Water Quality Improvement and Conservation Project

Opportunities & Options for Participatory Irrigation Management in Central Jordan Valley

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فرص واختيارات تطبيق مشروع المساهمه في ادارة الري في الغور الاوسط

ملخص الدراسه

بينت الدراسه ان المزارعين حالياً ليس لهم اي دور في ادارة نظام الري في وادي الاردن خارج نظام ري المزرعه.ومع ذلك فإن الدلائل تشير الى انهم قادرون على ادارة انظمة الري الخاصه دون ادنى تدخل من الدوله ، وقد بينت الدراسات في البلدان الاخرى انه عندما تتعاون المؤسسه والمزارعين فإن هؤلاء المزارعين او المستفيدين يشعرون باهمية النظام ويساهمون في تطوير ادائه. وابعد من ذلك فإن لدى مسؤولي الدوله شعور متزايد بارتفاع كلفة تشغيل نظام الري في الوادي . ولذلك فإن تحويل المسؤوليه الى المستفيدين يمكن ان يساهم في تخفيض نفقات التشغيل والصيانه وبالتالي لتخفيض الاعباء الماليه التي تواجهها الدوله.

ان الفرصه الآن سانحه لسلطة وادي الاردن ومشروع تحسين وحفظ نوعية المياه الى وضع نظام ادارة للري مبني على المشاركه ، وبعكس المشاريع التي تديرها الدوله في الدول الاخرى في اسيا والشرق الاوسط فإن مستخدمي المياه في الوادي اكثر ميلاً للتعاون مع السلطة ، ولذلك فإن السلطة قادرة على اقامة علاقة المشاركه في المسؤوله مع المنتفعين من نظام الري.

وقد تم استخلاص الاستنتاجات التاليه بناء على مقابلة المزارعين في الغور الاوسط:-

١- يرى المزارعون ان نظام الري الحالي عادل تماماً بالرغم من تجاوزات بعض المزارعين.

٢- ان نظام الطلب المسبق على مياه الري يضع عبئاً على المزارعين ويعتبر غير ملائم ويبدي المزارعون الرغبه في تغيير النظام بحيث لايضطرون لمراجعة اجهزة الدوله.

٣- هناك مشاكل فنيه في انظمة الري وخاصة في منطقة التطوير ٢٩ حيث يحتاج نظام الري الى تجديد واصلاح.

٤- يتردد المزارعون في المساهمه في الاداره الا اذا تمت معالجة مشاكل البنيه الاساسيه.

٥- هناك حاجة ماسه الى المساعدة في الري بالرغم من اعتقاد المزارعين بأن معرفتهم وخبرتهم كافيه، ومع ذلك هناك قلق متزايد من تردي نوعية المياه.

٦- من بين مجالات المشاركه في ادارة الري والتي تبدو واعده هي الارشادفي مجالات التوزيع ، الجدولة والري .

٧- ان مسألة تكلفة المياه ليس من المواضيع المطروحه في الوقت الحاضر ولكن الزيادة المتوقعه في الاسعار ابتداء من العام القادم تتيح فرصة لوضع مقاييس المحافظه على المياه.

ان المشاركه في ادارة الري تعني تقاسم المسؤوليه بين المؤسسه والمستفيدين من ادارة انظمة الري وهذا يعني:-

١- معرفة ان الاداره غير الكفؤه لتشغيل النظام تعني في بعض المعايير ان المستخدمين للمياه ليس لهم اي دور في حل مواضيع المياه المعقده.

٢- الحاجه لاعادة النظر في العلاقات مع المستفيدين بافتراض قيامهم بدور في اتخاذ القرارات لتشغيل النظام وتحول سلطة الدوله من دور الاداره الى دور الخدمات الموجهه فقط.

٣- المعرفه بأن المستخدمين للمياه سيكونون اكثر نشاطاً وسيلعبون دوراً فعالاً في نظام الري ، وان النظام سيعمل بكفاءه اكثر عند مشاركتهم في الاداره.

٤- التأكيد على ان سلطة الدوله سوف تستمر في لعب دور مهم في التشغيل وخصوصاً ايصال المياه والخدمات الارشاديه واسترداد التكاليف.

ان ادخال المشاركه في ادارة الري في وادي الاردن تتطلب تعديلاً جوهرياً في نظام التشغيل الحالي والاجراءات التي لاتكفي ان تكون على شكل توصيات ولذلك تم وضع ثلاث اختيارات او توجيهات لاخذها بعين الاعتبار من قبل السلطة اولاً ومن ثم الاطراف ذات العلاقه مثل برنامج الامم المتحده الانمائي وبرنامج المحافظه على المياه والمزارعين انفسهم :-

١- تأخير مشروع عملية المشاركه في الاداره والاستمرار في استخدام النظام الحالي.

٢- تقديم مشروع المشاركه في ادارة الري من خلال مشروع ريادي يتم تقييمه بعنايه ويشتمل على :-

- بيع كميات المياه بالجمله عند بداية كل خط رئيسي في النظام.
- اذا شارك المزارعون في ادارة التوزيع على طول الخط الرئيسي فإن ذلك يضع حداً لتقديم الطلبات الفرديه للحصول على المياه.
- مساعدة المستفيدين في حل الخلافات المحتمله والفعليه على امتداد الخط الرئيسي.
- بيان المعلومات الارشاديه للري واساليب حفظ المياه.
- مشاركة المزارعين في وضع خطط الزراعه الموسميه.
- تعيين مراقبي السلطة للعمل مع مجموعات السقاه كما كان الحال في الستينات قبل التوسع السريع في النظام.
- تقديم التدريب والتوعيه لموظفي السلطة والمزارعين.
- المساعده او الربط مع عمليات التسويق.

٣- وضع نظام المشاركه في الادارة كاملاً بوضع التشغيل وعلى نطاق واسع وباستخدام العناصر الوارده في الخيار الثاني.

هذه الخيارات الثلاث هي في الواقع معالم على الطريق وليست خيارات ثابته لاتتغير ، ولذلك يمكن الوصول الى حل وسط يكون اكثر قبولاً او معقوليه

ان اعتبار ادخال مفهوم المشاركه في ادارة الري يتطلب قبولاً اوسع داخل وخارج سلطة وادي الاردن . وفيما يلي بعض الخطوات الرئيسيه التي يمكن ان تساعد على تقدم هذه العمليه

<u>تقدير الفائده والالتزام</u>: هذه النقطه الاساسيه الاولى التي يجب ان تأخذها السلطة بعين الاعتبار اذا رغبت في تطبيق نظام المشاركه في ادارة الري وعلى المستوي الذي ستقوم باعتماده

توضيح الاهداف:عند تقرير احسن كيفيه للبدء تيوجب ان يحدد مسؤولي السلطة اهدافهم من تنفيذ هذا البرنامج ، وتشمل الاهداف المحتمله:-

- تحسين اداء النظام بمشاركة المستفيدين.
- تخفيض تكاليف التشغيل والصيانه.
- توسيع قاعدة الديمقراطيه.
- تحسين مستوى الارشاد في الري.
- تسوية الخلافات والمواضيع الاخرى بصوره عادله دون تدخل الدوله.
- الربط بين مختلف الفعاليات الزراعيه مثل ادارة المياه والتسويق.

بناء الثقه والوفاق: ثمة قناعات في سلطة وادي الاردن ووزارة المياه والري على اشراك المستفيدين في صنع القرار. ان التفاهم الواسع بين هذه المؤسسات ضروري جداً ، ولذلك فان قيام ورشات عمل او زيارات للبلدان الاخرى هي من وسائل بناء هذه الثقه.

بيان حقيقة المنفعه: يمكن ان تساور الانسان بعض الشكوك في الفائده المتوخاه من توسيع قاعدة مشاركة المستفيدين في مسؤولية ادارة عمليات النظام . ان تدقيق الفائده من هذه العمليه خلال المراحل الاولى للاجراءات الحكوميه يمكن ان تركز على العائد المالي الحقيقي، والاقتصادي والاجتماعي والمؤسسي الذي يمكن ان تنتج عن هذا التطبيق ، ويمكن لهذا التدقيق او المراجعه ان يفحص فوائد المشاريع ذات الاتجاهات المختلفه ،.ومن حق موظفي الدوله ان يعرفوا العائد المتوقع من ادخال تغييرات في السياسات او انظمة التشغيل.

وضع خطه متابعه تفصيليه وموازنتها: بمساعدة مشروع تحسين وحفظ نوعية المياه يمكن وضع خطه تفصيليه والموازنه الضروريه لها لتحديد هذا البرنامج، ويجب ان تكون الخطه التفصيليه بعيدة عن التخيلات مع تصور كامل لبرنامج مساهمة كل من سلطة وادي الاردن وموظفي السلطه والمزارعين.

EXECUTIVE SUMMARY

Farmers presently play no role in the management of the Jordan Valley irrigation system above the farm outlet. However, evidence indicates that they can competently manage private systems without any or with only minimal government intervention. Experiences in other countries show that when a line agency and farmers share management responsibility users see they have an important stake in the system and can improve system performance. Furthermore, there is a growing concern among many government officers that the valley system is expensive to operate. The transfer of management responsibilities to users can lessen the often crushing O&M financial burden faced by governments.

Promising opportunities exist for the Jordan Valley Authority and the Water Quality Improvement and Conservation Project to introduce a participatory irrigation management program. Unlike many government-run irrigation systems elsewhere in Asia or the Middle East, water users in the Jordan Valley are generally favorably inclined to the line agency. The JVA might well build on this relationship by sharing management responsibilities for the system with users.

Based on interviews with central Jordan Valley farmers, the following conclusions were drawn:

- Farmers view the present system as being inherently equitable, although they recognize in practice there is much abuse by users.

- The system of requests for water delivery places demands upon farmers that can be burdensome or inconvenient, and most farmers would welcome a change that would not require them to confirm water delivery at a government office.

- Technical problems inhibit the operation of the system, particularly in DA-29 where an aging infrastructure requires renovation and upgrading.

- Farmers will hesitate to participate in organization efforts unless infrastructure problems are addressed early on.

- There is a need for irrigation assistance although farmers believe that their knowledge and experience are adequate. Concerns about how to deal with increasingly degraded water are growing.

- Among the areas of participatory management that appear to be promising initially are distribution, scheduling, and irrigation extension.

- The cost of water is not an issue at present, but expected increases in pricing beginning next year offer an opportunity for introducing conservation measures.

Participatory irrigation management means joint involvement and shared responsibility

by both the line agency and users in the operation of an irrigation system. Shared responsibility:

- recognizes that inefficient system operation is in some measure the result of users' having little or no role in resolving critical water-related issues
- requires a revision of relationships, with users assuming a decision-making role in system operation and the government authority shifting from a management to a service-oriented role
- acknowledges water users can be active, contributing players in irrigation systems and that the systems work better when water users are involved
- confirms that the government authority will continue to play a critical role in its operation, particularly in delivery, extension services, and recovery of costs

The introduction of participatory irrigation management into the Jordan Valley would require a significant modification of present operations and procedures which cannot adequately be presented in the form of usual recommendations. Instead, **three major options or directions are offered** for consideration primarily by the JVA and secondarily by other involved parties, including USAID, the WQICP, and the farmers themselves:

1. **Delay any introduction** of a participatory management program and keep the present system essentially intact.
2. Introduce a participatory irrigation management program through **a pilot project** which would then be carefully monitored. Elements might include:
   - making bulk sales to the head unit on the line
   - having farmers manage distribution along the line[1], ending the need for farmers to confirm deliveries individually
   - assisting users in resolving potential or actual water conflicts on the line
   - introducing irrigation extension information and/or water conservation measures
   - working with farmers to produce seasonal cropping plans
   - assigning JVA staff to work closely with the lateral group, mirroring what was done in the 1960s before the rapid expansion of the system

[1] This approach to water distribution in the Zarqa Triangle was first proposed by Dar Al-Handasah and Netherlands Engineering Consultants in the report "Zarqa Triangle Irrigation Project, Final layouts and preliminary engineering design," September 1974

- providing sensitization and training to both farmers and JVA staff
- assisting with or linking to marketing imperatives

3. Introduce a participatory irrigation management program in a **full implementation mode on a large-scale basis**, using elements from the previous option.

These three options are actually points on a continuum rather than exclusive choices. Some intermediary approach might in fact be considered more appropriate or feasible.

Consideration of whether or not to introduce participatory irrigation management will require wide vetting within and beyond the Jordan Valley Authority. The following are **possible next steps** which might carry the process forward:

Determine interest and commitment: An obvious initial point will be for the JVA to consider if it wishes to proceed with a participatory irrigation management program and the scale at which it will operate.

Clarify objectives: When considering how best to proceed, JVA officials might also identify their objectives in carrying out such a program. Possible objectives include: improving system performance by giving users a stake, reducing O&M costs of the line agency, expanding democratization, improving irrigation extension assistance, settling issues or disputes equitably without government intervention, and linking different agricultural requirements, most often water management and marketing.

Build understanding and consensus: There is interest in some quarters within the JVA and MWI in bringing users into decision-making roles. Wider understanding within the institutions is critically important. Workshops in Jordan and study tours to other countries are effective vehicles for building consensus.

Conduct a benefit audit: One may encounter some skepticism about the anticipated benefits of expanding user responsibility in system operations. A benefit "audit" conducted during early government deliberations might focus on realistic financial, economic, social, and institutional consequences that are likely to result. The audit might examine benefits from programs of different magnitudes. Government officers need and deserve to know what the prospective returns will be from introducing significant policy and operational changes.

Develop a detailed implementation plan and budget: With the assistance of the WQICP, a detailed implementation plan and budget will be needed to define the program. The plan should be an outgrowth of detailed conversations with the full variety of program participants: JVA headquarters and valley officers and staff and farmers.

ACRONYMS AND TERMS

ACC	Agricultural Credit Corporation
AMPCO	Agricultural Marketing and Production Corporation
DA	development area
dunum	one tenth of a hectare
fasil	a time-share of water in a spring-fed system
ghor	Jordan Valley
GOJ	Government of the Hashemite Kingdom of Jordan
GTZ	German Agency for Technical Cooperation
ISPAN	Irrigation Support Project for Asia and the Near East
JCB	Jordanian Cooperative Bank
JCO	Jordanian Cooperative Organization
JD	Jordanian dinar (JD 1 = USD 1.33)
JES	Jordanian Environment Society
JVA	Jordan Valley Authority
JVFA	Jordan Valley Farmers Association
KTR	King Talal Reservoir
MOA	Ministry of Agriculture
MWI	Ministry of Water and Irrigation
USAID	U.S. Agency for International Development
WERSC	Water and Environment Research and Study Center
WQICP	Water Quality Improvement and Conservation Project
WUO	water user organization

OPPORTUNITIES AND OPTIONS FOR PARTICIPATORY IRRIGATION MANAGEMENT IN THE CENTRAL JORDAN VALLEY

BACKGROUND

This report examines the feasibility of creating and sustaining water user organizations in the central Jordan Valley. It does so in a number of contexts:

- Institutional: The Jordan Valley Authority (JVA) makes all decisions concerning operation of the system above the farm turnout. On-farm, there is no government entity with clear responsibility for assisting farmers with water management. The JVA delivers water to the farm turnout only, and the agricultural extension department does not have water management expertise.

- Physical: The Jordan Valley Authority operates and maintains a pressurized pipe system that is designed to deliver water for irrigation directly to an outlet on a farmer's land upon demand. Although maintenance costs are relatively small, the cost of operation is high.

- Social: The delivery of water to the farm unit underscores the individuality of farmer activities in the Jordan Valley. However, some farmers do work together in the agricultural sector, such as through cooperatives. Farmers are highly varied and include absentee landlords, owner-operators, sharecroppers and renters, managers, and workers who are preponderantly foreigners (mostly Egyptians and Pakistanis).

- Economic: The Jordan Valley is an area of intensive cultivation and sophisticated technology, including drip irrigation systems and plastic houses, where marketing and pricing concerns are the most serious. Water for irrigation is underpriced. The system is based upon a volumetric charge for water, but most meters at the farm outlets are not working and in some areas, billing is based on an estimation of use.

- Historical: The Jordan Valley has been an area of social and economic disruption and change during the past 25 years. The irrigation infrastructure has been completely changed, land has been redistributed, and there has been a significant population influx from elsewhere in the country.

- Governmental: Government officers have had virtually no exposure to water user organizations (WUOs) in the Middle East or Asia and have devoted little time to considering an expanded role for users in the management of the system.

These contexts suggest a set of conditions which would seem to work against the formation of WUOs in the Jordan Valley: an irrigation infrastructure not readily attuned to joint management, limited experience in cooperative efforts, an absence of a government mandate, and a highly heterogeneous population with little incentive to work together. However, a recent study in the Jordan Valley indicates that there is a clear

need for the improvement of on-farm water management practices. Some farmers are over-irrigating and high technology methods, including drip irrigation systems in open fields and plastic houses, are not being used efficiently (Shatanawi et al. 1994).

Farmers play no role in the operation of government schemes in Jordan, although evidence indicates that they can competently manage private systems without any or with only minimal government intervention. Experiences in other countries show that when line agency and farmers share management responsibility users see they have an important stake in the system can improve system performance. Furthermore, there is a growing concern among many government officers that the valley system is expensive to operate. From 1988 to 1992, 16.5 percent of the O&M costs were recovered through water revenues, and 63 percent of the annual budget is allocated for personnel (GITEC 1994). The system is far more costly to manage than comparable systems elsewhere, including in Morocco (Naff 1987). The transfer of management responsibilities to users can lessen the often crushing O&M financial burden faced by governments.

At this time of significant change for Jordan, with a future of increasing water shortages but new marketing and other opportunities, it seems appropriate to examine whether the time is also ripe for an expanded role and improved services for water users.

Objectives of the Report

The main objective of this report, according to the scope of work (Annex A), is to examine whether one or more water user organizations are needed and can be viable in the central Jordan Valley. To that end, the report identifies generic types of farmer organizations operating in the valley, characterizes their basic features, explains the legal framework within which they operate, and details particular cases. However, our investigations in the valley indicated that a focus of this report should be broader than the need for WUOs alone. A more pertinent focus would be ways in which farmers could join formally or informally to improve irrigated agricultural management practices, given the physical plan of the system. This approach leads to identifying both opportunities for organizational efforts and next steps which might be considered for action.

The assignment was undertaken contemporaneously with another WQIC Project effort with parallel interests: an examination of the need for irrigation management services in the central Jordan Valley. The scope of work for the WUO assignment is essentially written in terms of WUOs being a home for an irrigation extension service, a communication link between farmers and the JVA, and a coordinator of training and demonstration programs. These responsibilities reflect only a small part of what WUOs can contribute to the conduct of irrigated agriculture, as is evidenced outside of Jordan. This report is an initial effort to assess what might be appropriate roles for farmers in the Jordan Valley.

AN HISTORICAL PERSPECTIVE OF THE JORDAN VALLEY

The Jordan Valley has witnessed human settlement for more than 12,000 years. Archaeological evidence attests to agricultural activity for some of this period: foodstuffs from the valley were exported to nearby states 5,000 years ago and irrigation networks were build more than 4,500 years ago (Khouri 1981). Until 1950, the valley remained only sparsely populated and of minor significance in terms of agricultural production. Roughly 95,000 dunums were cultivated, mostly for wheat and barley. These areas were irrigated from the Jordan and Yarmouk Rivers and from side wadis and springs.

During the early decades of this century, plans were first advanced to construct hydroelectric facilities to generate electricity and irrigate large tracts of land (Haddadin 1990, Ionides 1946). However, it was not until the construction of the first 70 kilometers of the East Ghor Main Canal (EGMC) in 1958-61 that there was a significant population increase and expansion of irrigation. A land redistribution program was introduced in 1962 which divided holdings into units of 30-40 dunums, the minimum considered to be adequate to support a single farm household engaged in market agriculture. By 1966, the valley population under the first stage of the EGMC alone had increased to over 60,000 people and irrigation reached 123,000 dunums (Ohlmeyer 1987). Some of the landowners lived in the valley and moved to the cooler highlands in the summer, especially before 1973 due to the lack of electricity, domestic water, and other services.

A four-year period from 1967 was one of constant disruption. Most of the civilian population left their homes, some moving to the highland cities outside the valley and returning to tend their citrus groves, bananas, and vegetables. In 1971, the government reactivated its development plans for the valley drawing together a number of different threads into an integrated agricultural approach: the development of land and water resources, social services, improved agricultural technology, and marketing networks (Haddadin 1990).

A focus of government efforts has been the progressive extensions of the EGMC and extensive expansion of the irrigation infrastructure (Figure 1). A major technological innovation was introduced in 1978 with a pressurized pipe system of submains, laterals and head units extending to individual farm outlets. Eighty percent of the irrigated land in the valley is now served by the pressurized pipe system, with full valley coverage planned eventually. Presently, roughly 304,000 dunums are served by the irrigation system. The final 73,000 dunums are expected to be completed by 1996.

A land redistribution program that mirrored its predecessor was reinstituted and still operates in the valley according to terms encapsulated in Law No. 19 of 1988. According Article 24, priority preference is given to those who held irrigated or unirrigated land at the time of redistribution and are the actual operators. In descending order are sharecroppers, lessees, professional farmers first residing then not residing in the valley, and finally holders residing outside the country.

According to the law, farm units can vary in size from 30 to 200 dunums, depending upon the class of land. Article 22 further states that "under no circumstances may any farm unit be divided or parceled into several units" which are less than the amounts

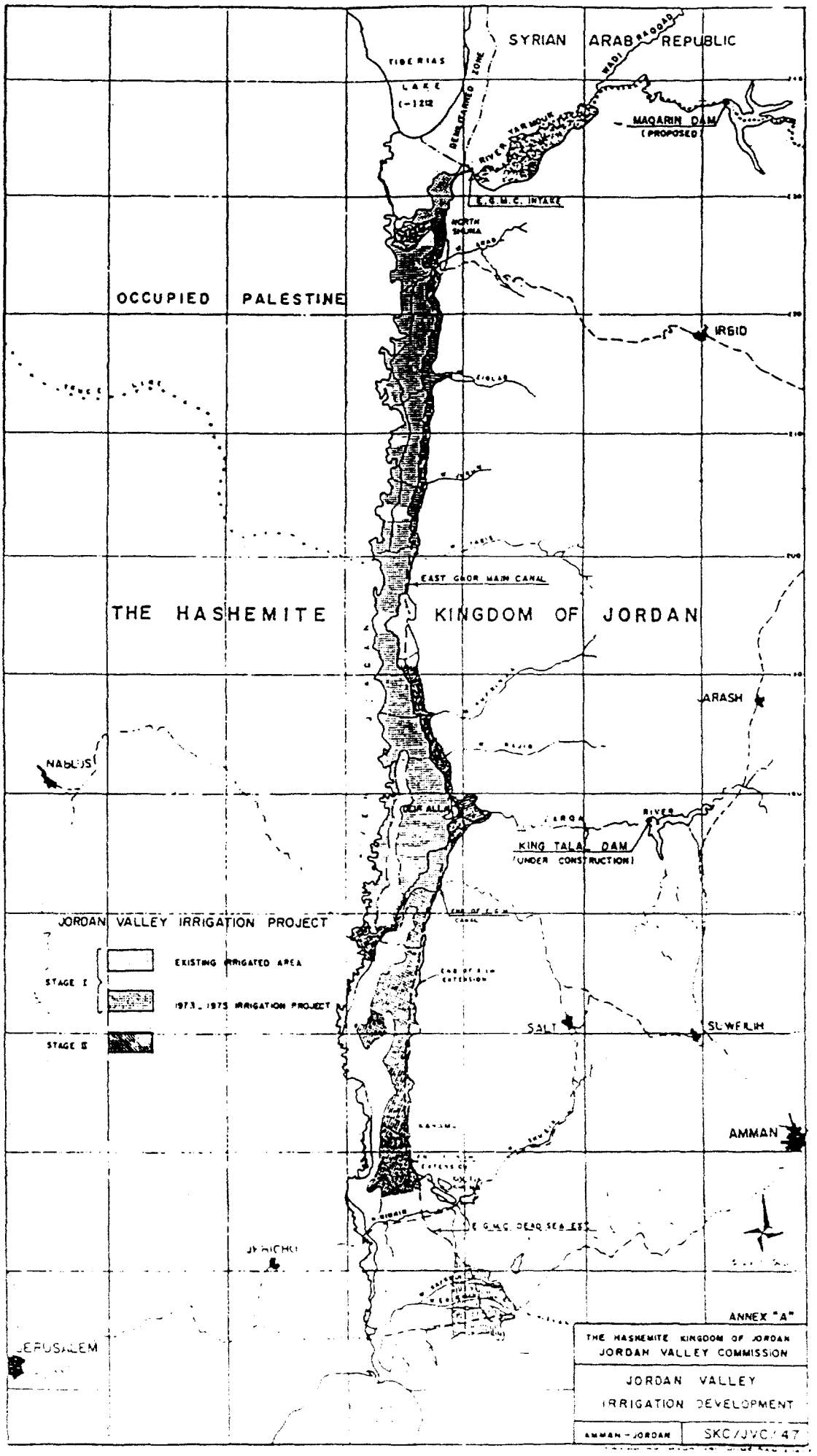

Figure 1: Jordan Valley

fixed. In practice, land holdings over time have been subdivided for heirs, and actual holdings are frequently far below legal levels. A study of irrigation practices on 400 farms in the central Jordan Valley by the Irrigation Support Project for Asia and the Near East (ISPAN) and the Water and Environment Research and Study Center (WERSC) of the University of Jordan found that actual farm size ranged from 16 to 360 dunums (Shatanawi et al. 1994). A single farm outlet still brings JVA-delivered water to the unit which farmers, usually groups of brothers or other close relations, then distribute among themselves.

Participants in Jordan Valley agriculture are a varied lot. They include absentee owners, owner-operators, renters, sharecroppers, managers, and their workers., most of whom are foreign. According to the ISPAN/WERSC study, owners cultivate or have others manage 53 percent of the land in the central Jordan Valley; 47 percent is commonly leased or far less commonly sharecropped. Roughly two-thirds of the farms were managed by individuals other than the landowners. Twenty-five farms were operated by hired managers, with more proportionately managing the farms not leased. Permanently hired workers is the largest source of labor. Only 22 percent used family labor. There was little mix of family and hired labor. Most hired foreign workers are from Egypt, Pakistan, and India, and few Jordanians were hired as permanent farm workers (Shatanawi et al. 1994).

Farmer Organizations Operating in the Valley

There are some entities which have operated or are operating in the Jordan Valley that can be called farmer organizations (Table 1). In order to draw as widely as possible from any experiences for project implementation efforts, this section looks to the past, present, and future for examples. It defines the term "organization" as broadly as possible: a formal (legally sanctioned) or informal group or network of farmers focused on a common, agriculturally-based endeavor. Obviously, this definition is a wide net permitting broader inclusion than is usually the case. As such, four general kinds of farmer organizations can be identified:

- broadly mandated, government-sanctioned association
- single or multiple purpose agricultural cooperative
- informal users group
- network or interest group

As ordered above, they exhibit a diminishing formality of structure in terms of membership criteria, fees and services, rights and responsibilities, and administrative set-up. The four types essentially reflect the range of farmers working directly with other farmers, except at the most personal level. The following discussion does not deal with farmer-oriented service institutions present in the valley, which are part of the Government of Jordan and are fully funded from its coffers, except with reference to particular cases. These include the Jordanian Cooperative Organization (JCO), the

Agricultural Credit Corporation (ACC), and the Agricultural Marketing and Processing Corporation (AMPCO).

Table 1
Features of Farmer Organizations in the Jordan Valley

Type/Name of Farmer Organization	Membership Fee	Fee Uses	Capital Accumulation	Multi/Sngl Purpose	Formal Structure	Legally Sanctioned	Govt. Links
Broadly Mandated, Government-Sanctioned Association							
Jordan Valley Farmers Assoc.	Yes	Salaries Admin	Yes	Single	Yes	Yes	Yes
Single or Multiple Purpose Agricultural Cooperative							
Women's Rural Cooperative	Yes	Admin	Yes	Multiple	Yes	Yes	Yes
Ma'adi Cooperative	Yes	Salaries Admin	Yes	Multiple	Yes	Yes	Yes
Potato Cooperative	Yes	Salaries Admin	Yes	Single	Yes	Yes	Yes
Informal Users Group							
Side Wadi Irrigation	No	-	No	Single	No	Yes	Yes
Spring Irrigation	No	-	No	Single	No	No	No
Network or Interest Group							
MOA Extension Closed Group	No	-	No	Single	No	No	No

Broadly Mandated, Government-Sanctioned Association

The sole example of this type is the Jordan Valley Farmers Association (JVFA), established under Law No. 19 of 1974. The law set the objectives, responsibilities, and functions of the association, created a general assembly of members, established a board of directors, defined development areas, and empowered local councils in those areas. Its initial resources, when it began operation in 1977, were a $1,500,000 loan from USAID and a matching amount from the GOJ for technical assistance, equipment, and construction. In addition, it received JD 14,000 from the government, which it deposited in a bank account for immediate purchases.

Although established as a farmer-run entity, the JVFA is seen to be a component of the JVA, by both its staff and valley farmers. Its funds are largely government-provided and, as someone noted, even its vehicles have government licenses. Furthermore, the secretary-general of the JVA must approve the ten farmers who are elected to the board. The present chairman of the board of directors, an elected farmer, is a member of a landed valley family, the El Faour.

Common assessments of the JVFA are that it is not active, farmers have defaulted on loans, it is propped up by the government, and the private sector has more experience with providing inputs and marketing and does them better.

Objectives. Article 3 of the law states that the objectives of the JVFA are to develop agriculture, enable farmers to participate in formulating and implementing agricultural policy and programs, increase farmer participation in the national economy, ensure equitable earnings, and increase food production in the valley. To meet these objectives, the association was to have the following functions: provide loans and agricultural inputs; undertake agricultural operations, including pest and insect control, harvesting and transporting crops, and packaging and preparing them for marketing; and sell and market crops domestically and for import.

Membership. According to the law, all farmers holding 15 or more dunums of irrigated land at sea level or below are considered to be members of the JVFA. Membership is compulsory. Holders may be owners, renters or sharecroppers, but not managers or salaried workers. A member may not designate another, even a close family member, to replace him. Women may be members of the association; foreigners, such as Egyptian or Pakistani renters or sharecroppers, may not.

In practice, membership is somewhat more ambiguous. Although it is compulsory, roughly two thirds of the potential farmers in the valley are on the computer list of members and roughly one-third are members in any real sense: they pay a nominal yearly fee and purchase inputs through the association.

A great dilemma for the JVFA has been in determining who is entitled to membership. Minimum levels for holdings as a criterion of membership were set according to laws governing land redistribution. However, the further division of land among inheritors has fractioned holdings below those established levels. As a result, one of the owners of a unit will be the member in name and may purchase inputs for others not recognized. Many active farmers who are potential members are excluded.

Paid-up membership entitles farmers to vote in the general assembly for ten farmer board members. It also permits them to take part in selection of council members in the 33 JVFA development areas. (These are not to be confused with JVA development areas which divide the valley differently and are differently numbered.) A JVFA development area (DA) has roughly 8000 dunums and 200 farmers. In each DA, a council is formed of four farmers. They are responsible for meeting twice a month and preparing a report with the help of an MOA extension agent delineating problems in the area. The reports are sent through the JVFA director general, a salaried non-farmer, to the board for review. In practice, months go by without a report being prepared.

Fees. Members pay a JD 3 annual fee; new members pay an additional one-time association fee of JD 2. Fees are used to cover purely administrative costs. To date, JD 75,000 in fees have not been paid by farmers on the JVFA rolls. The association has 80 full-time, salaried staff. It also pays members of the board of directors JD 10 for each meeting, held roughly twice monthly. The membership fee is a small part of the JFVA's funds. It receives a grant roughly every two or three years from the Ministry of Finance. The last, three years ago, was for JD 500,000. It also receives regular interest-based loans from the Agricultural Credit Corporation. In 1994, it received JD 300,000.

Services. Despite its broad objectives and functions, the JFVA has basically provided two services to members since its formation: loans and inputs at reduced cost. Loans for inputs began in 1978. In all, 3373 farmers received JD 2,794,000. Of this, 750 farmers have not repaid JD 620,000. Farmers who have defaulted are described by JFVA officers as those who are working at a loss, because of low market prices.

In 1988, the loan function of JVFA was taken over by the Agricultural Credit Corporation. Since then, the JVFA functions have been limited largely to providing inputs (methyl bromide, fertilizer, seeds, and pesticides) to farmers at a lower cost. Most farmers pay for the inputs with cash. A few, who are considered to be good risks, are given credit and pay at the end of the season. Farmers who have not repaid loans are permitted to buy inputs with cash. Those whose membership fees are in arrears are not. Some farmers prefer to buy their inputs from private distributors who provide credit.

Perhaps the most constraining feature of the law is the requirement that members must market, sell, export, and transfer products only through the association except under certain stated conditions. In fact, the JVFA has no marketing facilities. Its functions have been taken over by AMPCO, but most farmers market directly with local wholesalers or exporters.

The JVFA appears to have been a local rallying point recently, when roughly 2000 farmers from the valley met there to protest a government raise in the price of a cubic meter of water from 6 to 15 fils.

Linkages. As noted, JFVA has strong linkages with a number of government entities. Its 15 member board of directors includes ten farmers elected by the general membership and one each (five representatives) from the Jordan Valley Authority, Ministry of Agriculture, Agricultural Credit Corporation, Jordanian Cooperative Organization, and Jordanian Marketing Organization. The Ministry of Finance and Agricultural Credit Corporation provide regular grants and loans, respectively. MOA extension agents serve as secretaries to the DA councils, usually working with several at a time.

Single or Multiple Purpose Agricultural Cooperative

Ten agricultural cooperatives are presently functioning in the central Jordan Valley. They are both single and multiple purpose groups which are legally registered through the Jordanian Cooperative Organization. The legal framework for cooperative societies is the Cooperation Law No. 55 of 1968, the Cooperative Societies by-Law No. 1 of 1970, and the Cooperation Law No. 20 of 1971. The 1968 law established the JCO as a non-governmental institution and set a broad framework for cooperative societies in the Kingdom. Cooperatives were based on shareholdings by members, the value of one share set at JD 10. The 1970 by-law defined cooperative societies as socioeconomic institutions with a predetermined structure of assemblies and administrative committees. The 1971 law replaced the 1968 law, made the JCO a government institution, and created the Jordanian Cooperative Bank (JCB). Shares are now valued at JD 1 each, according to the JCO Deir Alla branch manager.

Cooperatives are registered through a lengthy process with the JCO. A minimum of ten members is required to form a cooperative. They first write a letter of interest to the local JCO office which gives them a format for providing data for an economic feasibility analysis. They then attend a meeting and elect three officers with signatory powers. Each JCO branch office has an extension agent who works with the prospective cooperative members to determine the name, a one-time membership fee, and the terms of shareholdings by members. The cooperative is permitted to decide its own financial conditions: the amount of the fee, the minimum number of shares each member must purchase, and the purchase period. The one-time fee is usually JD 5. Once the terms are set, the package is sent to the JCO main office in Amman for approval.

Registered cooperatives are entitled to raise capital in the form of members' shares, hold bank accounts in the name of the cooperative, and take loans from the Agricultural Credit Corporation and the Jordanian Cooperative Bank. The two government entities now operate in parallel in the agricultural sector, one as the legalizing institution, the other as the financial creditor. Since 1989, the JCO no longer loans money and the ACC claims to be the only government entity that presently gives loans for agricultural pursuits. In practice, the JCB has made only one loan in the central Jordan Valley and the ACC has made only one loan to a cooperative in the entire valley. Member shares are the capital foundation of a cooperative and the base for further accumulation, rather than ACC or bank loans. For example, members of the Potato Cooperative agreed to purchase 5000 shares at JD 1 each over a defined period, giving it a minimum capital of JD 200,000 since members are permitted to purchase more shares.

ACC loans nationwide appear to have yearly themes. In 1993, most of its 400 loans were for agricultural inputs. In 1994, the ACC has encouraged loans to women. In 1995, loans to alleviate unemployment in the agricultural sector will receive priority attention. Repayment over the years has been poor. Since 1989, 70 percent of the loans have not been paid back. According to the ACC 1992 Annual Report, the percentage of total collection on loans among its 14 branches is worst in the three valley branches at 24 percent in South Shouneh, 32 percent in Middle Ghor, and 48 percent in Wadi Al Yabis. They compare with a nationwide average of 66 percent.

ACC staff have said that they are less concerned with the return of loans than with providing opportunities to the agrarian sector to generate income. If money has not been repaid, a repayment schedule is redrawn. Although the ACC has the authority to take land away from a debtor after a defined period, it has never done so.

Eight of the cooperatives in the central Jordan Valley focus on agricultural production and marketing, one on livestock production and marketing, and one on income generation for women. The following table presents the latest available data:

Table 2
Agricultural Cooperatives in the Central Jordan Valley
(1992)

Cooperative Name	Year of Registration	No. of Members	No. of Shares
Middle Ghor Ag. Cooperative	1971	226	61836
Deir Alla, Damia Ag. Coop.	1974	222	3576
Spring Cooperative	1978	110	10348
Triangle Ag. Cooperative	1979	181	22716
Dayat Ag. Cooperative	1979	104	8165
Ma'adi Coop for Marketing	1980	20	49050
Ma'adi Coop for Livestock	1988	18	950
Potato Prod. and Marketing	1989	26	18040
Women's Rural Cooperative	1989	24	768
Farmers Union Cooperative	1993	NA	NA
Total			274666

Source: Jordan Cooperative Organization, Deir Alla Office

The following discussion focuses on three agricultural cooperatives presently operating in the Jordan Valley, and are said to be among the most successful:

Women's Rural Cooperative. This women's group was the only cooperative that borrowed money from ACC since 1989. In November 1992, a group of about 20 women borrowed JD 6,000 from the Deir Alla Branch to purchase 75 goats. At this level, the loan was termed "medium" which stipulated a grace period through May 1994 (18 months from the start of the loan), seven percent simple interest, and repayment over six years. The ACC considers the cooperative to be successful because it made a first repayment of JD 500 in August 1993. The cooperative is now planning to broaden its activities to drying molokhia for sale.

Ma'adi Cooperative for Marketing Agricultural Products. The cooperative was formed with ten members in 1980 and has now grown to 25. It is registered with the JCO. Its members must be vegetable farmers. Most are owners, a few are renters, but none are sharecroppers. Although the geographical focus of the cooperative is DA-24, some members come from neighboring development areas. None of the members grow vegetables during the summer season. In 1992, the accumulated shares were valued at about JD 50,000.

The primary objectives of the cooperative are to help members market their vegetables. In a sense, the cooperative operates like a market middleman, arranging for the sale of vegetables most frequently at the Amman Central Market. Members provide the transportation themselves. Middlemen charge five percent of the total sale for marketing assistance. The cooperative charges members 4 percent for marketing and keeps the

money in a bank account under the name of the cooperative. Profits belong to the members.

The cooperative also purchases agricultural inputs (seeds, pesticides, and fertilizer) which it sells to members for cash or on credit. Smaller farmers may take up to JD 500 a season, large farmers may take up to JD 1000. As a result, it competes easily with JVFA which provides credit to only a carefully selected few. But the level of inputs offered is not adequate for some members. Those who have quit the cooperative did so because they could not adequately cover their input requirements through the cooperative and had to turn to the private sector for more credit.

Even at the level at which credit is given, farmers can have serious problems repaying. In one case, about five years ago, one member could not repay the cooperative for the inputs he had taken on credit, and the cooperative took a piece of his land which fell outside the JVA command. The land remains in the name of the cooperative.

After a nominal one-time entrance fee, members must pay JD 250 yearly for shares. Funds are used in part for the salaries of some officeholders and administrative expenses. The JCO extension agent is an officer of the cooperative, and the cooperative contributes JD 1500 yearly to JCO for services. Members attend a yearly meeting in the AMPCO offices, although the cooperative operates independently of it.

Farmers Cooperative for Potato Production and Marketing. This cooperative is widely cited as being the most successful in the valley. The cooperative was started in 1991 with 26 members and has grown to 45. It is registered with the JCO. Centered in DA-30, there are also members from other development areas. Members are all potato farmers, most are owners but renters and sharecroppers are also included. Although members say that anyone can join, there is an important personal criterion. On occasion, a prospective member has been turned down because of his character. The number of members remains relatively small because few farmers in the immediate area cultivate potatoes. However, since the formation of the cooperative, the land under potato cultivation has grown steadily to the present roughly 1000 dunums in the area.

At the time of inception, members agreed to purchase JD 5000 worth of shares at a rate of JD 250 yearly. The yearly purchase is now JD 500. A small portion of the funds is used to pay the salaries of some officeholders and administrative expenses. The rest is banked. Officers include a president, treasurer/secretary, and the extension agent from the JCO office. The president is a senior member of the largest landholding family in DA-30. The cooperative contributes JD 1500 yearly to the JCO as a payment for its services.

The stated objectives of the cooperative are to provide seed potatoes to members at discounted rates and on credit. Members pay no less than 20 percent down and the rest after the season. Seed potatoes are imported from Syria, Holland, Germany, and France by the cooperative for roughly JD 400 a ton. It sells the seed potatoes to members at JD 430 a ton, but members would have to pay JD 460 to 470 on the private market. About 2,000 tons pass through the cooperative yearly, which suggests a profit of about JD

60,000. In fact, the cooperative's accumulated capital from shares and sales in three different valley banks is presently JD 200,000.

The cooperative provides no other inputs and has no marketing functions. However, this year it forged links with a European Community export group busily expanding in the valley. The export group has asked the cooperative to provide 2,000 tons of potatoes for Great Britain in the February to June 1995 period.

Although tightly focused on potatoes, the cooperative plans to expand its activities commercially. It is planning to go into chips production and use its resources to purchase a storage refrigerator.

Informal User Group

Although water users on the JVA pressurized pipe system largely operate independently of each other, there are past and continuing examples of collective water management in the Jordan Valley under no or limited government control. The cases clearly indicate that water users can work together in irrigation, but the physical requirements of those delivery systems are markedly different from those of the newer JVA system.

Irrigation from the Side Wadis. Long before the present JVA system, farmers irrigated the Jordan Valley. Most of the water was provided by twelve side wadis which intersect the valley from the east along almost its full length between Lake Tiberias and the Dead Sea. The Yarmouk and Jordan Rivers were the major sources of water for irrigated agriculture, but these side wadis also made a significant contribution to the valley's water resources. The earliest figures obtainable from the JVA indicate that of the 158,616 dunums of irrigable land, 88,890 dunums were irrigated by the wadis in 1950. Of these, 1558 were planted with bananas, 1602 in citrus, 305 with other fruit trees, 2175 with vegetables, and 83,250 with cereals. Another 6,000 dunums were supplied by the Yarmouk.

Laws formalizing land and water rights date back to 1951-1954 when the Law of Settlement was promulgated. The law drew a distinction between ownership of irrigable and unirrigable land for all of Jordan. Ownership of irrigable land meant ownership also of water; on irrigable land, rights to land and water were one. A period of transition was from 1961 to 1966, with the opening of the first three stages of the EGMC for DA 1-23 and the completion of the laterals. Over time, the government took legal control of the side wadis, transferring their water to the King Abdullah Canal. The terms of the 1954 law grew increasingly important, since the government compensated owners differently for irrigable and unirrigable land. The former included water and received greater compensation. By 1966, most of the wadis had been integrated into the system and the land and water transferred into government hands. At present, only the water of Wadi Shueib, a southern wadi, has not been merged into the King Abdullah Canal Project. The southern part of the valley is being developed, and farmers on this wadi still have their land and water rights intact. When this last extension is completed, the same laws of acquisition and compensation will apply.

Until 1949, the wadi system was fully user built, maintained, and managed. Each wadi had two canals, north and south. Small groups of farmers managed water on segments of each system. In interviews with farmers who had used Wadi Kufrinja, they mentioned group sizes that ranged from 12 to 25 users. Water was scheduled in two hour turns at an estimated discharge of 70 liters/second. As water was tied to land, four hours were given for 50 dunums weekly. Land irrigated from Wadi Kufrinja, as elsewhere in the valley, was cultivated only for winter crops (wheat, barley, and house gardens), since there was no water in wadi during the summer months. Farmers recall that water stealing was endemic.

Government involvement in the side wadis began in 1949 with the first construction of diversion weirs and lined canals. Later, concrete canals were built and canal lining continued by the Department of Land, replacing the farmer-built earthen infrastructure when the wadi and EGMC systems were integrated. With this foothold, in the 1960s the government introduced a supervisory structure which involved staffing three stages of the canal (DA 1-10, DA 11-18, and DA 19-23) with a water master, ditchriders, and clerks. In each stage, an advisory committee of eight to ten farmers was formed, appointed by the water master. It met every week to discuss water conditions and address problems. Scheduling was decided by the water master. A unit for the forth stage was added in 1966, but soon after, all of the wadis were merged with the EGMC, and the farmer managed wadi system, which was already on the wane, ceased to exist.

Irrigation from a Spring. The irrigation command in Salikhat is widely identified as the only significant system in the Jordan Valley which is still farmer managed. The Salikhat system is spring fed and lies outside the JVA command. It is found to the east of DA-18, between Wadi Yabis and Wadi Kufrinja. Farmers in the command cannot say how old the system is, but the story of its origins is recalled. Five families living in Khirbet Al Wahedna, near Ajloun, developed the Salikhat spring, moving increasingly between the two locations until they settled in the valley. This was done probably less than a hundred years ago, given the size of water shares among descendants. The size of these suggests no more than five generations in the area.

Landowners in the command still have title to unirrigated land in Khirbet Al Wahedna, and older members of the community remember moving there in the hot summer weather when they were young. The five families in turn became the 16 major owning units of the system. Salikhat is now the name of both the spring and the village where the residents of the founding families reside. The entire cultivated area of Salikhat is about 7000 dunums of which about 1000 are irrigated. Most of the farmers in Salikhat are the owners; renters are estimated to be only ten percent of the total.

The area has obvious advantages. It has dependable, although not plentiful, water. The discharge is about 15 liters per second. The soil is deep and much of it is sandy, giving good drainage, although some is stony. There is no frost, a problem mentioned elsewhere by valley farmers, and it has cooler summer weather. Thus, it can provide excellent growing conditions. Most of the winter crops are peppers, squash, and tomatoes. There are about 150 dunums of bananas and 50 dunums of citrus, neither of which require a government license since they fall outside the JVA command.

The system, developed by the families, has two canals - north and south. They never operate at the same time or on the same day. The south canal has a far larger command of the two. Both are now cement-lined from the spring to the village above the fields, a product of JVA intervention in 1992 for which farmers contributed nothing. The earthen canal was said to have had big water losses. This was the first time the JVA was involved in the command, but JVA officials think that its participation is unlikely to expand given the present water supply. Now that the JVA has entered the system, even nominally, some farmers are interested in getting further support in the construction of a carrier pipe from the spring to the irrigated land, a hydrologic study to determine dam capacity, and assistance with water conservation measures. In the past, JVA interventions eventually led to legal takeover. It is unlikely that Salikhat farmers would welcome what a takeover also would mean: limits to landholding size and restrictions on tree planting.

Water allocations from the spring are based on portions of the number of turns of the original developers. Each turn (fasil) is the equivalent of 12 hours every 11 days, giving 22 full shares. In the generation preceding the present most senior one, one individual had as many as three shares or 36 hours. Another had 27 hours, 20 minutes, and a third had 14 hours, 20 minutes. In the first case, in the succeeding generation, the 36 hours were divided among 17 descendants who each have about 2 hours every 11 days. As a result, when the amount of entitled water is less than adequate for irrigation, close relatives join together and manage the water and land as a single unit. Water is also sold within the system for JD 150 per hour for a one year duration. It is never sold in perpetuity or alienated permanently from the land. Trading also occurs and appears to be more common, since 11 days can be too long to wait for a turn. In that case, hours are traded among users for more frequent irrigations. There has never been a water charge paid by farmers for use of the spring's waters.

The system is maintained by the owners and renters who pay for its upkeep. The cost is divided among them according to their share. If work is required on both canals or above the canal, all pay. If it is done on only one canal or below, only those in that part of the command pay. No one special collects the money, and there has never been a problem getting payment, but O&M costs are low. One owner with two hours or one-sixth of a turn said that he has paid about JD 36 so far in 1994 for himself and his close kin with whom he works the land. There are no officers, council, or other body overseeing the system and no meetings of members. There are occasional infractions. Some people in the command have been caught stealing water. They were visited by a contingent of the community, warned, and made to give an equivalent amount of their time to the one stolen from.

Network or Interest Group

This generic type is a collection of individuals sharing a specific interest, but they do not work together to reach a common goal. They are a group in the broadest sense of the term. The example discussed below remains an approach not yet implemented. It is an innovative strategy by the Department of Agricultural Extension in the Ministry of Agriculture and replaces the usual, unsuccessful approach employed by the ministry for more than 50 years. Directives have gone out from Amman headquarters to the country's

22 districts to carry out the plan. The program is now in the earliest stages of development.

In each district, agricultural extension agents will form at least one "closed group" of 75 members for crop production or 50 members for animal husbandry for intensive extension activities. According to the plan, agents are to meet with farmers to discuss their problems and jointly decide what the focus of the group is to be. Agents are supposed to visit people in the group six times a year.

In addition, each of country's 104 extension agents will form a "middle group" of 250 members for less frequent interaction, responding to a variety of needs. The groups are to be vehicles for information dissemination. Neither is expected to become a formal entity. If they wish to organize further into action groups, the MOA position is that it is for the group members to decide.

In the Deir Alla district in the Middle Ghor, activities started in July 1994. Agents are now selecting 75 farmers for the closed group. About half have been chosen. However, the agents rather than the farmers chose leaf miner infestation of citrus trees as the focus. If the farmers can be helped, the group may continue for another year and expand its interest with citrus production. If not, it may decide to change the focus of the group and hence its membership.

Conclusions

Although farmers say that they rarely work together, there are a number of examples of joint or cooperative action, from formal associations to loosely structured groups. Among the most successful are those are which have minimal or no government interference: the potato cooperative and the Salikhat users group. Any effort to work with farmers will need to avoid creating an entity which requires government funding to survive. Under no terms can the Jordan Valley Farmers Association be considered a self-sustaining institution. It performs precious few of the functions in its mandate and only manages because of government grants and loans. Those to be emulated focus on the management of a common resource and/or address the actual production and marketing imperatives that farmers face, rather than acting as a conduit for subsidized agricultural inputs in competition with the private sector.

Water Management in the Zarqa Triangle

An Overview of Water Resources in the Zarqa Triangle

The JVA irrigation system is fed by the Yarmouk River and from the King Talal Reservoir (KTR) and supplemented by the side wadis. The KTR supplies part of the irrigation water to the middle and south of the Jordan Valley. The water of the KTR has five sources: rainwater runoff from a semi-arid catchment which includes many of the main urbanized areas in Jordan, spring water much of which has ceased, treated sewage effluent from the Al-Samra Treatment Plant, treated and untreated industrial wastewater which discharges directly into the Zarqa River, and untreated municipal waste from

villages. The quality of the water in the KTR is dependent on annual rainfall and the Al-Samra effluents discharged into the river.

The Zarqa Triangle of the Jordan Valley is the lower basin of the Zarqa River. Unlike the rest of the JVA system, which receives either Yarmouk River or mixed Yarmouk/King Talal Reservoir water, the Zarqa Triangle, with one small exception, receives its water from the King Talal Reservoir and side wadis. This point is a matter of contention between the JVA and farmers in DA-30. According to the JVA, DA-30's water should be a mixture of Yarmouk and KTR water, but farmers insist that the source is only from the KTR since there is not enough Yarmouk and side wadi water to supply it. The exception is five units in DA-29 which receive mixed Yarmouk and side wadi water because of infrastructure problems. In 1995 a new JVA dualing project is expected to begin providing farmers with the opportunity to use Yarmouk and KTR water alternately, the water would not be mixed, for 60,000 dunums of the middle valley, part of the Zarqa Triangle will be covered.

Irrigation in Development Area 29

The two development areas in the Zarqa Triangle are different from other DAs in the central Jordan Valley in a number of ways: the source of the supply (only King Talal Reservoir), the layout of the physical system (all laterals take off directly from the main), condition of the system (most meters and regulators are not working), delivery (only the head unit is opened by the ditchrider, not the farm turnouts), and billing system (charges are mostly based on the design liter per second flow rather than actual metering).

Development area 29 contains 290 units on 10,813 dunums. According to JVA records 49 units are less than 30 dunums, 159 units are between 30 and 40 dunums, and 82 units are greater than 40 dunums. Unit size is a matter of public, official record and does not reflect actual worked holdings. The survey of farmers revealed that holdings could be as small as 8 dunums for a household, when in one case four brothers inherited their father's single unit. The unit maintains some integrity since it has one farm outlet for water, but otherwise it is worked independently by the four. A recent study of landholdings found the average owned property was 26 dunums in Deir Alla (Haddad 1993).

DA-29 has a single main line which comes directly from Tel Al-Thahab Weir. There is no pumping station. It has 35 submains or laterals connected by head turnout units. Laterals in the development area have any number of outlets, ranging from two to 49, largely depending upon topography. As Table 3 indicates, most lines have a relatively small number of farm turnouts, fewer than ten.

Table 3
Number of Farm Turnouts on a Line in DA-29

No. Turnouts on Line	No. Lines
2-4	11
5-9	15
10-19	7
20-30	1
>30	1
Total	35

Source: Jordan Valley Authority

Each farm turnout is supposed to have a flow meter, pressure regulator, and, some say, an orifice plate. Meters in DA-29 are exposed and the victims of broken parts, jamming, or vandalism. According to JVA officers only about ten percent of the meters and regulators are actually operating. Meters are used for determining water bills. In DA-29 and DA-30 where they are not working, the JVA water billing is based on the designed flow of five liters per second. The flow may be closer to eight or nine, but it can also be as low as three if farmers on a line are taking water they did not request.

Furthermore, in DA-29 and DA-30, ditchriders open the head unit freeing the water in the line. Unlike other development areas, where keys are necessary to open the turnout, the ditchriders in DA-29 and DA-30 do not open each farm turnout according to the farmer's request to the JVA. Farmers open the turnouts themselves. As a result, use is virtually unregulated. As long as water is flowing into the line, any farmer can and does open his turnout and get unmetered and unbilled water.

Ditchriders appear to be a point of system breakdown. Farmers charge that they give preferential treatment to some farmers at the expense of others. More insidious is that the system often operates at their convenience. They will turn the water on late or close the head units early. Eight or sixteen hours of promised time may be much less because the ditchrider decides he wants to go home early.

DA-29 is said to have the valley's oldest pipe system, installed in 1978 and now subject to breaks and major leaks causing water losses.

In DA-29, 51.4 percent of the land is served by conventional (mainly furrow) irrigation system and 47 percent by high-technology (mainly drip) irrigation systems, of which 5.8 percent is in plastic houses. Most of these systems were installed years ago and are not being managed as efficiently as they could be. A recent baseline study concluded that average efficiency is 70 percent for surface irrigation, 56 percent for drip irrigation, and 42 percent for drip irrigation in plastic houses (Shatanawi et al. 1994). The percentage

of high technology systems is slightly less than elsewhere in the valley (DAI 1993). Crops grown in the Zarqa Triangle are representative of the rest of the valley.

Profile of the Farmers Interviewed

Interviews with 50 farmers in the central Jordan Valley were conducted between 5 and 10 November 1994. Of these, 43 farmers are in the Zarqa Triangle (32 in Zarqa Valley or DA-29 and 11 in Zarqa Zhor or DA-30), two are in DA-22, two are in DA-25, and three are in Salikhat. The interviews were concentrated in the Zarqa Triangle, particularly in DA-29, because it is expected to be the major site of the WQICP on-farm irrigation implementation. Interviews in DA-29 covered a large part of the area: the 32 farmers from DA-29 owned, managed, rented, or sharecropped 155 of the 290 units (Figure 2). The 50 farmers interviewed range widely in terms of the roles they play in the system:

- 2 were non-working owners
- 20 were owner/operators
- 4 were owner/renters
- 7 were managers
- 12 were renters
- 2 were sharecroppers
- 3 were workers (two Egyptians and one Pakistani)

The size of the holding they worked also varied widely from two owner/operators with 8 and 12 dunums each at the lowest end to a manager with responsibility for supervising 26 sharecroppers on 30 units and an owner/operator who oversaw direct family holdings of 40 units. However, the last two were clearly unusual within the group of 50 farmers since the next largest holding was five units. Table 4 provides the number of farmers interviewed for different holding sizes in the JVA system.

Table 4
Number of Interviewed Farmers by Holding Size

	Number of Units Worked						
Farmer Category	1	2	3	4	5	>5	Total
Non-working owner	1			1			2
Owner/operator	12	3		3		1	19
Owner/renter				1	2		3
Manager		4	1		1	1	7
Renter	5	4		1	1		11
Sharecropper	2						2
Worker	3						3
Total	23	11	1	6	4	2	47

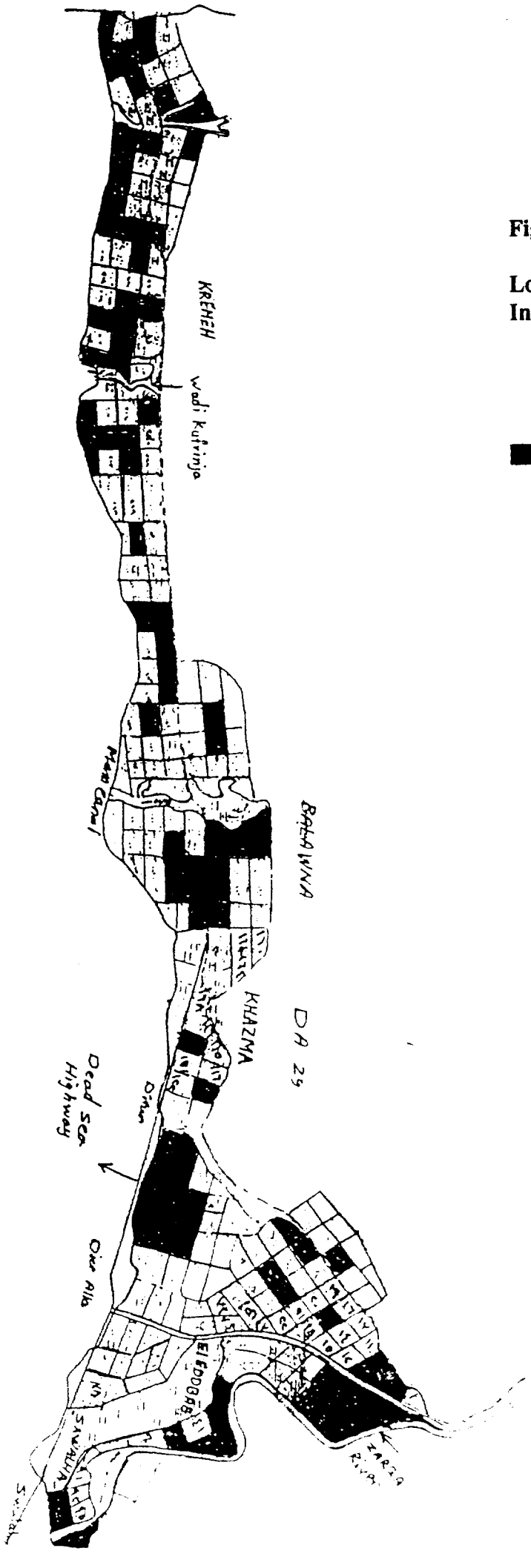

Figure 2

Locations of Farmer Interviews in DA-29

■ Units worked by farmers interviewed

Although some have conjectured that there is a lot of fluidity and little continuity in personnel in farming operations in the Jordan Valley, the survey indicates the contrary. Besides the owner/operators who have been on the land since their birth or since redistribution, two categories of farmers show high stability: renters and managers. All but one of the renters had been there for at least three years and five of thirteen had been there for from ten to 21 years. No manager had been working for an owner for less than six years and five of the seven had been there from 12 to 33 years. These relationships are clearly not short-lived. Sharecropping relationships may be briefer, but there were too few interviewed to be certain. The two had been on the same farm unit for one and two years each.

Of the 47 farmers in the JVA command, all but six used the JVFA to purchase agricultural inputs for cash. Eight of them had borrowed money from the ACC, three of them from DA-20 and five from DA-30, usually to purchase drip irrigation systems or plastic houses. Three were members of agricultural cooperatives and had had some dealings with the JCO.

Perceived Water Problems

The major water problems mentioned by farmers largely cut across all categories and locations: water quantity and water quality. In DA-29, quality problems appear to be growing more acute. Citrus growers complained about yellowing and falling leaves. Summer cultivation is a problem because of shortages and many farmers have stopped because of both water supply and pricing/marketing problems. In DA-29 a number of farmers mentioned breaks in the pipelines of the aging system and the need for repairs. Many mentioned low pressure which gave them less than their anticipated amount of water. Farmers at the end of lines noted clogging problems. In the context of overall water problems, only a few spoke of problems in managing water with other farmers on the same line. However, when asked specifically, most said that stealing and related problems were widespread. These will be discussed in detail below.

Sources of Information about Water Management

Farmers rarely seek advice from others in matters regarding the management of irrigation water. Farmers almost never mentioned another farmer as a source of information, and never mentioned the MOA extension agents. Nearly all of them regard themselves as irrigation experts, whether they are owner, manager, renter, or worker and think themselves perfectly capable of deciding when and how to irrigate and see virtually no need for outside assistance. One area of uncertainty and concern is degraded water quality. Four farmers mentioned that they have taken soil samples to the JVA laboratory for analysis.

These responses pose a challenge, since the ISPAN/WERSC study indicates that irrigation systems are not managed efficiently in the central Jordan Valley; as much as 20 percent of the water may be wasted. The introduction of water conservation measures will be challenging for two reasons: farmers generally believe that water is being used properly and there is little incentive for farmers to adopt water conservation measures given the present pricing policies and the state of the metering devices.

Relations with the Jordan Valley Authority

Farmers' opinions of the Jordan Valley Authority are in general positive, as might be the case with a largely paternalistic institution which likes to think of itself as overseeing the needs of its dependents. Although it does not offer the breadth of social and economic services that was envisioned in the 1960s and 1970s, it has provided a delivery system which generally works and has instilled a high level of confidence among users. However, serious reservations about system operations were raised. Farmers voiced the following complaints during interviews:

Supply

- Farmers get less water than they should. Instead of eight hours during the day, they may get six or even four and instead of 16 hours at night they may get less than half.
- The period of delivery is determined more by the ditchrider's liberal working hours than by the farmer's requirements.
- Most of the laterals are opened at the same time so there are pressure problems. Water does not always reach the turnouts at the lower end of the lines.
- The JVA has not been able to reduce water thefts effectively.

Maintenance

- Lines need to be better maintained in DA-29.
- Lines are closed for maintenance without warning.

Scheduling

- Getting to the local stage office twice a week to request water the day before it is scheduled can be difficult to do. Most farmers said that at one time or another they forgot to make the request or had other commitments. Either they did not get water or took it, which is considered stealing by the JVA and subject to a fine.

Water Charges

- Paying monthly water bills can be time-consuming and unnecessarily complicated.
- Air in the pressurized pipes gives a false reading to meters.

Despite these complaints, farmers characterize the system as being basically equitable. Farmers may not get all the water they need, it may come late, and it may stop early, but by and large they do get it, and they can depend upon it. All of the farmers interviewed in the JVA system thought that the buried pressurized pipe system was an improvement over the open canal system that preceded it. Although in some quarters it is said that large

landowners use their influence to take the scheduled time of small holders, the farmers interviewed denied that this had ever happened to them.

A few farmers complained about the cost of water delivery but it was raised so infrequently, that it appears not to be a critical issue at present. The ISPAN/WERSC study indicates that water is from three-tenths to three percent of the total cost of production and marketing. Still, the water bill is a recurring obligation that cannot always be met. Farmers receive a water bill at the beginning of each month, which they must pay within 45 days or risk the cutoff of their water. Payment during the summer months is regular, but farmers often delay paying during the winter cropping season when rainfall is adequate. However, they must pay eventually. JVA field officers in the stage offices may intercede on a farmer's behalf two or three times, but if the nonpayment is chronic the case goes to the director of the JVA directorate for review and a decision. The number of late payments was too difficult to retrieve by the Middle Directorate office, but they are said to reach as many as five hundred in any winter month.

Relations among Water Users

Those interviewed had trouble giving examples of situations where they worked cooperatively with their neighbors in any regular endeavor. They might help others in need, by offering use of farm machinery. Some have joined cooperatives, but generally they farm independently on a unit or part of a unit. The JVA pipe system has underscored this individuality by delivering water directly to each farm outlet, so theoretically there need be minimal contact even among neighbors. If the system were working as designed, with working meters in place with adequate pressure and water, the units might well act as isolates.

However, system operation only approximates the design and farmers push it to the limit. Many try to get as much water as possible, at the expense of the system, their neighbors, and their crops. Many have dug pools on their farms, which they fill during their turns, and then pump from as desired. In order to do this, farmers will leave the turnout valve open until the pressure in the pipe drops below the level required to deliver water. This approach is contrary to the nature of the system, which is to be always under pressure to maintain the design deliveries.

Stealing water is endemic and seemingly encouraged. In DA-29, meters are not working and turnouts are easily opened. An often cited problem is that one farmer on a line will order water and others will open their turnouts, reducing the pressure and the volume for the one who paid. Since their meters are not working, there is no record of misuse. Farmers say that the JVA will not take action unless an inspection committee sees the theft itself. But actions are taken. The JVA will issue a warning and fine the party from JD 50 to JD 300 depending upon the number of transgressions. Farmers do pay the fines. Several farmers interviewed admitted they has stolen water and some said they have been fined and paid. In a system with marginal regulation, theft is worth a risk since infractions are rarely caught.

Need and Support for an Water User Organization

Most of the farmers were satisfied with the JVA's delivery of water, but they were evenly divided among those who thought that farmers could manage and schedule water from a head unit along a line and those who thought it would not work. Those who though it would not work said that large farmers would divert water away from the small holders, that stealing would increase, and that they would be fighting constantly over scheduling. Two of those who thought it would were already doing it on a small line with close relatives or neighbors. Others thought that under certain conditions it should be tried. The meters and regulators would have to be working and protected from jamming and vandalism. The water supply would have to be adequate for crop requirements - there could be no shortage on the line, and water quality would have to be improved. However, only two of the 23 who thought that it would work thought also it was not a good idea and that JVA management should be continued. Many of the others thought that if farmers managed the line themselves scheduling might improve and stealing might be reduced. Many also thought that it would no longer make it necessary for them to go to the stage office to request water twice a week, which is generally seen to be an unwelcome chore. One owner working seven units claimed he had hired a worker just to go to the stage.

Membership: Decision-making in Irrigation Management

Any consideration of water users groups in the Jordan Valley will need to address the sensitive issue of membership, since, as has been noted, so many different kinds of farmers are involved. Not surprisingly, farmers in each category, with the exception of hired workers, thought they were the most appropriate to be included. What is clear is that hired workers, even those who are permanently employed, should not be considered. They invariably say that their bosses make the decisions, even as they are in the water carrying them out. To make any group viable, whether it includes owner/operators, renters, or managers, those who actually make the day-to-day decisions and interact regularly with the JVA and other government entities, ought to be included. Information and directions filter down to workers. They are less likely to filter up.

Conclusions

Survey results suggest that opportunities exist for the JVA and WQICP to work with farmers and extend some level of management responsibility to them. Unlike many government-run irrigation systems elsewhere in Asia or the Middle East, water users in the Jordan Valley are generally favorably inclined to the line agency. The JVA might well build on this relationship by giving users a bigger stake in the system. Based on the interviews, the following conclusions are drawn:

- Farmers view the present system as being inherently equitable, although they recognize in practice there is much abuse by users.

- The system of requests for water delivery places demands upon farmers that can be burdensome or inconvenient, and most farmers would welcome a change which would not require them to confirm water delivery at a government office

- Technical problems inhibit the operation of the system, particularly in DA-29 where an aging infrastructure requires renovation and upgrading.

- Farmers will hesitate to participate in organization efforts unless infrastructure problems are addressed early on.

- There is a need for irrigation assistance although farmers believe that their knowledge and experience are adequate. Concerns about how to deal with increasingly degraded water are growing.

- Working owners, managers, renters, and sharecroppers invariably make the decisions about water use and are the most reasonable participants in any organizational effort. Both renters and managers have long-term relationships with landowners providing stability to farming operations.

- Among the areas of participatory management that appear to be promising initially are distribution, scheduling, and irrigation extension.

- The cost of water is not an issue at present, but expected increases in pricing beginning next year offer an opportunity for introducing conservation measures.

Participatory Irrigation Management

Participatory irrigation management means joint involvement and shared responsibility by both the line agency and users in the operation of an irrigation system. Shared responsibility:

- recognizes that inefficient system operation is in some measure the result of users' having little or no role in resolving critical water-related issues

- requires a revision of relationships, with users assuming a decision-making role in system operation and the government authority shifting from a management to a service-oriented role

- acknowledges water users can be active, contributing players in irrigation systems and that the systems work better when water users are involved

- confirms that the government authority will continue to play a critical role in its operation, particularly in delivery, extension services, and recovery of costs

The more users are alienated from real participation, the more they operate as individuals seeking to satisfy only their own requirements.

In the Jordan Valley, farmers have virtually no say in the running of the system above the farm turnout. The JVA has benevolently provided an irrigation and management infrastructure which is exclusively top-down. Law No. 19 of 1988 (Articles 25-35) includes restrictions on users' actions but has no features which empower them. Instead

it has a list of offenses and penalties. There are no provisions through which users may manage water above the turnout or for vehicles through which they may petition the government or seek recourse, except as a normal course through the courts.

Despite these restrictions, farmers have an unusually personal relationship with JVA officers, regularly visiting them to discuss water supplies or calling them to complain about water stealing. JVA officers point to this interaction with pride. However, this encompassing relationship between the JVA and farmers undermines the relationships farmers have with each other. As long as the situation continues, farmers will remain junior members, the system will operate at only a serviceable level, water conservation measures are unlikely to succeed, the dissatisfaction of farmers will grow in frustration as their costs rise, and O&M expenditures will mount.

The previous discussion of farmer organizations and survey results indicates that many farmers are interested in greater management responsibility, provided certain conditions can be assured. Above all, they want a properly working infrastructure. With the price of water about to increase by multiples, farmers are also likely to demand more verification in billing practices and better services for their money.

Conversations with JVA officials revealed that they are aware that the Authority is incapable of resolving operational issues alone and that some degree of user involvement is required. Among the problems they most often mentioned were the following:

- overuse of irrigation water by farmers despite the overall shortage
- state of the regulating devices, particularly the meters, so that billing is inaccurate and flow is widely variable
- pervasive water stealing
- misuse of the system which lowers pressure in the pipes
- absence of seasonal cropping patterns for farm units with which to forecast water requirements, despite repeated requests

Conversations with water users revealed the following common problems:

- inadequate supply and low pressure
- pervasive water stealing by others on a line
- deteriorating state of the system
- increasingly degraded water quality
- uncooperative ditchriders who arrive late and leave early
- inconvenient system requiring confirmation for water deliveries

Many of the complaints are the same for both officials and users, and they are ones which can only be resolved by both government and farmers jointly addressing them. Participatory irrigation management can provide an opportunity for dealing with what both groups consider to be intractable problems.

Many countries in Asia and the Americas have introduced participatory irrigation management programs to bring users into decision-making roles, realizing system performance is disappointing and O&M costs are staggering. These programs usually seek to:

- improve system performance by giving users a stake
- reduce O&M costs of the line agency
- collect irrigation service fees
- expand democratization
- improve irrigation extension assistance
- create an organization for easier interaction with government entities
- settle issues or disputes equitably without government intervention
- link different agricultural requirements, most often water management and marketing

Experiences creating water user organizations have been mixed. The organizations are not sustainable if the government's objectives are unclear, significant user control over the resource is denied, enabling legislation is not promulgated, adequate training to support new roles for both farmers and line agency staff are not provided, the government supports them only as a means of reducing its O&M burden, and water management is seen as an end in itself.

Participatory irrigation management has a far better chance of thriving in a climate with clear government policies and implementation strategies, adequate support by government and understanding by users, an effective management and physical infrastructure, and a strong links to other agricultural needs, particularly marketing. While water is a critical input to Jordan Valley farmers, their greatest concern centers about the marketing of their produce at good prices. In addition to resolving water management issues, participatory irrigation management should be used as an opportunity for farmers to improve returns on their investments and strengthen their negotiations with providers of public and private sector services (Goldensohn 1994).

It is important to keep in mind that participatory irrigation management need not be done through formal organizations. It can also be approached through informal user groups with an absence of complicated structures. Or it can be introduced through a series of government measures aimed as transferring well-defined responsibilities from the line agency to the users. However, these changes need to be structured at some point or they

risk becoming chaotic or conflicting. Some user entity needs to exist in order to systematize interactions between the government and users.

A recently issued decree by the JVA opens the door for the first time to user participation in system management, even if on an ad hoc basis. Stealing water is endemic, and although it is practiced in every irrigation system, JVA controls are unconvincing to most farmers. Implementation of a 22 June 1994 decree signed by the then secretary-general of the JVA altered farmer dependence on the authority (Annex C). The decree severely restricted the ability of the Directorates to provide compensation water to farmers. Farmers will receive compensation water if the water that reaches the head unit on a scheduled day is inadequate to match the requests. However, the JVA will no longer provide compensation water to farmers if the water reaches the line but it does not reach the turnout. In other words, farmers must now settle stealing issues among themselves rather than have the JVA circumvent the issue by providing more. Apparently, for the first time (in only the Northern Jordan Valley) farmers are encouraged by the JVA to settle water-related issues among themselves. The JVA reports that the incidents of theft have noticeably declined in the affected area.

Options for Consideration

The introduction of participatory irrigation management in the Jordan Valley would require a significant modification of present operations and procedures which cannot adequately be presented here in the form of usual recommendations. Instead, this section offers three major options or directions for consideration primarily by the JVA and secondarily by other involved parties, including USAID, the WQICP, and the farmers themselves:

- Delay any introduction of a participatory management program and keep the present system essentially intact.

- Introduce a participatory irrigation management program through a pilot project which would then be carefully monitored.

- Introduce a participatory irrigation management program in a full implementation mode on a large-scale basis.

These three options are actually points on a continuum rather than exclusive choices. Some intermediary approach or combination of elements might in fact be considered more appropriate or feasible.

Maintain the Status Quo

The Jordan Valley Authority may decide that despite problems in the system, it prefers to maintain the status quo and not open management to users. During the past decade or so, there have been some in-house suggestions to expand the locus of decision-making to include the farmers, but they received little serious attention. The problems have not abated, and anticipated changes in pricing and an increasingly deteriorating system in the older development areas will only worsen them. For the present, the JVA may decide to

make minimal modifications or repairs and continue its present directive relationship with users. Whatever the decision, participation by users is inevitable.

Design and Implement a Limited Pilot Project

The JVA may decide to make a cautious, but still serious, entry into participatory irrigation management, making use of two resources or opportunities available: the present, general goodwill of farmers being served by the system and the Water Quality Improvement and Conservation Project and ancillary supporting services. By designing and implementing a pilot project within confined boundaries and with specific objectives, the JVA may monitor and modify the approach in order to assess its effectiveness and benefit.

This is not the place to design a pilot project, but rough guidelines can be presented. A possible approach might be, with farmer agreement, to select two comparable laterals in DA-29, the primary locus of the WQICP on-farm irrigation improvement efforts, and introduce management and infrastructure innovations. DA-29 laterals have turnouts ranging in number from two to more than 30, but seven have ten to 19. This might be the area for selection, since a certain critical mass will be required to try organizational changes. In other DAs, efforts could be made either on a lateral or a submain with laterals coming off of it.

On one, the infrastructure might be kept largely as is, with broken meters and pressure regulators, with nominal changes to upgrade it. The other might be made to work as closely to the design as possible, if farmers will agree to keep it maintained during the course of the pilot project. Another option would be to introduce another method of measuring flow, less apt to break - perhaps a time meter which records the time that the turnout is open.

The implementing units would have worked closely with users to identify their major problems, objectives, agreement on roles, and a course of action. With infrastructural controls in place, farmers, agency, and project would join in identifying and introducing management changes. Some that might be considered include:

- making bulk sales to the head unit on the line
- having farmers manage distribution along the line[1]
- ending the need for farmers to confirm deliveries individually
- assisting users in resolving potential or actual water conflicts on the line
- introducing irrigation extension information and/or water conservation measures

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[1] This approach to water distribution in the Zarqa Triangle was first proposed by Dar Al-Handasah and Netherlands Engineering Consultants in the report "Zarqa Triangle Irrigation Project, Final layouts and preliminary engineering design." September 1974.

- working with farmers to produce seasonal cropping plans
- assigning JVA staff to work closely with the lateral group, as was done in the 1960s before the rapid expansion of the system
- providing sensitization and training to both farmers and JVA staff
- assisting with or linking to marketing imperatives

The WQICP would also draw on its substantial public awareness resources, including the Jordan Environment Society (JES). The unit's mandate includes working with farmers, and it could play a pivotal role joining with the Irrigation Management Unit in establishing initial meetings with farmers, working with farmers to identify problems and design and help carry out a pilot program for implementation. JES already has a branch office in Deir Alla staffed by volunteers.

A key element in the pilot effort would be monitoring of the activities and results, perhaps most effectively by an impartial outside entity. Important areas to monitor would include overall system performance and whether stealing abates, overuse is reduced, distribution problems lessen, on-farm water management improves.

Design and Implement a Broad Participatory Program

Having decided to launch a participatory irrigation management program in the Jordan Valley, the JVA could choose to carry out a broad and ambitious program all at once. Rather than have farmers on a lateral as the organizational unit, a large scale might be attempted: a development area or a stage.

A number of management innovations from the second option might be introduced, but they would have to be done through a more formal structure, probably a hierarchy of committees. Changes in the legal code would also have to be made, since the implementation effort would have moved well beyond an observation phase.

In attempting to organize water users over a large area, lessons might be drawn from similar efforts elsewhere. Usually, as in Egypt or Pakistan, the target unit is small, such as the farmers on a watercourse, or in this case a lateral. Organizing is time-consuming and labor intensive. An alternative approach was carried out in the Bihar State of India where distributary canals with many villages were selected. There, organizers worked at the level of the distributary, forming a large committee representing all of the villages, and letting the villages organize themselves. The approach, called "macro-to-micro," recognized that farmers in some villages might drop out, but that many more would succeed and that the cost of the effort would be far less; a large area could be organized relatively quickly. The experience is that carefully made building blocks do not necessarily form a strong wall.

NEXT STEPS

Consideration of whether or not to introduce participatory irrigation management will require wide vetting within and beyond the Jordan Valley Authority. The following are possible next steps which might carry the process forward:

Determine Interest and Commitment

An obvious initial point will be for the JVA to consider if it wishes to proceed with a participatory irrigation management program and the scale at which it will operate.

Clarify Objectives

When considering how best to proceed, JVA officials might also identify their objectives in carrying out such a program. A number of objectives for other country programs have already been mentioned in this report.

Build Understanding and Consensus

There is interest in some quarters within the JVA and MWI in bringing users into decision-making roles. Wider understanding within the institutions is critically important. Workshops in Jordan and study tours to other countries are effective vehicles for building consensus. Workshops might be held at different levels and with various participants, including MWI, JVA, USAID, other donors, NGOs, and farmers.

Study tours could be arranged for senior JVA officers to apprise them of similar efforts elsewhere. Candidate locations include: Egypt, the site of a major Government of Egypt and USAID effort; Sri Lanka, which has had successful participatory experiences and is the site of the International Irrigation Management Institute headquarters; and Pakistan, which has been noticeably less successful. Failures can be as insightful as successes.

Conduct a Benefit Audit

One may encounter some skepticism about the anticipated benefits of expanding user responsibility in system operations. A benefit "audit" conducted during early government deliberations might focus on realistic financial, economic, social, and institutional consequences that are likely to result. The audit might examine benefits from programs of different magnitudes. Government officers need and deserve to know what the prospective returns will be from introducing significant policy and operational changes.

Develop a Detailed Implementation Plan and Budget

With the assistance of the WQICP (through both the Irrigation Management and Public Awareness Units), a detailed implementation plan and budget should be prepared to define the program. The plan should be an outgrowth of detailed conversations with and between the full variety of program participants: JVA headquarters and valley officers and staff and farmers.

ANNEXES

ANNEX A

SCOPE OF WORK
WATER USER ORGANIZATION SPECIALIST

DESCRIPTION

The main objective of the STTA specialist is to determine if a WUO is viable in the Central Jordan Valley. No water based organization exists in the valley though there are commodities-based organizations. If feasible, a WUO would contribute substantially to the success of the WQIC Project. The WUO could serve as the linkage, presently absent, between the JVA and the farmer.

The supplementary baseline survey should be completed before the arrival of the WUO Specialist. This survey will subjectively (from the farmer member point of view) evaluate the farmer organizations in the Central Jordan Valley and be very useful to the specialist.

SCOPE OF WORK

1. Inventory all farmer organizations operating in the valley and characterize their basic features.

2. Select three representative kinds and determine:

   - membership fees
   - how membership fees are used
   - range of membership
   - rights of members
   - responsibilities of members
   - services provided members (both actual and design)
   - whether members' financial standing influence rights, responsibilities, and services
   - objectives of the organization
   - how they achieve their objectives (economic, social, political)
   - linkages to other farmer organizations and government agencies

3. Investigate the legal framework within which farmer organizations operate.

4. Conduct extended interviews of 50 farmers in the Zarqa Triangle on the perceived need for and support of a WUO.

5. Determine the need for one or more WUOs for the Central Jordan Valley.

6. If the WUO is feasible, recommend how membership should be determined.

7. Complete a feasibility assessment and report, the draft to be submitted to the DAI Chief-of-Party before departure from Jordan.

DURATION

Four weeks or one person month.

QUALIFICATIONS

Minimum of ten years experience working closely with water user organizations. This experience should include studies of the feasibility of WUOs, the establishment of WUOs, and the sustainable operation of successful water user organizations.

Annex B

CENTRAL JORDAN VALLEY FARMERS INTERVIEW SCHEDULE

NO.

1. JVA DA _____ Unit No._____ Line No._____

2. Owner___ Owner/Operator___ Renter___ Sharecropper___
Manager___ Worker___

No. of Workers: Permanent/Monthly_____ Daily_____

3. Years on unit___. If before 1968, irrigate?____ Work with other farmers managing water?

4. Member or user of services of JFVA___ ACC___ JCO___
Conditions of services and/or loans:

5. No. units and farmers on line:
Condition of meter:
Water sharing on line:
Water stealing on line:

6. Problems with water:

7. Where do you go if you need information about water use?
MOA Ext____ JVA___ Other farmers___ Private distrib___
Other_____ No one/self___

8. Who makes decisions about managing water on your farm?:

9. Do you have problems with JVA getting water?

10. Are you satisfied with pressurized system of confirming time and delivery to farm?

11. Do you think you could work well with other farmers in managing and scheduling water from head unit?

12. Do you see a need? Why?

13. If a group is formed, who should be members?

بسم الله الرحمن الرحيم

The Hashemite Kingdom Of Jordan
Ministry Of Water & Irrigation
Jordan Valley Authority

المملكة الأردنية الهاشمية
وزارة المياه والريّ
سلطة وادي الأردن

No. ____________ الرقم :

Date ____________ التاريخ :

مدير مديرية التشغيل والصيانة المركزية
مديـــر مديريـــة وسط وادي الاردن
مديـــر مديريـــة جنوب وادي الاردن
مديـــر مديريـــة شمال وادي الاردن

نظرا للوضع المائي الصعب لمياه الري في وادي الاردن، وحتى يتم ضبط برامج توزيع المياه اليومية بصورة دقيقة ، أرجو التقيد بما يلي : -

١ . تحديد دورة الري الاسبوعية للوحدات الزراعية وتعميمها على المزارعين وعدم اسالة المياه للوحدات الزراعية خارج دورة الري الا في الحالات الضرورية وبالموافقة الخطية من مدير المديرية المعنية وتزويد مكتبي نسخة كاملة عن دورة الري الاسبوعية .

٢ . عدم اسالة مياه للوحدات الزراعية بكميات تزيد عن المخصص الاسبوعي .

٣ . عدم اصدار اية اوامر سقاية او ملاحق باي شكل من الاشكال خارج اوامر السقاية المعتمدة من الكمبيوتر .

٤ . تشغيل جميع انظمة النقل بالانابيب ومعالجة جميع الحالات التي ما زالت على الاقنية الفرعية ضمن المناطق التي اكتمل فيها نظام النقل بالانابيب وموافاتي بكشف يتضمن جميع هذه الحالات واسباب عدم تحويلها .

٥ . يعمم على جميع مشغلي محطة الضخ وموزعي المياه بعدم التشغيل أو اسالة المياه خارج نطاق امر السقاية اليومي وضمن الكمية المحددة والوقت المحدد .

٦ . الغاء اوامر تحويل المياه بين الوحدات الزراعية .

٧ . يتم وقف اسالة المياه للوحدة الزراعية لمدة دورة اسبوعية اذا تم اسالة المياه اليها دون امر سقاية من قبل المتصرفين ويتم مخاطبة الجهات المختصة بما في ذلك المحكمة لاتخاذ الاجراء المناسب بحق المخالفين .

689400 / 410 / 419
2769 Amman
Cable : JOVACO
Fax 689916
Telex: 21692 JVC JO
فاكس : ٦٨٩٩١٦
تلكس : ٢١٦٩٢
٦٨٩٤٠٠/٤١٠/٤١٩
٢٧٦٩ عمان
جوفاكو

بسم الله الرحمن الرحيم

The Hashemite Kingdom
Of Jordan
Ministry Of Water & Irrigation
Jordan Valley Authority

المملكة الأردنية الهاشمية
وزارة المياه والرّي
سلطة وادي الأردن

الرقم : _____ No. _____

التاريخ : _____ Date _____

٨ . تقوم مديرية التشغيل والصيانة المركزية / قسم ادارة المياه بتحويل حالات الاعتداء على منشاءات وقناة الملك عبدالله والمنشاءات الرئيسة الى الجهات المختصة بما في ذلك المحكمة لاتخاذ الاجراء المناسب بالتنسيق مع المديرية المختصة في وادي الاردن .

٩ . يطلب من جميع المديريات عدم تجاوز كميات المياه المخصصة لهم .

١٠ . تقوم مديرية التشغيل والصيانة المركزية / قسم ادارة المياه بمتابعة برامج توزيع المياه ودورة الوحدات الزراعية في المديريات والمياه المستهلكة وتقديم تقرير اسبوعي بهذا الخصوص لمكتبي .

١١ . عدم اسالة المياه للاقنية بكميات تقل عن ربع استيعاب هذه الاقنية لتوفير الفاقد .

٢١ . تكلف لجان التفتيش بما يلي : -

١ - ضبط الوحدات الزراعية المخالفة
٢ - التدقيق على دورة الوحدات الزراعية
٣ - التدقيق على اوامر السقاية
٤ - التدقيق على دوام المرشدين وموزعي المياه في المديريات
٥ - التدقيق على تقارير الميدان

وأنني اذا اطلب من جميع المديريات التقيد بما ورد اعلاه لارجو الله ان يعيننا جميعا على تجاوز هذا الوضع الصعب بحسن الادارة والتعاون فيما بينكم .

واقبلوا فائق الاحترام

امين عام سلطة وادي الاردن
الدكتور المهندس عبد العزيز الوشاح

689400 / 410 / 419
2769 Amman
Cable : JVVACO
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Telex 21692 JVC JO

No. SWA/17/1/3727
22 June 1994

Director of Central O&M Directorate
Director of the Middle Jordan Valley Directorate
Director of the Southern Jordan Valley Directorate
Director of the Northern Jordan Valley Directorate

Because of the critical situation for irrigation water in the Jordan Valley and to provide better control of the daily water distribution program. Please follow the following instructions.

1. Identify the weekly irrigation time for each farm unit and make the farmers aware of it. Don't give water to farm units out of the schedule except in urgent cases and then only upon written approval from the director of the responsible directorate. Bring a copy of the program to my office.

2. Don't give water to farm units in a quantity greater than what is allocated in the program.

3. Don't issue any irrigation order different from that issued by the computer.

4. Survey all the pressurized pipe systems and list all units that are still on lateral canals within the area of the pressurized pipe system. Let me know all these cases and explain why they are not converted to pressurized pipe.

5. For those responsible for water distribution and operation of the pumping plant, don't give water to farm units on a schedule different from the proposed program; all deliveries should be within the specified time and quantities.

6. All orders diverting water between farm units must be canceled.

7. For those who are violating the distribution program, water will be cut for one week and the violator brought to the court for punishment.

8. The Central Directorate of O&M Water Management Division will take measures against those who damage the water or irrigation facilities and, in coordination with the responsible directorate of the JVA, will bring them to the court.

9. All directorates must not use more than the quantity of water allocated to them.

10. The Central Directorate of O&M Water Management Division must follow-up on the distribution program for farm units in each directorate and submit a weekly report to my office.

11. To decrease water losses, don't run water in canals in a quantity less than 1/4 of the capacity of the canals.

12. Inspection commissions must do the following.
    1 - Identify the farm units violating the water delivery schedule
    2 - Audit the farm units irrigation cycle
    3 - Audit the order of water deliveries to farms
    4 - Audit the work starting time for the water distributors and ditchriders in each directorate
    5 - Audit the field report

I ask for all directorates to follow these instructions in order to try to overcome this critical water situation by good management and cooperation.

Best Regards

(signed)
Dr. Engr. Abdul Aziz Weshah
Secretary General, JVA

ANNEX D

PEOPLE CONTACTED

MINISTRY OF WATER AND IRRIGATION

Muhammad Bani Hani, Secretary-General, MWI

Jordan Valley Authority

Hashem Al-Shboul, Secretary-General, JVA
Rasem Anshasi, Head, Water Quality Section, Soil, Water, Plant and Fertility Laboratory, Middle Ghor
Farouk Bashebshi, Director, Middle Directorate
Soliman Ghezawi, Director, Irrigation Division
Muhammad Hanbali, Assistant to the Secretary-General
Muhammad Fouad Hassan, formerly Director, Middle Directorate
Avedis Serpekian, Director, Directorate of Studies and Information

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Bakar Abdoul Nabih, Agricultural Extension Agent, Deir Alla
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JORDAN VALLEY FARMERS ASSOCIATION

Rakan Jamiel El-Faour, Chairman
Mohammad B. El-Tawil, Director General

UNIVERSITY OF JORDAN

Anwar Battikhi, Dean of Academic Research and Graduate Studies
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Maha El Shaer, Executive Asistant, Public Awareness Project in Water

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Odeh Al-Jayyousi, Civil Engineering Department. Applied Science University, Amman
Mohammad Al-Kayad, President, Agricultural Production and Marketing Farmers Cooperative, Jordan Valley
Zeidan Massalha, President, Farmers Cooperative for Potato Production, Jordan Valley

WATER QUALITY IMPROVEMENT AND CONSERVATION PROJECT

Sami Abbasi, Public Awareness Unit (WAJ)
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Charles Busch, VOCA Volunteer
Ross Hagan, Irrigation Management Specialist
Yasser K. Nazzal, Irrigation Engineer
Hani Rashid, Advisor, Irrigation Management Component (WAJ)
Muwaffaq M. Saqqar, Project Coordinator
Edwin Stains, Chief of Party/Senior Water Management Advisor

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Carl Dutto, Director, O/WRE
Timothy Miller, Deputy Director, O/WRE

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ANNEX E

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