 are not comparable.

Table 2-21 indicates significant changes in the cropping pattern in the Valley in recent years. The area devoted to field crops has fallen substantially, while the area under vegetables has increased substantially and that devoted to fruits has risen moderately. These changes continued trends begun with the completion of the East Ghor Canal in the mid-1960's.*

The cropping patterns vary between the northern and southern portions of the Valley. The northern area extends from Adasiyeh to Balawneh (just south of Kreimah and Wadi Kufrinja), and includes most of the initial area of the East Ghor Canal project. The southern area, which is known as the Middle Ghor, includes most of the Stage I Development projects.

In 1975, about 16 percent of the land cultivated in the northern area was under fruit, with citrus predominating, while the remainder of the cropped area was about evenly divided between field crops and vegetables. By 1979, the proportion of the cultivated area in the north given over to fruits had risen by more than 25 percent, the area planted with vegetables had increased by about 65 percent, and the area under field crops had fallen by about 55 percent.

In 1975, much of the area in the southern portion of the Valley had only recently been brought under irrigation, primarily from wells, and vegetables predominated accounting for 59 percent of the cropped area, with field crops accounting for 41 percent and fruits for only 6 percent. By 1979, the proportion of the cultivated area in the south given over to fruits had risen by more than 16 percent, the area planted with vegetables had increased by about 44 percent, and the area under field crops had declined by about 50 percent. Thus, the trends in the cropping pattern in the Valley were mirrored in both the north and the south, but, as might be expected, the changes have been greatest in the north where the major completed irrigation projects are located.

Table 2-21 indicates a significant increase in the cropping intensity for the East Jordan Valley between 1975 and 1979. As explained above, caution should be exercised in accepting the dramatic reduction in cultivated area, particularly in the southern portion of the Valley, in 1979. It is this reduction which primarily resulted in a sharp increase in cropping intensity to 215 percent in the southern portion and to 158 percent in the entire Valley. A more reasonable estimate of the current cropping intensity would be about 120 percent, with the cropping intensity being about the same in both the northern and southern parts of the Valley.

It should be recognized that at least a portion of the rise in cropping intensity can be attributed to the five years of drought, 1975 through 1979, which resulted in a reduction in the non-irrigated rainfed cultivated area. This was accompanied by an expansion in double-cropping of vegetables and increasingly by mixed cropping of tomatoes with other crops such as cucumber, squash, and green beans. Thus, a recent study showed that of the 851.4 hectares cultivated in 1978-1979 under open farming with drip irrigation in the East Jordan Valley, over 38 percent was planted with tomatoes mixed with other crops (Steitieh and Musa, 1980).

*The same trends in the seven years from 1968 to 1975 also were noted (Harza, 1978).

Table 2-22 shows the distribution of crop area for the major crops in the East Jordan Valley for the period, 1975 through 1979. In 1975, in the field crop sector, wheat accounted for about 75 percent of the crop area, barley for about 18 percent, and maize and sorghum for the remainder. About two-thirds of the wheat was grown under irrigation. By 1979, the percentage of the field crop area devoted to wheat had fallen to about 70 percent, while the percentage accounted for by barley had risen to about 23 percent. In addition to maize, lentils and vetch were accounting for the remainder. The 1978 census of agriculture indicated that about 76 percent of the total area devoted to field crops was irrigated.

In 1975, tomatoes dominated the vegetable sector, making up a third of the harvested area, with eggplant and melons accounting for about 16 percent each. Other important vegetables included squash, cucumbers, peppers, potatoes, broad beans, string beans, and cauliflower. By 1979, there had been little change in the vegetable pattern. Tomatoes remained the most important crop, followed by eggplant and squash. Melons had diminished in importance. Some differences exist in the vegetable cropping pattern in the north and south. Tomatoes, eggplant, and squash account for a majority of the vegetable crop area in both the north and the south, but are relatively more important in the south. Potatoes and cauliflower are grown primarily in the north, while melons are grown primarily in the south.

In the fruit sector, oranges were the most important crop in 1975, occupying roughly one-third of the area devoted to fruits. Lemons accounted for an additional 18 percent and other citrus accounted for about 27 percent. Bananas were the most important non-citrus fruit and accounted for about one-fifth of the fruit crop area. The cropping pattern for fruits had changed only slightly by 1979, with lemons accounting for 29 percent and oranges for 26 percent of the total fruit crop area. Bananas remained the most important non-citrus fruit, but accounted for only about 11 percent of the fruit crop area. Throughout the period, fruit remained relatively more important in the north than in the south, with roughly four times the area being given to fruits in the north as compared with the south.

2.5.2 Yields

Table 2-23 shows the behavior of yields for major crops grown in the East Jordan Valley over the period, 1975 through 1979. Again, the 1975 data come from The Agricultural Census in the Ghors, while the data for 1976 through 1979 are taken from the annual issues of The Agricultural Sample Survey in the Ghors. The survey data are based on a 6 percent sample of plot identified in the 1975 census. It is generally recognized that because the sample is based on listings of plots, rather than on area maps and specific crops, it is subject to substantial error, particularly for crops that are concentrated in specific sub-regions of the Valley and for crops which account for a small proportion of total output. Moreover, reported yields show a good deal of fluctuation from year-to-year by crop, and in any given year, among sub-regions of the Valley. Even for a given crop grown in a specific sub-region, yields may vary widely from one farm to another. Thus, care must be exercised in attempting to draw conclusions about long-term trends in yields from the available data.

Table 2-22

CROP DISTRIBUTION IN THE EAST JORDAN VALLEY
1975 - 1979

Crop	Thousands of Hectares						Per- cent
	1975	1976	1977	1978	1979	Avg.	
<u>Vegetables:</u>							
Tomatoes	3.8	4.7	5.2	5.9	5.2	5.0	20.0
Eggplant	1.8	2.4	1.9	2.6	2.8	2.3	9.2
Cucumber	0.7	0.9	0.6	1.1	1.0	0.9	3.6
Squash	1.1	2.3	2.3	2.4	2.5	2.1	8.4
Potatoes	0.3	0.7	1.0	0.6	0.4	0.6	2.4
Cauliflower & Cabbage	0.3	0.2	0.3	1.0	0.8	0.5	2.0
Other	3.5	3.2	3.2	3.2	4.2	3.5	14.0
Total*	11.4	14.5	14.6	16.8	16.9	14.8	59.2
<u>Fruits:</u>							
Citrus	1.7	1.9	2.0	2.3	2.7	2.1	8.4
Bananas	0.4	0.2	0.2	0.7	0.3	0.4	1.6
Other	0.2	0.2	0.2	0.2	0.3	0.2	0.8
Total*	2.6	2.2	3.1	3.3	3.3	2.9	11.6
<u>Field Crops:</u>							
Wheat	7.0	6.2	5.1	4.3	2.8	5.1	20.4
Other	2.3	2.7	2.4	2.0	1.6	2.2	8.8
Total*	9.4	8.9	7.5	6.3	4.4	7.3	29.2
Total Valley*	23.4	25.6	25.2	26.4	24.6	25.0	100.0

* Totals may not add due to rounding.

Sources: 1975 - Department of Statistics, 1977.
1976 - 1979 - Department of Statistics 1977, 1978, 1979, and 1980.

Table 2-23

AVERAGE YIELD PER DUNUM OF SELECTED CROPS GROWN
IN THE EAST JORDAN VALLEY
1975 - 1979

Crop	Average Yield (Kg. per dunum)					
	1975	1976	1977	1978	1979	Mean
Tomato	1,763	1,085	981	2,458	2,115	1,680
Eggplant	1,833	1,667	1,158	2,269	2,044	1,794
Cucumber	1,429	1,000	1,000	1,546	1,300	1,255
Squash	1,000	652	1,000	1,708	1,520	1,176
Cauliflower & Cabbage	1,333	500	1,667	2,400	1,500	1,480
Potato	1,333	1,571	1,200	1,333	1,500	1,395
Citrus	706	684	1,650	1,304	963	1,061
Wheat	11	97	98	163	36	102

Source: 1975 - Department of Statistics, 1977.

1976 - 1979 - Department of Statistics, 1977, 1978, 1979, and 1980.

Until recently, most observers of agriculture in the East Jordan Valley believed that yields had stagnated since the original East Ghor Canal was completed in the mid-1960's (Hazleton, 1974; and Hyslop, 1978). However, Table 2-23 suggests that yields may have increased sharply in 1978 and 1979, particularly for the principal crops, i.e., tomatoes, eggplants, and cucumbers. This rise perhaps reflects the impact of increasing intensification of farming through the adoption of drip irrigation and cultivation under plastic covers.

2.5.3 Output

Table 2-24 summarizes the output of the principal crops grown in the East Jordan Valley during the period, 1975 through 1979. The sources for this data are the same as for Table 2-21, 2-22, and 2-23. Because of the general inadequacy of production data for the Valley, it is difficult to come to any quantitative conclusions about the general trends in output. Nonetheless, the available data appear to support the conclusion that there has been a modest increase in agricultural production in the East Jordan Valley during the period, 1975 through 1979. Such a conclusion is consistent with the views of individuals familiar with agriculture in the Valley and with the conclusions reached earlier that there has been an increase in cropping intensity and yields. It is also consistent with the noticeable increase in the use of drip irrigation and cultivation under plastic covers, both of which would be expected to result in increased yields a longer cropping season. Finally, the rise in production levels is consistent with the increase in truck traffic on the major roads in the Valley over the same period, as discussed in the following chapter of this report.

Table 2-24

OUTPUT OF THE MAJOR CROPS GROWN IN THE
EAST JORDAN VALLEY
1975 - 1979

Crop	Total Output (Thousands of Tons)					
	1975	1976	1977	1978	1979	Mean
Tomato	67	51	51	145	110	85
Eggplant	33	40	22	59	47	40
Cucumber	10	9	6	17	13	11
Squash	11	15	23	41	38	26
Cauliflower & Cabbage	4	1	5	24	12	9
Potato	4	11	12	8	6	8
Citrus	12	13	33	30	26	23
Wheat	8	6	5	7	1	5

Sources: 1975 - Department of Statistics, 1977.
1976 - 1979 - Department of Statistics, 1977, 1978, 1979, and 1980.

3. DEMOGRAPHY AND SERVICES

3.1 POPULATION GROWTH

3.1.1 Introduction

The population level of the Jordan Valley has fluctuated considerably during the last two decades. The spread of diseases such as malaria and the shortage of water, have both limited population growth prior to 1960. However, malaria was essentially eliminated from the Valley in the 1960's with the assistance of several donors including the United States Government. In addition, the construction of the East Ghor Main Canal, with U.S. assistance, greatly stimulated agricultural production and population growth in the mid 1960's.

The rapid population growth of the Valley during the 1960's was temporarily interrupted during the later stages of the decade. Population in the Valley may have doubled during the first two-thirds of 1960's. However, the outbreak of war in 1967 and the subsequent civil strife, have both temporarily halted population growth. During this period, most Valley residents left their home; it is generally believed that over half of Valley housing was destroyed.

After restoration of peace, many Valley residents returned. The social and economic survey of all Valley residents in March, 1973 indicated that the population had grown to 64,012. This represents an average annual population growth of about 2.8% per year since the previous census in 1961. This is lower than natural increase, which the Department of Statistics estimated at 3.1% in 1973. However, it represents remarkable growth, considering the major disruptions caused by war and civil strife.

Population growth continued during the 1970's, largely as a result of expanded irrigation and agricultural opportunities. According to preliminary figures from the census pretest, population reached 76,677 by November, 1978. Very early returns from the 1979 census suggest that population reached 84,869 by November, 1979. These latest figures from the censuses of 1978 and 1979 should be interpreted cautiously due to their preliminary nature and the fact that they include Jordanian residents of the Valley who were living elsewhere at census time. Valley population growth between 1973 and 1978/79 is discussed in a later section.

The 1975-1982 Jordan Valley Development Plan has as one of its objectives the optimization of manpower. Additional manpower and thus population are needed to fully exploit newly irrigated lands. The plan provides for two basic incentives to attract population to the Valley. The first incentive is attractive income from the redistribution of irrigated land. The second incentive is improved living environment consisting of adequate housing, social services and public utilities.

The Plan is directed towards attracting new residents to the Valley, in numbers which are determined by the amount of labor needed to optimize production on the increasing supply of irrigated land. According to the plan, the optimum population growth pattern is as follows:

<u>Year</u>	<u>Optimum Population</u>
1975	67,920
1976	69,957
1977	80,055
1978	90,457
1979	101,171
1980	112,206
1981	123,572
1982	135,279

Though the Valley has experienced relatively rapid population growth in recent years, it has not been able to attract the planned number of migrants. Consequently, present (1979) population is about 15,000 less than the "optimum" population called for in the Plan. On the other hand some other aspects of the Plan have lagged behind schedule, so less than "optimum" population does not necessarily present a serious constraint to the region's development.

The Plan calls for the distribution of Valley population in 31 existing and 5 new population centers. The 36 centers are classified into three categories.

Category A: 4 centers with populations in excess of 10,000.

Category B: 9 centers with populations between 5,000 and 10,000.

Category C: 23 centers with populations below 5,000.

Three complete censuses of population in the Jordan Valley have been conducted recently (1973, 1978 and 1979). In addition, a head count was made in 1975 for the 1975 Agricultural census. The Valley is thus probably more adequately covered by censuses than many other places in the world. Complete processing of the data from 1978 and 1979 will enable a detailed analysis of population dynamics in the Valley.

As of August, 1980, the preliminary results from the 1978 and 1979 censuses are useful but somewhat confusing. For example, taken at face value available data suggest an annual population growth rate of 3.2% between 1973 and 1978, and of 13.2% between 1978 and 1979. Though possible, such a rapid acceleration of population growth appears unlikely.

Part of the confusion results from different definitions used in the different censuses. For example, the 1978 census includes members of Valley households who were living elsewhere in the East Bank at census time. On the other hand, the 1979 census figures include members of Valley households who were living outside of Jordan at census time. Unfortunately, disaggregated figures were not available in time for this report. Table 3-1 presents basic data from the censuses of 1973, 1978 and 1979. These data should be interpreted with caution.

Table 3-1
GENERAL PATTERN OF JORDAN VALLEY POPULATION
GROWTH 1973 TO 1979

	Population			Annual % Increase		
	1973 ^a	1978 ^b	1979 ^c	73-78 ^d	78-79	73-79 ^e
<u>Total Valley</u>						
Male	33,159	40,352	45,186	4.3%	12.0%	5.6%
Female	30,853	36,325	39,683	3.6%	9.2%	4.5%
Total	64,012	76,677	84,869	3.9%	10.7%	5.1%
<u>North^f</u>						
Male	14,581	17,980	17,188	4.6%	- 4.4%	2.9%
Female	13,928	16,386	16,035	3.5%	- 2.1%	2.5%
Total	28,509	34,366	33,221	4.1%	- 3.3%	2.7%
<u>Middle^g</u>						
Male	12,226	15,042	18,985	4.5%	26.2%	8.1%
Female	11,107	13,469	16,074	4.2%	19.3%	6.7%
Total	23,333	28,511	35,059	4.4%	23.0%	7.4%
<u>South^h</u>						
Male	6,352	7,330	9,015	3.1%	23.0%	6.4%
Female	5,818	6,470	7,574	2.3%	17.1%	4.8%
Total	12,170	13,800	16,589	2.7%	20.2%	5.6%

- a. Dept. of Statistics, 1973, "Social and Economic Survey of the East Jordan Valley", Table 17.
- b. Preliminary results provided by JVA of 1978 census pretest by Dept. of Statistics. Population figures include members of Valley households who were living outside the Valley in other areas of East Bank at census time.
- c. Very preliminary results from 1979 population census. Population figures include members of Valley households who were living outside of East Bank at the time of the census.
- d. March 1973 to November 1978; 4.67 years used to compute % annual increase.
- e. March 1973 to November 1978; 5.67 years used to compute % annual increase.
- f. el Himma, al Addasiyeh, at Baqqureh, al Sakhneh, Khirbat Murshid, North Shuna, al Manshiya, al Aramsheh al Faddiyyin, Waqqas/Qleiat, al Sheikh Muhammad, al Sheikh Hussin Harawiyyeh, Tel al Arabein, Biseileh, al Zemaliyeh, Seil al-Himma, al Mashare. Tobgat-Fahal, al Mirizeh, Wadi el Yabbis, Zeglab Dam, Abu Habil, el Katar, Ispeireh, el Qarn, Karkameh, Hejijeh/Abu Fallah.
- g. Sleikhat, Abu Sido, el Marayeh, Kreimeh, al Faqir, Abu Obideh, al-Balawina, al Khazineh, el Izzabeh, Dirar, al Ruweiha, Abu Zeyad, Abu Zighan, el Sakneh, al Rabe, Hamma Ghor el Arbain, al Diyat, el Majid, el Modraseh, el Shihdat, Deir Alla, el Sawalha, Maudi, al Arda, Maysara/Fannush, al Muthalath al Masri, Damiya, Dharet al Ramel, al Karama.
- h. al Sukneh, South Shuna, Abu Nigereh, Zore el Mahkbareh, Mahand, al Hajajira, al Jofat, Tel el Faqar, el Mintah, el Ipsarat, et Kafrein, Tel al Ramel, Ghor Kabed, Zor el Sudeha, al Rauda, Ghor Nimreen, al Sueidyah, al Rame, al Sweima.

The existing data make it difficult to identify the specific subareas in the Valley that are growing most rapidly. The 1973 census divided the Valley into North, Middle and South subareas. These are different from the subdistrict boundaries used to divide the Valley for the 1978 and 1979 census (see Figure 3-I).

Comparisons of population growth rates for individual villages are also difficult to obtain. The three censuses each give population figures by village. However, a different set of villages is listed in each census. The overlap of villages is about 50%, in other words about half of the villages listed in each census are not listed in the other two censuses. The following quotation from the 1973 survey illustrates the problem:

A common characteristic of population settlements in the Valley is the existence numerous names for the same locality or of its quarters. Sometimes the same name of a farm owne (located near a settlement) is given to the population locality. One of the difficulties in identifying the population localities is the absence of known village or settlement geographical limits.

Seasonal population variations also confuse the population picture in the Jordan Valley. Agricultural activity declines considerably in the Valley during the very hot summer. Harvesting is essentially finished by late June and preparation for the next season doesn't normally begin until mid to late August. Consequently, many farm families move to the highlands during this period. Numerous nonfarm families also leave the Valley during the summer. Unfortunately, reliable data are not available on the percentage of population which leaves during the summer¹. Available information appear to suggest that about one third of the Valley population leaves during July and much of August. However, this fraction appears to have declined in recent years.

Fortunately, seasonal population variations do not seriously affect conclusions drawn from the census data. The summer seasonal population decline does not influence the censuses of 1973, 1978, and 1979 because they were conducted in March, November, and November respectively.

3.1.2 Population Growth and Migration

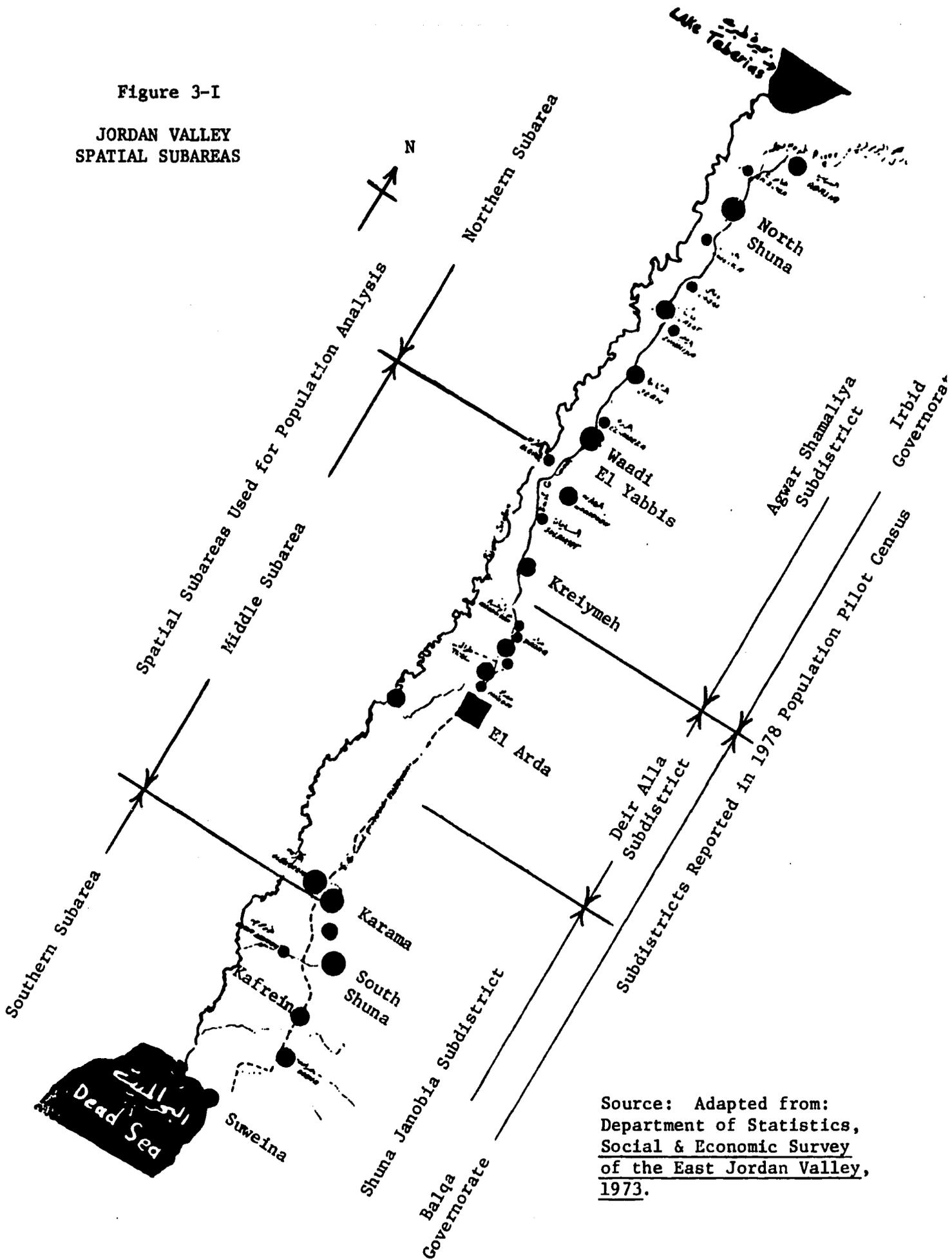
The population of the Jordan Valley grew from 64,012 in 1973 to about 80,773 in 1978/79² (Table 3-2). This represents an average annual growth of about 3.8%. The Valley appears to have experienced considerable immigration, the natural population growth rate is currently estimated at 3.5%³. The available data suggest that a net immigration of over one and a half thousand was experienced between 1973 and 1978/79.

¹Limited information suggests that visits to health clinics may decline by about 40% during the summer.

²This figure represents an average of the 1978 and 1979 census figures. See note a of Table 3-2.

³Department of Statistics, Jordan Fertility Survey 1976, Amman, 1979, p. xi.

Figure 3-1
 JORDAN VALLEY
 SPATIAL SUBAREAS



Source: Adapted from:
 Department of Statistics,
Social & Economic Survey
of the East Jordan Valley,
 1973.

Table 3-2

ADJUSTED PATTERN OF JORDAN VALLEY POPULATION
GROWTH AND MIGRATION 1973 TO 1978/79

Area	Population		Annual % Increase ^b	Expected 78/79 Pop ^c	Estimated Net Migration ^d
	1973	1978/79 ^a			
North ^e	28,509	33,794	2.8%	35,251	-1,457
Middle ^e	23,333	31,785	5.1%	28,850	2,935
South ^e	12,170	15,194	3.7%	15,048	146
Total	64,012	80,773	3.8%	79,149	1,624

- a. 1978/79 Population equals the average of the 1978 and 1979 census figures. These were averaged in an attempt to obtain a better measure of population level late in the decade as well as to minimize differences in definitions used in the 1978 and 1979 censuses.
- b. From March 1973 to May 1979 (mid way between censuses of November 1978 and November 1979) or 6.17 years.
- c. Assumes natural growth rate for 6.17 years at 3.5% per year (Dept. of Statistics Jordan Fertility Survey 1976, Amman, 1979, p. xi).
- d. 1978/79 Population minus Expected 1978/79 Population at natural growth rates.
- e. See Figure III-1 for subareas.

As mentioned in the previous section, currently available data are not well suited for the identification of which Valley areas or villages are growing most rapidly. To investigate this issue, the Planning and Analysis Unit of the JVA identified the locations of all villages reported in either 1973, 1978 or 1979 census. These villages were then allocated to either the north, middle, or south sections utilized in the 1973 census (see footnotes f, g, h, of Table 3-1). This made possible the comparison of population growth rates for these three areas.

Available data (Table 3-1, and 3-2) indicate that most of the recent growth in the Jordan Valley has been concentrated in the middle section between Kreiymeh and Karama. Between 1973 and 1978/79 this area experienced an average annual growth rate of over 5%; almost 3,000 people migrated into the area during the time period.

The southern section grew fairly rapidly and appears to have had net immigration. In contrast, population growth in the north was slow and net outmigration was experienced. This is to be expected, since the north represents a more stable agricultural economy, with an outmigration of young upward mobile and educated sons and daughters.

Data on building characteristics also indicate that population growth has been concentrated in the southern portion of the Valley. In the northern half of the Valley (Irbid Subarea), only 16% of all housing units were constructed after 1973. In contrast, the comparable percentages for Deir Alla and Shuna Janobia Subareas were 31% and 21% respectively (Table 3-3). Furthermore, only 18% of nonresidential building units in Irbid were constructed after 1973 compared to 34% in Deir Alla and 26% in Shuna Janobia. The data suggest that the area around Deir Alla is growing more rapidly than any other area of the Valley.

The Deir Alla area has attracted most migrants because it offers plentiful economic opportunities¹. Expanded irrigation and the adoption of modern intensive agriculture have increased the demand for labor. Wages have increased and, in response, agricultural labor has moved into the area. The expansion of public services has stimulated immigration of public servants. Furthermore, expanded economic activity and the additional incomes of new residents have increased the overall demand for goods and services. This demand has enabled both existing firms to expand and new businesses to be established. This increased economic activity is both partial cause and consequence of migration into this area.

Existing data make it difficult to identify with certainty the urban hierarchy in the Valley. Available information indicate that the largest settlements in the Valley are as follows:

*Migration literature indicates that economic considerations are the primary motive for almost all voluntary migration.

Table 3-3

HOUSING AND BUILDING CHARACTERISTICS IN
1978 BY SUBAREAS¹

	Total	Irbid Subarea	Deir Alla Subarea	Shuna Janobia Subarea
<u>Total Building Units</u>	14,636	7,365	3,099	4,172
Housing Units ²	13,180	7,030	2,647	3,503
Percent	90.1%	95.5%	85.4%	84.0%
Non housing units	1,456	.335	.452	.669
Percent	9.9%	4.5%	14.6%	16.0%
<u>Construction Dates</u>				
Housing				
1976-78	11.3%	8.0%	17.2%	13.4%
1973-75	9.3%	8.2%	14.2%	7.9%
Before 1973	79.4%	83.8%	68.6%	78.7%
Total	100%	100%	100%	100%
Nonhousing Units				
1976-78	15.3%	11.9%	26.3%	9.6%
1973-75	11.3%	6.3%	8.2%	16.0%
Before 1973	73.4%	81.8%	65.5%	74.4%
Total	100%	100%	100%	100%

1. See Figure 3-I for local of subareas.

2. Total building units minus nonhousing units

Source: 1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

<u>Settlement</u>	<u>Subarea</u>	<u>Population 1978/79</u>
North Shuna	North	7,597
Mashare	North	7,266
Kreimeh	Middle	4,756
Waqgas/Qleiat	North	4,094
Wadi el Yabbis	North	3,312
Deir Alla/Sawalha	Middle	3,127
Karama	Middle	3,148
El Rauda	South	3,011
Diyat	Middle	2,726
South Shuna	South	2,595

It is interesting to note that four of the five largest centers are located in the North Subarea. This observation seems consistent with other data which suggests that the North is more developed than other areas of the Valley.

3.1.3 Age-Sex Characteristics of the Population

The 1978 census indicates that 52.6% of the population were male, compared to 52.3% for the total East Bank. This difference is smaller than expected given the large number of foreign male farm workers in the Valley. The percentage of males has increased slightly from 51.8% to 52.6%, between 1973 and 1978. The percentage of males is slightly higher in the middle and south, than it is in the north.

This is not surprising since the former areas are the ones where most foreign male farm workers are employed.

The age-sex pyramid of the Valley is presented in Table 3-4. Males outnumber females in almost all age cohorts. This is particularly true for the working-age cohorts between the ages of 20 and 59. While males 20 to 59 years old constitute 17.7% of the total population, females in this age group comprise only 14.9% of the total population. This difference is expected, given the large contingent of foreign male farm workers. It is also interesting to note that over half of the population is less than 15 years old. This is typical of areas with high rates of natural population increase, including Jordan as a whole.

3.2 EMPLOYMENT

3.2.1 Agricultural Employment

Employment in the Valley is dominated by the agricultural sector which employs about two thirds of all labor in the Valley. However this fraction is declining because nonagricultural employment is growing far more rapidly than agricultural employment. Between 1975 and 1978 paid farm employment grew by an average of only about 4% per year; nonfarm employment grew by about 12% per year between 1973 and 1978. The structure and pattern of agricultural

Table 3-4

JORDAN VALLEY POPULATION DISTRIBUTION BY
AGE AND SEX, 1978

Age	Male	Female
75+	0.9%	0.8%
70-74	0.6%	0.6%
65-69	0.7%	0.6%
60-64	1.0%	1.1%
55-59	0.9%	1.0%
50-54	1.3%	1.1%
45-49	1.8%	1.3%
40-44	2.5%	1.5%
35-39	2.7%	2.2%
30-34	2.5%	2.4%
25-29	2.6%	2.1%
20-24	3.4%	3.2%
15-19	5.0%	4.9%
10-14	7.8%	6.9%
05-09	8.9%	8.0%
00-04	10.0%	9.7%
Total Jordan Valley 1978	52.6%	47.4%
Total East Bank 1979	52.3%	47.7%

employment has changed considerably in recent years. Data on farm employment from the 1975 and 1978 agricultural censuses are presented in Table 3-5. These data should be interpreted with caution because the 1975 census covers both fall and spring seasons while the 1978 census covers only the fall season. Also the 1975 census covers a slightly larger geographic area than the 1978 census¹. Despite these limitations, the data provide some interesting insights.

In general, paid employment appears to be increasing². The increase was most rapid for "temporary" workers, i.e. those who work from one third to two-thirds of the agricultural year. Paid "permanent" employment, those who work more than two-thirds of the agricultural year, also seems to be increasing. However, "occasional" workers, employed less than one third of the agricultural year, appears to be declining. This suggests that farmers are using the same workers for longer periods whereas they used to employ more, very short term, or "occasional" workers. This trend appears to be consistent with a movement to more modern and more efficient agriculture.

In order to assess changes in total labor utilization, "temporary" and "occasional" employment levels were converted to "Permanent Employee Equivalents" or "PE's" (see footnote 2, Table 3-5). Use of paid labor (PE's) was 10,750 in 1975 and 12,180 in 1978. This suggests a growth rate of about 4% per year. These figures mean that Valley farms used enough labor to employ 12,180 persons on a "permanent" basis during the fall season of 1978.

The data suggest that female paid employment is growing faster than male paid employment. This shift to more paid female employment suggests that some females who were previously unpaid workers are now getting paid, perhaps because they no longer work on their family holdings.

Use of unpaid workers (i.e. family members) appears to have declined between the 1975 and 1978 censuses. The general decrease in the use of unpaid labor is consistent with the availability of relatively cheap imported labor. Many farmers have decided to hire foreign workers and free their spouses and children for schooling or other activities. This is both caused by, and a result of, improved quality of life for farm families.

The data indicate that agricultural growth has been concentrated in the southern portion of the Valley (Balqa Governorate). This trend in agricultural employment is consistent with population growth data which indicate rapid growth in the southern portion of the Valley and net out-migration from the north.

¹The 1978 census covers the area from the Jordan River up the Valley walls to the point of Sea Level. The 1975 census covers additional sparsely settled area above Sea Level.

²Because the 1975 census covers a slightly larger geographical area, the growth rates implied in Table 3-5 are probably conservative.

Table 3-5

AGRICULTURAL LABOR UTILIZATION 1975 AND 1978

Governorate	Total				Male				Female			
	1975 ³		1978 ⁴		1975		1978		1975		1978	
	No.	P.E. ²	No.	P.E.	No.	P.E.	No.	P.E.	No.	P.E.	No.	P.E.
<u>Balqa: Paid</u>												
Permanent	416	416	883	883	383	383	826	826	33	33	57	57
Temporary	1,007	671	1,874	1,249	999	666	1,676	1,117	8	5	198	132
Occasional	8,150	2,717	9,533	3,178	6,381	2,127	7,130	2,377	1,769	590	2,403	801
Total Paid		3,804		5,310		3,176		4,320		628		990
<u>Unpaid</u>												
Permanent	6,459	6,459	4,612	4,612	3,848	3,848	3,056	3,056	2,611	2,611	1,556	1,556
Temporary	228	152	625	417	55	37	202	135	173	115	423	282
Occasional	226	75	1,059	353	45	15	358	119	181	60	701	237
Total Unpaid		6,686		5,382		3,900		3,310		2,786		2,075
<u>Irbid: Paid</u>												
Permanent	991	991	770	770	890	890	665	665	101	101	105	105
Temporary	3,239	2,159	6,895	4,597	2,856	1,904	5,817	3,878	383	255	1,078	719
Occasional	11,388	3,796	4,509	1,503	8,866	2,955	3,412	1,137	2,522	841	1,097	366
Total Paid		6,946		6,870		5,749		5,680		1,197		1,190
<u>Unpaid</u>												
Permanent	5,526	5,526	3,368	3,368	3,698	3,698	2,234	2,234	1,828	1,828	1,134	1,134
Temporary	312	208	698	465	102	68	337	225	210	140	361	241
Occasional	270	90	331	110	115	38	152	51	155	52	179	60
Total Unpaid		5,824		3,943		3,804		2,510		2,020		1,435
<u>Valley Total</u>												
Paid		10,750		12,180		8,925		10,000		1,825		2,180
Unpaid		12,510		9,325		7,704		5,820		4,806		3,510

1. Source: Department of Statistics: Agriculture Census for 1975, 1978.

2. P.E. equals Permanent Employee equivalents. Permanent employees work more than 2/3 of agricultural year. Temporary employees work between 1/3 and 2/3 of the agricultural year. Occasional employees work less than 1/3 of agricultural year. It is assumed that: one permanent employee equals one permanent employee equivalent (P.E.), one temporary employee equals .67 P.E.; one occasional employee equals .33 P.E.

3. 1975 census covers both fall and spring seasons.

4. 1978 census covers only the fall season.

The north and south portions of the Valley demonstrate considerable difference in their mixes of paid versus unpaid employment (Table 3-5). In 1975 in the north, 54% of all employment (PE's) was paid compared to only 36% in the south. By 1978, the percentage paid had increased to 64% in the north and 50% in the south. These data suggest that the north is more advanced in terms of farm employment because of its greater reliance on paid labor. The higher relative increase in paid labor in the south, is again attributable to the more stable agricultural system in the north, and the fastest rate of growth in the south.

The use of less unpaid (family) labor in the north indicates that farm families have more time to pursue education, other employment, household work, or leisure activities. This implies that northern farm families, on the average, have a better standard of living than farmers in the southern portion of the Valley.

It is very curious that agricultural growth up to 1978 was concentrated in the south well before recent irrigation infrastructural investments in that area came on line. With completion of the East Ghor Canal Extension and Zarqa Triangle projects and with the additional water available from the heavy 1979/80 rains, the southern parts of Valley (south of Kreyimeh) should experience very rapid future growth. In contrast agricultural growth in the north is far more constrained.

3.2.2 Nonagricultural Employment

As mentioned in the previous section, nonagricultural employment in the Valley has grown very rapidly in recent years. The increase between 1973 and 1979 was about 90%, or about 12% per year.

Unfortunately detailed nonagricultural employment data for women were not available at the time this report was written. Existing data indicate that between 1973 and 1978, female nonagricultural employment has doubled¹. In any case, females hold only about 7% of all permanent nonfarm positions in the Valley. The remaining portion of this section focuses on male non-farm employment, for which better data are available. The role of women in the development of the Valley is discussed in Chapter 4.

Between 1973 and 1978 male nonagricultural employment increased very rapidly in most sectors (Table 3-6). The fastest growing sector was Electricity, Gas and Water which was almost non-existent in 1973. At least three-fold increases were obtained in the Construction² and the Transportation, Storage and Communication sectors³. Rapid growth in these sectors is a direct consequence of the substantial public investment in infrastructure made

¹The 1973 census indicates 213 Valley females were employed outside of agriculture. By 1978 this figure had increased to about 425 (487 employed in all sectors from the 1978 population census pretest minus 162 employed full time in agriculture from the 1978 agricultural census).

²Most of the increase in construction employment is a result of two large Korean construction firms which were working on public projects in the Valley at census time.

³Rapid increase in transportation employment can be partially attributed to AID assisted improvements to the Yarmouk-Dead Sea Road.

Table 3-6

NONAGRICULTURAL EMPLOYMENT OF MALES 1973 AND 1978

Sector	1973	1978	% Increase
Electricity, Gas & Water	37	559	1,411%
Construction	123	470	282%
Wholesale & Retail	440	547	24%
Transportation Storage & Communication	217	670	209%
Community, Social & Personal Services	2,206	3,729	69%
Other	169	96	-43%
Total	3,192	6,071	90%

Sources: 1973, Department of Statistics, "Social and Economic Survey of the East Jordan Valley," Table 11b. Source provided data for all employed males. Data were reduced by 2.1%, because 2.1% of employed males in 1973 were below age 15.

1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics. Source provided data for married Jordanian males over age 15. Data were increased by 46% because there 46% more males over age 15 than married Jordanian males.

during this period. The rate of growth of these sectors will undoubtedly decline in future years to a level roughly comparable to income growth or about 10% to 20% per year.

Nonagricultural male employment was fairly well distributed in the Valley except for employment in Electricity, Gas & Water which was concentrated in Deir Alla Subdistrict (Table 3-7). Irbid subarea in the north had 777 male nonagricultural employees per 10,000 population whereas Deir Alla Subdistrict had 587 and South Shuna Subdistrict had 643. This suggests that a wider variety of goods and services were available in the northern parts of the Valley.

3.2.3 Employment of Non-Jordanian

Considerable attention has been focused on the employment of non-Jordanians, especially Egyptian farm workers. Unfortunately, accurate data are not available on this relatively controversial issue. The population census pretest identified 2,275 non-Jordanians in the Valley in November, 1978 (Table 3-8). However, most people feel this figure is on the low side, especially since the census pretest recorded only 628 Egyptians in the Valley.

According to the census, 90% of non-Jordanians in the Valley were male and only 10% were under age 14. The census also indicates that 94% of the 1,895 non-Jordanian males in the Valley over age, 15 were working. These percentages seem realistic.

3.3 INCOME DISTRIBUTION

3.3.1 Analysis

Detailed data on income distribution in the Jordan Valley are not available. The 1973 and 1978 censuses do not contain data which pertain to income levels. This section attempts to analyze income distribution in the Valley using rather sketchy information. The reader should realize that this section is mostly based on the informed judgment and therefore should be interpreted with caution.

For the purposes of this section, employment can be divided into six basic types:

1. Non-Jordanian farm workers
2. Jordanian farm workers
3. Tenants (primarily Jordanian)
4. Land owning farmers
5. Public Servants (teachers, drivers, laborers, etc.), and comparably paid private sector non-agricultural employees.
6. Own-account non-agriculture workers (includes private sector employees).

Table 3-7

DISTRIBUTION OF NONAGRICULTURAL MALE EMPLOYMENT
BY VALLEY SUBAREA¹, 1978

Sector	Irbid	Deir Alla	South Shuna	Total
Electricity, Gas & Water	273 (7.5%)	264 (20.4%)	22 (1.9%)	559 (9.2%)
Constructure	323 (9.0%)	63 (4.9%)	84 (7.2%)	470 (7.7%)
Wholesale & Retail	315 (8.7%)	110 (8.5%)	122 (10.4%)	547 (9.0%)
Transportation, Storage & Communication	384	146	140	670
Community, Social & Personal Services	2,260 (62.7%)	702 (54.2%)	767 (65.5%)	3,729 (61.5%)
Other	51	10	35	96
Total	3,606 (100%)	1,295 (100%)	1,170 (100%)	6,071 (100%)

1. Figure 3-I for delineation of subareas.

Source: (Same as Table 3-2)

Table 3-8

**JORDAN VALLEY
NON-JORDANIAN POPULATION
1978**

	Total	Irbid Governorate	Balqa Governorate
Total Population	2,275	817	1,458
Males	2,043	762	1,281
Females	232	55	177
% Female	10%	7%	12%
Persons under age 14	10%	7%	12%
Egyptians	628	119	429
% of all Non-Jordanians	28%	24%	29%
% Female	6%	6%	6%
Other Arab	111	63	48
% of all Non-Jordanians	5%	8%	3%
% Female	41%	49%	29%
Pakistanis	324	7	317
% of all Non-Jordanians	14%	1%	22%
% Female	40%	29%	41%
Indians	289	152	137
% of all Non-Jordanians	13%	19%	9%
% Female	0%	0%	1%
S. Koreans	851	370	481
% of all Non-Jordanians	37%	45%	33%
% Female	0%	0%	0%
Other	72	26	46
% of all Non-Jordanians	3%	3%	3%
% Female	14%	31%	13%

Source: 1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

1. Non-Jordanian Farm Workers

These workers, who numbered in excess of 2,000 in 1979 are the poorest residents of the Valley. They earn between JD 50 to JD 55 (\$165-180) per month or JD 450 to JD 550 (\$1,500-1,800) per year. These workers tend to come to the Valley without their families; however, we can assume they support families in their home countries. Assuming these families have about 4.2 non-working members for every worker, the per capita income is between JD 90 and JD 100 (\$300-340) per year. This is extreme poverty in Jordan where average annual per capita income is about JD 200 (\$680). However, most of these workers come from Egypt where annual per capita income is only about JD 75 (\$250). Even assuming these unskilled agricultural workers must incur costs of about JD 100 (\$340) per year traveling to and from Egypt, they have higher incomes than most of their countrymen. Though Egyptian and other foreign farm workers are poor by Jordanian standards, they are not part of the Jordanian poor and do pretty well compared to people in their home country.

Non-Jordanian workers voluntarily migrate to the Valley in search of jobs. This suggests that the Valley provides them with better opportunities than they can find at home. Therefore, these migrant workers benefit from the expansion of agriculture in the Valley. They should be counted as beneficiaries of irrigation and other agricultural projects in the Jordan Valley.

2. Jordanian Farm Laborers

With the rapid influx of foreign farm workers, the intensity of the use of Jordanian labor on farms has declined. It is very hard to estimate the number of Jordanian farm workers. Our estimate is that there were between 1,000 and 1,200 in 1978. This number may have declined to between 600 and 800 by 1980 due to the increase in use of foreign farm laborers. This does not, however, imply increasing unemployment in Jordan, since the displaced Jordanian labor has, in all probability, migrated to the major cities or to the neighboring labor importing countries. In either cases, their earnings can be expected to have improved.

Jordanian farm workers earn a farm income of about JD 75 to JD 90 (\$250-300) per month, or about JD 1,000 (\$3,400) per year. Assuming 4.2 dependents per worker, this suggests an annual per capita farm income of about JD 180 to JD 200 (\$600-680). Our very rough guesstimate is that about 25% have per capita income of JD 150 (\$500) or less. A family with seven members and an income of JD 1,000 (\$3,400) would have a per capita income of JD 143 (\$500) per year. These estimates do not include financial assistance and remittances from other family members, who may be working outside the Valley.

Though Jordanian farm workers and their families are poor by Jordanian standards, the number of such workers in the Valley is declining. It is assumed that Jordanian farm laborers are moving into sharecropping or perhaps non-agricultural employment.

3. Sharecroppers

We estimate that there were about 3,800 sharecroppers or renters working the Valley in 1978. There are very wide variations in sharecroppers' annual income. Assuming the typical sharecropper works about 25 dunums and splits the net return of JD 50 to JD 100 (\$170-340) per dunum with the owner on a 50-50 basis, he earns about JD 1,200 (\$4,100) per year. Each sharecropper's income supports about 5.2 persons on the average; thus resulting in a per capita income of JD 231 (\$800) per year. This places sharecroppers slightly below the national average of JD 250 to JD 350 (\$850-1,200) per year.

Of course, some sharecroppers do less well than others because they work smaller holdings and/or use more traditional practices. A five person sharecropper family working 15 dunums and using traditional practices (average net return of JD 60 per dunum), would have a per capita income of only JD 90 (\$300) per year. Our rough estimate is that 20% of sharecropper families have per capita incomes of less than JD 150 (\$500) per year.

4. Land Owning Farmers

There were about 2,100 land owning farmers in the Valley in 1978. Though there is an extremely broad range of farm size, technology and income levels, by making a few reasonable assumptions we can estimate average income for land owning farmers. Assuming a median farm size of 40 dunums and average net return (after expenses) of JD 40 to JD 80 (\$140-280) per year. This implies a per capita annual income of JD 462 (\$1,600) which is considerably higher than the national average.

Some farmers have extremely high incomes while other have little or no income, especially in bad years. However, in general, Valley land owning farmers do quite well. We estimate that about 15% of land owning farmers have per capita incomes of less than JD 150 (\$500) per year. This would be the income earned in an eight person farm family working 20 dunums with an average return to JD 60 per dunum.

5. Public Servants and Private Sector Nonagricultural Employees

There were about 6,400 nonagricultural workers in the Valley in 1978 and about 700 of these were own-account workers. This implies that there were about 5,700 public and private sector nonagricultural employees. Most public employees such as teachers, drivers and laborers, and low paid private sector employees earn about JD 85 (\$290) a month or approximately JD 1,020 (\$3,500) per year. Assuming one salary supports about 5.2 people; the per capita income is about JD 196 (\$670) per year. This is a relatively low income. By Jordanian standards, most public employees and comparably paid private sector employees are considered poor. We estimate that about 20% of these employees have per capita incomes of less than JD 150 (\$500) per year. A seven person family living on a JD 1,020 income represents a JD 146 (\$500) per capita income level.

6. Own-Account Nonagricultural Workers

The JVA Village Index Survey has identified about 600 private enterprises in the Valley in 1980. We estimate that there were about 700

own-account nonfarm workers in 1978. These workers have a wide variation in income. We estimate that their median income is about JD 2,400 (\$8,000) per year or about JD 462 (\$1,600) per capita. Only about 10% of this group are expected have per capita incomes of less than JD 150 (\$500) per year.

3.3.2 Overview

The results of this rather crude analysis of the Jordan Valley income distribution are presented in Table 3-9. The analysis must be interpreted with extreme caution because many of the data are rough and the methodology adopted, though rational, is rather simplistic. The poverty income line of JD 150 (\$500) per capita is a judgmental estimate, which is in line with what other studies have suggested.

The Table indicates that, exclusive of foreign farm workers, about 21% of the Valley population have per capita incomes of less than the JD 150 (\$500) poverty line. According to the Table, about 40% of those living in poverty are families of public and private sector employees. About one-third are families of sharecroppers and the remainder are mostly families of farm owners or farm workers.

3.4 PROVISION OF PUBLIC SERVICES

3.4.1 Introduction

Both past growth and expected future growth in the Valley provide insights into the future demand for public services and housing. The demand for public services can be expected to increase most rapidly in those areas which have experienced greatest population growth in the past. This being the case, planners should anticipate this growth and locate social projects to best meet existing and expected future demand.

3.4.2 Housing

The Jordan Valley Authority with assistance from AID and other donors is selling 1888 new public housing units and providing 300 rental units for government employees. The locations of these units are shown in Table 3-10.

In general, the new public housing units appear to be relatively well located with respect to present and future population. Public housing units are provided at an average rate of 234 units per 10,000 population (or about 146 units per 1,000 households). In the Middle Subarea, new public housing will be sold at a rate of 264 units per 10,000 population; this rate is higher than the rate in other subareas (Table 3-11). It is appropriate that the rate of public housing provision is greatest in the middle subarea because its population is growing faster than any other area.

The rate of housing provision is about equal in the north and south subareas. It is slightly higher in the north which is not consistent with the fact that population is growing more rapidly in the south subarea. In addition, available information indicates that, in general, housing conditions are worse in the south; this suggests that housing need is greatest

Table 3-9

JORDAN VALLEY 1978 - ESTIMATED INCOME AND POVERTY LEVELS
(All Monetary Values in Jordanian Dinars)

	Foreign Farm Workers	Jordanian Farm Workers	Tenants	Land Owing Farmers	Public Private Employees	Own- Account Non Farm	Total
1. Number of Workers	5,175 ^a	1,100 ^e	3,800 ^b	2,100 ^c	5,700 ^d	700 ^f	18,575 ^g
2. Annual Worker Income Range	450-550 ^e	900-1,100 ^e	100-5,000 ^h	200-up ⁱ	900-3,000 ^e	300-up ^e	
3. Annual Worker Median Income	500 ^e	1,000 ^e	1,200 ^e	2,400 ⁱ	1,020 ^e	2,400 ^e	
4. Median Per Capita Income ^j	-	192	231	462	196	462	
5. Total Persons ^j	7,020 ^l	5,720	19,760	10,920	28,080	5,200	76,700 ^k
6. % Persons with less than J. D. 150 per capita	-	30% ^e	25% ^e	15% ^e	20% ^e	10% ^e	21% ⁿ
7. Number of People (excluding foreign farm workers) with per capita incomes less than J.D. 150m	-	1,716	4,940	1,638	5,616	520	14,430

NOTES: a. Obtained by subtraction from other categories.

b. Estimated from the fact that in 1978 about 3,000 farm units were primarily rented either for cash or on share basis. Assumes some units worked by more than one sharecropper.

c. Based on the fact that in 1978 about 2,270 holdings were primarily operated by owners. Assumes some owners have more than one holding.

d. From note g below, about 6,400 nonagricultural workers minus estimated 700 own account nonfarm workers.

e. Estimated.

f. Estimated from JVA Village Index which identifies about 600 private enterprises.

g. Agricultural workers (permanent equivalent): about 10,000 males and about 2,180 females (from Table 3-5). Nonagricultural workers: about 6,070 males (from Table 3-6) and 325 females (487 employed in all sectors from the 1978 population census pretest minus 162 permanent paid female agricultural workers from 1978 agricultural census).

h. Assumes net return of JD 60 to 100 per year per dunum, average of 25 dunums per holding and 50% of net return goes to landowner.

i. Assumes net return of JD 40 to 80 per year per dunum and average of 40 dunums per holding.

j. Assumes 5.2 persons per full time permanent worker.

k. From Table 3-1.

l. Obtained by subtraction from other categories, indicates: (1) some part time employment and temporary unemployment among foreign farm workers, as well as (2) some dependents.

m. Line 5 multiplied by line 6.

n. $14,434 \div (76,700 - 7,020) = 21\%$.

Table 3-10

NUMBER AND LOCATION OF NEW HOUSING UNITS

I. <u>Government Housing</u>		
North:	North Shuna	80
	Wadi el Yabis	<u>55</u>
	Subtotal	(135)
Middle:	Eddbab	70
	El Arda	<u>20</u>
	Subtotal	(90)
South:	South Shuna	<u>75</u>
Total		300
II. <u>Public Housing</u>		
North:	North Shuna	198
	Manshiya	112
	Waqqas	100
	Tel El Arbein	144
	Mashare	86
	Wadi El Yabis	<u>100</u>
	Subtotal	(740)
Middle:	El Arda	91
	Muadi	100
	Ruweiha	59
	Dahrat Er Romel	145
	Kreiymeh	200
	Balawneh	50
	Karameh	143
	Damiya	<u>50</u>
	Subtotal	(838)
South:	South Shuna	160
	Kafrein	100
	Rauda	<u>50</u>
	Subtotal	(310)
Total Public Housing Units		1,888

Table 3-11

DISTRIBUTION OF PROJECT HOUSING BY SUBAREAS

	Total	Subarea		South
		North	Middle	
Population 1978/79	80,773	33,794	31,785	15,194
Annual % increase since 1973	3.8%	2.8%	5.1%	3.7%
<u>Project Activities</u>				
Housing				
Public Units	1,888	740	838	310
per 10,000 pop	234	219	264	204
Govt' Units	300	135	90	75
per 10,000 pop	37	40	28	49

in that part of the Valley. Greater population growth and housing need in the South coupled with a lower rate of housing provision appear to suggest that the demand for public units in the South might be higher than in the North. On the other hand, purchasing power appears to be slightly higher in the North, with an expectation of a greater number of qualified buyers and perhaps more rapid sales.

In conclusion, available data indicate that the 1,888 public housing units have been relatively well located in response to future housing demand. Additional insights into the effectiveness of this program can be obtained from an analysis of the applications for purchasing these houses. An analysis of such applications is presented in Chapter 4 of this report.

The 300 rental units for government employees have been allocated to a variety of governmental agencies which will rent the houses to their employees. Though about 20% of these units have already been occupied, rental rates have not been established yet. Each separate agency will determine its own rental rates and procedures for allocating houses to its employees.

On average, about 37 housing units for government employees are being provided per 10,000 population. The rate is highest in the South at 49 per 10,000 population and lowest in the Middle Subarea, 28 per 10,000 population (Table 3-11). It is difficult to assess the appropriateness of the spatial allocation of housing for government workers. The demand for such housing depends on the distribution of government employment which tends to be related to the demand for public services. Another factor is the availability of other housing alternatives. While provision of government employee housing is lowest in the Middle Subarea, the provision of public housing is greatest in this area. Government employees are eligible to purchase public housing. Therefore, the high rate of public housing provision in the Middle Subarea tends to balance the low rate of provision of government employee housing. By the same token, rates of provision of public and government employee housing tend to balance each other in the South Subarea as well. It thus seems that the spatial allocation of housing for government employees is appropriate.

3.4.3 Health Services

Provision of health services has increased considerably in the last five or six years. In 1974/75 there were 9 health clinics in the Valley. By 1980, 22 Valley settlements had health clinics. In addition to growth in the number of clinics, the size and variety of services available has increased as well.

Under the Village Development I project, ten new health centers have been constructed; half of these were built in villages which were previously without health services¹. The other five centers will replace small, older clinics which were inadequate for present needs². Under the Village Development III project, three new clinics will be built to replace three old clinics³.

¹Kereimeh, Dirar, Waqqas, Rauda, and Damiya.

²N. Shuna, Mashare, Yabis, South Shuna, Mauddi.

³Sweima, El Manshiya, Karama.

The distribution of new and existing health clinics in the Jordan Valley appears relatively uneven. Only 1.4 new clinics per 10,000 population are being provided in the North Subarea compared to 1.9 in the other areas (Table 3-12). Combining new and existing clinics, there are only 3.2 per 10,000 population in the North compared to 5.0 in the other areas. These figures suggest that the North has lower access to health services. This seems inconsistent with the fact that other variables, such as literacy levels and employment data, indicate that the quality of life is higher in the North. The settlement pattern provides one explanation for the relative lack of health centers in the North. The population in the North is concentrated in relatively large settlements. Four of the five largest towns in the Valley are in the North, including the two largest, North Shuna and Mashare. Due to this concentration, the population can be served by a fewer number of larger clinics. Two type "A" clinics were constructed in the North and no type "C" clinics. This focus on larger clinics is appropriate for the settlement pattern in that area. The distribution of health clinics thus also appears to be appropriate, given the size and distribution of the population in the three subareas of the Valley.

3.4.4 Schools

Enrollments in the Jordan Valley have increased rapidly since 1973 and the demand for education is expected to continue to increase in the years ahead. Provision of quality education, including suitable buildings, is an important development priority in the Valley.

Total school enrollments increased by about 61% between 1972/73 and 1978/79 (Table 3-13). For comparison, the population grew by about 28% during this same period. The increase was far higher for females (77%) than for males (52%). Secondary school enrollments increased by 119% (181% for females and 103% for males). Increases for preparatory schools (65%) and elementary schools (53%) were lower, but still very impressive. In short, dramatic increases in enrollments were obtained between 1972/73 and 1978/79. These increases are expected to continue as more people move into the Valley and as the proportion of school-age children enrolled continues to rise, though more slowly as saturation levels are approached.

Preliminary data suggest that school enrollment increased very rapidly between the 1978/79 and 1979/80 school years. Available data suggest an increase of about 20% to 25% during the last academic year¹. A sizeable portion of this increase can be attributed to the new schools constructed under the Village Development I Project.

The proportion of school age children actually enrolled in school increased rapidly during the mid 1970s. Between 1973 and 1978, enrollment of males aged 6 to 14 increased from 78% to 87%; for females the increase was from 50% to 65%. Table 3-14, from which these percentages were calculated,

¹The size of this increase should be cautiously interpreted because different, and possibly inconsistent, data sources were used to calculate it.

Table 3-12

DISTRIBUTION OF NEW AND EXISTING HEALTH CLINICS
IN THE JORDAN VALLEY

	Total Valley	Subarea		
		North	Middle	South
1978/79 Population	80,773	33,794	31,785	15,755
Annual % increase since 1973	3.8%	2.8%	5.1%	4.0%
<u>Clinics</u>				
<u>New</u>				
VD I, Type A	3	2	0	1
Type B	4	2	1	1
Type C	3	0	3	0
VD II, Type A	1	0	1	0
Type B	3	1	1	1
Total New Clinics	13	5	6	3
Per 10,000 Population	1.6	1.5	1.9	1.9
Existing Clinics ^a Continuing Service	20	5	10	5
Total Clinics	34	11	16	8
Per 10,000 Population	4.2	3.3	5.0	5.0

a. From JVA Village Index; includes private clinics, see Appendix IV.

Table 3-13

TOTAL STUDENTS IN VALLEY SCHOOLS¹
1973 - 1978

Level \ Sex	Male	Female	Total
Elementary	7,681 5,272 47%	5,574 3,369 65%	13,255 8,641 53%
Preparatory	2,701 1,800 50%	1,369 664 109%	4,070 2,464 65%
Secondary	1,488 734 103%	532 189 181%	2,020 923 119%
Total	11,870 7,806 52%	7,475 4,222 77%	19,345 12,028 61%

1. The top number in each box indicates the number of students enrolled in the Valley during the academic year 1978-79. The middle number indicates the number enrolled in 1972-73. The third number represents the percentage increase during that period. Figures cover enrollments in both MOE and UNRWA Schools. All figures are derived from the 1973 and 1978 Socio-Economic Censuses of the Jordan Valley.

gives enrollments by age groups for males and females in both 1973 and 1978. In general, female enrollments increased more rapidly than male enrollments. Also, enrollments for the 6 to 9 age category increased faster than those for other age categories. Table 3-13 and 3-14 provide quantitative evidence of the rapidly improving school situation in the Valley.

School enrollments in other parts of the East Bank also increased rapidly between 1972/73 and 1978/79. Tables 3-15 and 3-16 compare Valley enrollments per 10,000 population with those for other parts of the East Bank. The Tables indicate, for example, that Valley enrollments for males in elementary school went from 82% of the total East Bank average in 1972/73 to 100% in 1978/79. The Tables show that Valley enrollments have: 1) improved, compared to total East Bank, for elementary schools; 2) remained about the same for preparatory schools; and 3) declined for secondary schools. This last conclusion is attributed to the very impressive leap in secondary education, nationwide, which was not matched in the Valley. It is also attributable to the fact that no secondary school construction was included in the AID sponsored Village development projects, which were limited to the 9-year compulsory cycle.

School enrollments in the Northern part of the Valley are higher than those in south. This finding and the results from the employment analysis earlier in this chapter indicate that in general, the north is better off than the south. North-south differences in enrollments tend to be greater for females (Table 3-17). For example, north-south differences in enrollments for females aged 6 to 9 is 17% (77 minus 60); while that for males is only 6% (87 minus 81). The facts that: 1) the proportion enrolled is lower in south (therefore has more room for improvement); and 2) the population in the south is growing more rapidly, suggest that the number of pupils (and thus the demand for school facilities and teachers) will increase far more rapidly in the south than in the north. This trend provides some guidelines for the future provision of school facilities.

School facilities should be located in order to meet both existing and anticipated future demand. Construction of school facilities is a very important components of the Jordan Valley development effort. A total of 57 new schools with 567 classrooms are being provided. In general, these new schools are being well received by pupils, teachers, and the communities in general. This is discussed more fully in Chapter 4.

The spatial allocation of new schools was analyzed carefully during the design of the Village Development projects. The criteria for this allocation involved an assessment of existing facilities and growth trends in the enrollments of individual schools. While this allocation did not have the benefit of the recently available data from the 1978 and 1979 censuses, these data will be used in this section in order to provide a quick assessment of the spatial allocation of classrooms.

Each of the three major areas received a relatively large number of classrooms (Table 3-18). The spatial distribution on a per capita basis appears somewhat uneven. The South Subarea received 86 new classrooms

Table 3-14

JORDAN VALLEY SCHOOL ENROLLMENTS¹ BY AGE AND SEX
1973 and 1978

Age	Date	Total Persons	Persons in School	Per Cent in School	Increase 1976-1978
<u>Males</u>					
6-9	1973	4,474	3,165	71%	14%
	1978	5,278	4,485	85%	
10-14	1973	4,087	3,511	86%	2%
	1978	5,775	5,082	88%	
15-19	1973	2,688	1,219	45%	14%
	1978	3,763	2,209	59%	
6-19	1973	11,249	7,895	70%	9%
	1978	14,816	11,776	79%	
<u>Females</u>					
6-9	1973	4,185	2,228	53%	18%
	1978	4,904	3,465	71%	
10-14	1973	3,636	1,703	47%	12%
	1978	5,268	3,105	59%	
15-19	1973	2,644	303	11%	13%
	1978	3,709	886	24%	
6-19	1973	10,465	4,234	40%	14%
	1978	13,881	7,445	54%	

1. 1973 data are for all Valley residents while 1978 data are for Jordanian Valley residents.

Sources: 1973, Department of Statistics, Social and Economic Survey of the East Jordan Valley, pp. 128.

1978, Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

Table 3-15

NUMBER OF STUDENTS PER 10,000 POPULATION
NATIONAL AVERAGE AND THE JORDAN VALLEY¹
1972 and 1973

Sex Level	Male	Female	Total
Elementary	991	815	1,806
	811	518	1,329
	82%	64%	74%
Preparatory	294	197	491
	277	102	379
	94%	52%	77%
Secondary	115	67	182
	113	29	142
	98%	43%	78%
Total	1,400	1,079	2,479
	1,201	650	1,850
	86%	60%	75%

1. The top number in each box represents the national average, based on a total population of 1,750,000. The middle number indicates the average for the Jordan Valley based on a Population of 65,000. The lower number indicates the ratio of Valley to National averages. Figures include enrollments in both MOE and UNRWA Schools. All data are synthesized from the Statistical Yearbook of the Jordanian Ministry of Education, and the 1973 Socio-Economic Census of the Jordan Valley.

Table 3-16

NUMBER OF STUDENTS PER 10,000 POPULATION
 NATIONAL AVERAGE AND THE JORDAN VALLEY¹
 1978 and 1979

Level \ Sex	Sex		Total
	Male	Female	
Elementary	1,012	890	1,902
	1,011	733	1,744
	100%	82%	92%
Preparatory	394	333	727
	355	180	535
	90%	54%	74%
Secondary	248	190	438
	196	70	266
	79%	37%	61%
Total	1,562	1,413	3,067
	1,562	984	2,546
	94%	70%	83%

1. The top number in each box represents the national average, based on a total population of 2,100,000. The middle numbers indicates the average for the Jordan Valley based on a Population of 76,000. The lower number indicates the ratio of Valley to National averages. Figures include enrollments in both MOE and UNRWA schools, as well as Valley residents enrolled elsewhere in Jordan.

Source: Socio-Economic Census of the Jordan Valley, conducted in November, 1978.

Table 3-17
SCHOOL ENROLLMENT OF SUBAREA¹ 1978

	Total Persons	Total in School	In Element- tary	In Prepa- ratory	In Secon- dary	% in School
<u>Agwar Shamaliya</u>						
Age 6-9 Male	3,090	2,678	2,678	-	-	87%
Female	2,848	2,202	2,202	-	-	77%
10-14 Male	3,439	3,096	1,867	1,222	7	90%
Female	3,180	2,040	1,374	663	3	64%
15-19 Male	2,278	1,385	-	487	898	60%
Female	2,213	583	-	245	338	26%
<u>Deir Alla</u>						
Age 6-9 Male	1,096	919	919	-	-	84%
Female	1,050	656	656	-	-	62%
10-14 Male	1,156	1,004	641	355	8	87%
Female	1,021	552	383	165	4	54%
15-19 Male	711	438	-	169	269	62%
Female	673	154	-	65	89	23%
<u>Shuna Janobia</u>						
Age 6-9 Male	1,092	888	888	-	-	81%
Female	1,006	607	607	-	-	60%
10-14 Male	1,180	982	688	313	2	83%
Female	1,067	513	352	159	2	48%
15-19 Male	774	386	-	155	231	50%
Female	823	149	-	72	77	18%

1. See Figure 3-I for location of subareas.

Source: 1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

Table 3-18

DISTRIBUTION OF NEW AND EXISTING CLASSROOMS BY AREA

	Total Valley	Sunarea		
		North	Middle	South
1978-79 Population	80,773	33,794	31,785	15,755
Annual % increase since 1973	3.8%	2.8%	5.1%	4.0%
<u>Classrooms</u> ¹				
<u>New</u> ¹ VD I	278	155	91	32
VD II	233	56	114	63
VD III	56	0	16	40
Total New	567	211	221	135
Per 10,000 Population	70	62	70	86
Existing Good	84	21	49	14
UNRWA ²	177	103	52	22
Total Classrooms	828	335	322	171
Per 10,000 Population	103	99	101	109

1. School Locations from Village Development III Project Paper and USAID/CD summary sheets.
2. Assumes that there is one classroom per 35 students.

per 10,000 population compared to only 61 per 10,000 population in the North. Of course, other factors besides population distribution must be considered in locating new school facilities. The location of existing facilities must be considered.

There were apparently 84 existing non-UNRWA classrooms in the Valley project area which were in good condition. Most of these were located in the Middle Subarea. In addition, about 177 UNRWA classrooms are being used in the Valley. The UNRWA classrooms are concentrated in the North Subarea.

An estimate of the supply of classrooms in each area at the end of the planning period can be obtained by adding the new, existing non-UNRWA, and UNRWA classrooms. An estimated 828 classrooms will be available upon completion of school construction plan. This represents about 103 classrooms per 10,000 population (using the 1978/79 census population figure). The rate of classroom provision varies from 99 in the North to 109 in the South. This variation is consistent with the characteristics of the Valley. Enrollment ratios¹ are low and expected to increase in the South, where the population is growing rapidly. In contrast, enrollment ratios are already fairly high in the North and population is not growing so fast. Therefore, demand for classrooms in the North is expected to increase more slowly than in the Middle or South Subareas.

3.4.5 Other Public Services

Public services in rural areas, such as the Jordan Valley, are generally concentrated in service centers. Larger centers are fewer in number and provide a wider range of services. The more numerous smaller centers provide only a few of the most basic services. Because they are located in many centers, the most basic services tend to be relatively accessible to most people. On the other hand, the higher level services, which are only available in a few large centers, are less accessible. People living far from a large center must travel relatively long distances to obtain such services.

The Jordan Valley contains a system of villages which provides a variety of public services. Most villages contain boys' and girls' elementary schools as well as a mosque. These basic services are within easy access of most Valley residents. Health clinics are only available in about 20 of the larger villages in the Valley, thus they are less accessible than elementary schools. Secondary school education is available in only 5 or 6 of the largest centers; therefore they tend to be even less accessible, with a resulting lag in the levels of secondary school enrollments, as discussed above.

There are considerable data on the provision of public services in the Jordan Valley. CARE conducted a survey of the services available in 1974/75, while the JVA's Planning and Analysis Unit conducted a similar survey in 1980². The data from these two surveys are in Table 3-19. The Table shows

¹Ratio of actual school enrollment to total school age population.

²The complete results of this surveys are included in Appendix IV.

what services were available in major Valley villages in both 1974/75 and in 1980.

The provision of services in the Valley has increased dramatically during the last five or six year. In 1974/75 there were only four secondary schools, one for girls and three for boys. By 1980, twelve secondary schools were operating, five for girls and seven for boys. The number of villages with girls' preparatory schools increased from 8 to 24. For boys, the number went from 12 to 22. Construction of new preparatory schools, with AID assistance, has contributed directly to improve access to both elementary and preparatory education.

Rapid improvements were made also in the provision of health services. In 1974/75, health clinics were available in only nine villages. By 1980, 22 different villages had health clinics; thus access to basic health services has improved dramatically. AID directly contributed to this improvement by supporting the construction of ten new health clinics under the Village Development I Project.

Only Mashare and Karama had improved domestic water supplies in 1974/75. The number of villages with improvement systems increased to 17 by 1980 and is expected to be available in almost all Valley settlements by the mid 1980s. Improvement in domestic water supply could have important impact on the basic health of Valley residents, especially as more residents refrain from the use of polluted Canal water for domestic purposes.

The spatial location of services is usually evaluated in two ways: spatial efficiency and spatial equity. Spatial efficiency is concerned with locating services so as to minimize the average distance people must travel to obtain the services. Spatial equity is concerned with locating services so as to minimize the travel of those persons who live farthest away from the service. Equity considerations result in services being provided in remote and sparsely populated areas. These areas would probably go without services if efficiency were the only criteria used to locate services. A rough analysis of the spatial efficiency and equity of service provision in the Jordan Valley has been undertaken. The results of this analysis are presented in Table 3-19.

The Table indicates that access to girls secondary schools has increased dramatically. Average one-way time needed to travel to a girls secondary school decreased from 68 minutes in 1974/75 to 12 minutes in 1980, assuming travel is by motor vehicle. Obviously if travel is by foot or other means, travel times would be much larger. The maximum time it takes all Valley resident to travel to the nearest girl's school declined from 113 minutes in 1974/75 to 20 minutes in 1980. These gains in access to girls' secondary schools are significant, and, as expected, have partially contributed to the rises in enrollments discussed above.

Access to boy's secondary schools also increased considerably (Table 3-20). In 1980, however, three boys' secondary schools were located quite close together in Balawina, Deir Alla, and Muadi. Spatial efficiency and equity would be improved if one of these were located in either Kreiymeh, Karama, or the El Rauda-El Rama area.

Table 3-19

BASIC SERVICES PROVIDED IN JORDAN VALLEY CENTERS 1974/75 AND 1980

Centers	Basic Services												Type of Council
	Girls Elem. School	Boys Elem. School	Mosque	Postal Service	Girls Prep. School	Boys Prep. School	Health Clinic	Improved Water System	Boys Sec. School	Girls Sec. School	Mother-Child Health Center	Dental Care	
North Shuna	PA	PA	PA	PA	PA	PA	PA-A	+	PA	PA	+	+	MC
South Shuna	PA	PA	PA	PA	PA	PA	PA-A	+	PA	+	PA		MC
Mashare	PA	PA	PA	PA	PA	PA	PA-B		+	+			MC
Dier Alla	PA	PA	PA	PA	+	PA	PA-A	+	+	+	+		MC
Mauddi	PA	PA	PA	PA	PA	PA	PA-C	+	PA				MC
Kereimeh/Obeideh	PA	PA	PA	PA	+	+	+C			+			MC
Karama	PA	PA	PA	PA	PA	PA	+op ¹	ps					Muk
Kirar/Khazimeh	PA	PA	PA	PA	+	PA	+C	+					VC
Waqas-Qaliat	PA	PA	PA	PA	+	+	+B		+				VC
Al Balawneh	+	+	+	+	+	+	+op	ps	+				Muk
Al Rama	PA	PA	+	PA	PA	PA	+C	ps					Muk
El Kafrein	PA	PA	PA	PA	PA	PA	PA-op						VC
Wadi al Yabbis/ al Mirizeh	PA	PA	PA	PA	PA	PA	PA-A						VC
El Manshiya	PA	PA	PA	PA	+	+	PA-op ¹						Muk
Al Diyat/Twal	PA	PA	PA	PA	+	PA	+op						Muk
Al Arda	PA	PA	PA	PA	+	PA							VC
Rauda	+	+	+		+	+	B	ps					Muk
Sweima	PA	PA	PA	PA	+	+	PA-op ¹						Muk
Al Mukheiba al Tahta	PA	PA	PA	PA	+	+	+op						Muk
Damiyeh	PA	PA	PA	PA	+	+	+C	+					Muk
Tell al Arbaein	+		+	PA	+		+op	+					Muk
Al adasiya	PA	PA	PA	PA	+	+							VC
Maisara/Fannush	PA	PA						+					Muk
Al Rabia	PA			+	+		+op	+					Muk
Saknat al Shuna	+	+		PA									Muk
Khazma	+	+	PA		+	+	+op						Muk
Jofat al Kafrein	+	+	+	+				tps					Muk
Al Roweina	+	+	+	+				+					Muk
Dharat el Romel	+	+						tps					Muk
Sleikhat	+	+	+										Muk

NOTES: PA = Previously available in 1974/75

+ = Service added between 1974/75 and 1980

Health Clinics: A = Category A Health Clinic
B = Category B Health Clinic
C = Category C Health Clinic
op = Out Patient Clinic Only

Improved Water System; ps = Partial System, often means that only the schools have a piped water supply.

Type of Council: MC = Municipal Council
VC = Village Council
Muk = Mukhtars only (Unincorporated)

1 = Will be up graded to Type 'C' clinic under Village Development II Project

Sources: 1974/75, CARE Village Index based on CARE survey.
1980, JVA Village Index based on JVA survey.

Table 3-20

PROVISION OF BASIC SERVICES 1974/75 AND 1980 :
SPATIAL EFFICIENCY AND EQUITY

Service	Year	Number of Villages Providing Service	Estimated Distance of Valley Resident to Nearest Location Providing the Service ^a			
			Average Distance		Maximum Distance	
			Distance	Time ^b	Distance	Time
Girls Secondary School	74/75	1	45 km	68 min.	75 km	113 min.
	1980	5	8 km	12 min.	20 km	20 min.
Boys Secondary School	74/75	3	12 km	18 min.	30 km	45 min.
	1980	7	6 km	9 min.	20 km	20 min.
Health Clinic	74/75	9	5 km	8 min.	20 km	30 min.
	1980	22	< 2 km	< 2 min.	15 km	15 min.
Mother Child Health Center	1980	3	12 km	18 min.	30 km	30 min.
Pharmacy	1980	6	7 km	5 min.	20 km	20 min.
Telephone	1980	18	< 2 km	< 2 min.	15 km	15 min.
Postal Service	1980	29	< 2 km	< 2 min.	15 km	15 min.
Agricultural Extension	1980	9	3 km	3 min.	20 km	20 min.
Adult Education	1980	4	10 km	15 min.	50 km	50 min.

a. To assess average distance, villages providing the service were first located on a map. The average distance for residents in each major village group was then estimated. A weighted average of these estimates was used as the average distance Valley residents had to travel to obtain the service. Maximum distance was simply scaled from the map.

b. Time assessed assuming travel by motor vehicle at 40 km/hour in 1974/75 and 60 km/hour in 1980 (due to improvements of Yarmouk-Dead Sea road).

Source: Authors, utilizing data from the JVA Village Index, 1980.
(See Appendix IV)

The thirteen new health clinics which were established in the Valley had a very noticeable impact on accessibility. The average distance Valley residents had to travel to their nearest health clinic declined from about 5 kilometers to less than 2 kilometers. In 1980, the farthest any resident had to travel to a health clinic was about 15 kilometers. Only those living far away from the main road in the relatively isolated area between Karama and Maudi had to travel this far. It is estimated that at least half of Valley residents are presently within about 1.5 kilometers of one of the 22 health clinics.

Table 3-20 provides also information on access in 1980 to several other services. Accessibility to most public services is quite good. Residents of the southern end of the Valley have relatively poor access to adult education. The southern most center providing adult education is Damiya which is about 50 kilometers by road north of Sweima. Consideration should be given to providing adult education in South Shuna or some other center in the south end of the Valley.

3.5 PROVISION OF PRIVATE SERVICES

Private services include a wide variety of activities which are generally provided by private entrepreneurs. Such activities include retail sales, wholesales, personal services, as well as artisan and small scale manufacturing activities. Examples are cafes, all types of stores, laundries, barber shops, petrol sales, carpentry and metal work activities, auto mechanics, taxi services, jitneys, public transit, etc.

Available information suggests that the provision of private services has improved during the 1970's. This is attributed to the attraction of private capital, which is directly or indirectly caused by massive public investments, and to the increased demand for services in the Valley. The number of Valley males employed in Transportation, Storage, and Communication increased from 217 in 1973 to 670 in 1978. These data are indicative of the growth in the provision of private services. It should be noted, however, that many of these workers are probably employed in the public sector as drivers, postal workers, telephone employees, etc. Growth in the wholesale and retail sectors was less dramatic. The number of males employed in these activities grew by 24% between 1973 and 1978 (from 440 to 547), while the population grew by about 20% during this same period. These numbers do not necessarily mean that there was little improvement in the provision of wholesale and retail services. A larger number of females many of them unpaid and working in family stores, may now be employed in these services. In addition, greater capital investment and the availability of electricity may have greatly improved productivity in these two sectors.

Over half of the general retail stores are concentrated in the North Subarea of the Valley. In that area there are 47 general stores per 10,000 population. In contrast, there are only about 27 per 10,000 population in the Middle Subarea. This suggests that at least some of the residents of the Middle Subarea may do their shopping in the North. It is also possible that general retail stores in Middle and South areas are larger. It is not completely surprising that the North has most general stores, since there is evidence of higher disposable incomes in that part of the Valley.

There are almost twice as many fresh food stores (bakeries, butcher and poultry shops and produce shops) per capita in the South as in the rest of the Valley (Table 3-21). There appears to be no obvious explanation for this finding except that such stores exist on a smaller scale in the South, and thus that there are smaller, but more numerous shops in that part of the Valley.

Though restaurants and cafes are relatively equally distributed, transportation services are concentrated in South and Middle Subareas. In the North, which contains about 43% of the Valley population there is only one petrol station, one taxi dispatch, one tire repair shop and five auto/electric repair businesses. Perhaps the fact that North Shuna is north of the point where the Irbid road meets the Yarmouk-Dead Sea Road diminishes its importance as a transportation center.

Skilled services are concentrated in the Middle Subarea. Given the central location, it would not be surprising if carpenters, plumbers, blacksmiths and miscellaneous repair shops in the Deir Alla provided services to the North and South areas of the Valley.

3.6 QUALITY OF LIFE

3.6.1 Measuring Quality of Life

Quality of life is an extremely difficult concept to measure. Often income level is used as a surrogate indicator for quality of life. The appropriateness of income as such a measure has been the focus of numerous arguments. In most cases, however, analysts use whatever relevant data are available, in an order to investigate quality of life.

This section attempts to investigate the quality of life of Jordan Valley residents using available census data. Data from other sources are utilized where appropriate. Existing preliminary data from the 1978 census provide information on literacy, educational attainment, and employment distribution. Though these data do not adequately capture all aspects quality of life, they do provide some useful insights. Discussions throughout other sections of this report, of housing and other basic services, provide additional insights into the changing quality of life in the Valley.

3.6.2 Literacy

Literacy is an important component of quality of life, since literate people are usually better off than those who are illiterate by virtue of the additional opportunities and options which are available to them. Considerable progress was made between 1973 and 1978, with respect to literacy, particularly among women. Literacy for women over age 15 increased from 12% to 25% during that period (Table 3-22). For men, the figure went from 48% to 59%. Though there is still room for considerable improvement; these gains during this short period are significant. Not only did literacy rates increase rapidly, the absolute number of illiterates actually decreased between the 1973 and 1978 censuses (Table 3-22). Since about 85% of the males and 65% of the females aged 6 to 14 are in school, rates of illiteracy are

Table 3-21

DISTRIBUTION OF PRIVATE SECTOR SERVICES
BY VILLAGE GROUP

	Total Valley	Subarea ¹		
		North	Middle	South
Population 1978/79	80,773	33,794	31,785	15,194
<u>General Stores</u>				
Number	291	160	86	45
Per 10,000 Population	36.0	47.3	27.1	29.6
<u>Fresh Food Stores²</u>				
Number	74	29	22	23
Per 10,000 Population	9.2	8.6	6.9	15.1
<u>Restaurants and Cafes</u>				
Number	36	16	12	8
Per 10,000 Population	4.5	4.7	3.8	5.3
<u>Transport Service³</u>				
Number	61	8	35	18
Per 10,000 Population	7.6	2.4	11.5	11.8
<u>Skilled Services⁴</u>				
Number	35	11	21	3
Per 10,000 Population	4.3	3.3	6.6	2.0

1. See Figure III-1 for Subareas.
2. Includes bakeries, butcher and poultry shops, and green groceries.
3. Includes gasoline stations, tire repair and auto/elec. shops, taxi dispatches, and driving schools.
4. Includes shops providing watch, radio and T.V. repair, painters, carpentry, blacksmiths, and photographers.

Table 3-22

**ILLITERACY IN JORDAN VALLEY AMONG
JORDANIANS¹ AGE 15 AND ABOVE**

	Population Age 15		Illiterate		Per Cent Illiterate	
	Male	Female	Male	Female	Male	Female
<u>1973</u>						
Total Valley	16,046	15,162	8,364	13,323	52%	88%
North ²	6,820	6,748	3,376	5,774	50%	86%
Middle ²	6,632	6,033	3,532	5,432	53%	90%
South ²	2,594	2,381	1,465	2,117	56%	89%
<u>1978</u>						
Total Valley	17,318	17,070	7,121	12,877	41%	75%
Irbid ²	10,021	9,949	3,727	7,205	37%	72%
Deir Alla ²	3,554	3,456	1,621	2,759	46%	80%
Shuna Janobia ²	3,743	3,665	1,773	2,913	47%	79%

1. For comparison, assume illiteracy for all Valley residents in 1973 is equal to illiteracy for Jordanian Valley residents.

2. For Spatial Divisions in 1973 (North, Middle, South) and 1978 (Irbid, Deir Alla, South Shuna) see Figure IV-1.

Sources: 1973: Department of Statistics, Social and Economic Survey of the East Jordan Valley, June 1973, pp. 112-115.

1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

expected to continue to fall rapidly in the near future. Illiteracy rates are highest in the south and lowest in the northern part of the Valley. This confirms the many previous findings that the north is probably better off with respect to a variety of quality of life indicators. The data are not suitable for directly assessing declines in illiteracy for different areas of the Valley because different subareas were used for the 1973 and 1978 censuses. However, the data appear to suggest that spatial differences in illiteracy are becoming more pronounced. In 1973, the gap between lowest and highest areas was 6% for males and 3% for females. By 1978, the gap had increased to 10% for males and 7% for females. This finding may indicate that north-south differences in illiteracy may be expanding. This may be attributable to the larger school enrollments and the longer history of widespread education in the North. The primary message in the data, however, is that rapid progress is being made.

3.6.3 Educational Attainment

The level of educational attainment is another indicator of the quality of life in the Jordan Valley. People with higher levels of education are generally more productive and qualify for more skilled and higher paying jobs. They thus tend to receive higher incomes and can afford higher standards of living.

The educational attainment of Valley males over age 15 has increased significantly between 1973 and 1978. The number (and percentage) of males with all types of post-secondary education, including university, increased threefold (Table 3-23). The number with either a full preparatory or full secondary education has doubled. Despite this progress, the percentage of adult males with at least a full preparatory education was only 24% in 1978 (up from 11.7% in 1973). As with literacy, the north is ahead of the south with respect to educational attainment. For males in the north Valley (in Irbid Governorate), 26% had at least a full preparatory education. The comparable figure for the South Shuna subdistrict in the south was 19%.

Women made remarkable progress. Only 1.8% had at least a full preparatory education in 1973. By 1978 this figure had increased to 11.9%: more than a six-fold increase. As with other indicators, women in the south trail those in the north with respect to educational attainment.

3.6.4 Employment Distribution and Service Provision

Employment characteristics provide information on quality of life in two ways. First, employment in some sectors is generally more lucrative than in others. For example, employees in manufacturing or construction tend to earn more than those in agriculture. Therefore, shifts in employment into more lucrative sectors may reveal higher average income levels and thus an improved quality of life. Second, employment distribution provides insights into the type of public and private services that are available. For instance, rapid growth in retail employment may indicate larger sales, more consumption and improved standards of living. Growth in public service employment suggests greater provision of, and better access to, public services.

Table 3-23

HIGHEST EDUCATIONAL ATTAINMENT FOR JORDAN VALLEY RESIDENTS OVER AGE 15

	Total Valley				Spatial Subareas 1978					
	1973		1978		Irbid		Deir Alla		Shuna Janobia	
	No.	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Males										
Less than full preparatory	14,153	88.2%	13,259	76.5%	7,409	73.9%	2,816	79.2%	3,029	80.9%
Full preparatory	1,175	7.3%	2,594	15.0%	1,686	16.8%	445	12.5%	463	12.4%
Full secondary	553	3.4%	896	5.2%	542	5.4%	201	5.6%	153	4.1%
Post secondary	165	1.0%	574	3.3%	389	3.8%	92	2.6%	98	2.6%
Total Males	16,046	100%	17,318	100%	10,021	100%	3,554	100%	3,743	100%
Females										
Less than full preparatory	14,885	98.2%	15,033	88.1%	8,681	87.3%	3,044	88.1%	3,308	90.3%
Full preparatory	204	1.3%	919	5.4%	587	5.9%	169	4.9%	163	4.4%
Full secondary	63	0.4%	896	5.2%	542	5.4%	201	5.8%	153	4.2%
Post secondary	10	0.1%	222	1.3%	139	1.4%	42	1.2%	41	1.1%
Total Females	15,162	100%	17,070	100%	9,949	100%	3,456	100%	3,665	100%

Sources: 1973: Department of Statistics, "Social and Economic Survey of the East Jordan Valley," June 1973, pp. 90, 94 and 96.

1978: Preliminary Results provided by the Jordan Valley Authority from the 1978 census pretest in the Jordan Valley conducted by the Department of Statistics.

Employment in agriculture increased relatively slowly, in comparison to nonagricultural employment. This suggests an improvement in service provision and an expected concomitant improvement in the quality of life. However, many Valley farmers earn more than workers in other sectors; therefore increasing nonagricultural employment does not necessarily imply rising average income levels.

The rapid increases in nonagricultural employment indicated in Table 3-6 indicates a rapid expansion in such services as electricity, water supply, transportation, health care, education and construction. In addition, Table 3-19 and 3-20, indicate dramatic increases in the provision of public services and in people's access to these services. These services, together with the attraction of private capital and the provision of many private services have also contributed to improving the overall quality of life in the Valley. Available employment and service provision data confirms the general conclusion that the quality of life is better in the Northern parts of the Valley. In those parts, the percentage of unpaid farm workers is smaller than it is in the Middle and the South. There are also more nonagricultural workers and stores per capita in the Northern section of the Valley.

4. PARTICIPANTS AND BENEFICIARIES

4.1 PEOPLE AND INSTITUTIONS

4.1.1 Socio-Economic Change¹

The agricultural economy of the East Jordan Valley has undergone marked stages of developmental evolution during the last 30 to 40 years. In the early thirties it was basically a subsistence economy composed of the production of grazing, livestock, wheat and barley. In the early forties two major east-west roads connecting Jordan with Palestine were constructed, at the northern and southern ends of the Valley. These roads: Amman-South Shuneh-Jerusalem and Irbid-North Shuneh-Haifa, influenced the change of the agricultural economy from a subsistence to a cash economy. Two more recent improved roads are the Amman-Damiya-Nablus, running east-west through the central Valley and the Yarmouk-Dead Sea Road, running north-south through the Valley, and constructed with AID funds. During the fifties the construction of the East Ghor Canal Irrigation project was started, to be completed in the early sixties. During the seventies, water resources developments along with the reconstruction of the Yarmouk-Dead Sea Road have greatly influenced the identity of the farming population, land tenure and land use, as well as the organization of credit and marketing. This section addresses the change in the identity of the farming population and changes in the general socio-economic structure of the Valley.

The indigenous nomadic tribes of the Jordan Valley were generally small, sometimes consisting of no more than a few families. Many of their members were the descendants of slaves escaped from larger tribes to the east or from Egypt or Nejd in Saudi Arabia, and show Ethiopian or Sudanese characteristics. Most were tent dwellers, while some were semi-settled, living in mud huts. Their circumstances were described as often worse than those of the refugees in the nearby camps. Those fortunate enough to own livestock followed the seasonal pastoral round, moving into the hills in summer and back to the Valley in winter. By the early fifties some of these nomads had migrated to the Transjordanian Plateau or to the towns. Others who settled in the Valley became charcoal or lime burners and woodcutters, or provided a cheap labor supply for the villages, public works projects, and commercial enterprises.

¹In addition to information gathered in site visits and interviews with Government officials, this section draws heavily on the following sources: George L. Harris, et al., Survey of World Cultures. Jordan: Its People, Its Society, Its Culture; The Hashemite Kingdom of Jordan; the Jordan Valley Commission, Rehabilitation and Development Plan of the Jordan Valley (East Bank) (1973-75). 1972. Arthur D. Little, Inc., Geotechnical Engineers, Inc. and the Institute for Conservation Archaeology, Harvard University, Environmental Assessment for the Proposed Maqarin Dam and Jordan Valley Irrigation System Project. Ch. 8.

Whatever the number of layers in nomadic tribal organization, two in the lineage and the extended family, are always present. They represent the basic social units from which the larger social aggregates are constructed. The hamulah, or lineage, consists of several related extended families, who as a rule trace their descent to a common ancestor. Next to the extended family, the hamulah is the group with which the individual identifies himself most closely and which functions as a unit for both nomadizing and protection from enemies.

The extended family, the nucleus of all Arab tribal organization, typically consists of three generations of parents and children who reckon descent in the male line. Leadership in nomadic tribal society is vested in the heads of successively larger kinship aggregates. Every competent male can count on becoming the head (sheikh) of his own extended family. Generally, among the extended families making up a lineage, one family has the hereditary right to the headship of the lineage and one of the family's senior males -- usually but not always the most senior, depending on such factors as wealth, reputation and ability -- heads the lineage.

It is not always easy to distinguish between a bedouin group which ought to be called a tribe (qabila), and one which is properly a subtribe (ashira). The leadership role, however, provides a general criterion-- which is simply that the tribe is headed by a sheikh who is subordinate to no one, while the sheikh of any subdivision bows to higher leadership.

In the past, the transformation of a nomadic tribe into settled agriculturalists might have taken as long as three hundred years. In the Jordan Valley this process has been telescoped to a period of less than a generation, an acceleration due mainly to the water resource and transportation projects mentioned above.

Village life in Jordan, reaching back into prehistoric times, may well be older in the area than the more spectacular bedouin nomadism; its patterns persist with the nomad when he becomes sedentarized. The typical East Jordan Valley village of the period preceding the changes introduced by the Stage I Projects, was composed of a tightly clustered group of houses and other buildings, surrounded by the field which were worked, but generally not owned, by the inhabitants. The village proper was usually divided into a number of sections (harah), each of which tended to be inhabited by members of the same lineage. Almost universally, the houses consisted of one room for each family of parents and unmarried children and another room for equipment and livestock.

The basic principles of kinship organization which obtain among the nomads are also found in the villages: male descent, paternal residence and authority, the extended family and lineage. Except for recently settled nomads, however, the village, as a local entity, replaces the kinship-based tribe as the largest immediate social unit with which the individual identifies himself.

As more amply compensated work in the towns has drawn individuals away from the Valley, the cohesion of the extended kin group has tended to break down. As more individuals, through choice or force of economic

circumstances, have struck out on their own, the old forms of paternalistic authority have become less compelling and have commanded less respect. The wage-earning husband finds himself more dependent on his own efforts than on the cooperative economic activity of a circle of relatives.

The farm population in the Valley is composed of a mixture of original settlers (pre-1948), Palestinian refugees, immigrants from other parts of the country, and migrants from neighboring Arab and Islamic countries. According to the Rehabilitation and Development Plan of the Jordan Valley (East Bank) 1973-1975, more than half of all farmers came from Palestine, one third were born in the Valley, while the remaining farmers were born elsewhere in Jordan. Palestinians are mostly concentrated in the Southern part of the Valley and form the bulk of its tenant farmers.

Following the conflicts of 1948 and 1967, newcomers from the Israeli-occupied territories transformed the Valley's social and economic geography. The number of settlements in the Ghor increased. This growth was interrupted for a time by the civil war that turned the Ghor into a battleground.

Many of the East Bankers were recently settled nomads for whom agriculture was a new business. By contrast, the newcomers had been skilled farmers for generations, and organized their villages on different principles. In the old Trans-Jordanian villages, all settlers are usually from one tribe, so that everyone in the village is related by blood; tribal solidarity expresses itself through the support of fellow tribesmen in disputes, through friendships within the clan rather than outside it, and most importantly, through endogamous marriage patterns. By comparison, the new villages are formed from a much broader base and tend to have a wider social network. In addition to having differences in outlooks and skills, the newcomers are immigrants in an area where insider/outsider distinctions are quite strong; their preference for living and dealing with other newcomers is typical of most immigrant groups.

These cultural and social differences give individual villages distinct characteristics depending on the origin of their settlers and the degree of importance either group holds in the village. Both groups tend to have large families and close ties to kinsmen, but trying to integrate new settlers in a village of tribal origin that is a social unit is quite a different problem from adding new elements to a village established on a more eclectic basis.

In addition to the two major groups in the Valley, there are also Pakistanis, Egyptians, and Koreans. The Pakistanis are agricultural laborers and sharecroppers. Many came as individuals, but today in the south a number of tent communities are made up of Pakistani families. Because they often do not speak Arabic, are not part of any village, and work for lower wages than Jordanians, local residents do not regard them as equals; also they are generally ignored in terms of social planning. The Egyptians are recruited in Egypt and flown to Jordan to meet seasonal peak labor demands; they show little interest in settling in Jordan, but intend to profit from the relatively high wages in Jordan and then return to their own villages. Koreans are now working on large

construction projects, but are housed in camps and will depart when their contracts end. While presently planned projects are not expected to bring any new ethnic groups to the Valley, a major question about how many Egyptian laborers will continue to come remains to be answered.

The socio-economic structure in the East Jordan Valley is based on land ownership and tenure patterns within the agricultural economy. In striking contrast with the rest of Jordan, sharecropping is the most common type of land tenure. This has led to a highly stratified social system with landlords who operate their own farms at the top, followed by small farmer owners-operators, sharecroppers, Jordanian wage laborers, with foreign wage laborers at the bottom.

Large landowners form the traditional elite of the Valley population. Many benefited from the registration of land in the names of individuals during the British Mandate period, while others invested in land when it was cheap. Exact data are not available on ethnic origin of the landowners, but the most widespread belief among Valley residents is that they are mostly of East Bank origin. Absentee landlords are found predominantly in the north where they make up almost half of the landlord class. They generally have more land than owner operators. Absentee landlords decline in number as one moves south, but the size of holdings grows larger. This reflects the results of JVA's land redistribution conducted in the north. Land was purchased by the government and sold to landless farmers, thus increasing the number of owner-operators and reducing large holdings, but without changing the basic social structure of the region. This occurred in part because many large landowners, not foreseeing how the East Ghor Main Canal (EGMC) would increase the value of their holdings, willingly sold their excess land to the government or refugees. Owner-operated farms covered 36% of the Valley's arable land in 1973. These owner-operators benefited from land redistribution, credit schemes, and cooperatives.

Sharecroppers worked 67% of the farmland in 1979. The expansion of agriculture has resulted not only from EGMC water, but also from an increased supply of sharecroppers. In contrast to most parts of the world, sharecropping in the Valley is highly efficient. This is due, in part, to the large pool of relatively skilled newcomers which was available to fuel agricultural expansion. Many of these newcomers, former landowners themselves, found themselves in an economically inferior position because of international politics. They did not come out of a long tradition of feudal dependence, but were innovative and upwardly mobile. They are generally considered to be superior farmers in comparison with East Bank sharecroppers, many of whom are new to agriculture. In the south, Palestinian sharecroppers make up almost two-thirds of that population. These sharecroppers are almost entirely landless, with a small percentage owning some land in the north and middle Ghors, but with the south having the highest percentage of landless farmers.

Agricultural wage laborers hold the lowest economic position. Laborers are often foreigners, Egyptian and Pakistani, who work for lower wages than do Jordanians. Because sharecroppers enjoy both higher social status and important social ties in the Valley, they find competing with foreign

labor demeaning. If the agricultural system changes more toward wage labor, a labor shortage could follow that would make the Valley's development increasingly dependent on foreign labor for jobs which Jordanians will reject. It should, of course, be noted that other more lucrative non-agricultural employment opportunities are open to Jordanians who wish to leave the Valley and work in the major urban centers or in the neighboring oil producing countries.

Increased agricultural productivity is creating a new non-agricultural class of people, such as small traders, teachers, government workers, and truck drivers who are likely to play a growing role in the Valley's society, which has previously been dominated by landlord-tenant relations and tribal affiliation. Little social research has been done on the impact these middle-class groups will have on the Valley. Land redistribution has had some minor effect in changing the socio-economic structure, it seems unlikely that the land redistribution law will significantly change the basic social structure in the new land area. More significant socio-economic changes, however, are taking place, as a result of the shift from traditional sharecropping to technology-capital partnerships, and the increasing role of high technology in the structure of the agricultural economy of the Valley.

4.1.2 The Structure of Local Government

The Jordan Valley consists of about 50 settlements which vary in size from a few to almost ten thousand people. Local governments in all urban and rural settlements in Jordan fall into one of three categories:

(a) Incorporated villages with village councils: any un-incorporated village which has a minimum of 1,000 residents, 100 houses, and 180 taxpayers can request to be reclassified to incorporated status, and thus have its own village council. The new proposed law will use the 1,000 resident cut-off point as the major criterion for setting up village councils, although some smaller communities have been recently allowed to incorporate. There are currently seven incorporated villages in the Valley. These are Muaddi, Dirar, Waqqas, Kafrein, Wadi al Yabis, Arda, and Adasiya.

(b) Municipalities: any village which has a village council for five years and which has attained a population of 2,500, can request the Ministry of Municipal, Rural and Environmental Affairs (MMREA) to change its status to that of a municipality. A new proposed Local Administration Law raises the threshold population to 5,000. There are currently five municipalities in the Valley. These are North Shuna, South Shuna, Mashare, Deir Alla and Kreimeh.

(c) Unincorporated villages are those settlements which do not fall into either of the above two categories. There are probably about 40 such settlements in the Valley.

The ability to tax, and the availability of funding sources are both a function of the official classification of the Community. Unincorporated villages have no access to funds other than grants and the Village Improvement

Fund. The former are ad hoc, and depend on both the Governor's allocation of grant funds and the political connections of the village in the central government. The Village Improvement Fund is made up of a head tax of between JD 0.500 and JD 2.000 which may be collected by the Governor from every property owner and every male resident who is between 18 and 65 years of age, as well as a tax which may be collected on livestock. Funds collected from each village are earmarked for that village, and are disbursed with the approval of the Governor or Subgovernor. Needless to say, these funds are minimal, considering the small size of unincorporated villages. Many of the smaller settlements do not participate in this program, because of their poverty and small size. The seats of the Governorate to which the Jordan Valley belongs are outside the Valley: in Irbid and Salt.

The following paragraph will describe the capabilities of typical local governments in Jordan, with respect to the provision of services. This description is representative of how communities in the Valley would have had to cope with development, in the absence of the Jordan Valley Authority. The role and impact of the JVA, and particularly the Village Development component of the first stage of the development effort, will then be explored.

Upon becoming incorporated a village establishes a village council and is given the right to tax. It thus becomes able to collect its own head, livestock, and agricultural production taxes, as well as property taxes and trade license fees. Its new status allows it more freedom in making its own expenditure decisions, subject to the approval of the Governor or his representative. It also becomes eligible for its share of a trust fund which is made up of certain percentages of fuel taxes, import duties, vehicle registration and traffic and health violations. In 1978, each incorporated village obtained JD 6,000 from this fund. This gives the village a constant source of funding, against which it can develop a borrowing capacity. All village council budgets are reviewed annually by the Governor and are typically in the order of JD 10,000 to JD 15,000 per year. The Governor's budget review is intended to assure compliance with priorities and to assure that the village has allocated whatever amounts it has been assessed for such regional functions varying from civil defense and anti-malaria campaigns to boyscout activities.

Upon obtaining municipal status, the community is enabled to collect, in addition to the taxes collected by village councils, property taxes at the rate of 17 (seventeen) percent of the estimated annual rental value of all properties within its jurisdiction. Property owners are also assessed 3% of the annual rental value for an education tax which is collected by the central government. The share of a municipality from the annual trust fund will also increase, depending on its classification into any one of five categories. A newly established municipality, for example, might obtain 0.5% of the fund, which amounted to JD 25,000 in 1978. The Jordanian Municipal Law requires that these funds be disbursed to cities on the basis of population, relative contribution to the fund, and other special factors of national significance. All municipal budgets are prepared annually and must be approved by the Ministry of Municipal, Rural and Environmental Affairs (MMREA). Mayors are also required by law to submit an annual report to the MMREA together with relevant comments from both the municipal council and the Governor or his representative.

Both villages and municipalities are able to obtain revenues from productive projects such as the rental of land or buildings, from the sale of water or electricity or from the provision of such services as garbage collection.

While many communities in Jordan are still lacking in the infrastructure necessary for the provision of their basic human needs, others have managed to obtain the necessary services for satisfying those needs, and some are well on their way toward improving the quality of their physical economic, and social lives. Variations among villages and towns can be attributed on the one hand to their size, location, and economic structure, and on the other hand to the aggressiveness, qualities, and entrepreneurship of their local leadership. There seems to be very little debate as to the top needs and priorities of the rural communities which are not endowed with many of the basic services. These are invariably water supply, education, health services and electricity, in that order. The implementation of such projects, however, does not have to occur in this order, since the mechanisms for obtaining them vary with the government bureaucracy, national service delivery resources and policies, and with the ability of the community to pay its required share of the cost of the service. Typically, villages without councils are striving to improve the schooling situation, by obtaining a few elementary grades, or by expanding and improving the existing facilities. Having no funds of their own, except for the minimal Village Improvement Fund, villages without councils are dependent on the governor to help finance their share of the cost of schools structures. They may also settle for the use of dilapidated rented or donated facilities. These villages have very little chance of obtaining water and power from the Water Supply Corporation (WSC) or the Jordan Electricity Authority (JEA), since these services require local cost-sharing, as well as the existence of a village master plan which lays out the major road and land-use systems. Their only resource is again the governor's funds or self-help coupled with assistance made available by Private Voluntary Organizations. Villages with councils, on the other hand, have some resources at their disposal. Most of them are in the process of preparing village plans through the assistance of MMREA and have obtained or are in the process of obtaining water and/or power. Many such villages also have or are attempting to construct or rent the physical facilities for clinics, although the availability of qualified medical staff remains to be the bottleneck. Communities with municipal councils are at the upper end of the spectrum, with both more resources and managerial sophistication. They generally have or are in the process of obtaining these four basic services. They are mainly concerned with school expansion, or with when their turn will come for the distribution of electric services. Water supply also remains to be a major concern for many small municipalities.

As a community grows, and as its basic needs begin to be satisfied the focus of the concerns of its leaders and members seem to shift towards improving the quality of life and the overall level of social and economic opportunity. The hierarchy of needs and the typical stages of development in Jordanian communities are depicted in Table 4-1, in which the basic needs are shown as "Stage I". The financing of the activities listed in this stage are typically undertaken by the present Municipal and Village Development Bank (MVDB). Technical assistance is provided by the responsible ministries and agencies.

The second stage in the development process seems to address questions relating to the quality of life. Invariably, villages tend to pursue the construction of a mosque, street grading and paving, and the construction of a village/city hall and/or a community center. Mosques are generally constructed using funds from donations from the village, from outside philanthropists, and/or from the Ministry of Maqf and Religious Affairs (MWRA). Street paving and grading and community structure are usually funded from MVLFF loans. The latter facilities are usually constructed in order to save on rental payments and as an indication of community pride and status. The cost of both street-paving and community structures is generally within the normal borrowing capacity of a typical village council. The transition from the basic needs to the quality of life levels has generally been a smooth and easy one to make for most village councils.

The third stage is one in which attention begins to focus on economic and social opportunity. At this point, the village has become a reasonable place to live, and ambitions are directed toward improving income and the potential for the future. Residents at this point are hard pressed to come up with lists of needs which could be accomplished by their village council. Although general complaints seem to persist about constraints on their income, agricultural production, and transportation, villagers do not seem to have a clear idea as to what to do or how to go about improving the situation. Typical activities at this stage include irrigation, farm-to-market roads, public transportation, agroindustries, vegetable and produce markets, and the expansion of the basic infrastructure to accommodate growth. The villagers at this stage also begin to aspire to be elevated to municipal status. Most of these activities fall in the category of productive projects. They are different from those encountered in the previous two stages, require more entrepreneurship and sophistication, may call for new types of institutions and new modes of cooperation among residents, and have no obvious single sponsor for either financing or technical assistance. These factors make the transition to this stage a particularly difficult one, which many villages are still struggling with. Agencies such as the Jordan Cooperative Organization (JCO), the National Resources Authority (NRA), the Agricultural Credit Corporation (ACC) and foreign Private Voluntary Organizations (PVOs) are relatively active in these sectors. The role of village councils is also minimal, since the cooperation of these agencies usually requires the initiative of individuals or the establishment of cooperative organizations or private companies. Farm-to-market roads seem to have a low priority at the Ministry of Public Works (MPW). The resources of NRA are limited as far as minor rarely occur unless leveraged by both village self-help and local monetary contributions, as well as assistance from foreign PVOs. Produce markets can be implemented by the village council through loans from the MVDB, by private individuals, or by loans from the JCO to cooperative organizations. Agroindustries are implemented and financed by private individuals or cooperatives through loans from the ACC or JCO. Similar constraints exist in the establishment of public transportation services. In any case, the need for a higher level of sophistication and a new institutional setting creates a barrier to crossing the threshold leading to this stage of development. There is, of course, no reason why some of these types of economic potential and productive projects

should not occur during earlier stages of community development. This is indeed a preferable timing, but it requires both an education and outreach effort and a streamlining of the bureaucratic processes leading to project development and financing.

During the difficult third stage of development, most villages would have, are preparing for, or are aspiring to elevation to municipal status. This transition would increase their resources, particularly since their share of the Municipal and Village Trust Fund will jump from JD 6,000 to JD, 25,000 at 1978 levels, with the concomitant budget increases to a level of JD 50,000-60,000; clearly an impressive jump. This big gap is partially responsible for the observation that the transition from Stage III to IV (see Table 4-1) is much less painful than that from Stage II and III, especially since it is during the latter transition that the village must both repay its outstanding debts for the provision of its basic infrastructure, and provide for the social and economic opportunities which will transform it into a viable community. Communities at this stage will typically first turn toward such city functions as garbage collection and disposal, street lighting, slaughterhouses, and retail and wholesale produce markets. The latter two types of projects are potential producers of revenue for the city. At this point in its life the city may start to attract some rural-urban migration, with the concomitant increased pressures on its basic infrastructure, and thus a continuing need for the expansion of schools, water supply and power systems. The extent to which a city will go in as far as the development of such additional revenue-producing projects as commercial centers, industrial estates, cold storage facilities, and transportation terminals will depend on the aggressiveness of the city fathers, their ingenuity and their financial savvy. In most cases, it is not until such projects are developed, that the city begins to consider such amenities as parks, libraries, and tourist facilities. As the city grows and its population density increases, the need may arise for a capital intensive wastewater disposal system. About a dozen cities in Jordan have reached this stage. Sources of funding for projects which are classified as Stage IV projects become more diverse as city-size increases, and as its revenues escalate. At the lowest extreme, funding is exclusively through borrowing from MVLF. With increasing revenues, borrowing from local commercial banks becomes a possibility, while the largest cities in the country have been able to obtain loans from foreign governments and international and local financial institutions, with the guarantee of the Jordanian Government.

The decision-making process at the local village or city level involves the identification of those projects which should be pursued with higher authorities for the purposes of obtaining the necessary funding. This process varies by the size of the community and its stage in development. Villages and smaller municipalities are almost completely dependent on MVDB for funding, and thus pursue all their improvements through the Governor and MMREA. Larger municipalities on the other hand, are only partially dependent on MVDB, can obtain funding from a variety of local and foreign sources, and often have direct and strong connections with a variety of branches of the central government.

Table 4-1

STAGES OF DEVELOPMENT IN JORDANIAN COMMUNITIES¹

Stage I	Stage II	Stage III	Stage IV
Basic Needs	Quality of Life	Economic & Social Opportunity	Environmental & Economic Development
Water Supply School Health Care Electricity	Mosque Street Grading & Paving Village/City Hall Community Centers Social and Athletic Clubs	Irrigation Farm-to-Market Roads Farm Improvements Public Transportation Agroindustries Vegetable Markets Expansion of Basic Infrastructure Moving to Municipal Status	Retail & Wholesale Vegetable Markets Commercial Centers Industrial Estates Transportation Terminals Garbage Disposal Street Lighting Slaughterhouses Sewerage Communal Barns Parks & Libraries Cold Storage Facilities Tourist Amenities Fire Protection Traffic Signalization

1. Each of these stages includes the maintenance and expansion of projects completed in the previous stage.

For most communities, the initiation of a project in the first two stages of a community's development cycle is not a controversial matter. Agreement within the community on the need for water, schools, health care and electricity is generally easy to obtain. These types of projects are all relatively easy to develop. They are generally conceived by village elders, Mukhtars, and village councilmen, who in turn approach the Governor or his representative. It is also not uncommon for the Governor to alert the towns people to the need for these types of projects, or even for representatives of the national ministries of education or health, to do so. It is also often the case that representatives of the Jordan Electricity Authority will contain a village when high voltage lines are expected to arrive in the vicinity. Village awareness of the need for the basic infrastructure is so strong that village councilmen and Mukhtars are continuously lobbying with both the Governor and the Ministries in Amman for its provision. While basic needs projects are generally not controversial at the village or town level, controversy might begin to arise in the following two stages of development, where factionalism and local rivalries will start to play an increasing role. Such controversies are more likely to arise with respect to productive project since individual and tribal interests become at stake in many of these types of undertakings. When such situations arise, however, the voting mechanism within the village or city council is used to settle the issue in question. In some cases, however, personal and tribal rivalries and disagreements may be so strong, that even a council-approved project could be killed by its opponents who might directly lobby against it with the Governor or the central government. In cases of dispute, the Governor or his representative usually intervenes and attempts to settle the issue through discussion and compromise, failing which he can enforce a solution on the community. There does not seem to be much debate as to priorities in the basic needs area, where a community usually attempts to satisfy all four needs, starting with water and education. Discussion, and sometimes disagreement, begin to arise during the second stage and are perhaps most intensive in the third. In the elected or appointed councils of larger cities, where professionalism seems to prevail over tribalism, and where the councils are farther removed from a much more heterogeneous public, petty factionalism is reduced appreciably.

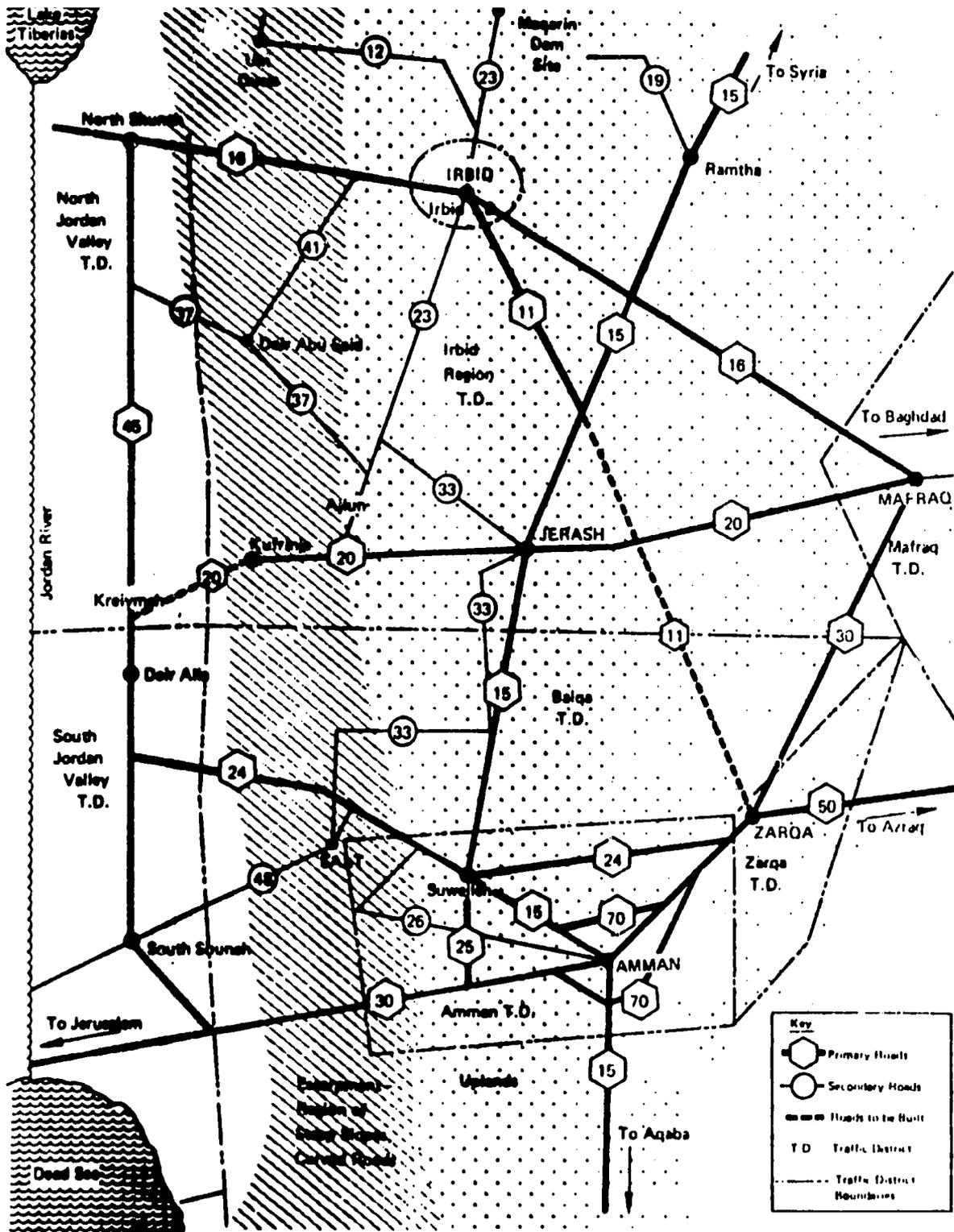
In accordance with Temporary Law No. 18 for the year 1977 (The Jordan Valley Development Law), the Jordan Valley Authority was entrusted with the total development effort in the Valley, including the implementation of town and village plans, the imposition of zoning and building codes, the planning, design and construction of water supply, electricity and communication networks, as well as the provision of all facets of the service infrastructure. Those facilities were to be provided by the JVA at no cost to the community. With speed and efficiency, the JVA proceeded to provide these services in accordance with the law. At the completion of this phase of development in the Valley, all settlements will have their basic needs taken care of, as described in Table 4-1. Many of the larger settlements will be well into Stages II and III of this development. The communities did not have to plan and be involved in many of the decisions made, nor did they have to commit any of their resources for obtaining these facilities. The public's confidence in local leadership is not stronger than that encountered in other rural areas in the country. Most residents, however, view the government and JVA positively, and expect the JVA to provide them

with all services, even those which are clearly not within the Authority's jurisdiction. With minimum local participation and commitment, the communities of the Valley have become appreciably ahead of their counterparts in other parts of Jordan, in as far as the provision of basic human needs are concerned. In the process of achieving this fortunate state, however, they became completely dependent on the JVA. This is borne out by the fact that most of the villages have not committed any of the funds which were allocated to them from the fuel tax revenue sharing system, during the past two or three years. It is also borne out by the fact that in a recent questionnaire about their needs, villages and towns in the Valley have offered the JVA a shopping list of needs which included items like clubs, playgrounds, libraries, market centers, cemeteries, transport terminals, slaughter houses, street lighting, garbage collection vehicles, and nursery schools. While such facilities definitely help improve the quality of life in the Valley, their provision should be accompanied by local participation and cost-sharing, in order to insure the healthy development and growth of the local institutions which should be entrusted with taking over the operation of all local facilities. Priorities for expenditures should be set by the local communities themselves, and the emergency of effective local leadership should be encouraged, for the benefit of the long-term development of the region. While these communities should continue to maintain their present institutional status, assistance should be provided to them in the areas of planning, management, and engineering. One possible vehicle for such assistance, is the setting up of a "technical assistance corporation" in which all communities may participate. Such a body might assist in the building of local capabilities, in advice on financial matters and matters of program development, and in setting up joint services commissions among adjacent settlements for the purposes of procuring such services as a slaughter house or a public works maintenance center. In fact many of those communities should be helped to develop their own five-year plans, in the light of their needs, priorities, and fiscal and human resources. It should be noted that villages and towns in other parts of the country are presently encouraged to prepare such plans, under the auspices of the respective governors.

4.2 INFRASTRUCTURE UTILIZATION

4.2.1 Transportation

The improvement of the Yarmouk-Dead Sea Road is one of the major projects which were conducted as part of the Stage I Jordan Valley Development effort. This road represents the main western north-south link in the Jordanian highway system (see Figure 4-I). This project included (i) the reconstruction, widening, and resurfacing of 97.17 kilometers of the existing road, (ii) the construction of a new 7.66 kilometers road between the Kufrain junction and the Amman-Naur-Jerusalem road, and (iii) the demolition of a one-lane, and the construction of a two-lane steel bridge over the Zarqa River in Ma'adi. This work was completed in August, 1977. The total cost of the project was \$6.4 million of which AID has contributed \$3.9 million. The location of the road was not changed, except for the new 7.66 km link, and thus it continued to be at the traditional spinal chord of the Valley, serving traditional marketing and settlement patterns, and causing minimal disruption to land-uses and life-styles.



Source: Arthur D. Little.

Figure 4-I
TRANSPORTATION NETWC
(Not to scale)

The benefits of the road include:

- (i) Reduction of the distance to travel the length of the Valley from 107.1 kms to 104.1 kms, and an increase in the average speed from 30-50 kms/hr to 70 kms/hr.
- (ii) A corresponding reduction in travel time and vehicle operating costs.
- (iii) Reduction in road maintenance costs.
- (iv) Savings in the maintenance and operation of the Valley irrigation system resulting from easier and more economic access.
- (v) Reduction in the transportation costs of farm inputs and marketable commodities and reduced spoilage of agricultural produce.
- (vi) Improved access of farmers to marketing outlets, and of Valley residents to schools, clinics, and other public and private services.

While it is difficult to quantify some of these benefits, there is no question that they have accrued to a wide spectrum of beneficiaries: the JVA, farmers, marketers, truckers, residents, and consumers. Using only the quantifiable benefits of time savings, savings in vehicle operation and road maintenance costs, and assuming a growth in traffic of 5% per year and no salvage value after 20 years, the rate of return on the investment in the road was found to be 8 percent. The estimated rate of traffic growth was based on growth between 1965 and 1973, during which period the average daily traffic grew from 662 to 875 vehicles, or about 5% per year. Considering that this period was one of instability, wars, and civil strife, and considering that the road has not undergone any major improvement during that period, the projected rate of growth was conservatively estimated. Figure 4-II shows actual traffic volumes in 1973 and 1978 at 6 locations along the Yarmouk-Dead Sea Road, and at 2 locations on the major connections from Irbid and Salt (the North Shuneh and Arda Junctions). The average daily traffic has increased during this five year period from 875 to 2,096 vehicles. The total increase in traffic is then 141% over the base year, or about 20 percent per annum. Although this growth is partially attributed to the growth of movement of people and goods between the East to the West Banks as a result of the opening of the bridges between them, it is still an impressive growth and is indicative of the overall growth of the Valley's economy. It should also be noted that the increase in traffic along roads connecting to the Valley (locations numbered 1, 2, and 8 on Figure 4-II) significantly less than the corresponding growth on the Yarmouk-Dead Sea itself. This is indicative of an increasingly self-contained and viable local economy. These growth figures indicate that the user benefits of the road which have materialized by 1978, are at least twice those anticipated at the design stage. It is expected that these benefits will increase at 5 percent per year in the future, since the major impact of

highway improvement has already occurred in the first three years of the road's life. In any event, the rate of return on the investment is significantly higher than originally anticipated.

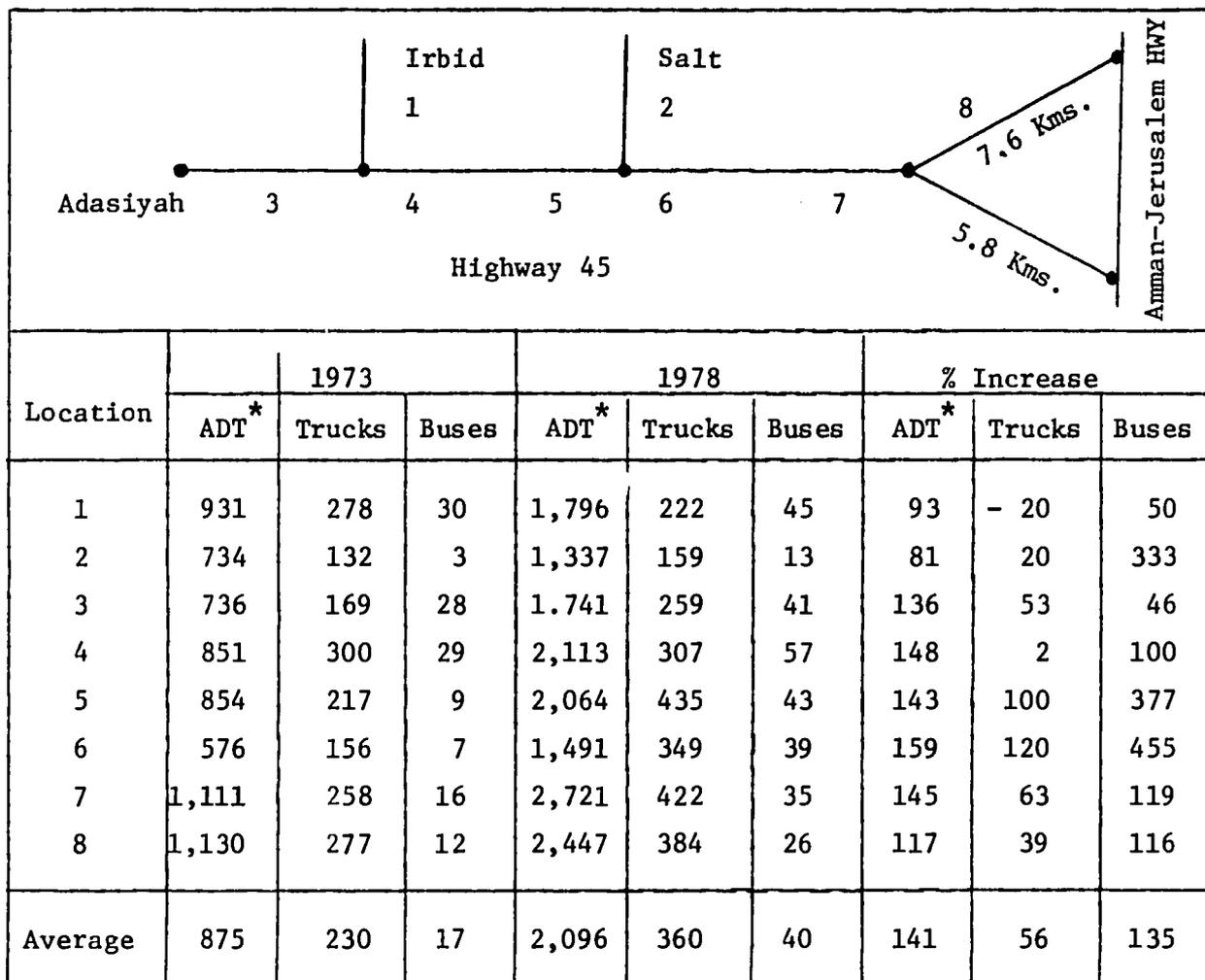
Most of the growth in road traffic has occurred in automobiles and buses. Truck traffic has grown by only 56 percent, with the volume of trucks on the road dropping from 26 to 18 percent of the total traffic. Most of the increase in truck traffic occurred within the Valley, rather than on its main connecting links to the highlands. Total truck traffic on the links connecting with Amman, Salt and Irbid has increased by about 12%. Truck traffic on the road to Amman (the new 7.6 km section of the road) has increased by 39 percent. Considering that this includes increased shipments from the West Bank, the growth in the flow of goods to and from the Valley, has not been substantial. The number of buses on the road, however, has maintained its level at 2 percent of the total traffic, but has increased by 135 percent in absolute numbers. At some locations the number of buses per day has more than quadrupled. This is indicative of a general and strong improvement in the level of transit service available to the lower income sector of the population. This service is, of course, further supplemented by a large number of taxicabs and jitneys (service cars) which are counted as private automobiles.

Other transportation improvements included in the Village Development Series include the construction of 116 kms of farm access roads and the paving of 27 kms of village streets. Additional farm access roads were also constructed as parts of the East Ghor Canal Extension and the Zarqa Triangle projects. Access roads have definite benefits to farmers. They are also necessary in order to allow the expected benefits of the Yarmouk-Dead Sea Road to materialize. They do, however, still represent one of the weakest links in the transportation network in the Valley. There is still a need for improving several hundred kilometers of such roads, throughout the Valley.

4.2.2 Housing

It is estimated that more than half of the housing units which existed in the Jordan Valley prior to 1967 was destroyed during the war of that year, and the following conflicts in the area. It was thus decided to incorporate two housing components in the Village Development series. As part of the effort to improve both productivity and the quality of life in the Valley, it was evident that some attention must be paid to the housing problem in order to (i) keep and attract professionals and skilled workers, in order to assure the efficient operation and maintenance of public facilities, and to provide necessary private and public services, and (ii) improve the housing situation of farmers in the Valley, especially those living in substandard housing, and those at the lower ends of the economic spectrum. In response to these needs, the JVA has included in the development effort, a housing and town planning component. For each village in the Valley, a site plan was prepared which:

1. established the boundaries of the village;
2. laid out a network of streets and other public ways;
3. established sites for educational, health, commercial, religious, government, and other facilities;



* Average Daily Traffic for Yarmouk-Dead Sea Road is obtained by averaging the ADT's of locations 3 through 8 above.

Figure 4-II
TRAFFIC ON VALLEY ROADS

4. established plots for home sites of a standard 12 m x 24 m size which include areas with buildings already constructed in most instances; and
5. identified unbuildable areas.

The site plans have now been prepared for all of the villages, and in the villages in which development activities are taking place they have been used as the basis for siting of facilities and the allocation of land for housing. The significant feature of the site plans is that they are the basis for reallocation of village lands for housing and other purposes. Article 23 of the Jordan Valley Development Law establishes the formula through which village land, all of which is expropriated to the JVA by the law, is redistributed. In part, it provides that:

1. The (Jordan Valley) Authority shall have the power to improve and develop to the extent it sees fit the lands expropriated for housing purposes located within town and village boundaries approved by the Authority. The Authority shall divide those lands into housing plots the minimum area of which is not to be less than 250 m², and the maximum not to exceed 300 m³. (The President of the Authority with Board approval may exceed the upper limit of housing plots if the public interest so requires.)
2. The following lands within town and village boundaries are expropriated without compensation:
 - No part of any holder's expropriated land whose area does not exceed 288 m².
 - All the land in excess of 288 m² from holders whose expropriated land does not exceed 284 m².
 - 25% of the area in excess of 384 m² from holders whose expropriated land area is larger than 384 m².
3. The Authority shall allocate housing plots to the holders whose land it expropriated on the following basis:
 - One housing plot for holders whose expropriated land does not exceed 288 m² (after the deduction for excess land taken without compensation.)
 - For holders with larger parcels, the number of housing plots a holder is able to put into 288 m² segments on the land remaining after the free taking.
 - For holders who have excess land after multiplying the housing lot size by the number of his family members (i.e., for a holder with six family members for example, this would be 1,728 m²), the following allocation applies:

- Housing plots equal to the number of his family members if his net land in square meters is less than double the number resulting from multiplying the lot size by number of family members. (A holder with six family members and 2,000 m² could have six housing plots on 1,788 m², for example.)
- Housing plots equal to twice the number of his family members if his net holdings are between two and three times the number of his family members. (The holder with six family members and 4,000 m², for example, could have 12 housing plots or 3,456 m².)
- Housing plots equal to three times the number of his family members if his net holdings are between three and four times the members and 6,000 m² could have 18 housing plots on 5,184 m².)
- Housing plots equal to four times the number of his family members if his net holdings are more than four times the number of family members. (The holder with six family members and 12,000 m² would have 24 housing plots on 6,912 m².)

The purpose of the reallocation formula is much the same as that applied to agricultural land in the Valley--the village land that is "improved" through government action is to be allocated first to current holders (owners) of village land on the basis of size of current holdings (i.e., a measure of commitment to the Valley's agricultural development) and to present and future need for passing on land to the next generations in proportion to the size of the current owner's holdings. Owners with a housing lot below the minimum size will not be able to improve his land--build a new house--without acquiring a standard parcel. Owners with large holdings that are in excess of family "needs" will have excess land expropriated with compensation to be determined by a Committee established by the JVA.

Based on the village plans, surveys and property maps showing streets, public places, and building lots are being drawn from each of the designated villages. Once these property maps are drawn, building parcels will be allocated to holders of land in accordance with the formula outlined in the law of 1977. Houses which exist on properly sized and allocated lots will then be able to receive direct water and electric power from the facilities being constructed in the mapped streets. The replatting also provides the basis for locating streets, which are then graded and topped with a temporary surface. Holders of land entitled to building lots will be able to build or rebuilt houses on these lots in accordance with a building code which sets construction and facility standards for each house. When the village plans were originally accepted by JVA, a ban was placed on all reconstruction activities that did not conform to the plan. At present, only two villages have gone through the complete replatting and land allocation process. Since the replatting program applies to those parts of the designated villages which are already built up with houses of various sizes, shapes, and conditions as well as to vacant areas, this process is expected to be long and complicated. Since the objective of the replatting program

is to provide a system for the orderly provisions of utilities to each site, as well as to allocate lots of serviceable size to villagers, flexibility is being applied in the actual plot design and allocation.

While the major tenant of the Development Plan is for villages to provide their own standard housing on allocated plots, a decision was made in 1975 to provide some housing under JVA auspices both because of the delay that was going to be experienced in replatting and because individual villages were having difficulty in constructing new houses with their own financial and technical resources. The Village Development series includes two types of housing assistance: (i) an assistance of about \$5.4 million, to be used for the construction of 300 rental housing units which are to be used for housing government employees working in the Valley, and (ii) an assistance of \$4.0 million, to be used for the support of a mortgage lending program to allow prospective purchasers to own housing units constructed by the JVA.

The 300 rental housing units which were constructed under this program have an area of 96 square meters each, and have been allocated to different governmental agencies, in order to alleviate the inconvenience of having employees who are assigned to the Valley, to commute to it from the highlands on a daily or weekly basis. The distribution of these units to the agencies, by location, is given in Table 4-2. Some of those agencies have already assigned employees to these units, some of which have been occupied for months. Two questions remain to be determined during the following few months: maintenance and rents. An interagency committee will decide on the agency whose responsibility will be to provide for the continued maintenance of these units. A choice will probably be made between the Ministry of Public Works and the Jordan Valley Authority. The question setting the value of the monthly rents also needs to be resolved. It is probable that no single rent will be set, and that the different Ministries and Agencies will be allowed to set their own policies, depending on the types and levels of employees they assign to the units, and on the extent to which each agency may have to provide assistance in order to convince its employee to move to the Valley. From present practices, it seems that the monthly rent may vary from nothing to JD 15 per month. It should be noted that a policy in which no fixed rents are set may not be unreasonable, in view of the fact that those employees residing in these units may have different incomes, and may need different level of subsidy, in order to entice them to settle in the Valley. While the operation of some agencies might require the availability of low paid employees in the Valley (e.g. drivers earning JD 70 per month), other agencies may find that their priorities involve the settlement of physicians or engineers earning 2-4 times as much. It would thus not be unreasonable to set different rental rates to these two groups.

The second component of the housing program, the Mortgage Lending Program, is intended for the provision of a mortgage loan fund, to enable families to purchase or improve houses in the Valley. The JVA has constructed about 1,900 houses in different locations in the Valley. A description and analysis of the spatial distribution of these units is given in Chapter 3 of this report. Each house has an area of 60 sq. meter (660 sq. ft), and is being sold at the cost price of JD 3,000 (\$10,000).

Table 4-2

DISTRIBUTION OF GOVERNMENT RENTAL UNITS

Ministry or Agency Name / Location	North Shuneh	Wadi Al-Yabis	Al-Dabab	Al-Arda	South Shuneh	Total
Ministry of Health	12	12	5	1	12	42
Ministry of Education	16	12	12	-	5	45
Telecommunications	2	2	3	-	3	10
Superior Islamic Judge	3	-	-	-	3	6
Electricity Authority	4	4	8	3	4	28
Ministry of Supply	1	-	-	-	1	2
Ministry of Interior	5	5	5	-	5	20
Ministry of Justice	1	-	-	-	2	3
Ministry of Communications	3	2	3	-	3	11
Ministry of Awqaf	1	1	1	-	1	4
General Antiquities	1	-	1	-	1	3
Lands and Survey Dept.	-	-	1	-	1	2
Ministry of Finance	3	-	2	-	2	7
Ministry of Social Development	2	2	2	-	2	8
Meteorological Dept.	1	1	1	-	1	4
Ministry of Agriculture	5	5	5	-	2	17
Totals	60	46	49	4	48	207
Remainder of 300 units allocated to the Jordan Valley Authority	20	9	21	16	27	93

USAID has provided \$2 million in each of the first two Village Development projects, for the mortgage loan fund. At a maximum loan of JD 2,500 (\$8,333), the U.S.AID loan will cover about 480 houses or about a quarter of all housing constructed. The first loan of \$2 million has been fully committed to purchasers by July 1980. The housing units are of concrete block construction, and were originally constructed on 288 sq. m. lots. After the first stage of the construction, it became apparent that the area is too small to be socially and practically acceptable to the potential buyers, who felt that they would need more space for their outdoor activities, and more separation from their neighbors, in order to maintain their privacy. It was thus decided to construct the house on every other lot, thus providing each housing unit with 576 sq. meters of land.

The target beneficiaries of the program were to be:

1. Persons with skills regarded a critical to the success of the development effort, agricultural workers, and staff assigned to the new irrigation and social support services.
2. Persons residing in substandard mud housing.

These general categories were clarified in an Implementation Letter (No. 17) from the USAID Mission Director to the President of the Jordan Valley Authority. In that letter, the order of priority for participation in the mortgage lending program was defined as follows:

- a.
 1. Labor attracted to the Valley.
 2. Natural population growth
- b. Accommodations of homeless people now residing in the Valley.
- c.
 1. Families living in mud houses
 2. Families living outside the boundaries of sites designated for development.
- d. Persons attracted to the Valley to staff the facilities being constructed.

The Implementation Letter specified that within the general eligibility classification, the distribution of available mortgage funds should be as follows:

- a. No less than 70 percent of the funds are to be made available to farm workers, sharecroppers, tenant farmers, owners of a single farm unit or less of land and employed persons earning JD 70 per month or less. Persons qualifying under this category will be required to own or buy the plot on which the house is built.
- b. 30 percent of the funds is to be made available to other eligible borrowers. It is expected that these borrowers will consist of teachers, nurses, technicians, etc. The borrower must own or buy the plot of land on which the home is built.

- c. Home improvement loans will be permitted to eligible borrowers providing the applicants agree to include as part of the proposed home improvement the construction of a percolation pit, if no satisfactory facilities are available in the home.
- d. The maximum loan will be JD 2,500. This, in effect, requires the purchaser of a new unit to make a downpayment of at least JD 500, and to commit himself to a monthly payment of JD 19.400 for a period of 20 years, at an interest rate of 7%.

According to an Administration Agreement dated October 2, 1975, the Jordan Valley Authority shares with the Housing Bank the responsibility of selecting mortgagors, who are allowed to purchase new housing units or to obtain loans for home improvement. In the process of determining an individual's eligibility for a mortgage loan, the JVA obtains the following information:

- (i) Photostatic copies of an identity document, such as a passport, and of the marriage certificate, if applicable;
- (ii) a record of employment and family income over the preceding three (3) years;
- (iii) evidence of land ownership by the family in the Jordan Valley, such as a title deed, or a certification by the JVA of its intent to sell, or to permit the sale of, a specific plot of land to the prospective mortgagor;
- (iv) an appraisal of the value of the land identified in (iii) above;
- (v) a projection over the next five years of the income of the individual and his family, based on the type of economic activity in which the individual and his family are expected to be engaged, e.g., as an owner-operator of a 3-hectare fruit and vegetable farm, as a hired agricultural worker, etc., and
- (vi) an appraisal of the value of the housing unit which the prospective mortgagor proposes to construct, purchase, or upgrade with the proceeds of a mortgage loan.

A special JVA committee screens all application, and if the individual applicant is deemed Eligible by that committee, the documentation is then forwarded to the Housing Bank, which will, in turn, investigate the credit worthiness of the applicant. The Bank runs a credit review of the applicant, which includes an evaluation of his assets, the assets and liabilities including current obligations incurred over the past five (5) years, repayment history, and, if applicable, rent paid over that same period. The Bank then analyzes the loan application in the light of the prospective mortgagor's ability to repay, as indicated by the JVA's projection of the prospective mortgagor's income, and in the light of the Bank's determination of the Mortgagor's currently outstanding debt obligations and past performance

in paying financial obligations (debt and/or rent). On the basis of that analysis, it approves conditionally, or rejects, the loan application and informs the JVA and the prospective mortgagor in writing within five (5) days of reaching the decision.

The purchase of a housing unit for cash is allowed if an eligible applicant desires to do so in order to avoid the payment of interest. It is also permitted if a surplus of housing units remains after all eligible and credit worthy applicants has been satisfied. The approval of the Council of Ministers is required before sales of the latter type are approved. No AID funds would, of course, be involved in any cash sales.

In an attempt to analyze and describe the beneficiaries of the AID financed mortgage lending program, a study was undertaken of 283 loan applicants, who have either received, or are expected to receive, a loan under either the Village Development I or II projects. Of those 283 applicants, 217 or 77 percent were identified as "low income" households, earning less than JD 70 (\$240) per month, while 65 or 23 percent were identified as "high income" households. The incomes in this category was mostly below JD 120 (\$400) per month, although some had incomes as high as JD 1,000 (\$3,000) per month. This is in general compliance with the covenants of the agreement, which stipulates that a minimum of 70% of the beneficiaries be in the low income category. The objective of the study is to obtain a profile of each of these two categories, in order to ascertain the extent to which benefits occur to each of these groups, and to obtain an understanding of the types of communities which might emerge in these new settlements. In order to conduct the study, information was obtained on the number of persons per household, the occupation of the applicant, his present housing situation, and his present monthly income and rental expense, for each of the 283 applicants. This information is summarized and discussed below.

A profile of the applicants indicates that the number of persons per household is larger for low income households, than it is for high income households. While 56% of those in the low income category had a household size of between 6 and 13, only 35% of those in the high income category had such large household sizes. Household sizes of 4-5 persons occurred in 25% of the low income applicants and in 50% of the high income applicants. These 4-5 person households represented about 31% of the total pool of applicants. Another 30% consisted of households with 7-10 members. As mentioned above, the size distribution of the low income households is skewed toward the larger family sizes, while higher income families tend to concentrate around 3-6 persons per households. For the more than half of the low-income families whose household size is in excess of 6 persons, the housing units will undoubtedly be overcrowded. The average gross housing area per person, for a household of 8, is less than 8 square meters. For the same household, the average living space (exclusive of kitchen, bath and hallways) is less than 35 square meters. By comparison, the United States Federal Housing Administration (FHA) specifies a minimum of 5.5 sq. meters of bedroom space per person. While these low standards for large families will result in overcrowding, they are still often an improvement over the residents original housing

conditions. It should be noted that the housing units are designed for, and can accommodate, some expansion. It is questionable, however, whether the poorest and largest families will be able to afford the additional mortgage payments resulting from such an expansion.

Table 4-3 provides a distribution of the applicants' occupations, by income categories. Of the low-income applicants, about 71% are involved in agriculture, and are evenly divided between owner-operators and tenants/sharecroppers/laborers. Of those in the high income category, 63.5% are involved in agriculture, all of whom are farm owner/operators. This large percentage of mortgagees involved in agriculture, is line with the standing policy of attracting and keeping agricultural workers in the Valley. The rest of the applicants represent a wide spectrum of occupations. As expected, the higher income groups includes professionals such as physicians, engineers, and lawyers; while the low income group is generally made up of lower-paid salaried employees, civil servants and small businessmen or technician. This diversity is, to some extent, the result of a conscious policy on the part of the JVA, which is aimed at encouraging occupational diversification in the Valley, in the hope of influencing the overall quality of life and of increasingly the availability of professional and techrical services in the region.

Present monthly rental payments for the majority of "low-income" applicants were between JD 5 and JD 20 (\$17-70), with the largest group being in the JD 11-JD 15 (\$38-50) range. One third of the "low income" group is presently renting, one seventh own their residences, while another seventh are presently living with relatives. The rest reside in temporary structures, and stand to improve their living standards most by moving to the new housing units. None of the "high income" applicants reside in temporary housing. Almost one half of them are present home owners, a quarter reside in rented units, while another quarter reside with relatives.

4.2.3 Public Buildings

A total of 44 public service buildings and 2,188 houses are included in the Village Development I Project. These buildings include 10 health centers, 7 administration buildings, 1 community center, and 26 schools. With the exception of about 20% of the houses, construction of all of these buildings in virtually complete. The vast majority of houses and several of the service buildings, however, were not being utilized as of July 1980. A summary of the status of building utilization is provided in Table 4-4.

Health Centers

The construction of six health centers was completed by March 1979. The other four centers were completed by June 1979. However, most of the buildings remained vacant for about a year after completion. This is unfortunate, since while unstaffed and unoperational health centers do not contribute to health care, they may also stimulate annoyance or frustration on the part of the communities in which they are located.

Table 4-3

MORTGAGE APPLICANTS BY OCCUPATION

OCCUPATION	LOW INCOME	HIGH INCOME	TOTAL
Total Applicants	N1 = 217	N2 = 65	N = 283
	Percent of N1	Percent of N2	Percent of N
Farm Owner/Operator	35.5%	63.5%	41.8%
Tenant/Sharecropper/ Farm Laborer	35.9	-	27.9
Salaried Employee	6.5	3.2	7.5
Teacher	7.8	-	7.8
M.D./Farmer	-	.92	.71
Veterinarian	-	.46	.36
Agr.-Engineer	-	11.1	2.5
Lawyer	-	3.7	.71
Jordan Electric Authority Engineer	-	1.4	1.1
Laborer	1.8		1.4
Soldier	4.1		3.2
Electrician	.46		.36
Policeman	.92	-	.71
Barber	.92	-	.71
Driver	3.2	-	2.5
Housewife	.46		.36

Table 4-4

UTILIZATION OF PUBLIC BUILDINGS CONSTRUCTED UNDER VILLAGE DEVELOPMENT I PROJECT

VD 1 Location and Type of Building	Date Construction Completed	Date Building Occupied/Utilized	Electricity Provided?	Water Hook Up?	Existing Problems	Comments
North Shuna 'A' Health Center	6/79	Not by 7/80	Yes	Yes	Not Occupied	Some of the furniture had been delivered by 5/80
Waqqaq-Qleiat 'B' Health Center	3/79	3/80	Yes	No*		Center staffed by full-time physician, male nurse, and messenger/custodian.
Mashare 'B' Health Center	5/79	3/80	Yes	No*		Center staffed by part-time physician, and full-time male nurse, and messenger/custodian.
Yabis-Meraze 'A' Health Center	6/79	Not by 7/80	Yes	No*	Not Occupied	Some medical equipment had been delivered by 5/80/
Kreimeh 'B' Health Center	3/79	3/80	Yes	No*		Center staffed by full-time physician, male nurse and messenger/custodian.
Dirar 'C' Health Center	3/79	3/80	Yes	Yes		Center staffed by part-time physician, and full-time male nurse and messenger/custodian.
Mauddi 'C' Health Center	3/79	3/80	Yes	Yes		As of 7/10/80, 837 patients had been treated. Number of patients has decreased by about 40% during the summer months. Center staffed by part-time physician and full-time male nurse and messenger/custodian.
Damiya 'C' Health Center	3/79	3/80	Yes	Yes		Center staffed by part-time physician and full-time male nurse and messenger/custodian.
South Shuna 'A' Health Center	6/79	Not by 7/80	Yes	Yes	Not Occupied	Some medical equipment had been delivered by 5/80.
Raudn 'B' Health Center	3/79	3/80	Yes	Yes		By 7/11/80, 1,088 patient visits had been made to the center. Center staffed by full-time physician, three male nurses, one midwife, and one messenger/custodian. Midwife delivered 9 babies in May and June.
Kreimeh Community Center	3/79	9/79	Yes	No*		Activities include: 105 child kindergarten (at JD 3 per month), adult education, sewing class, local volunteer landscaping for center, and meetings with local representatives to identify priority local social needs. Many activities planned.
Manshiya Admin. Bldg.	3/79	Not by 5/80	Yes	No*	Not Being Utilized	
Waqqaq-Qleiat Admin. Bldg.	3/79	Not by 5/80	Yes	No*	Not Being Utilized	
Tel El Arbaein Admin. Bldg.	3/79		Yes	No*	Not Being Fully Utilized	As of 5/80, two of the ten rooms were being used by the local council on a part-time basis.
Kreimeh Admin. Bldg.	3/79		Yes	No*	Not Being Completely Utilized	Local council appears to be actively using building. All offices have been allocated but not occupied yet. Postal service says office is too small for its equipment. Local groups have landscaped the site.

*Water delivered by tanker truck.

(To be continued)

Table 4-4 (cont'd)

VD I Location and Type of Building	Date Construction Completed	Date Building Occupied/Utilized	Electricity Provided?	Water Hook Up?	Existing Problems	Comments
South Shuna Admin. Bldg.	3/79		Yes	No [*]	Not Being Fully Utilized	Building used by: municipal council, Islamic Court, Post Office Civil Commission, and Ministries of Supply and Interior. Other offices have been allocated but not occupied. Mayor's secretary says: "Building is too small."
Kafrein Admin. Bldg.	3/79	Not by 7/80	Yes	Yes	Not Being Fully Utilized	Only three of ten rooms have been occupied by JVFA and Land Dept. who use them on a part-time basis.
Rauda Admin. Bldg.	3/79	Not by 7/80	Yes	Yes	Not Being Utilized	
<u>Schools</u>						
N. Shuna Boys A	8/78		Yes	Yes		
N. Shuna Boys B	8/78		Yes	Yes		
N. Shuna Girls	8/78		Yes	Yes		Double shift because nearby UNRWA school recently collapsed.
Manshiya Girls	8/78		Yes	No [*]	Water Shortage	
Waqqas-Qleiat Boys	8/78		Yes	No [*]	Water Shortage	Two teachers were living at school building during 1979-80 school year.
Waqqas-Qleiat Girls	8/78		Yes	No [*]	Water Shortage	
Tel El Arbaein Girls	8/78		Yes	No [*]		
Mashare Boys A	10/78		Yes	No [*]		
Mashare Boys B	2/79		Yes	No [*]		
Mashare Girls	10/78		Yes	No [*]		
Yabis-Meraze Boys	2/79		Yes	No [*]	Water Shortage	
Yabis-Meraze Girls	10/78		Yes	No [*]	Water Shortage	
Kreimch Boys	8/78		Yes	No [*]		
Kreimch Girls	8/78		Yes	No [*]		Ten teachers were living in the school administration unit during the 1979-80 school year.
Dirar Boys	9/78		Yes	Yes		
Dirar Girls	9/78		Yes	Yes		
Eddhab Boys	8/78		Yes	Yes		
Eddhab Girls	8/78		Yes	Yes		
Rabe Boys	5/79		Yes	No [*]		
Twal Boys	8/78		Yes	No [*]	Water Shortage	
Twal Girls	8/78		Yes	No [*]	Water ^{**} Shortage	
Arda Boys	8/78		Yes	Yes		
Kafrein Boys	2/79		Yes	Yes		
Kafrein Girls	2/79		Yes	Yes		
Fauda Boys	9/78		Yes	Yes		
Rauda Girls	9/78		Yes	Yes		

* Water delivered by tanker truck.

** Septic tank fills with ground water, out of use.

It is particularly surprising that new centers remained vacant in communities which had old clinics.¹ It seems that the staff and equipment from the old clinic could have been moved into the new center. Approximately a year after construction was completed, four type 'B' and three type 'C' health centers were both staffed and operational. The new type 'B' centers; located at Waqqas/Qleiat, Mashare, Kreimeh, and Rauda; are typically staffed with a full-time physician, nurse(s) and a messenger/custodian. The smaller type 'C' centers, located at Damiya, Dirar and Mauddi, have a full time nurse and messenger/custodian. A physician visits these centers for two or three days a week.

The new type 'B' and 'C' health centers typically handle 5 to 10 cases a day. This case load is, however, expected to increase when the seasonal population returns to the Valley in late August and when the local population becomes more familiar with the services provided by these centers. Most of the cases handled at the centers are concerned with diarrhea, other digestive ailments, fever and contagious diseases. The patients pay a flat fee of JD 0.300 (\$1.00) per session with the physician, and JD 0.100 (\$0.30) per type of medicine received. Obviously, these prices are heavily subsidized and do not represent a major burden on the users. Brief discussions with the staff at these new health centers suggest that the centers are operating satisfactorily and that the buildings are well suited for the use to which they are being put.

Perhaps the most unfortunate feature of the Village Development I Project is the fact that the three large type 'A' centers have been vacant for over a year. These large centers have the potential for providing a level of service which heretofore has not been available in the Valley. The fact that they are still vacant has a somewhat demoralizing impact on the local population. For example, on the day of a site visit, a farmer near south Shuna accidentally got poisoned. About an hour was spent, within sight of the new type 'A' health center, trying to obtain for him transport to the Salt hospital, more than 20 kilometers away, via a steep winding road.

Community Center

The operation of the one, rather experimental, community center in the Valley started slowly. However, it appeared to be operating quite effectively by July 1980. Construction on the new center at Kreimeh was completed in March 1979. Activities at the center started around September 1979. One of the first activities was an adult literacy class which proved relatively successful, with seventeen persons having graduated by July 1980. During the summer of 1980, a sewing class, sponsorship of a youth club, and kindergarten were in process. The local response to the kindergarten has been very impressive. A total of 105 children were enrolled; each paying JD 3 (\$10) per month. Though the price is relatively high, the staff at the center indicate that most of the children come from farm families. They anticipate a larger class during the next session.

¹Mashare, Mauddi, Dirar, Waqqas/Qleiat, and Kreimeh.

An impressive feature of the center is that it appears to have engendered considerable local support. The center staff has met with local representatives in order to identify priority local social needs. The community has donated concrete blocks and volunteered to build a relatively large garden area for the entry way to the center. The community also wants to build a playground adjacent to the center and a canopied area for protection against the hot summer sun.

The center is planning or considering a variety of future activities including carpentry, plumbing electrical, and possibly typing classes. These classes may be operated on a partially self-supporting basis in that the students' fees would provide payment for the instructors, who will be recruited from the local population, whenever possible. The equipment, classroom, and materials would be supplied by the government.

The activities of the center look and sound encouraging. These activities should be monitored for the next year or year and a half. If after that time, they are judged successful, serious consideration should be given to establishing other community centers in the Valley.

Administration Buildings

The Village Development I Project includes the construction of seven local administration buildings. Construction of the buildings was completed in March 1979. The buildings, which are the responsibility of the JVA, are intended to facilitate a closer linkage between government activities and the people of the Valley. The buildings provide facilities for local governmental councils and a variety of national and regional government agencies such as the Jordan Valley Farmers Association (JVFA), postal service, Lands and Surveys Department, Ministry of Interior, Ministry of Supply, Passport Department, and several other agencies. The access of Valley residents to these agencies will be greatly increased when the agencies open new offices in the newly constructed administration buildings.

Unfortunately, few governmental agencies have actually opened new offices in these administration buildings. Though the JVA has apparently allocated all of the office space in the new buildings to governmental agencies, most have not moved into to buildings yet. Consequently, the link between government and the people is still relatively weak in the Valley. Available information suggests that three of the buildings; at Manshiya, Waqqas/Qleiat, and Rauda; are virtually vacant, 15 months after construction was completed. Only a small portion of the buildings at Tel El Arbaein and Kafrein is being used, and only on a part-time basis. The administration buildings at South Shuna and at Kreimeh are being utilized by a variety of agencies, although they are not yet being used to full capacity.

The large administration building at South Shuna is being used by the municipal council, Islamic Court, Postal Service, Civil Status Department (registration of births, deaths, etc.), and the Ministries of Supply and of Interior. Agencies which have not as yet occupied their office space include the Passport Department, the Ministry of Justice, Ministry of Finance, Ministry of Education, and others. It is not clear when these agencies will start operating in the new administration buildings.

The Kreimeh administration building is not fully occupied but does house the offices of the local council, JVFA, and the Land and Surveys Department. The community appears to be maintaining the facility well and have started to landscape the site¹.

Schools

In contrast to the other buildings constructed under the project, the schools were all occupied and operational shortly after construction was completed. This is important because the 26 new schools represent the largest single addition to the service infrastructure in the Valley. Fortunately, the Ministry of Education has prevented any waste by moving into the schools as soon as they were ready. In fact 14 of the schools which are being used do not yet have connections to a piped water system but rather rely on water from tanker trucks. The trucks fill the water storage tanks on the roofs of the schools; the water then runs through the normal plumbing system.

Available information suggests that the new schools have had a very positive impact on the Valley. They have acted to raise the morale of teachers, pupils, and the general population of the community. People express a sense of pride in their new schools. Teachers are highly satisfied with their working conditions. Evidence suggests that drop-out rates and absences have declined in the new schools. Furthermore students in the new schools appear to have better examination scores than they had previously when they attended the old schools.

Construction of the new schools is correlated with rapid increases in enrollments. Since the opening of new schools in 1978-79 school year, enrollments have increased by about 20% per year. This is a very rapid rate of growth; it implies that 100% enrollment of school-age children might possibly be approached in the next few years. Enrollment increases have been greater for females than for males. This is to be expected because the percentage of school-age females enrolled is considerable lower than that for males.

There are some features of the new schools which could be improved. Both students and teachers feel that the schools need paved access. They also would like more library facilities and club space. Some feel that a wall should be constructed around the school boundary and protective bars should be placed over the windows.

Another problem is the lack of adequate housing for teachers. During the 1979-80 school year, ten female teachers were living in the administration unit of the Kreimeh girls school. Two male teachers were living in the boys school at Waqqas/Qleiat. Additional efforts are needed to provide adequate housing for teachers in the Valley.

¹Responsibility for maintenance of the new administration buildings has not been settled as yet. Whoever assumes this responsibility will undoubtedly hire a local full-time maintenance person.

Lack of water connections and shortages of water are another problem. This problem should be solved when construction of piped water distribution systems is completed. A specific problem is the septic tank at the Twal girls school. The tank rapidly fills with ground water and therefore is unuseable.

Despite these few problem, the schools component of the Village Development I Project is definitely a success. The schools have been fully utilized and have had a very favorable impression on education, particularly for girls, and the communities in general.

4.3 ATTITUDES AND PERCEPTIONS

In the survey conducted by Arthur D. Little, Inc., most residents of the Valley have expressed satisfaction with their lives and their villages. Both men and women were very optimistic about the future. They stated high aspirations for sons and daughters, whom they hope will obtain enough education to enter professions; those mentioned again and again were: teaching, medicine, and engineering. While the upwardly-mobile attitudes of poor parents may at first appear unrealistic, they do not seem so in light of the large numbers of young Valley men who work abroad, earning salaries far in excess of their parents. Of all adults interviewed, not one wanted a son to become a farmer or a daughter to marry a farmer, because farm life was "too difficult". The survey also found that Valley families are large, ranging from five to thirteen children, and that Valley women want to use birth control methods to limit family size. This was found to be true not only of young women, but also of women nearing the end of their child-bearing years.

Little variation was expressed about village needs. They were found to be, in descending order: water, electricity, clinics, roads, schools and garbage collection.

Perhaps one of the most extensive survey of attitudes in the Valley, is the one conducted by the JVA Planning and Analysis Unit in the Spring of 1980. This survey was limited to government employees working in the Valley, and was intended to assess their perceptions with respect to the quality of life in the Valley. While this survey covers only a subset of the population, many of whom are not permanent Valley residents, it is an important subset in the sense that it reflects the needs and aspirations of those whose movement to the Valley represents a corner block in its social and economic development. The survey was thus devoted to (i) assessing the willingness of non-residents and temporary residents to permanently settle in the Valley, (ii) identifying factors which attract non-residents and temporary residents to settle in the Valley, as well as factors which might deter them from doing so, and (iii) explore reasons for permanent settlement as perceived by permanent settlers.

Of a total sample of 182, eighty were identified as permanent year-round residents of the Valley. Two other classifications were used. Temporary residents who either commute on a weekly basis or reside in the Valley on a seasonal basis, not in excess of eight months per

year; and non-residents who commute on a daily or every other day basis. The former category included 37 employees while the latter included 65 persons or 36 percent of the sample.

Of those classified as permanent residents, 61 (76%) owned their houses, 10 (12%) rented them, and 9 (11%) were reported as "other", which includes settlers on squatter land. Almost two thirds lived in concrete or cement block houses, while a third lived in mud houses. All of those included in this category have lived in the Valley for at least seven years, with almost one half of the sample having been born in the Valley. When asked to give reasons which have induced them to live in the Valley, the most common response was the existence of family ties (cited in 24% of the answers), closely followed by "was born in the Valley and do not want to migrate" (cited in 17% of the answers). Other frequently given answers included owning a house, liking the Valley, owning agricultural land and having a good job, in that order. When asked about factors which might induce them to leave the Valley, only 31 percent of those asked responded by citing such factors as getting a better job outside the Valley (36 percent of those responding), lack of public services, inadequate social environment, and unfavorable weather conditions.

Forty percent of all employees considered as temporary residents resided in the Valley on a seasonal basis, while the other sixty percent commuted on a 4-6 day cycle basis. Of those considered in this category 27% have started their temporary residence less than a year ago. Thirty five percent started it between one and two years ago, while 38% have been temporary residents for between five and seven years. More than half of this subsample resided with friends, about a third resided with family, and a sixth resided alone. Half of the temporary residents identified their original place of residence as the occupied territories, while the other half identified it as the East Bank. Of the latter group 50% came from the Amman-Zarqa area and 40% came from the Irbid area. Only one in five of those classified as temporary residents expressed a willingness to live in the Valley. The most commonly cited reasons for this attitude included: family commitments outside the Valley (cited 25% of the time), inadequate public services (21%), inadequate social life (19%), ownership of property outside the Valley (6%), low salary (6%), hot weather (4%), and not owning agricultural land in the Valley (4%). When those who expressed an unwillingness to settle in the Valley were asked about factors which might attract them to live there, almost one third responded that nothing would entice them to do that. Adequate housing was cited in 18% of the responses, higher salary in 15%, social activities in 15%, owning agricultural land and adequate public services in 8% each. It thus seems that under the best conditions only about 70% of those employees who are temporary residents would consider to become permanent residents of the Valley. When temporary residents were asked to prioritize public services, the top rank went to the improvement of housing conditions and to the development of recreational facilities (18 percent of the responses, each). Lower priorities were placed on drinking water (13%), general stores (11%), health services (11%), electricity (9%) and transportation (5%).

Of the 65 respondents classified as non-resident commuters: 39 commuted from Salt, 17 from Irbid, and 9 from the Amman-Zarqa area. A third of the total commuted by jitney (service taxes), a quarter by contracted car pools, a fifth by private automobiles, and only 4 percent by government vehicles. This group was slightly more willing to reside in the Valley than those on temporary residence status: one of every three in the sample expressed such willingness. Seventy percent of those willing to settle in the Valley were male employees, while 70% of those not willing to settle were female employees. Three quarters of those willing to settle cited the avoidance of the commuting trip as the main reason for their attitude, while only 7 percent cited the fact that they liked the Valley, as their main reason. Family commitments outside the Valley, unfavourable social life, inadequate public services and inadequate housing, were again the most frequently given reasons for not wanting to live in the area. These four factors accounted for 84 percent of the responses. Adequate housing, social activities and health services were the most frequently given factors which would attract those who are positively disposed to settling in the Valley.

A final part of the employee survey was devoted to their attitudes towards the new JVA housing units. Of the total sample of 182, only 28% expressed a willingness to purchase one of these units. Of those, 42% already owned property in the Valley. The reasons given for not wanting to purchase a unit included not desiring to settle in the Valley (cited 22% of the time), not being able to afford it (20%), housing unit too small (16%), already owning a house in the Valley (10%), poor quality of construction and design (9%), and does not allow privacy (7%). Among those willing to purchase such a unit, sixty percent were found to be willing and able to pay between JD 15 and JD 20 per month, while a quarter expressed a willingness and ability to pay only JD 10. It should be noted that the actual mortgage payments are presently set at JD 19.400 (\$65) per month.

4.4 THE ROLE OF WOMEN

Women play an important role in the Valley's economy and development. They constitute one quarter of the total labor inputs in the Valley: 18% of all paid labor and 37% of all family unpaid labor. The lives and attitudes of women in the Valley have been influenced by the variety of development projects which have been completed there during the past few years. Perhaps the most important change has occurred in the area of education. While about 90% of all women of age 15 and above were illiterate in 1973, this percentage has dropped to about 75% in 1978. The number of females in school has increased by 77% during the same period, with the largest relative strides made in both the preparatory and secondary stages in which growth was 109 and 181 percent, respectively, during the same period. This jump accounts, at least partially, for a drop in the number of women who work on an unpaid basis in family farms. This number has dropped from 2,806 in 1975 to 3,510 in 1978. It should be noted, however, that the number of females per 10,000 population who are actually enrolled in school, continues to lag behind the national average by about 30 percent. Another reason for the drop in the number of unpaid women working in agriculture is the combination of increased farm income resulting from better yields and higher agricultural prices, and the availability of relatively cheap

foreign labor. These two factors have probably contributed to the substitution of this labor for unpaid work by women.

As part of the environmental assessment for Stage II of the Valley development scheme, Arthur D. Little, Inc. has conducted interviews with more than 40 valley women. It was concluded that female participation in the agricultural labor force is correlated with poverty, and that paid women laborers were predominantly widows, single, or members of very poor families by village standards. There are about 5,000 women who are employed in paid agricultural jobs. The low economic status is reinforced by the wage structure which pays women at only half the rates of males, including foreign males; for four hours of work a female is paid JD 1 or roughly \$3.40, while a male doing the same work for four hours receives JD 2 or \$6.80. This discrepancy is justified by such comments as: "men work harder than women," and "men's work is harder than that of women." Assuming that a woman is the only wage earner in her household, as happens often when children attend school, her annual income, including some overtime, would probably total about \$680. If she supports a family of three, herself plus two children, their per capita income is only \$226, considerably lower than Jordan's national average of \$610.

In addition, rural women care for each family's domestic animals--cows, goats and chickens. However, the most onerous responsibility of most rural women, of both high and low income is carrying the family's domestic water, typically about 1/2 to 1-1/2 miles each day from a public well or tap or the EGMC to their homes. The piping of water is quickly reaching an increasing number of households, and is planned for all houses in the Valley. The main transmission lines and associated reservoirs have been completed, and work on distribution networks is currently underway.

Nearly all women interviewed stated their desire to limit their family's size. However, their efforts have been hampered to date by lack of clinics and clinic female staff. Many women would like to improve their skills. However, most think primarily of household skills, such as nutrition, child care, sewing, spinning, and embroidery, rather than marketable skills. Nearly all responded favorably to the establishment of community centers; these centers and their programs were viewed primarily as social outlets, rather than as opportunities for developing employable skills.

Although many of the women work in agricultural activity, either with their husbands or as paid laborers, only those of Karama expressed interest in improving their agricultural skills. To other women, working in the fields indicates low status. In general, those women in the most desperate financial circumstances, namely widows and wives and daughters of very poor families, were interested in finding better jobs and earning more money. Most said that child care would not be a problem, since their mother-in-laws or eldest daughters could care for the children.

Awareness and understanding of economic and social development processes increased with literacy. Female teachers were the only women who felt comfortable talking about how local decisions were made, about the types of community development projects most suitable for the village, and about investment strategies.

Although the Valley women are energetic and vital, they expressed boredom with their lives. The level of modernization in rural Jordan is high as measured by exposure to the outside world, urban-rural linkages, and attitudes toward change. The constricting lives of rural women is manifested throughout the Third World by the migration of young women to urban centers at a rate which approaches that of young men. It is likely that an increasing out-migration of educated Valley women will occur over the next generation. Both mothers and daughters interviewed aspire to achieve high educational levels and to qualify for occupations such as teachers and nurses. This is at least partially attributable to increased levels of education and to exposure to urban ways of life which are occurring as a result of improved services. Women, for example, are being relieved from the duties of carrying domestic water, since water supply systems have or are in the process of being installed in most parts of the Valley. The introduction of electricity and the concomitant acquisition of appliances such as refrigerators, and television sets also contributes to the urbanization of attitudes of both men and women in the Valley.

Work available to females has traditionally been repetitive and unchallenging. The more challenging tasks of decision-making marketing and equipment handling have traditionally been considered man's work. While no major programs has been undertaken to train women for these more challenging tasks, JVA has endeavored to hire women for work in the grading and marketing center at Arda, where about one half of all workers during the first experimental season (Spring of 1980) were women. They were paid the same as their male co-workers, and were provided with transportation to and from the job. It is interesting to note that this short experience is already having an impact on the attitudes of males, who sometimes concede that "women are at least as good, perhaps better" than men for this type of work. This type of transformation, however, is inevitable as a result of higher levels of education and aspiration among Valley women.

In an effort to assess the attitudes of Valley women toward work in agricultural industries and particularly in the Arda grading and marketing center, the JVA Planning and Analysis Unit has conducted a study in which 185 women residing within 15 kms of Arda were interviewed. Students were not included in the sample. Of those interviewed, 18.7% were between 20 and 30 years old, 28.8% between 30 and 40, 22.2% between 40 and 50, and 3.9% between 50 and 60. Three quarters of the women interviewed were illiterate, and only 4.8 percent had completed parts or all of their preparatory and/or secondary education. The average household to which the interviewed women belong had 7.2 members, 2.09 of whom were students. The average number of workers per household was 1.32 males and 0.73 females. The latter were mostly occasional paid or unpaid agricultural workers. In fact, half of the women interviewed were working, and two thirds of those working were unpaid. No significant difference in the literacy rate was found between working and non-working women. The probabilities of working in agriculture, however, have been found to decline as the women's level of educational attainment increased.

Of those women not working, 39.2% cited their family's objection as the main reason for not joining the labor force. Other reasons given included being occupied in raising a family (47.9%), no need to work (6.8%), and other

(6.1%). When asked about their willingness to work in the grading and marketing center, 11.9 percent of the total sample provided a positive response. Almost half of those were unmarried and less than 20 years old, while 18.2% belonged to families in which the head of household was unemployed.

Three quarters of those willing to work in the Center preferred to work mornings, while 13.6% preferred the afternoons and/or evenings in order to devote the mornings to their homes and families. The average expected pay was JD 60 (\$200) per month plus transportation to and from work. When asked whether they would be willing to learn how to operate farm machinery and be subsequently employed in that line of work, 14 women provided positive responses, with the proviso that employment be on their family farms. Older and non-working women generally rejected the idea. Some of those who rejected the idea cited such reasons as "this is a man's job", or "our families would not permit this".

It is clear from the above that while many social and cultural values stand in the way of large-scale employment of women in other than family-sponsored agriculture, some women are getting increasingly involved in paid non-family-sponsored agriculture or non-farm employment. This is occurring as a result of education and/or financial need. The willingness to participate in such activities is highest among younger women with few family responsibilities and with some level of education.

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Appendix I

JORDAN VALLEY IRRIGATION PROJECTS: STAGE I

This Appendix was prepared by the Planning and Analysis Unit of the Jordan Valley Authority. It is a status report as of October, 1979.

JORDAN VALLEY IRRIGATION PROJECTS: STAGE I

Stage I irrigation projects encompass all the irrigation projects that utilize. The free unregulated flow of the Yarmouk River, and the free and regulated flow of the side wadies between the Yarmouk River and the Dead Sea; and the Jordan Valley Irrigation Project - Stage II refers to the project that will utilize the regulated flow of the Yarmouk River by building a dam on this river at Maqarin.

Stage I consists of the following projects:

1. East Ghor Canal Project.

This project is comprised of the following components:

- A 960 m tunnel starting at the Yarmouk River and discharges into the beginning of the East Ghor Main Canal near Adassiya.
- The concrete lined East Ghor Main Canal extending from the tunnel outlet southward for a distance of 69.04 km, with a capacity of 20 cu.m/sec.
- The 8 km extension of the East Ghor Main Canal from station 70 near Deir Alla to station 78 near Damya Junction.
- A network of lateral concrete lined canals with a total length of 560 km.
- A network of operation and maintenance and farm roads.

This project was built progressively between the years 1962 and 1969. The first 70 km of the canal and its distribution network utilize the unregulated flow of the Yarmouk River and the regulated and non-regulated flow of the side wadis north of the Zarqa River, the irrigated area is 12,000 ha approximately. The construction of this part of the E.G.C. project was financed by U.S.AID. The 8 km extension was built between 1966 and 1969 and was financed by the Kuwaiti Fund. The area this extension was to irrigate from the Khalid Idn Walid Dam whose construction on the Yarmouk River was suspended in June, 1967 is about 1,300 ha.

2. Zarqa River Complex.

This scheme regulates the flow of the Zarqa River and allows the use of its waters to irrigate by sprinklers 5,076 ha and to supply the 1,300 ha under the 8 km extension of the East Ghor Main Canal with its water requirements. The scheme consists of the following projects:

a. King Talal Dam

This 92.5 m high dam on the Zarqa River has a live storage capacity of 48 Mm³. Construction of the dam started in 1972 and was completed in 1978. Because of the draughts of the past few years the dam impounded only 25 Mm³ in 1978 and 15 Mm³ in 1979.

Consultants:	Energoproject, Yugoslavia
Contractors:	Planum, Yugoslavia
Project Cost:	\$46 million
Kuwait Fund Loan:	\$16.8 million
Abu Dhabi Fund Loan:	\$5.6 million

b. East Ghor Canal 18 km extension

This project consists of:

- Extension of the East Ghor Main Canal by 18 kms from the end of the 8 km extension to a point 2 km south of Karama.
- Four pumping stations.
- A diversion weir on the Zarqa River and a 2 km long carrier canal that discharges water into the East Ghor Main Canal immediately after it crosses the Zarqa River.
- A 350 km network of pressure pipes of various diameters.
- A network of operation and maintenance and farm roads.

This project irrigates a total area of 3,650 ha divided into 944 farm units of 3 to 4 ha area.

Construction of the project started in March, 1975 and was completed in June, 1978.

Consultants:	Dar Al-Handasah, Lebanon
Contractors:	Cho Suk Construction Co., S. Korea
Project Cost:	\$15 million
AID Loan:	\$ 10 million

c. Zarqa Triangle Irrigation Project

This project consists of:

- A diversion weir on the Zarqa River and a desilting basin adjacent to it.
- A 18 km carrier pipe of 900 mm and 800 mm diameter.
- A 9.5 km carrier pipe of 450 mm and 400 mm diameter.

- A 150 km network of pressure pipes of various diameters.
- A network of operation and maintenance farm roads.

This project irrigates 1,500 ha divided into 411 farm units of 3 to 4 ha area.

Construction started on the Project in June, 1975 and was completed in May, 1978.

Consultants:	Dar Al-Handasah, Lebanon
Constructors:	Cho Suk Construction Co., S. Korea
Project Cost:	\$5.8 million
AID Loan:	\$4.5 million

3. Northeast Ghor Complex

This irrigation scheme is comprised of the Northeast Ghor Irrigation Project and the Wadi Arab Dam and Irrigation Project.

a. Northeast Ghor Irrigation Project.

This project utilizes the unregulated flows of Wadis Arab and Jirim and the regulated flows of wadi Zeglab. The project was designed and implemented using pressure pipe networks to irrigate an area of 2,760 ha of which 1,760 ha area new lands above the East Ghor Main Canal, and 1,000 ha are converted from the surface irrigation system of the East Ghor Canal to sprinkler irrigation.

The project consists of:

- A diversion facility on Wadi Jirim and a 1 km carrier pipe 600 mm in diameter.
- A distributary pipe 30 km long crossing the project area ranging in diameter from 200 mm to 900 mm.
- Ziglab carrier pipe connecting the distributary pipe to Ziglab reservoir.
- A 278 km network of pressure pipes.
- One pumping station.
- A network of operation and maintenance and farm roads.

Work started on the Project in August 1976 and was completed in March 1979.

Consultants:	Dar Al-Handasah, Lebanon
Contractors:	Cho Suk Construction Co., S. Korea
Project Cost:	\$13 million
IDA Loan:	\$6 million
OPEC Loan:	\$1.65 million

b. Wadi Arab Dam and Irrigation Project

The project aims at regulating the flow of Wadi Arab and to irrigate by sprinklers 450 ha of new lands and convert to sprinkler irrigation an area of 800 ha.

The project consists of the following components:

- A zoned earth fill dam on Wadi Arab, with a live storage capacity of about 6 Mm³, a height of 63.5 m and a crest length of 411 m. The volume of fill is estimated at 1.4 m³.
- A carrier pipe connecting the dam to the distributary pipe of the Northeast Ghor Irrigation Project, and serves both the Northeast Ghor Project and the Project area. The pipe is 3,200 meters long and 1,350 mm in diameter.
- A distributary pipe crossing the Project area with a total length of 11.5 km and a diameter ranging between 250 and 700 mm.
- A pressure pipe network with a total length of 136 km and diameters ranging between 100 mm and 200 mm.

Final design of the Project started in November 1977, and site investigations have been conducted under the supervision of the consultants. Reviewing Consultants were also appointed for this project. Preparation of the final design and tender documents is expected to be completed in January 1980. Contractors have been pre-qualified and tendering for the Project is expected to start in February 1980.

The project will irrigate 1,250 ha of which 820 ha will be conversion from surface to sprinkler irrigation.

Consultants	Nippon Koei, Tokyo, Japan, in association with: Nagai Engineering Co., Kyoto, Japan
Estimated Cost:	\$52 million
OEFC Loan:	\$33 million

c. Hisban-Kafrein Irrigation Project

This project consists of:

- Kafrein Dam and reservoir constructed in 1967 with assistance from the U.K.
- A diversion weir on Wadi Hisban and a carrier pipe to carry the flood of Wadi Hisban and discharge it into the Kafrein Dam reservoir.

- A pumping station and a seepage collection pond to allow pumping of the seepage water from Kafrein reservoir back into the reservoir.
- A 63 km network of pressure pipes.
- A network of operation and maintenance and farm roads.

Work on the Project was started in August 1976 and was completed in December, 1978. The Project irrigates 1,550 ha divided into 560 farm units of 3 to 4 ha area.

Consultants:	Sir M. MacDonald and Partners U.K.
Contractors:	Cho Suk Construction Co., S. Korea
Project Cost:	\$9.6 million
German Capital Aid through KFW:	\$7.2 million

4. Portable Farm Equipment

Sprinkler equipment for a total of 2,785 farm units of the new projects have been procured and stored in three locations in the Jordan Valley. JVA is now supplying this equipment to farmers on long-term credit basis (10 years at 6% interest).

Cost of equipment:	\$5.5 million
AID Loan:	\$4.5 million

5. Sub-surface Drainage Project

Field investigations, analysis and design of a tile drainage network has been completed for about 3,200 ha of irrigated area of Stage I Projects. Orders to procure perforated PVC pipes have been placed and their delivery is expected in December, 1979. Area requiring urgent drainage networks is about 1,800 ha most of which lies in the East Ghor Canal Project, and some at the beginning of the East Ghor Canal 18 km Extension Project.

The procured PVC pipes are of the flexible and of the rigid types to test the ease of installation and the performance efficiency. A trenching machine has been procured for the job and has been delivered; six dump trucks and two shovel loaders were also procured and delivered to the stores in the Valley.

Construction is scheduled to start in December 1979 at a rate of 800 ha per year.

Consultants:	Harza Overseas Engineering Co., U.S.A.
Contractors:	JVA Force Account
Project Estimated Cost:	\$3 million

6. Land Redistribution

The process of farm land redistribution can commence after the irrigation project is completed and the "as-built" drawings area superimposed on the drawings of land ownership before the project was started and the land redistribution law is then applied.

In the East Ghor Canal 18 km Extension Project, the first to be completed among the new irrigation projects land redistribution started in September 1978. Of the 944 farm units included in the Project, 826 farm units have been distributed, and a number of them went into operation in the 1978 farming season. The Project is going into operation this season of 1979.

Of the 411 farm units in the Zarqa Triangle Irrigation Project, 387 farms have been distributed.

Land distribution in the Hisban-Kafrein Project started in August 1979, immediately after the completion of the "as-built" drawings. Of the 560 farm units in the project area, 140 have been distributed and the Project will go into operation this season of 1979.

In the Northeast Ghor Irrigation Project, the conversion area of 1,000 ha was distributed in 1963. The "as-built" drawings for the Project were completed in September 1979 and land redistribution of the new lands will start in October 1979.

The severe draught of last year did not permit earlier operation of farms that have been distributed, and is also imposing a delay in the operation of farms during this farming season.

Public Utilities Sector

Project under this sector are the Jordan Valley Electrification Project and the Domestic Water Supply Project.

1. Electrification Project

This project is designed to supply electricity to 36 villages in the Jordan Valley, and to several pumping stations in the irrigation and the domestic water supply projects. The project is scheduled for implementation in two phases.

Completed in July 1978, the first phase is now in operation and consists of the following components:

- Three high tension 33 kv lines feeding electricity to the Valley with a total length of about 65 km, and an inter-valley high tension 33 kv line 110 km long extending between Adasiya in the north and Sweima on the north shore of the Dead Sea in the south.

- Low voltage networks and 54 transformers serving eight pumping stations and 26 villages.

The number of house connections made under this phase is about 8.500 connections.

The second phase of the Project is under construction and consists of the following components:

- A fourth 33 kv feeder line from Ajlun on the highlands to Kreiymeh in the Valley with a length of about 20 km.
- Low voltage networks and transformers to supply electricity to the agricultural research station of the Faculty of Agriculture and to five villages in the Valley.

Consultants:	Lahmeyer International, West Germany
Contractors: High tension:	Elektrim, Poland
Low voltage:	Kabelmetal, West Germany
Electricity	
Poles:	Jordan Electricity Authority
Project Cost:	\$12.2 million
German Capital Aid	
through KFW:	\$8.3 million

2. Domestic Water Supply Project

This project has been designed to supply potable water to the Valley villages from springs and tube well sources. Planned to be implemented in phases, the project in its first phase consists of the supply and installation of pumping stations, chlorinating units and main pipelines, and of the construction of reinforced concrete reservoirs.

Phase I works for 14 villages between Khazma and Dharat Al-Ramil in the middle sector of the Valley were completed in 1973, and JVA installed a 6 km main line to two other villages in this sector.

Phase I works for four villages in the southern sector between Karama and Rauda, were completed in January 1979, and have been recently extended to serve a fifth village (Ghor Nimrin).

Phase I works for ten villages between Adasiya and Sleikhat in the northern valley started in January 1979 and will be completed in May 1980. They are now 55% completed.

The second phase of the project consists of the supply and installation of smaller diameter pipelines (not larger than 75 mm) and the supply and installation of house connections and water meters.

Water meters for the Project have been procured and supplied to JVA stores, and the pipes needed for Phase II works in the middle sector villages have also been procured and stored. Tender documents for the rest of the works have been completed and contractors interested in bidding for the works have been prequalified. Work on Phase II is expected to start in January 1980 and be completed in March 1981.

Consultants (Phase I and Phase II):	VBB, Sweden
Contractors (Phase I):	General Contracting Co., Jordan (Middle Sector) Cho Suk Construction Co., S. Korea (Northern Sector)
Project Cost (Phase I and Phase II):	\$8.3 million
German Capital Aid through KFW:	\$3.4 million

Transportation Sector

Listed under this sector are the Yarmouk-Dead Sea Road and the upgrading of operation and maintenance and farm roads in the existing East Ghor Canal Irrigation Project.

1. Yarmouk-Dead Sea Road

This 105 km road with 7.2 m carriage-way crosses the Valley from north to south and serves the dual purpose of carrying the input of goods to the Valley and exporting its agricultural produce.

This Project consists of the following works:

- Widening of 44 km length from 3, 4 and 5 m width to a 7.2 m carriage-way and a 2 m shoulder on each side.
- New construction of 7.8 km between the village of Joufa and the sea level marker on the Amman-Jerusalem highway.
- Hot mix asphalt surfacing of the entire length of 105 km.

Work on the Project started in January 1975 and was completed in August 1977.

Consultants:	De Leuw Cather, International, U.S.A.
Contractor:	Shahin Engineering co., Jordan and Force Account of the Ministry of Public Works
Project Cost:	\$6.4 million
AID Loan:	\$3.9 million

2. Operation and Maintenance and Farm Roads

To rehabilitate and upgrade the roads in the existing East Ghor Canal Irrigation Project area, this project was initiated and was phased for purposes of implementation.

The project consists of a 5 m carriage-way and one meter shoulder on each side of the road, with a base course, a prime coat and a bitumenous seal coat that will provide an all weather surface.

Works of the first and second Phases of the Project started in September 1977 and were completed in May 1979. 100 km of these roads have been upgraded.

Cost of the first and second Phases:	\$1.2 million
AID contribution:	\$605,000

Grading, Packing and Marketing Centers

To improve the process of marketing of the Valley agricultural produce, three centers were planned for construction in the Valley. Grading and packing of the Valley produce will be made in these centers which will also serve as wholesale markets to sell the produce through auctioning. A fourth center, at North Shuna, is in existence and will be used to grade and pack citrus fruits.

1. Arja Center

The first constructed among the three centers in the Plan, the Arda grading and packing center contains an 8,000 sq. m. grading and packing hall with a cafeteria and a box making hall, and two auctioning halls 6,000 sq.m. each. The center also contains 1,000 sq.m. of office space and a water reservoir.

Work started on the construction of the center in August, 1977 and was completed in May 1979.

Grading and packing lines and other mechanical equipment for the Center have been ordered and will be supplied and installed in December 1979. The grading and packing lines were ordered from ROADA, an Italian supplier. The center is scheduled for operation in February 1980 at the time of the harvesting of the Valley winter season.

Consultants:	Jordan Engineering Consortium
Contractor:	Jordan Development Co., Jordan
Project Cost:	\$3.6 million
Government of the Netherlands grant:	\$2.1 million

2. Wadi Yabis Center

A feasibility study for establishing this center was performed by the Tropical Products Institute of the United Kingdom. The center consists of one big hall, grading and packing will be done in one part, and auctioning on another. The two parts are separated by offices. The total area is about 22,000 sq.m.

Preparation of final designs and Tender Documents was completed by the Consultants, Covell Matthews Partnership, the documents were distributed to prequalified contractors and bids will be opened on October 22, 1979. Work is expected to start in December and will last for 18 months.

Consultants:	Covell Matthews Partnership, U.K.
Project Cost:	\$5.6 million
ODA Loan:	\$2.9 million

3. South Shuna Center

This center will be built in stages. JVA is negotiating with Covell Matthews Partnership to prepare the final designs and tender documents for the first stage, and for supervision of construction.

Work is expected to start in May 1980 and be completed in July 1981.

Project Cost:	\$2.6 million
German Capital Aid through KFW:	To be negotiated.

Social Services Sector

A. Village Development Project

Designed to be implemented in phases, this project consists of the following phases and components:

1. Phase I

a. Schools

These have been completed and are now fully operational. Operation of a number of them started at various times since September 1978.

26 schools of various sizes have been built decently furnished and have been staffed properly. The new schools are a source of pride to teachers, students and parents.

The new schools contain 274 classrooms and can accommodate 9,864 students comfortably, the schools include 25 libraries already furnished with reference books and materials, 26 chemistry labs, 9 physics labs, 12 home economics rooms, 14 handcraft rooms all equipped and furnished with high standard equipment and furniture. They also include 25 stores where modern athletic tools and uniforms are kept for use by the students, and 26 school administration buildings and adequate facilities, refrigerators, T.V. sets and stereo equipment. Levelling of the playgrounds was completed, and water connections have been made to 13 schools, the other 13 are being served by water trucks until the domestic water networks are built in the remainder of the villages. Electricity connections were also completed.

b. Health Centers

A total of ten health centers have been built and are now being equipped and furnished. The sizes of these centers and the respective number and function are described below:

- (1) Three type "A" health centers of an area 2,311 sq.m. each providing space and facilities for the following:
 - Outpatient clinics
 - Inpatient service and operation theater for surgical cases of frequent occurrence in the Valley.
 - Dental clinics
 - Maternity and child care
 - X-Ray facilities, a laboratory and a pharmacy
 - Administration offices and waiting halls.
- (2) Three type "B" health centers of an area 443 sq.m. each providing space and facilities for the following:
 - Outpatient clinics run by visiting physicians twice a week
 - Maternity and child care service
 - A pharmacy
 - Administration offices and waiting halls
- (3) Three type "C" health centers of an area 182 sq.m. each with space and facilities to handle emergency cases in transit to other centers and to provide outpatient clinic services by a visiting physician twice a week.

Complete furniture and modern equipment have been ordered and a portion of these have been delivered.

Operation of these centers by the Ministry of Health will commence by mid-December 1979, when they have been equipped and furnished.

c. Housing for Government Employees

Three hundred housing units have been completed. Each is composed of two bedrooms, a living room, a kitchen, a bathroom and a porch with an area of 93 sq.m. The demand on these houses has been very high and some were occupied by employees even before the final touches were done.

The advantages of these units in operating the new projects of health centers, schools, government buildings, electricity, domestic water, Farmers' Association Activities, irrigation and marketing centers are substantial.

JVA is now in the process of allocating these houses to the Government Ministries and Departments and they will be rented out to their employees.

d. Local Administration Buildings

Six type "B" building of an area of 414 sq.m. each and one type "A" building of an area of 1,650 sq.m. have been completed. These will provide the office space and facilities for government departments that are or will be functioning in the Jordan Valley. The Farmers' Association has its share of offices and meeting halls in these buildings.

Furniture for these buildings has been ordered and is being supplied now. Operation of these buildings will start as of December 1979.

e. Community Centers

One community center has been built and is being equipped and furnished. A pilot project plan has been adopted for the center and operation has commenced, and as of September 25, 1979, a training program for females in sewing started. Training in other skills for males and females will commence soon. Initial programs include training to generate skills in such categories as electricians sanitary fixtures for buildings, and home economics, audio programs will be conducted and programs for lectures in various community interests are being finalized.

The center includes limited choices of sport facilities, a meeting hall that will be used for various community functions.

Consultants for Phase I:	Jordan Engineering Consortium, Jordan
Contractor for Phase I:	Shin Seung Corporation, South Korea
Project Cost:	\$16 million
AID Loan:	\$11.55 million

2. Phase II

The project component in this phase is as follows:

a. Schools

A total of 29 schools will be built or expanded during this stage. These will add 379 classrooms to accommodate 13,644 students, and will contain 9 physics labs, 21 chemistry labs, 8 home economics rooms, 13 handicraft rooms, 20 libraries, 21 stores and 24 school administration buildings.

b. Health Centers

One type "A" and two type "B" health centers will be built under this stage of the project.

c. Local Administration Buildings

Two type "A" and two type "B" buildings will be built under this stage of the Project.

Tender documents for this phase were prepared by JVA, prequalification of contractors was done and seven contractors were qualified to bid. Only two responded and bids were opened on September 23, 1979. Bids are now being analyzed. It is expected that work can start around January 1980 and would last for 18 months.

Project Estimated Cost:	\$17.2 million
AID Loan:	\$6.0 million

Housing Program

The Jordan Valley Housing Program has been designed to provide acceptable standard housing for the Valley population. Care has been taken to maintain flexibility in the Program and allow several options for the beneficiaries to choose from.

The Program is structured to help mainly the low income Valley population, seventy percent of the housing funds made available by JVA are to be used to extend mortgage loans to low income beneficiaries earning JD 60 or less per month, and thirty percent of the housing funds are to be used to extend mortgage loans to beneficiaries whose monthly earning is in excess of JD 60.

a. Individual Housing Loans

Under the program, housing loans can be extended to individuals in the Valley to finance the construction of a new house for the improvement and/or the expansion of an existing house. In all cases the beneficiary has to meet the following criteria:

- a. He should have a title to the plot of land over which his house is or will be built.
- b. He shall have obtained a building permit from the JVA.
- c. The house shall include a bathroom and a kitchen.

The housing bank, acting as an administrator for JVA funds, appraises the applicants and, upon recommendation from the JVA, extends the loan to the applicant.

About 19 loans have been extended under which a total of JD 36,600 have been committed.

b. Construction of Houses by JVA

1. Background

Another alternative is open for beneficiaries to acquire houses built by JVA through contractors. Mortgage loans are being made available for eligible beneficiaries who opt for this alternative.

JVA decided on this alternative to help meet the pressing demand for housing. The individual mortgage loans program moved only very slow because of the following reasons:

a. Individuals desiring to build their own houses using mortgage funds very seldom had a legal title to the plot of land. Lands within town planning zones were owned jointly by several people. Parcellation of these lands among owners required a substantial surveying effort and a rather time consuming legal process.

b. The Jordan Valley Development Law No. 18 for the year 1977 provided the legal grounds for land redistribution within village boundaries. The redistribution process is still ongoing but is rather slow because of the needed surveying effort. The thrust of the efforts of JVA and the Department of Lands and Surveys is being directed towards redistribution of farm land and towards surveying of pipelines for the final designs of Stage II irrigation project.

Under these circumstances, JVA decided to move ahead and build 2,100 housing units which comprises a small percentage of the additional houses needed to be built in the Valley.

Construction of houses by JVA was initiated by preparing designs and tender documents for the housing project. Bids were invited and two construction contracts were awarded on March 28, 1978.

2. Project Implementation

A total of 1,050 housing units are being built under each of the two contracts.

3. Processing of Mortgage Loans

Over 2,300 applications were received by JVA whose applicants desire to purchase JVA built houses. Their applications are examined by both the JVA and the Housing Bank. Thus far a total of 730 applications have been approved and their applicants are eligible for a mortgage loan. Other applications are being examined and the results will be sent to the Housing Bank soon.

Out of the approved applications, 216 are in villages of the "Southern Sector" i.e. from Karama south. The maximum amount of the mortgage loan is JD 2,500 and it is expected that disbursement of these mortgage loans will be done in a very short time.

Consultants:

Mortgage Loans:	National Savings and Loan League, U.S.A.
JVA Construction: Contractor:	Jordan Engineering Consortium, Jordan Trans Orient Engineering Co., Jordan Shin Seung Corporation, South Korea

Project Cost:

JVA Construction:	\$22 million
Mortgage:	
AID:	\$4.0 million
German Capital Aid:	\$5.34 million

Appendix II

LOGICAL FRAMEWORKS*

*These Logical Frameworks are taken, whenever they existed, from the respective Project Papers. They are included in this report in order to provide quick access to the original expectations of the designers of the projects considered in this report.

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project:
From FY 1977 to FY 1979
Total U.S. Funding 8.0 million
Date Prepared:

ANNEX IV
Page 1 of 1

Project Title & Number: Sprinkler Irrigation Equipment

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <ol style="list-style-type: none"> Increase availability of produce for domestic consumption and export. Improved standard of living in project areas. 	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> Quantity of produce available in city markets, principally in Amman, and increase in exports of Jordan Valley produce. Increase in farmer's disposable income. 	<ol style="list-style-type: none"> Records of produce sales from Jordan Valley to city markets and export statistics. Surveys of farmer income and sales of consumer goods to farmers in project areas. 	<p><u>Assumptions About Linkage Between Project Purpose and Program-Sector Goal:</u></p> <ol style="list-style-type: none"> Increased crops will be marketed rather than consumed on the farm. Net returns to farmers on investment in sprinklers will be greater than without sprinklers.
<p>Project Purpose: Improve yield of agricultural crops in project areas.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status. Increased sales of produce by farmers in project areas.</p>	<p>Sales records and city market statistics.</p>	<p><u>Assumptions About Linkage Between Outputs and Project Purpose:</u></p> <ol style="list-style-type: none"> Training of farmers in use of sprinkler equipment will be successful; Expected increase in crop yields will be realized;
<p>Outputs:</p> <ol style="list-style-type: none"> Sprinkler irrigation system installed; Farmers trained in operation and maintenance of sprinkler equipment; Functioning credit system for purchase of sprinklers by farmers. 	<p>Magnitude of Outputs:</p> <ol style="list-style-type: none"> Sales of sprinkler equipment sufficient to irrigate 46,150 dunums by fall 1977; additional 38,050 dunums by fall 1978; additional 6,900 dunums by fall 1979. 3,000 farm operators using sprinkler irrigation by FY 1979. 	<ol style="list-style-type: none"> Physical inspection and JVC reports; Physical inspection, records of water sales and JVC reports; 	<p><u>Assumptions About Linkage Between Inputs and Outputs:</u></p> <ol style="list-style-type: none"> Timely construction and effective performance by contractor building irrigation water delivery system; Timely allocation of funds and timely delivery of on-farm sprinkler equipment.
<p>Inputs:</p> <ol style="list-style-type: none"> Land; Sprinkler equipment; Technical assistance in use and maintenance of sprinkler equipment; Farmer Credit. 	<p>Implementation Target (Type and Quantity)</p> <ol style="list-style-type: none"> 3,000 sets of sprinkler equipment together with spare parts, purchased and availability for distribution in Jordan Valley; Farmer credit availability. Warehousing and distribution of sprinkler equipment functioning. 	<ol style="list-style-type: none"> Suppliers invoices and shipping documents; JVC reports and warehouse records; Records of loans made by AAC 	<ol style="list-style-type: none"> Technical assistance and training will be available when needed.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Annex 7

Life of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____

Project Title & Number: Jordan Valley Village Development

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>Jordan Valley Development Goal:</p> <p>Improved welfare and productivity of present and future residents of the East Bank of Jordan River Valley</p>	<p>Measures of Goal Achievement:</p> <p>% of persons in sub-standard housing reduced, even as population increases. Scattered settlements minimized. 100% people have specified social services available in 19 villages</p> <ul style="list-style-type: none"> -Water -Health facilities -Classrooms <p>Residents indicate they are pleased with new arrangements.</p>	<p>Demographic survey.</p> <p>Demographic survey. Community records, demographic survey.</p> <p>Survey interviews</p>	<p>Assumptions for achieving goal targets:</p> <p>Village resettlement plan completed.</p>
<p>A.I.D. Project Goal:</p> <p>Stable, self-sustaining communities with basic social services established in villages supported under AID loan plus complement investments previously made by the Government of Jordan.</p>	<p>Measure of Project Goal</p> <p>Beneficiaries repay debts.</p> <p>Social services maintained at the national standard.</p> <p>Homes and community facilities maintained.</p>	<p>Housing Bank and GOJ records.</p> <p>Community and GOJ records; observation.</p> <p>Observation</p>	<p>Assumptions for Project Goal:</p> <p>Mid-East peace maintained. Employment opportunities and income opportunities of new production infrastructure adequate to stabilize settlers.</p> <p>An average person receiving fair share of production gains (income).</p>
<p>Project Purpose:</p> <p>Population locates itself in specified, serviced settlements.*</p> <p>* - Evaluation to concentrate on settlements where housing aid and sites available.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>900# housing sites sold by 1977. 600# housing units completed or effectively underway by 1977. 100% children attending school in 17 villages. 13 villages provided with potable water. Government services % health facilities are available to residents of 7 villages.</p>	<p>Housing Bank and GOJ records* on-site studies by AID</p> <p>* -includes JVC and local government records.</p>	<p>Assumptions for achieving purpose:</p> <p>Valley residents willing to locate. New settlers will go to planned areas. Income levels of population sufficient to purchase sites; build homes. Population can afford water connections. Employment opportunities attract settlers from outside Valley.</p>
<p>Outputs:</p> <p>Housing sites developed and financing available. Village streets. Health facilities constructed and operational. Municipal buildings constructed and in use. Classrooms constructed and operating. Commercial buildings constructed and in use. Water supply, mains and distribution system. Improvements to concrete panel plant. Social Development Center Houses constructed or remodeled.</p>	<p>Magnitude of Outputs:</p> <p>800 plots 20 kilometers 9 villages</p> <p>8 in specified villages 175 classrooms in 17 villages. 8 villages, as listed. 13 villages, as listed. 1 at Damiya. 1 at Krelymah \$2 million in loans</p>	<p>Housing Bank records, reports and Mission/AID-W inspection of sites (monitoring information).</p>	<p>Assumptions for achieving outputs:</p> <p>GOJ provides budget and staff to operate facilities effectively. Housing finance arrangements satisfactorily established.</p>
<p>Inputs:</p> <p>Technical Assistance to JVC (Grant Financing) for project implementation/ monitoring. Technical Assistance to the Housing Bank (Grant Financing) to establish Administrator's accounts. Provision of budget funds by GOJ to permit JVC to acquire land. Additional technical staff hired by JVC. Additional technical staff hired for USAID Housing Bank purchases mobile bank unit. AID/GOJ Loan & National Budget Funds</p>	<p>Implementation Target (Type and Quantity)</p> <p>3 experts--engineering & urban planning 1 expert--financial management Staff as required when facilities Staff as required by project progress 1 DH and 1 local hire during half 1976 Accomplished June 1975. Loan Agreement</p>	<p>A.I.D. records A.I.D. records GOJ records, site visits by AID Personnel A.I.D. Monitoring A.I.D. records A.I.D. inspection A I D</p>	<p>Assumptions for providing inputs:</p> <p>Execution of Grant Agreement and technical assistance is secured. Execution of Loan Agreement and conditions precedent are met.</p> <p>A law is passed permitting acquisition of land by JVC. JVC issues a building code for the Valley.</p>

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX 4

Life of Project:
From FY 1978 to FY 1982
Total US Funding \$ 8 million
Date Prepared August 15, 1978

Project Title & Number Jordan Valley Village Development II, 278-0205

Page 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program of Sector Goal: The broader objective to which this project contributes: (A-1)</p>	<p>Measures of Goal Achievement: (A-2)</p>	<p>(A-3)</p>	<p>Measures for achieving Goal targets: (A-4)</p>
<p><u>Jordan Valley Development Goal:</u> Improved welfare of present and future residents of the East Bank of Jordan River Valley.</p>	<p>Percentage of persons in sub-standard housing reduced, even as population increases.</p>	<p>Demographic and housing survey.</p>	<p>Village Development plans continue to be implemented. Other infrastructure (particularly irrigation) is in place and functioning effectively. Rainfall is adequate for system operations.</p>
<p><u>AID Project Goal:</u> Stable, self-sustaining communities with basic social services established in target villages.</p>	<p>100% of residents of target villages have access to basic education, health, and other public services. All facilities functioning, maintained, and fully utilized.</p>	<p>Demographic, socio-economic surveys. Observation Reports of relevant GOJ ministries or agencies. Special studies.</p>	<p>Mid-East peace is maintained. Employment and income opportunities are sufficient to encourage current residents to remain and new ones to arrive. Other Valley development projects, particularly those dealing with electricity and water, proceed as scheduled.</p>

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project:
From FY 1978 to FY 1982
Total US Funding \$ 8 million
Date Prepared August 15, 1978

Project Title & Number Jordan Valley Village Development II, 278-0205

Page 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1)	Conditions that will indicate purpose has been achieved: End-of-project status: (B-2)	(B-3)	Assumptions for achieving purpose: (B-4)
Provide selected Jordan Valley communities with the facilities needed to develop adequate public services and improve living conditions for Valley residents.	Schools, clinics and government buildings are staffed and in operation and occupied by locally residing students. 250-300 mortgages executed with eligible borrowers in equitable manner according to established procedures and regulations.	Ministries of Health and Education records and population census. Sample Surveys. Observations. Housing Bank records. Sample survey.	GOJ provides budget and staff to operate facilities effectively. Population desires facilities and is willing to use them. People desire and are able to afford to take out home mortgages.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1978 to FY 1982
Total US Funding \$ 8 million
Date Prepared August 15, 1978

Project Title & Number Jordan Valley Village Development II, 278-0205

Page 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for Achieving Outputs: (C-4)
Health facilities	1 Type A clinic, 3 Type B clinics.	Mission monitoring. Engineer and contractor reports. Observations.	Contracting procedure results in an acceptable bid by a qualified contractor with competent staff.
Schools	23 school buildings (300 rooms including 233 classrooms and numerous libraries, laboratories, etc.) in 17 villages.		Construction materials are ordered and arrive in a timely, efficient manner.
Government buildings	2 regional, 1 local facility.		Land acquisition is readily accomplished under the law.
Village streets	9 kilometers.		
Farm roads	43 kilometers.		
Housing mortgages	\$2 million in loans	Housing Bank records.	Surveying of house plots proceeds. Housing finance arrangements satisfactorily established.
			Expenditure of \$2 million in housing mortgage funds from Village Development I program.

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project:
From FY 1978 to FY 1982
Total US Funding \$8 million
Date Prepared August 15, 1978

Project Number & Title Jordan Valley Village Development II, 278-0203

Page 4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: (D-1)	Implementation Target (Type and Quantity): (D-2)	(D-3)	Assumptions for providing Inputs: (D-4)
<p>AID Loan Funds for:</p> <ol style="list-style-type: none"> Construction of community facilities including schools, clinics, and administration buildings. 	<p>Adequate JVA and AID staff as required by project progress for effective planning, monitoring, and supervising.</p>		<p>Execution of loan agreement, and conditions precedent are met.</p> <p>Expected funds are forthcoming from GOJ budget.</p>
<p>2. Housing mortgages</p>			
<p>JVA Funds from GOJ Budget for:</p>			
<ol style="list-style-type: none"> Construction of community facilities including schools, clinics, administrative buildings, village streets and farm roads. Land acquisition, engineering and supervision, and furnishings for item 1. 			

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Life of Project: From FY 1979 to FY 1983
Total U.S. Funding: \$ 7 million
Date Prepared: August 1, 1979

ANNEX 11-1
SUPPLEMENT 1

Project Title & Number: Village Development III, 278-0221

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes: (A-1)</p> <p><u>Jordan Valley Development Goal: Improved welfare of present and future residents of the East Bank of Jordan River Valley, Southern Ghors and Wadi Araba.</u></p> <p><u>AID Project Goal: Stable, self-sustaining communities with basic social services established in target villages.</u></p>	<p>Measures of Goal Achievement: (A-2)</p> <p>Percentage of persons in sub-standard housing reduced.</p> <p>100% of residents of target villages have access to basic education, health, and other public services. All facilities functioning, maintained, and fully utilized.</p>	<p>(A-3)</p> <p>Demographic and housing survey.</p> <p>Demographic, socio-economic surveys.</p> <p>Observation reports of relevant GOJ ministries or agencies. Special studies.</p>	<p>Assumptions for achieving goal targets: (A-4)</p> <p>Village Development plans continue to be implemented. Other infrastructure (particularly irrigation) is in place and functioning effectively. Rainfall is adequate for system operation.</p> <p>Mid-East peace is maintained. Employment and income opportunities are sufficient to encourage current residents to remain and new ones to arrive. Other Village Development projects, particularly those dealing with electricity and water, proceed as scheduled.</p>

ALL 1627-28 (1-73)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Village Development III, 278-0221

Life of Project: _____
From FY 1979 to FY 1983
Total U.S. Funding: \$ 7 million
Date Prepared: August 1, 1979

PAGE 2

NARRATIVE SUMMARY	OBJECTIVE: VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose: (B-1)</p> <p>Provide selected Jordan Valley, Southern Ghors and Wadi Araba communities with the facilities needed to develop adequate public services and improve living conditions for the residents.</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <p>Schools, clinics and government buildings are staffed and in operation.</p>	<p>(B-3)</p> <p>Ministries of Health and Education records and population census. Sample Surveys. Observations.</p>	<p>Assumptions for achieving purpose: (B-4)</p> <p>GOJ provides budget and staff to operate facilities effectively.</p> <p>Population desires facilities and is willing to use them.</p>

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____

PROJECT TITLE & NUMBER

Project Title & Number: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for achieving outputs: (C-4)
Health facilities	Type A clinic, Type C Clinic	Observation.	Contracting procedure results in an acceptable bid by a qualified contractor with competent staff.
Schools	22 school buildings (320 rooms including classrooms and numerous libraries, laboratories etc.)		Construction materials are ordered and arrive in a timely, efficient manner.
Government Buildings	1 regional, 1 local facility.		Land acquisition is readily accomplished under the law.
Access Roads	20 kilometers.		
Potable Water Supply	Installation of 4 kilometers of transmission and 20 kilometers of distribution pipe.		

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1983
Total U.S. Funding \$7 million
Date Prepared: August 1, 1979

Project Title & Number: Village Development III, 278-0221

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Inputs: (D-1)</p> <p>AID Loan Funds for :</p> <p>Construction of community facilities including schools, clinics, and administration buildings.</p> <p>JVA Funds from GOJ Budget for:</p> <ol style="list-style-type: none"> 1. Construction of community facilities including schools, clinics, administrative buildings, village streets and farm roads. 2. Land acquisition, engineering and supervision, and furnishings for item 1. 	<p>Implementation Target (Type and Quantity) (D-2)</p> <p>Adequate JVA and AID staff as required by project progress for effective planning, monitoring, and supervising.</p>	<p>(D-3)</p>	<p>Assumptions for providing inputs: (D-4)</p> <p>Execution of loan agreement, and conditions precedent are met.</p> <p>Expected funds are forthcoming from GOJ budget.</p>

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Project Title & Number: Yarmouk-Dead Sea Road Project A.I.D. Loan No. 278-W-01...

ment signed July 1, 1974

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To assist the Government of Jordan to improve the livelihood of the residents of the East Ghor Valley and to resettle the Valley by means of an organized program which will provide the essential social services and economic infrastructure.</p>	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> 1. East Ghor settlers increase from _____ to _____ by 19__ 2. Exports of agricultural goods from East Ghor increases by __% by 19__. 3. Per capita income rises. 4. New industries, handicrafts and increased opportunities for gainful employment. 	<p>Assumptions for achieving goal targets:</p> <ol style="list-style-type: none"> 1. Security conditions remain stable. 2. Other East Ghor development projects proceed on schedule (irrigation, housing, schools, etc.). 3. Viable marketing conditions and moderate inflation rate. 4. GOJ policies encourage new enterprises and industries.
<p>PROJECT PURPOSE:</p> <p>To provide the only north-south route in the Valley for the transportation of the inputs of goods and services for it's development and for the export of the agricultural produce from the Valley.</p>	<p>END OF PROJECT STATUS.</p> <ol style="list-style-type: none"> 1. Commercial traffic on 104.83 km new road increases 5% a year. 2. Lower Transport costs per mile for commodities. 3. Savings result on maintenance and operating irrigation system in Valley due to more economical access. 4. Lower vehicle maintenance cost. 5. Increased transportation time saving. (user savings). 	<p>ASSUMPTIONS FOR ACHIEVING PURPOSE:</p> <ol style="list-style-type: none"> 1. Weight limit on trucks enforced. 2. Adequate GOJ budget for maintenance of roads and equipment and new road is properly maintained. 3. Moderate rate of inflation and moderate rise in cost of fuel.

Appendix III

JORDAN VALLEY DEVELOPMENT LAW:
TEMPORARY LAW NO. 18 FOR THE YEAR 1977

This Law was published in the Jordanian official Gazette, Issue No. 2700, dated 16 May, 1977. The translation is by Mr. Aied Sweis, of the staff of USAID/Jordan.

We, Hasan Bin Talal The Regent

In accordance with para (4) Article (94) of the Constitution, and on the basis of the decision by the Council of Ministers dated 20 April 1977, do hereby approve in accordance with Article (31) of the Constitution, the following Temporary Law and order its promulgation and addition to the Laws of the state provided it will be presented to the Senate and House of Representatives in first meeting to be held.

PUBLISHED IN OFFICIAL GAZETTE ISSUE NO. 2700 DATED MAY 16, 1977

TEMPORARY LAW NO. (18) FOR THE YEAR 1977

Jordan Valley Development Law

Article I

This Law shall be called Jordan Valley Development Law for the year 1977 and shall become effective from the date of its publication in the official Gazette.

Article II

The following words and expressions whenever used in this Law shall have the meanings assigned thereto hereunder unless the content indicates otherwise:

- A. Jordan Valley or the Valley - The area which lies under sea-level, between the Jordan boundary to the north and the northern edge of the Dead Sea to the south and lower areas of the basins of the Yarmouk and Zarqa Rivers which lie up to 300 meters above sea level and any other area or areas the Council of Ministers decided to make a part of it.
- B. Authority - Jordan Valley Authority established in accordance with this Law.
- C. Board of Directors or Board - Board of Directors of Jordan Valley Authority.
- D. President of the Authority or the President - The President of the Jordan Valley Authority.
- E. Individual - Any Jordanian individual who has reached the age of maturity and is legally qualified. It shall also mean a legal body, a village, municipality, Government administration, or organization with legal entity.
- F. Land Classification - The official classification described in Volume III of the Master Plan Report of the Yarmouk and Jordan Valley project of 1955 or any subsequent classification approved by the Authority.

- G. Farm unit - Any tract of land irrigated from water of an irrigation project which had or shall have its boundaries determined by the Authority as a single unit.
- H. Housing Unit - A unit of land which lies within the boundary of a town or a village and had or shall have its boundaries determined by the Authority as a single housing unit for the purpose of housing only.
- I. Other lands - All other lands expropriated except those mentioned in paragraphs G and H of this article.
- J. Family - All those persons living in one household and jointly supported by one head person whether they are off springs, descendents, or wives, including the descendents, wives, servants, relatives and any other person for whom the individual is legally responsible for managing his affairs and supporting him.
- K. Lessee - The Authority.
- L. Lessor - The person or persons in whose name or names is registered, in accordance with the provisions of this Law, a unit or units of lands or shares thereof falling within the irrigation project area or any area and leased in accordance with this Law.
- M. Sub-Lessee - The professional farmer who rents a farm unit from others with the approval of the Authority and also the person or persons who rent from the Authority a farm unit in accordance with this provisions of this Law.
- N. Holding - A holding of land or water or both in accordance with a registration deed.
- O. Holder -
 - 1. The person or persons in whose name or names the land or water or both is/are registered in accordance with a registration deed, provided that in case there is more than one person who jointly holds a registration deed, the Authority has the right for purposes of allotment of farm units to consider all or any of them as one holder for the purpose of this Law.

2. Lessee or lessees of Government lands in accordance with a legal contract the duration of which is not less than three continuous years, if the Authority is convinced for the purpose of allotment farm units that he has carried out constructional works which resulted in a noticeable increase in the annual income of the leased land.
 3. The farmer or farmers who planted trees in the lands of the person or persons in whose name or names that land is registered in accordance with a registration deed if the Authority is convinced that cultivation was done with the written or implied approval of the landowner. In this case the Authority has the right, for the interest of production, to consider the farmer as having replaced the landowner in the share allotted to the farmer under the agreement. In case the trees are jointly owned by landowner and the farmer, the farmer, the two parties shall be considered as one holder.
 4. Lessee or Lessees in accordance with a legal contract the period of which exceeds 15 continuous years. In this case the lessee will replace the landowner as regards allotment of farm units.
 5. In all above mentioned cases, legal settlement between the two parties shall be made in the manner determined by the Authority Board. The Board's decision shall be final and not subject to contest.
- P. Farmer - The holder who takes agriculture as a profession as a main source of his livelihood and utilizes himself others lands by lease, share cropping or working against pay.
- Q. Jordan River Tributaries - Rivers and streams whose course joins the Jordan River.
- R. Tributaries Basins - Watershed areas and springs in it which naturally flow into these tributaries.
- S. Valley Water Resources - Surface and underground waters within the Jordan Valley or in the basins of the Jordan River Tributaries.

Article III

An Authority called the "Jordan Valley Authority" shall be established in accordance with this Law and shall be entrusted with the responsibility of developing the Jordan Valley economically and socially and carry out all necessary works to achieve this goal, including:

- A. Develop water resources both surface and underground and utilize this water for irrigation, domestic supply, industry, generating hydro-electric power and other productive uses; also will protect it and will carry out all relative works to achieve the said uses and protections, including:
1. Carry out necessary studies to assess all water resources by carrying out studies for hydrological, hydrogeological, and geological surveys, drilling exploration wells and setting up meteorological stations.
 2. Planning, designing, constructing, operating & maintaining all irrigation projects, developing and exploiting the same, and carrying out all relative works, including dams and its relative works, hydro-power stations and its relative works, wells, pumping stations, reservoirs, water distribution network drainage (both surface and sub-urface) and flood protection works roads, buildings and operations and maintenance.
 3. Soil surveying, soil classification and reclamation of all agricultural lands and parcellation into farm units.
 4. Settlement of disputes arising from the use of water resources.
 5. Organizing and directing the construction of private and public artesian wells.
- B. Develop and improve the environment and living conditions in the Valley and carry out all relative works including:
1. Develop towns and villages and select their locations and municipal boundaries and prepare detailed plans for these towns and villages. These plans should show on them: areas for streets, open areas, parking areas, and public parks, worship places, social services such as schools clinics, civic clubs, Government administration centers and others; areas allotted for housing, markets, industries and leisure places; areas restricted to have certain crafts and industries; and areas allotted for other purposes.
 2. Execute town and village plans and issue building codes for each zone in the area.
 3. Plan, design, construction, operation and maintenance of streets, playgrounds, social services buildings and government buildings.
 4. Develop areas allotted for housing, parcel it into housing units and plan, design, and construct housing projects.

5. Plan, design, construct, operate and maintain projects of domestic water, electricity and telecommunications, including all transport and distribution networks.
- C. Plan, design, construct and maintain all roads including main highway, village roads, farm roads and operation and maintenance roads.
- D. Develop tourism in the valley and assign areas which have special features for tourism and recreation, develop these areas and provide tourism and recreation facilities for them.
- E. Work for the development of inhabitants of the Valley socially by establishing private coops for them in order that these people could participate in reaching the said goals.

Article IV

The Authority shall be attached to the Office of the Prime Minister.

Article V

- A. In spite of all that has been mentioned in any other law or legislation, the Authority is fully authorized to implement all projects related to the development of the Valley which have been stated in Article III of this Law and to carry out works required for the implementation of these projects in accordance with the provisions of the law, regardless of whether or not these projects have been implemented in accordance with any other legislation, decision or arrangement within the authorities of any other Ministry or Department or official institution, or within the boundaries of any municipal or local or village council.
- B. The Authority is considered a litigant in all commitments and claims resulted by any of the projects which the Authority is implementing in accordance with the provisions of paragraph A of this Article. It will own all the special rights attached to or resulting from a project up to the date which the Council of Ministers specifies in its decision to deliver such project to the concerned party according to the provisions of this Law.

Article VI

- A. In accordance with the provisions of paragraph B of this article, the Authority will deliver the projects which lie under its authority in accordance with this Law, excluding the projects of developing water resources & irrigation projects, after it completes their implementation to the concerned Ministries, Departments and other official authorities & organizations, including the municipalities and local and village councils.

- B. Implemented projects as specified in paragraph A of this law are to be handed over by a cabinet decision recommended by the Authority. Delivery may be carried out as such for any single project or a member of projects or all the projects together.
- C. The Authority is entitled to operate and maintain any project, totally or partially, until such project is transferred according to paragraph B of this Article.

Article VII

The headquarters of the Authority shall be in the Valley, and it will have the right to open branch offices in Amman and any other place it deems necessary. Until the Authority builds its own offices in the Valley, the headquarters shall be in Amman.

Article VIII

- A. The Authority shall be composed of:
 - 1. Board of Directors
 - 2. Executing Staff
- B. The Authority Board of Directors shall be composed of the following:

1. President of the Authority	President
2. President of National Planning Council	Member
3. Under Secretary Ministry of Agriculture	Member
4. Under Secretary Ministry of Interior for Municipal and Rural Affairs	Member
5. Director of Budget	Member
6. Director of the Department of Lands & Surveys	Member
7. Director - General of the Natural Resources Authority	Member
8. Two other members appointed by the Council of Ministers upon nomination by the President of the Authority for the period he deems appropriate.	
- C. The Board shall determine the dates of its meeting, the method of invitation, and procedures therein and any other matters relating thereto.
- D. At least four of the members and the president must be present at a meeting to establish a quorum, and decisions shall be taken by a majority of members present. In case of tie votes, the president shall have the deciding vote.

- E. The Board may, if it deems appropriate, request experts, consultants, officials or supervisors to attend its meetings for seeking their advice without their having the right to vote.
- F. The President and each member of the Board shall receive remuneration determined by the Council of Ministers for each session he attends and signs its decisions.
- H. In case of the absence of the President of the Authority, his Deputy, whom he appoints and to whom he delegates all responsibilities, becomes a member on the Board.
- I. The Board elects a Vice-President who chairs the Board meetings during the absence of the President outside the country. He will have a decisive vote.

Article IX

The Board enjoys the following entitlements in addition to the entitlements delegated to it in accordance with this Law.

- A. Assign and approve the basic guidelines for the planning and development of the Valley.
- B. Set up the organization chart for the Authority.
- C. Study and approve the Authority'd budget.
- D. Study and approve the draft amendment to this Law and the regulations necessary to enforce this law and submit them to Council of Ministers for approval.
- E. Approve the transfer of funds set up in the Authority budget from on item to another.
- F. Approve loan funds and limit loan terms and purposes.
- G. Assign banks to negotiate with the Jordan Central Bank in order to deposit Authority funds, and decide on distribution of these funds among these banks.
- H. Select and employ chartered local accountant office/offices or audit bureau to supervise and audit the Authority system.
- I. Look into any matter the President of the Authority submits for discussion.

- J. Appoint one or more assistants to the President upon the recommendation of the President. Also appoints Directors of directorates in the Authority, who should have experience and be specialized in their fields. Determines the salary and the terms of their employment.

Article X

The President of the Authority shall be considered the Executive Director General of the Authority and shall be appointed by a Royal Decree based on a decision of the Council of Ministers. The Council of Ministers shall determine his salary, allowances and terms of his services.

Article XI

The President of the Authority shall be responsible for planning and implementing the Authority's overall policy and managing all its affairs. He shall enjoy the powers granted to a Minister in his Ministry. He may delegate to any official or employee in the Authority to exercise any of his authorities according to work requirements.

Article XII

The President of the Authority shall practice the following authorities and carry out the following duties:

- A. Preparation of the draft of the Authority annual budget for submitting to the Board at least three months before the beginning of the fiscal year, including in the budget the funds which are to be allocated by the Government to the Authority and the funds anticipated from local sources and others.
- B. Implementation of the Board's Decisions.
- C. Coordination of work in all projects of the Authority and maintenance of efficiency, cooperation and harmony between all departments, divisions and units of the Authority.
- D. Keeping the records necessary for showing works, assets, liabilities, revenues, and expenditures of the Authority as well as preparing the annual accounting statements and submitting them to the Board.
- E. Management of the affairs of the officials, employees and laborers of the Authority.
- F. Preparation of the drafts of the regulations necessary for the implementation of the provisions of this law and submission to the Board. for approval.
- G. Determine the responsibilities of his assistants and the directors of the directorates in the Authority.

Article XIII

The Authority shall be considered an autonomous body corporate. It may lease, purchase and acquire movable and immovable properties, and may conclude contracts and sue legal cases and lodge them in its name. In connection with any litigation in which the Authority is involved or for any other purpose, it may delegate the Attorney General or assign its own representative from the Authority staff or from outside.

Article XIV

The Authority, in its capacity as an independent government agency established to act for and on behalf of the Government of Jordan and according to his Law, shall have the right to avail itself of all grants, revenues, loans, credits and any other local financial means that may become available for performing its works and projects. The Authority shall also have the right to contract debts through mortgage, sale of financial bonds or any other means which may become available from the anticipated revenues for executing any of its projects with the approval of the Council of Ministers.

Article XV

- A. The Jordan Valley Commission, the Jordan River Tributaries Regional Corporation (JRTRC), the Natural Resources Authority (NRA), and the Domestic Water Supply Corporation (DWSC), shall be administratively, financially, technically and legally replaced in the Valley by the Jordan Valley Authority.
- B. All assets of JVC, JRTRC, NRA & DWSC in the Valley shall be transferred to the Authority.

Article XVI

- A. The Authority shall implement its works and projects, operate and maintain all its supplies, equipments and vehicles in accordance with the regulations issued by the Council of Ministers for the implementations of the provisions of this Law.
- B. Despite the provisions of this Law or any other Law, the project which are totally or partially financed by another party other than the Government of the Kingdom should be implemented in accordance with the original signed agreement.

Article XVII

- A. Spending from the Authority budget shall be made in compliance with financial regulations to be issued in accordance with provisions of this Law.

- B. A special cash box fund shall be established for the Authority, and all Authority cash box shall be deposited therein. Money of the cash box shall be deposited in a special account or accounts at the Central Bank. Money is drawn from this account or these accounts in the way specified in the financial regulations of the Authority and until such regulations are issued drawing is made as determined by the Board.
- C. The Authority shall avail itself of all national grants and loans from foreign arrangements, international organizations, agencies and corporations in accordance with the laws and regulations in force, with the approval of the Council of Ministers.
- D. The Authority shall have the right to invest its surplus funds, and the Board shall determine, with the approval of the Council of Ministers, when and how such investment shall be made. The Authority shall have the right to provide loans to finance its projects and works which are closely related and shall be complementary, and facilitates its implementation in the fulfilment of its objectives and the objectives sought from its projects and collections of its loans in accordance with regulations issued by the Authority for this purpose. The Authority shall have the right to share in companies dealing with its works for the fulfilment of its goals, with the approval of the Council of Ministers.
- E. Authority funds shall be considered to be Government funds. The Authority shall collect its debts in accordance with the provisions of the Government Fund Collection Law in force. The Authority, for this purpose, shall exercise all powers delegated to the administrative governor and the government fund collection committee provided for in the said Law.
- F. The Authority shall have a priority with respect to its debts and all demands over the movable and immovable properties of the debtor and his guarantors, whether these are mortgaged or given as collateral to the Authority, and the Authority's debts shall be of first priority.
- G. No member of the Board of Directors or Official of the Authority is entitled to make profit from any of the Authority's projects or any project or source related to it, or work in these projects or benefit from them in any other way except what he earns as salaries or remunerations within the limits specified explicitly in this law or any regulations issued accordingly.

Article XVIII

- A. Water acquired by means of projects constructed by the Authority and which was not used or exploited for irrigation purposes in any area prior to the declaration of water settlement in accordance with Land and Water Settlement Law, shall be considered state domain. Such waters may be sold, leased or otherwise disposed of in such a way as may be decided by the Authority.
- B. The Authority has full responsibility for allocations or usage of all surface and ground waters which are being developed under the supervision of the Authority.
- C. When the Authority constructs an irrigation project, it shall first secure the water rights registered in the Water Register, and any additional water shall be considered Government.

Article XIX

All minerals existing within the Valley, whether found on the surface underground or in waters, shall be considered state domain. Hence no party shall issue permits or licenses to exploit or transfer or trade in minerals without the consent of the Authority. Rights granted prior to this Law remain in effect.

Article XX

- A. The Authority shall have its own Cadre of staff. The classified officials shall be subject to the provisions of the Civil Pension Law No. 34 for the Year 1959 and its present and future amendments, the provisions of the Civil Service Regulations No. 23 for the Year 1966 and any other substituting Laws and regulations. The President of the Authority shall have the powers of a Minister, and the Deputy Director General or whomsoever the President authorizes shall have the powers of a Deputy Minister, which the said regulations define. As regards the unclassified officials and employees, the Authority shall have a special regulation to be issued in accordance with the provisions of this Law prescribing the procedure of their appointment, rights, grades, dismissal, termination of services, compensation and all other administrative matters relating to them.
- B. The Prime Minister by recommendation of the President of the Authority shall have the power to call on any employee from any Ministry, Council, Department or Official Corporation to work for the Authority for the period required to complete particular job or term of assignment. The Authority considers the services of these employees applicable to the employees pension plan. During the period of assignment, the employee is subject to the Authority's regulations in accordance with the provisions of this Law.

- C. The Authority has the right to retain the necessary employees from the employees of the JVC, JRTRC, NRA, DW² in the Jordan Valley at the time this law goes into effect, together with preserving their acquired rights in accordance with the Laws and regulations which were applied to them as well as the rights, with respect to compensation or other items, of those whose services shall be terminated.

Article XXI

The Authority, with the approval of the Council of Ministers, has the right within the Jordan Valley or in the basins of the Jordan River Tributaries of expropriation and immediate acquisition of lands, water shares or both as required for its projects and any other benefits pertinent to land or water, either by absolute expropriation against compensation or by lease for any period which deems appropriate. The Authority shall have the right to fix the rent for any periods it may deem necessary. In execution thereof the following arrangement shall be adopted in estimating the values or rents of lands and relative structures decided to be acquired.

- A. Values of lands or water shares or both or any other benefits or rent values shall be evaluated by a committee/committees called the "Land Evaluation Committee" which shall be composed of a high ranking Government employee as chairman, and two other experienced members appointed by the Council of Ministers at the Authority's recommendation. The Authority may issue regulations by which the committee or committees shall abide for evaluating lands, trees, water and any movable or immovable properties.
- B. Any such committee shall survey and estimate values of the acquired lands or water and determine the values of lands regardless of any rise in land prices resulting from the construction of any section or stage from any project implemented or which is being implemented or planned. The committee may seek the opinion of any Authority or individual in order to determine the land prices and then issue decisions on values by majority votes.
- C. The chairman of the Evaluation Committee shall publish in more than one local newspaper and display the committee's decisions for 15 days in a conspicuous place in the Village in which the acquired lands and waters are located, or in the Registry Department. A copy of such decisions shall be handed over to the President of the Authority and another Mukhtar of the Village. The Authority and any holder or individual enjoying has the right to object to the decisions of the committee concerning evaluation within fifteen days from the expiration date of the notice period. If this period expires and no objection to evaluation is made, evaluation shall be considered final. All cases leading to differences in estimated values of trees, seasonal crops and structures during the period falling between the first estimate and the time of handing over both the farm units and housing units to the new owners, shall be referred to the President of the Authority. The President shall form a special committee or committees for this purpose, and the President decision shall be considered binding to all concerned.

- D. Objections shall be submitted to an appeals committee composed of a judge as chairman who shall be delegated by the judicial council and whose grade shall not be lower than that of President of the Court of Appeal and two other members appointed by the Council of Ministers at the Authority's recommendation.
- E. The Appeal Committee, if it deems appropriate, shall have the right, upon scrutinizing any objection submitted to it, to go and inspect the site of lands or water shares the evaluation of which was objected to. It may also seek the opinion of any person whose experience the committee considers to be of benefit and examine any documents for the purpose of determining the actual values of lands, water shares and other rights provided that any rise in prices resulting from the construction of any section or stage from any project implemented or which will be implemented or planned, shall not be taken into account, and issue the necessary decision which shall be final whether such was taken unanimously or by majority of votes.
- F. The objector, on submitting his objection, shall deposit as security the sum of JD 5 with the sub-district accountant for each tract the evaluation of which is objected to. If the objection is rejected the deposit shall be considered as revenue to the Authority. If it appears that he is rightful in his objection, the amount of deposit shall be refunded to him. Non-payment of deposit shall constitute reason to reject the objection.
- G. Estimated values of lands, water shares or other rights acquired shall be considered as permanent capital values to the project and such values shall be registered in special records at the Authority and shall be considered binding to all persons concerned.
- F. All debts, taxes, fees, Government funds and costs of any section or stage of any project undertaken by the Government and other debts due in any land being expropriated before or after this law comes into effect shall be deducted from the capital value of the debtor's or holder's lands and shall be paid by the Authority to the creditor in installments during a period not exceeding 20 years at 4% interest. If the amount of debt exceeds that of the capital value then the creditor may claim the difference from the debtor.
- I. No compensations shall be made to the holder of the land for any improvement made after the date on which an expropriation decision was made.
- J. The Director of the Lands and Survey Department shall, upon receiving a notice from the Authority, prepare cadastral maps for the expropriated area showing the boundaries of units, roads, distribution systems of both irrigation and drainage, also housing units, streets, buildings, parks and all private and public facilities as determined by the Authority. He shall cancel all previous registration records and issue new title deeds in the names of former landowners to whom farm units or housing units have been allotted. They are exempted from fees

and stamps in the name of the Authority for all remaining units which have been acquired in accordance with the provisions of this law. The Authority shall be exempted from all fees acquired on land registration transactions listed in the Annex attached to the Land Registration Fees Law No. 26 for the Year 1958, or any other subsequent amendment thereto. It shall also be exempted from revenue stamps that are affixed on such transactions. It shall also be exempted from objection, or any other fees.

- K. The Authority shall have the right to suspend all transactions of land except these transferred through inheritance until all provisions of paragraph J of this article are final.

Article XXII

- A. The Authority shall parcel lands expropriated which either are irrigated or will be developed and irrigated into farm units. The minimum size of a unit shall be approximately 40 dunums of classes 1 & 2 and approximately 50 dunums of class 3, and the maximum size of a farm unit shall be 200 dunums under irrigation. Under no circumstances may any farm unit be divided or parcelled into several units the size of which is less than the minimum fixed in this paragraph.
- B. If the holder has lands of 40 dunums or more from the lands irrigable or developed for irrigation, the Authority shall allot to him lands according to the following formula:-

<u>No. of Irrigable Dunums Held Prior to Expropriation</u>	<u>No. of Irrigable Dunums to Be Allotted to Holder</u>
40 - 50	To be allotted in full
51 - 100	50 dunums shall be allotted, plus 25% of area exceeding 50 dunums.
101 - 500	62 dunums shall be allotted plus 17% of area exceeding 100 dunums.
501 - 1000	130 dunums shall be allotted, plus 12% of area exceeding 500 dunums.
1001 and above	200 dunums shall be allotted.

- C. With regard to lands which are wholly or partially planted with trees, the Authority may with the approval of the Council of Ministers not be bound by the provisions of paragraph B above.
- D. If the Holder was holding less than 40 dunums, the Authority, if possible, may sell or lease to him additional land provided that the area of the unit allotted to him shall not be less than 40 dunums approximately if the unit is from classes 1 or 2 and not less than 50 dunums approximately if it is from class 3.

- E. The area of each unit sold or leased by the Authority to an individual or family shall not exceed the 40 dunums approx. of land from classes 1 and 2, and 50 dunums approximately, of lands class 3. In case the classes of land in one single unit differ, a dunum of classes 1 and 2 shall be considered equivalent to a dunum and seven-tenths from class 3.
- F. For the purpose of organizing farm units to conform with the lateral and distribution systems and to avoid establishment of small units of irregular shape or in difficult technical cases the President of the Authority may not adhere to the area limits of the units allotted in paragraph A of this article.
- G. In case of the death of a holder or a sub-lessee, his rights in the farm unit shall revert to his heirs provided that the area of any farm unit is not thereby reduced to less than the minimum limit provided for under this article.
- H. Holders in whose names farm units are registered in accordance with the provisions of this Law, may lease to the Authority, if it so desires, units which they do not wish to utilize for a period of not more than 33 years (renewable upon Authority's request for any other period or periods it deems appropriate) and for a rent agreed upon between the Authority and the holder. The lessee shall sustain water costs. If the Authority does not take the unit on lease, the holder may, with the Authority's approval, lease the farm unit for a period of not less than 3 years and not more than 10 years to any other farmer who does not own or hold a farm unit or units in the Jordan Valley. The Authority's decision, in case of rejection, shall be subject to contest before the High Court of Justice. The lessor may also sell to it at any time during the period of lease, if the Authority desires to buy same at a price to be agreed upon.
- I. If it is proved to the Authority that a holder has leased a farm units or units not in accordance with the provision of paragraph H of this article, then the Authority will stop water delivery to his farm unit from the irrigation water, without compensating for any damages caused by that.
- J. Notwithstanding the provisions of any other law or regulation, no lease contract may be prepared for farm units, and no approval hereof may be made except by the Authority, and any contract prepared contrary to this shall be considered null and void.
- K. The Authority may lease units registered in its name or units leased to it to sub-lessees for a period not exceeding 33 years subject to renewal and may annual lease contracts if it appears to it that the sub-lessee is not utilizing the farm unit leased to him satisfactorily.

- L. The holder has no right at all in any case or any way to sell his farm unit to any one except to the Authority, and other deals to that effect shall be considered void. The Authority will purchase any land from the holder who wishes to completely sell his rights in the farm units provided that the purchasing cost to be paid by the Authority should not exceed the value estimated for the unit by the Evaluation Committee plus the value of improvement brought about through his special efforts after allotting the unit to him or minus the value of depreciation in the unit as a result of the holder's negligence or for any other reasons. The value for the improvement or depreciation on the unit shall be estimated by the special committee or committees in accordance with provisions of paragraph C of article XXI. of this law.
- M. In spite of what is mentioned above in paragraph L, holders whose names are registered jointly shall have the right to sell a farm unit or units to each other with the Authority's approval provided that the area of irrigated land not exceed what was allowed in accordance with this law.
- N. Persons whose names are registered in one registration deed have no right to divide the unit into different divisions for the purpose of development of each part or parts of it by one or all from the rest of the unit and from the other holders of the unit.
- O. The Authority shall have the right to take back any unit which is not utilized in accordance to the provisions of paragraph N above.

Article XXIII

- A. The Authority shall develop and improve lands expropriated and allotted for housing purposes and lying within the towns and villages whose plans were approved by the Authority to the extent it deems appropriate. The Authority shall parcel these areas into housing Units provided that the area of each housing unit will not be less than 250 m² and shall not exceed 300 m².
- B. The President of the Authority, with the approval of the Board, may in special cases where the public interest necessitates, exceed the maximum limits of the housing unit area fixed in paragraph A above.
- C. Portions and percentages of the land expropriated and falling within the limits of towns and villages shall be taken away **without compensation for public purposes, as follows:**

1. No portion of any holder's land shall be taken away if the total area of the land within his disposition and included in the expropriated area does not exceed 288 m².
 2. Any portion exceeding 288 m² shall be taken away from the holder's land if the total area of the land under his disposition and included within the expropriated area does not exceed 384 m².
 3. 25% of the land shall be taken away from a holder who holds land exceeding the total of 384 m² and included in the expropriated area.
- D. The Authority shall allot to the holder whose land lies within the limits of towns and villages and was taken away for the development of these towns and villages, housing units according to the following:
1. Allotted to the holder whose total land area does not exceed after taking away portions without compensation 288 m², one housing unit.
 2. If, after taking away without compensation the portion or percentage of a holder's land is in total less than the result of multiplying 288 by the number of family members, the holder shall be allotted a number of housing units equal to the whole number resulting from dividing the remaining area in square meters by 288. If after dividing a balance remains, the President of the Authority will allot an additional area to avoid allotting a portion of a unit.
 3. Allotted to the holder whose total land area in square meters -after taking away portions or percentage without compensation- exceeds 288 multiplied by the number of the members of his family.
 - A. Housing units equal to the number of the members of his family if the area of land under his disposal is less than double the figure resulting from multiplying the number 288 by the number of the members of his family in square meters after free of charge deduction.
 - B. Housing units equal to double the number of the members of his family if the area of land under his disposal ranging between double or triple the figures resulting from multiplying the number 288 by of the number of the member of his family in square meters after free of charge deduction.

- C. Housing Units equal to three times that of the number of the members of his family if the area of land under his disposal ranging between three or four times the figures resulting from multiplying the number 288 by the number of the members of his family in square meters after free of charge deduction.
- D. Housing units equals to four times that of the number of his family if the area of land under his disposal exceeds four times the figure resulting from multiplying the number 288 by the number of the members of his family in square meters after free of charge deduction.

Article XXIV

- A. The Authority shall appoint a committee or committees called "Farmers Selection Committees". Each shall consist of one official of the Authority as chairman and two other members, one of whom shall be from farmers experienced in the area, town or village where farm units or house units shall be allotted. These committees shall assist holders in choosing farm units or housing units which the Authority has the right to allot. The committees will then select farmers for farm units and occupants for housing units, and committee decisions shall be taken unanimously or by majority of votes. The Authority has the right to amend the decisions of these committees, observing in so doing the provisions of paragraph F of Article XXII of this Law regarding the farming units.

The decision of the Authority shall be final. In case a mistake appears in allotting farm units or housing units or if public interest necessitates, the Authority has the right to reconsider and/or adjust and substitute any allotment provided that the decision of the Authority is approved by the Council of Ministers.

- B. In all cases of allotments, the holder shall be considered to have priority in the farming unit or housing unit where he has land not less than 20% of the size of the net unit.
- C. The holder whom the Authority may allot a farming or housing unit in accordance with provisions of Articles XXII and XXIII of this Law may select the unit which he wishes to be allotted to him should request in writing to the Authority within 30 days from Authority's notice.
- D. If a holder did not select a farming unit or housing unit which he would like to have, and submit a written request to the Authority within the specified period in paragraph C of this article, then the committee may allot to him the units it deems suitable, or may refrain from allotting any units in accordance with the provisions of Articles XXII and XXIII of this Law. Decision of the Committee shall be final and binding to all concerned if approved by the Authority. Also if the holder did not submit within the specified period in paragraph C of this article, the Authority shall have the right not to abide in provisions of paragraph B of this article, and may take any decision it deems suitable, by allotting or not, and all decisions taken before this Law shall be final and true.
- E. If it is proved to the Authority that a holder of lands expropriated by the Authority for the purpose of development and utilization for irrigated farming has transferred to the name of his wife and children who are not subject to the provisions of paragraph O of Article II of this law before the lapse of one year from the date of issuance of this law. The Authority may consider the wife and children as members of the head of the family. The total area of land which they jointly hold shall be considered as being held by the head of the family, and they shall be allotted collectively farming units as allowed for in this law they being considered as one farming family subject to paragraph O of Article II of this Law.
- F. If land within the expropriated area has been transferred through inheritance to individuals and is still jointly held by them, it shall be divided among them. Provisions of this law, in so far as allotment is concerned, shall apply to everyone of them as if he were a single holder.

- G. The value of the farm unit or house unit allotted to the holder shall be deducted from the capital value of his lands registered in the Authority records in accordance with the provisions of paragraph F of Article XXI of this Law. If the value of a unit or units allotted to the holder exceeds the capital value of his lands, he, as well as every farmer to whom a farm unit or a house unit has been allotted and who has no capital value, shall pay the Authority the debt either in one payment or payments not exceeding twenty yearly installments provided that each installment for a farm unit shall not be less than 50 dinars as determined by the Authority Board along with 4 percent interest on the unpaid balance, provided that the time due for collection of installments starts from the date fixed by the Authority's Board.
- H. The Authority shall pay to the holder the balance remaining to him from the capital value of his lands registered in the Authority's records according to the provisions of paragraph F of Article XXI of this Law. It should pay the capital value of the lands of the holder to whom no farm units or house units have been allotted either in one payment or payments not exceeding ten yearly installments as determined by the Authority's Board along with 4 percent interest on unpaid balance, provided that the time due for collection of installments starts from the date fixed by the Authority's Board.
- I. The farmers Selection Committee shall select the farm family for settlement on farm units provided that priority of selection should be as follows:
- First Priority
 - A. Holders who themselves reside in the Kingdom and exploit their irrigated Jordan Valley lands at the time of their expropriation.
 - B. Holders who reside inside the Kingdom and own valley land which is not irrigated.
 - Second Priority - Holders who reside in the Kingdom and utilize their lands by lease or sharecropping.
 - Third Priority - Professional farmers residing in the Jordan Valley.
 - Fourth Priority - Professional farmers residing outside the Jordan Valley.
 - Fifth Priority - Holders who reside outside the Kingdom

- J. The Authority has the right to determine the maximum quantity of water to be supplied to the holders according to the quantity of water available and the kind of plantations in the units. It has the right to control, supply, distribute, and fix the price of water to farm units.
- K. The Authority shall consider any lands suitable for irrigated farming or utilized for irrigated farming, including land in the town and village plan which the Authority expropriated and allotted for purposes of town and village development or for utilization in irrigated farming as lands expropriated by the Authority for reclamation and utilization in irrigated farming. On this basis, the provisions of this law relating to the lands expropriated by the Authority for reclamation and utilization in irrigated farming shall apply to such lands and holders thereof except as provided under paragraph B of Article XXIV of this Law; and the rights for holding these lands shall automatically transfer to the Authority.

Article XXV

All decisions which were taken by the Natural Resources Authority, the Jordan Valley Commission and the Jordan River and Tributaries Regional Corporation before issuance of this Law shall be considered as though they are taken in accordance with this Law.

Article XXVI

The Authority shall have the right to allot, sell or rent to any establishment or Government Corporation a farm unit or units or housing unit or units or any land from the other lands.

Article XXVII

- A. The Authority shall have all rights in allotting, selling and leasing other lands provided it has the approval of the Council of Ministers. The Authority shall make arrangement as to the way of selling, setting date's of payment of installments, leasing and cancelling lease contracts, and repossessing other farming units and housing units, in accordance with regulations set for this purpose.
- B. Holders and sub-lessees shall pay all taxes due on farm units according to the laws in effect. Holders shall pay all taxes due on housing units and others.

Article XXVIII

The Authority may recover all or part of capital cost of the construction, maintenance and operation costs of its projects from holders and sub-lessees of irrigation projects, and from those benefitted from other projects according to the regulations which shall be issued by the Authority for this purpose.

Article XXVIX

All decisions and notices of the Authority will be communicated to the people concerned by advertisement in local newspaper. All decisions shall be final after publishing three continuous days in more than one local newspaper, this notice shall be considered as delivered to the people concerned.

Article .XXX

Any person authorized, by this law or the regulations issued accordingly, to make investigations, exploration and any other operation, may enter any lands provided that he pays to the landowners a fair compensation for any damage caused by him while carrying out his official duties.

Article XXXI

- A. Any person who intentionally destroys or damages any project of the Authority's projects, shall be punished with imprisonment for a period not exceeding one year or a fine of not more than 100 dinars and not less than 10 dinars, or with both such penalties. Moreover, the court shall order that all or part of the expenses incurred for repairing the damage, shall be borne by the person convicted.
- B. Any person who takes Valley water, or arranges, for obtaining water or utilizing it other than the water he is entitled to obtain under the Water Ownership Right recorded, according to proper procedure, in the Water Register, without the permission of the Authority, shall be punished with imprisonment for a period not exceeding one year or with a fine not more than 200 dinars, and not less than 50 dinars or with both penalties. In addition, the court shall order the removal of any arrangement, or works by means of which the offence was committed at the expense of the person convicted.
- C. Whosoever does any of the following acts shall be punished with imprisonment for a period not exceeding one month or with a fine not more than 50 dinars and not less than 5 dinars or with both such penalties. In addition, the court shall order that all or part of the expenses incurred for repairing any damage caused to the Authority's projects or any part thereof shall be borne by the person convicted:

1. By negligence or commission causes damage, alteration, enlargement or obstruction in any project in any way.
2. By negligence or commission, allows water to escape and causes damage to roads, buildings, projects or property of whatever nature, whether belonging to the Authority or in private to individual, societies or public organizations.
3. Destroys or causes damage or disfigures or removes any level mark, water guage or any other devices fixed by the Authority for realizing its purposes.
4. Hinders any official or employee of the Authority during his performance of his duties or any of the persons performing work for the Authority.
5. Contravenes the provisions of any notice published by the Authority in the official Gazette prohibiting or controlling the passage of animals or vehicles across any part of its projects.

Article XXXI

No construction works in the Valley shall be carried only by any Ministry. Government Agency or semi-government agency, without the approval of the Authority provided that this shall not apply to maintenance and operation.

Article XXXIII

No private buildings or construction works of whatever kind or for whatever purpose shall be constructed in the Valley except after a permit shall have been secured from the Authority provided that this shall not apply to the construction works under execution at the date this law comes into effect or to the land irrigation works.

Article XXXIV

Any person who commits a breach by building or construction of works under the provisions of Article XXXIII of this Law, shall be punished with imprisonment for a period not exceeding 3 months or fine not exceeding 500 dinars and not less than 50 dinars or both penalties. In addition, the court shall order the removal of buildings and construction works which were not in accordance with the provision of Article XXXIII of this Law and the expenses incurred shall be borne by the person convicted.

Article XXXV

If it is difficult to determine the contravener in accordance with Article XXXI above, the contravention shall be considered a crime in the meaning specified in the Collective Punishment Ordinance,

and with the procedure provided for in that ordinance may be applied thereto with the President of the Authority considered as the person injured as a result of such a crime, notwithstanding any action which may be taken under Article XXXI above in this Law. If as a result of any offence, any water is diverted and used contrary to the provisions of this Law and unlawfully benefits any land, the Director General may price such benefit and deduct from the quantity of water allotted to this land in the Water Register, such amount which he finds to be equivalent to the benefit unlawfully acquired.

Article XXXVI

The Authority shall submit to the Council of Ministers the following reports and statements:

- A. A work progress report for the previous fiscal year and full expenditures during the respective year including administrative, planning, organizational and implemental expenses and similar others.
- B. A report on the projects accomplished wholly or partially, during the previous fiscal year with relative expenses.
- C. A yearly report including the report of the national chartered accountants or the Audit Bureau on the previous fiscal year together with the estimate of assests.
- D. A report on the planning works and the projects covered by them during the previous fiscal year.
- E. Any other reports or statements required by the Council of Ministers.

Article XXXVII

The Authority shall determine the amount of remuneration to be paid to the heads and members of the committees stated in this Law.

Article XXXVIII

No person may pollute the waters of the Valley or introduce into these waters any polluted material declared by the President in the official Gazette to cause pollution of such waters without obtaining a written permit issued by the Authority.

Article XXIX

Nothing in this Law shall contradict or annul any existing agreement whether international or having an international trait existing before the issuance of this Law.

Article XL

Any person who violates any of the Provisions of this Law or the regulations issued accordingly shall be subject to imprisonment for a period not exceeding 2 years or a fine not exceeding 500 dinars and not less than 10 dinars or to both penalties. In addition, the court shall order the removal of any arrangements within one month from the date of the court order otherwise the Authority will do that at the expense of the person convicted.

Article XLI

All laws shall be cancelled to the extent which they are inconsistent with the provisions of this Law including:

- A. Jordan Valley Commission Law No. 2 for year 1973.
- B. Jordan River and Tributaries Regional Corporation Law No. 11 for the year 1975.
- C. The Organization of Natural Resources Affairs Law No. 12 for the year 1968 concerning the Jordan Valley.
- D. Domestic Water Supply Corporation Law No. 56 for the year 1973 concerning the Jordan Valley.

Any other amendments of the above laws, provided that the regulations issued in accordance with the provisions of same shall remain in force until superceded by new regulations to be issued under this Law.

Article XLII

The Council of Ministers, on the recommendation of the Authority, shall be entitled to issue the regulations it deems necessary for enforcing the provisions of this Law.

Article XLIII

The Prime Minister and the Ministers are responsible for enforcing the provisions of this Law.

Signed by

Hassan bin Tallal
and all Ministers

Translated by: Aied Sweis - USAID/J
June 1, 1977

On. 20 April 1977

Appendix IV

THE JORDAN VALLEY VILLAGE INDEX

- IV-1 Social and Economic Services
- IV-2 Educational Services
- IV-3 Private Sector Services

This Appendix is based on field data collected by the staff of the Planning and Analysis Unit of the Jordan Valley Authority, in the Winter of 1980.

Table IV-1A
SOCIAL AND ECONOMIC SERVICES

Village Name	Social Centers	Cooperative Organizations	Agricultural Extension	Agricultural Marketing	Irrigation	Streets	Means of Transportation (Persons)	Local Industrial	Adult Education	Other
1. Kreimeh		Ag. Coop.		Amman/ al-Karameh	Spring, artesian well	Y	H			
2. Al-Rameh	Sewing Center, Child Care Center		P	Amman/ al-Karameh	Hisban/Kafrein Dam	Y,X	T	Concrete Block Work, Plastic Pipe Works		
3. Al-Rauda	Child Care	Cooperative for the Strengthening of Rural Life	P	Amman/ al-Karameh	Hisban/Kafrein Dam	Y	T	Concrete Block		
4. Al-Kafrein		Ag. Coop.		Amman	Hisban/Kafrein Dam	Y,X	B, T			
5. Al-Jofeh		Ag. Coop.		Amman		Y,X	B, T	2 Con. Blk		
6. Al-'Ajajreh				Amman	Artesian Wells	Y	B, T			
7. South Shuneh		Ag. Coop.	P	Amman	Artesian Wells & Wadi Shu'eib Dam	Y,X	B, T	3 Con. Blk		Poultry Farms
8. Al-Sukneh				Amman	Artesian Wells & Wadi Shu'eib Dam	Y	B, T			
9. Al-Karameh	Social Club for Aged and Mentally III	Poultry Farmers' Cooperative	P	Wholesale Market on Site	Artesian Wells	Y,X	B, T			Poultry Farms
10. Dharet al-Rami					EGC	Y,X	B, T			
11. Damiya				Deir Alla	EGC	Y,X	B, H		P	
12. Al-Muchalath al-Masri				Deir Alla	EGC	Y	B			
13. Maisara/Fannush				Deir Alla	EGC	Y	B			

NOTE: B = Bus; H = Hitchhiking; P = Present; T = Taxi; Y = Yarmouk Dead Sea Road; X = Other Paved Streets.

(To be continued)

Table IV-1A (cont'd)

Village Name	Social Centers	Cooperative Organizations	Agricultural Extension	Agricultural Marketing	Irrigation	Streets	Means of Transportation (Persons)	Local Industrial	Adult Education	Other
14. Al-Arda		Ag. Coop.		Wholesale Market on Site	EGC	Y	B			
15. Deir Alla	Sewing Center; Sports & Cultural Center	Ag. Coop.	P	Wholesale Market on Site	EGC	Y,X	B,T	Concrete Block Works		JVFA Center
16. Al-Diyyat		Ag. Coop.		Deir Alla	EGC + Zarqa R.	X	B,T		P	
17. Al-Rabie				Deir Alla	EGC	X	B,T			
18. Abu al-Zighan	Child Care; Charitable Society			Deir Alla	EGC + Zarqa R.	X	B,T			
19. Al Riweoja				Deir Alla	EGC + Zarqa R.	X	B,T			
20. Dirar				Deir Alla	EGC	Y,X	B,T			
21. Khazimeh				Deir Alla	EGC	Y	B,T			
22. Balavneh		Ag. Coop.		Deir Alla	EGC + Seil Rajab	Y	B,T			
23. Abu-Lubeideh		Ag. Coop.		Deir Alla	EGC	Y	B,T			
24. Al-Faqir				Deir Alla	EGC	Y	B,T			
25. Kreimeh	Local Development Center	Ag. Coop.	P	Deir Alla & Amman/Irbid	EGC	Y	B,T		P	JVFA Center
26. Abu Sido				Irbid/Deir Alla	EGC	Y	B,T			
27. Sleikhat				Irbid/Deir Alla	Ain Sleikhat	Y	B,T			
28. Hijeifeh/Abu Fellah				Irbid	Spring		B,T			
29. Ispeirah				Abu Habil, Irbid	Spring, Artesian Well		B,T			

NOTE: B = Bus; H = Hitchhiking; P = Present; T = Taxi; Y = Yarmouk Dead Sea Road; X = Other Paved Streets

(To be continued)

Table IV-1A (cont'd)

Village Name	Social Centers	Cooperative Organizations	Agricultural Extension	Agricultural Marketing	Irrigation	Streets	Means of Transportation (Persons)	Local Industrial	Adult Education	Other
30. Abu Habil				Wholesale Market	EGC	Y	B,T		P	
31. Wadi Al-Yabis		Ag. Coop.	P	Irbid/Deir Alla/ Amman	EGC	Y	B,T		P	JVFA Ctr/ Ag. Res. Station
32. Al-Mirizeh				Wadi al-Yabis	EGC	Y	B,T			
33. Tabqat-Fahal				N. Shuneh/ Deir Alla	Spring		B,T			
34. Al-Mushar'a	Sport & Cul- tural Center	Ag. Coop.	P	Deir Alla/ N. Shuneh/	EGC + Streams	Y,X	B,T	3 Concrete Block Works		
35. Seil Al-Himma				Wadi Al-Yabis Irbid/N. Shuneh	EGC	Y	B,T			
36. Izmalyya				Deir Alla/ Irbid	EGC		B,T			
37. Biseileh				Irbid/Deir Alla/ Amman	EGC	Y	B,T			
38. Tell al-arba'in		Ag. Coop.		Irbid	EGC	Y,X	B,T			
39. Al-Sheikh Hussein		Ag. Coop.		Amman	EGC	X	B,T			
40. Khirbet al-Sheikh Muhammad		Ag. Coop.		Deir Alla	EGC		B,T			
41. Waqqas Qali'at					EGC + Zighlab Dam	Y	B,T			
42. Al-Faddiyyin				N. Shuneh	EGC	Y	B,T			
43. Al-'Araushah				N. Shuneh/Irbid	EGC	Y	B,T			
44. Al-Kanshiyyeh				N. Shuneh/Irbid	EGC	Y,X	B,T			

NOTE: B = Bus; H = Hitchhiking; P = Present; T = Taxi, Y = Yarmouk Dead Sea Road; X = Other Paved Streets

(To be continued)

Table IV-1A (cont'd)

Village Name	Social Centers	Cooperative Organizations	Agricultural Extension	Agricultural Marketing	Irrigation	Streets	Means of Transportation (Persons)	Local Industrial	Adult Education	Other
45. N. Shuneh	Charitable Society	Ag. Coop.	P	Wholesale Market on Site	EGC	Y,X	B,T	Concrete Block Works		JVFA Center
46. Al Sakhneh				N. Shuneh			B			
47. Al-Baqqureh		Savings and Loan Coop.		N. Shuneh			B			
48. Al-'Addasiyyeh				N. Shuneh	EGC	X	B			
49. Al-Mukeibeh al-Tahta					Spring	Y	T			
50. Al-Mukeibeh al-Fawqa			Ag. Extension (in Benni Kanana)	Irbid	Sail al-Himma (Stream)	Y,X	T			Park

NOTE: B = Bus; H = Hitchhiking; P = Present; T = Taxi; Y = Yarmouk Dead Sea Road; X = Other Paved Street.

Table IV-1B

SOCIAL AND ECONOMIC SERVICES

Village Name	Health Services											Public Utilities								
	Outpatient Clinic	MCH Center	Dental Clinic	HC "A"	HC "B"	HC "C"	Pharmacy	Private Clinic	Frequency: Doctor Visits to Outpatient Clinic	Other Village Using Clinic	Site, Distance: Supplementary Services	Electricity	Drinking Water	Municipal Slaughter House	Post Office	Telephone Exchange	Police Station	Mosque	Civil Defense Station	Garbage Collection
1. Suweimeh	1							1/wk		S. Shuneh 21 km		Gov't Tanker		1						
2. al-Rameh	1				1			3/wk	al-Rauda		P	1. Pipelines To Schools 2. Tankers 3. Stream		1	1		1			
3. al-Rauda	1							3		al-Rameh 5 km	P	1. Pipelines To Schools 2. Tankers					1			
4. al-Kaffrein	1							1		S. Shuneh 7-8 km		Tankers Some areas		1	1		2			
5. al-Jofeh											P	Pipelines to Schools, Tankers		1			1			
6. al-'Ajajrah	1							2-3		8 km		Tankers								
7. South Shuneh	1	1		1			1	2	Daily	al-Sukneh al-Rameh al-Kafrein al-Karameh Sueimeh	P	Pipelines Network		1	1	1	1	1	1	P
8. al-Sukneh										S. Shuneh 2 km	P	PN		1	1					
9. al-Karameh	1										P	Pipelines to School TN		1	1	1	1			
10. Dharet al-Raml										al-'Arda 10 km	P	PN								
11. Damiya						1				Deir Alla 30 km	P	PN								

NOTE: PN = Pipeline Network; TN = Tanker; P = Present; HC = Health Center.

(To be continued)

Table IV-1B (cont'd)

Village Name	Health Services										Public Utilities									
	Outpatient Clinic	MCH Center	Dental Clinic	HC "A"	HC "B"	HC "C"	Pharmacy	Private Clinic	Frequency: Doctor Visits to Outpatient Clinic	Other Village Using Clinic	Site, Distance: Supplementary Services	Electricity	Drinking Water	Municipal Slaughter House	Post Office	Telephone Exchange	Police Station	Mosque	Civil Defense Station	Garbage Collections
12. al-Muthalath al-Masri											Deir Alla 25 km		TN							
13. Maisara/Fannush											Deir Alla 23 km		PN							
14. al-'Arda											Deir Alla 20 km	P	PN							
15. Ma'adi						1			2/wk		Salt 30 km	P	PN		1	1		1	1	
16. Deir Alla		1		1			1	3	MCH 2			P	PN	1	1	1		3	1	P
17. al-Diyyat	1								Daily			P	TN		1			3		
18. al-Rabi'	1								Daily			P	PN		1	1				
19. Abu al-Zighan	1								2	al-Rwueiha	Deir Alla 3 km	P	PN		1			1		
20. al-Rwueiha											Deir Alla 4 km	P	PN		1	1		1		
21. Dirar	1					1			2	Khazineh Faqir	Deir Alla 5 km	P	PN		1	1		1		
22. Kharimeh	1								2		Kreimeh 8 km	P	PN					1		
23. Balawneh	1								3		Deir Alla 10 km Wadi al-Yabis		TR/PN		1			1		
24. Abu' Ubeideh											al-Balawneh 3 km		PN					1		

NOTE: TN = Tanker; PN = Pipeline Network; HC = Health Center; P = Present; Deir Alla = Malaria Center; HC = Health Center

(To be continued)

Table IV-1B (cont'd)

Village Name	Health Services										Public Utilities									
	Outpatient Clinic	MCH Center	Dental Clinic	HC "A"	HC "B"	HC "C"	Pharmacy	Private Clinic	Frequency: Doctor Visits to Outpatient Clinic	Other Village Using Clinic	Site, Distance: Supplementary Services	Electricity	Drinking Water	Municipal Slaughter House	Post Office	Telephone Exchange	Police Station	Mosque	Civil Defense Station	Garbage Collections
25. al Faqir											Kreimeh 2 km	P	TN							
26. Kreimeh				.	1		1		1		Army Hospital Sleikhat	P	TN		1	1	1	1		P
27. Abu Sido											Kreimeh 2 km		TN					1		
28. Sleikhat											Abu Ubeideh 3 km	P	TN					1		
29. Hijeijeh Abu Fellah											Abu Ubeideh Hosp. 5 km		TN							
30. Ispaireh											= 5		TN							
31. Abu Habil											= 4		TN							
32. Wadi al-Yabis	1			1*					2/wk		= 5	P	TN		1	1		1		
33. al-Mirizeh											Wadi al-Yabis 2 km	P	Spring							
34. Tabqat Fahal											al-Mushar'a 2 km	P	TN		1			1		
35. al-Mushar'a					1		1	1	2/wk			P	TN		1	1	1	3		P
36. Seil al-Hinna													TN							
37. Izmaliyya											Waqqas/ Qaliyyat 2.5 km		TN		1			1		
38. Biseileh											= 1 km		TN		1			1		
39. Tell al- Arba'in							1		3	al-Sheikh Ismaliyya	N. Shuneh 2 km	P	PN		1	1		1		
40. al-Sheikh Husseini											N. Shuneh 2 km Tell al- Arba'in 2 km		TN							

NOTE: P = Present; TN = Tanker; PN = Pipeline Network; * = Not opened; al-Mushar'a, Waqqas/Qali'at = Malaria Center; HC = Health Center.

(To be continued)

Table IV-1B (cont'd)

Village Name	Health Service										Public Utilities									
	Outpatient Clinic	MCH Center	Dental Clinic	HC "A"	HC "B"	HC "C"	Pharmacy	Private Clinic	Frequency: Doctor Visits to Outpatient Clinic	Other Villages Using Clinics	Site, Distance: Supplementary Services	Electricity	Drinking Water	Municipal Slaughter House	Post Office	Telephone Exchange	Police Station	Mosque	Civil Defense Station	Garbage Collection
41. Khirbet al-Sheikh Muhammad	UNRWA										Tell al-Arba'in 4 km		TN		1	1				
42. Waqqas/Qali'at	1				1			2				P	TN		1	1	1	1		
43. al-Faddiyyin											Quli'at 2 km		TN							
44. al-'Aramsheh											N. Shuneh 9 km		TN					1		
45. al-Manshiyyah	UNRWA										N. Shuneh 7 km	P	TN		1			1	P	
46. North Shuneh	1	1	1	1				2 1(Den.)				P	PN		1	1	1	1		
47. al-Sakhneh											N. Shuneh 5 km		Spring							
48. al-Baqqureh											N. Shuneh 4 km		Yarmouk R							
49. Al-'Addassiyeh											= 7 km	P	EGC		1			1		
50. al-Mukheibeh	1							2			Irbid		Spring		1			1		
51. al-Mukheibeh al-Fawqa	1							2			Irbid		Seil al-Himma		1	1	1	1		

NOTE: TN = Tanker; PN = Pipeline Network; P = Present; al-Mukheibeh al-Fawqa, Waqqas/Qali'at = Malaria Center; HC = Health Center.

Table IV-2

EDUCATIONAL SERVICES

Village Name	Type of Council			Population			Education (Schools)													Students From	Students To
	Municipal	Village	Mukhtars	Male	Female	Total	Level	Male	Female	Mixed	Sections	Number Teachers	Number Classrooms	Labs	Libraries	Home Economics	Admin. Offices	Others	Play-grounds		
1. al-Suweimeh			X	442	415	857	E P	140 39	16	X	8	8	4	-	-	-	-	-	-	Bedouins	South Shuneh
2. al-Rameh			X	903	891	1,844	E P E P	93 69 91 48	105		5-E 6-P	12	6	-	-	-	2	-	-	Suweimeh al'Ajajreh al-Rameh	South Shuneh
3. al-Randa			X	1,493	1,448	2,941	E P E P	171 13 187 101	248	X	14 15	15 11	12	X X	X X	X -	3 1	- -	- -		South Shuneh
4. al-Kaffrein		X		547	464	1,011	E P E P	99 101 19 41	82	X	4	11	8	X X	X -	-	2	-	-	al-Jofeh	
5. al-Jofeh			X	889	838	1,727	E	230	126		6	7	6	X X	X X	X -	2	-	-	al-Kaffrein	P: al-Kaffrein
6. al-Ajajreh			X	311	276	587	E E P	93 39 44	30 6 6	X X	6	6	6	- -	- -	- -	- -	- -	- -		S: South Shuneh
7. South Shuneh	X			1,612	1,174	2,786	P S E P E P S	112 24 110 133 252	49 79 145	X	5 5 16	8 10 25	5 5 13	- - X	- - X	- -	1 2 2	- - 1	- -		
8. al-Sukneh			X	1,083	964	2,047	E	126	122		9	9	7	- -	- -	- -	1	-	-		S: South Shuneh
9. al-Karaoeh			X	1,487	1,267	2,754	E P E P	459 134	269 55		16 10	17 11	16 10	- -	- -	- -	1 2	- -	- -		S: South Shuneh

NOTE: E = Elementary; P = Preparatory; S = Secondary

(to be continued)

Table IV-2 (cont'd)

Village Name	Type of Council			Population			Education (Schools)														Students From	Students To
	Municipal	Village	Mukhtara	Male	Female	Total	Level	Male	Female	Mixed	Sections	Number Teachers	Number Classrooms	Labs	Libraries	Home Economics	Admin. Offices	Others	Play-grounds			
10. Dharet al-Raml			X	278	218	496	E	108	21	X	4	9	9	-	-	-	2	-	-	Muthalath al-Masri	al-Arda/Ma'adi	
11. Damiya			X	148	140	288	E P	36 5	43 9	X X	4	4	4	-	-	2	-	-	-		Ma'adi Deir Alla	
12. al-Muthalath al Masri			X	42	24	66															Damiya	
13. Maisara/Fannush			X	533	480	1,013	E	25	13	X	2	2	2	-	-	-	1	-	-		P. al-Arda S. Ma'adi	
14. al'Arda		X		725	323	1,048	E P E	64 86 155			6 9	7 10	5 5	X X	X X	X -	2 2	-	-	Maisara	Ma'adi	
15. Ma'adi		X		748	670	1,418	E P E P S	93 36 95 256	166 87	X		12 20					2	-	X	Damiya Maisara		
16. Deir Alla	X			1,030	903	1,933	E E P S P S E	307 143 138 44			7 11 10 7	10 14 11 10	9 15 9 9	- X X -	- X X -	1 - X 1	- 3 3 -	- - -	- X X -	Abu-al-Zighan Al-Ruweiha Dirar Al-Rabi' (al-Twal-al-Shamali) al-Fajawa al-Diyyat	M(S) M'adi F(S) - 1st Dier Alla	
17. Al-Diyyat			X	1,334	1,210	2,544	E P E P		201 11		11 3		9 6	X X	X X	X -	2 2	- -	- X	Rural Children from Other Areas	F(S) Dier Alla M(S) Deir Alla Ma'adi	
18. al-Rabi'			X	855	838	1,693	E P E		111 8 167		5 8	5 10	5 8	- -	- -	X -	- X	- -	- -		S. Deir Alla	

NOTE: E = Elementary; P = Preparatory; S = Secondary

(To be continued)

Table IV-2 (cont'd)

Village Name	Type of Council			Population			Education (Schools)														Students From	Students To
	Municipal	Village	Mukhtars	Male	Female	Total	Level	Male	Female	Mixed	Sections	Number Teacher	Number Classrooms	Labs	Libraries	Home Economics	Admin. Offices	Others	Play-grounds			
19. Abu-Zighan		X		145	138	283	E P E P		74 13		3 7	5 9	4 9	- -	- -	X X	- -	- -	- -	Al-Ruweiha al-Dabab	S: Deir Alla Ma'adi	
20. al-Ruweiha			X	486	404	890	E	36	44	X	4	3	3	-	-	X	-	-	-		Deir Alla	
21. Dirar		X		940	893	1,833	E P		184 38		8	9	8	X	X	X	2	3	-	al-Ruweiha al-Khazineh	Deir Alla	
22. al-Khazineh			X	731	704	1,435	E P	133 85	85 4	X	13	14	13	-	-	-	1	-	-		Dirar, al-Balawneh al-Kreimeh	
23. al-Balawneh			X	396	386	782	E P E P S	165 169 192 196	97 184 38	X	7 14 14	7 19 22	7 14 14	- 1 1	- - 1	- 1 -	1 2 2	- - -	- - -	P: Kreimeh S: Kreimeh	Dirar al-Balawneh Kreimeh F(S) Deir Alla Balawneh/ Khazineh	
24. Abu'Ubeideh																						
25. al-Faqir			X																		Kreimeh al-Balawneh	
26. Kreimeh (UNRWA)	X			2,304	2,147	4,451	E P E P S E P E P	221 52	213 39 132		12 15 17 20	12 19 19 20	10 20 17 20	X X -	- X -	- X -	2 2 1 1	- 1 -	- -	al-Mashara al-Sleikhat Wadiel-Yabis	al-Mashara North Shuneh Ma'adi	
27. Abu Sido			X	798	741	1,539															al-Kreimeh	
28. Sleikhat			X	226	216	442	E	47	36	X	2	2	3								al-Kreimeh	
29. Bejijeh/ Abu Fallah			X	82	87	169															al-Kreimeh	

NOTE: E = Elementary; P = Preparatory; S = Secondary

(To be continued)

Table IV-2 (cont'd)

Village Name	Type of Council			Population			Education (Schools)													Students From	Students To
	Municipal	Village	Mukhtars	Male	Female	Total	Level	Male	Female	Mixed	Sections	Number Teacher	Number Classrooms	Labs	Libraries	Home Economics	Admin. Offices	Others	Play-grounds		
30. Ispeireh			X				E	13	3	X	1	1	1	-	-	-	-	-	-		al-Hashimiyyah
31. Abu Habil			X	243	249	492	E	76	43	X	4	4	4	-	-	-	-	-	-		MF(P) Wadi al Yabis
32. Wadi al Yabis		X		1,808	1,776	3,584	E P	272 78			13	12	14	X	X	-	2	2	-		Al Mashar'a N. Shuneh
33. Al Mirizen (UNRWA)			X				E P E P S		242 49		12	15	12	X	X	-	2	2	-		F: Freimeh M(S): N. Shuneh S: al-Mashar'a N. Shuneh
34. Tabqat-Fahal			X	141	134	275	E	76	43	X	2	2	2								al-Mashar'a
35. al-Mashar'a			X	3,498	3,316	6,810	E P S E E P S	276 229 198 381			24	27	20	X	X	-	2	1	-		N. Shuneh N. Shuneh
36. Seil al-Hinna			X	959	934	1,893															al-Mashar'a
37. Izmaliyyeh			X	26	104	200	E	61	46	X											F(P): Al-Sheikh Hussein S: N. Shuneh Al-Mashar'a
38. Biseileh			X	207	5	212															
39. Tell al-Arba'in			X	555	492	1,047	E P		214 53		9	13	12	X	X	X	2	2	-		M: Waqqas Qiliat N. N. Shuneh (Science) F: N. Shuneh F(S): al-Harawiyyeh al-Izmaliyyeh Biseileh al-Sheikh Mohammad al-Sheikh Hussein Qili'at N. Shuneh al-Mashar'a

NOTE: E = Elementary; P = Preparatory; S = Secondary

(To be continued)

Table IV-2 (cont'd)

Village Name	Type of Council			Population			Education (Schools)													Students From	Students To
	Municipal	Village	Mukhtars	Male	Female	Total	Level	Male	Female	Mixed	Sections	Number Teachers	Number Classrooms	Labs	Libraries	Home Economics	Admin. Offices	Others	Play-grounds		
40. al-Sheikh Hussein			X				E	81			3	3	3	-	-	-	1	2	-	M: al-Sheikh Mohammad al-Harawiyyeh Tell al-Arb'ain	
41. al-Sheikh Muhammad			X	966	966	1,936															
42. Maqqas/Qili'at (UNRWA)		X		1,997	1,874	3,871	E P S	201 115 121			9 9	10 15	9 9	X 2	X X	- -	2 3	2 4	- -	P: Waqqas M(S): al- Manshiyyeh al-Iznaliyyeh al-Sheik Hussein Tell al-Arba'in al-Harawiyyeh Biseileh	
43. al-Faddiyyin			X	164	169	333														P: al-Manshiyyeh S: N. Shuneh	
44. al-Aramsheh			X	258	236	494														P: al-Manshiyyeh S: N. Shuneh	
45. al-Manshiyyeh			X	1,056	1,040	2,146	E P E P E P	162 52 158 68	142 45		10 11 8		10 11 8								
46. N. Shuneh (UNRWA)	X			3,767	3,439	7,206	S E P E P S E E		332		12 13 13 10 13	20 15 12 13 15	12 13 13 10 13	X - - - -	- - - - -	- - - - -	1 1 1 1 1	- - - - -	- - - - -	S: Ma'an Wadi Musa Liwa' Madaba Hartha Harimeh Damin Deir Abu Sa'id Beni Kenana	

NOTE: E = Elementary; P = Preparatory; S = Secondary

(To be continued)

Table IV-3

PRIVATE SECTOR SERVICES

Village Name	Gasoline Station	Bakery	General Store	Construction Suppliers	Tanker	Blacksmith	Poultry Store	Novelties	Cement Outlet	Agricultural Supplies	Barber	Auto Elec. Mechanics	Restaurant	Butcher Shop	Green Grocery	Cafe	Elec. & Home Supplies	Taxi Dispatch	Driving School	Carpentry Shop	Radio/TV Repair	Buta-Gas Distributors	Commission Agent	
1. Suweimeh		1	6																					
2. al-Rameh	1		6		1																			
3. al-Rauda		1	10		1																			
4. al-Kafrein			2																					
5. al-Jofeh		1	7		1	1	2	1																
6. al-'ajajreh			1																					
7. South Shuneh	1	4	10		1	1	1	2	1		1	8	4	7	6	3	4	2	1					
8. al-Sukneh			3					1					1											
9. al-Karameh	2		8		1	2		1		1	1	4	1	3	1	3	1	1	1	1	1			
10. Dharet al-Ram			3																					
11. Damiya			1										1											
12. al-Muthalath al-Masri			1													2								
13. Maisara/Fannush			1																					
14. Ai-'Arda	1		3				1					2	2											
15. Ma'adi		1	9		1	1				1		4												
16. Deir Alla (al-Twal)	1	1	12	1	2	2	3	5		2	1	6		6	4		9	3		3	1	1	3	
17. al-Diyyat			4																					
18. Abu al-Zighan			2																					
19. al-Ruweiha			4																					
20. Dirar	1		5		1	1						1												
21. Khazineh			5		1	1			1					1										
22. Balavneh			6							1														
23. Abu 'Ubeideh			9							1														

(To be continued)

Table IV-3 (cont'd)

Village Name	Gasoline Station	Bakery	General Store	Construction Suppliers	Tanker	Blacksmith	Poultry Store	Novelties	Cement Outlet	Agricultural Supplies	Barber	Auto Elec. Mechanics	Restaurant	Butcher Shop	Green Grocery	Cafe	Elec. & Home Supplies	Taxi Dispatch	Driving School	Carpentry Shop	Radio/TV Repair	Buta-Gas Distributors	Commission Agent
24. al-Rabi'																							
25. al-Faair																							
26. Kreimeh			8	4	1	1		5		2	1	7	2	1		1	1			2			3
27. Abu Sido			5									1											
28. Sleikhat																							
29. Hijeijeh/ Abu Fellah																							
30. Ispeireh																							
31. Abu Habil														1									
32. Wadi al-Yabis			15			1		1			1	2	1		1								
33. al-Mirizeh			2																		1		
34. Tabqat Fehal			1																				
35. al-Mushar'a	1	2	20	1	1	1		1		1	1		2	1	1	1	3			2			
36. Seil al-Hirma			1																				
37. Iz-maliyya			4																				
38. Biseileh																							
39. Tell al-Arba'in			1																				
40. al-Sheikh Hussein			3																				
41. Khirbet al-Sheikh Muhammad			3																				
42. Waqaas/Qali'at			20									1											
43. al-Paddiyyin																						1	
44. al-'Aramsheh			1	1																			
45. al-Manshiyyeh			14																				

(To be continued)

Table IV-3 (cont'd)

Village Name	Gasoline Station	Bakery	General Store	Construction Suppliers	Tanker	Blacksmith	Poultry Store	Novelties	Cement Outlet	Agricultural Supplies	Barber	Auto Elec. Mechanics	Restaurant	Butcher Shop	Green Grocery	Cafe	Elec. & Home Supplies	Taxi Dispatch	Driving School	Carpentry Shop	Radio/TV Repair	Buta-Gas Distributors	Commission Agent
46. North Shuneh		3	50	5	1	2	3	1	4	2	2	2	6	6	10	6	5	1		1		1	5
47. al-Sakhneh			1																				
48. al-Baqqureh			3																				
49. al-'Addassiyyeh			4																				
50. al-Mukheibeh al-Tahta			7																				
51. al-Mukheibeh al-Fawqa		1	10																				

NOTE: Following are some additional services of some of the villages.

- Deir Alla - 1-Flour Sales, 1-Bookstore, 1-Ice Sales, 1-Tailor, 1-Photographer, 1-Ironing Service, 1-Watch Sales/Repair, 1-Paint Window, and 2-Bank
- al-Khazineh - 1-Chicken Feed Store, and 1-Flour Mill.
- Kreimeh - 1-Bookstore.
- Abu 'Ubeideh - 1-Wholesale Vegetable Market.
- South Shuneh - 1-Hotel, 5-Tire Repairs, and 1-Photographer.
- al-Mukheibeh al Fawqa - 1-Hotel.
- North Shuneh - 1-Bookstore, 2-Lawyers, 1-Ironing Service, 2-Bank, 1-Watch Sales/Repair, and 2-Photographer.
- Waqqaas - 1-Quarry.
- al-Mushar'a - 1-Real Estate (Land) Sales.
- Wadi al-Yabis - 1-Tire Repair.
- Ma'adi - 1-Plumber Pipe Fitter, and 1-Paint Window.
- al-Karamah - 1-Flour Mill.