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Water Users Association in the Republic of Uzbekistan:

Theory and Practice

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Water Users Association in the Republic of Uzbekistan: Theory and Practice

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Following my M.Sc. graduation at the University of Bonn, which I had completed with a thesis on the organization of water management in Khorezm, a doctoral thesis focusing on Water Users Associations seemed the logical continuation. Although the number of Water Users Associations (WUAs) in Uzbekistan increased from year to year, this rapid progress could not solve the problems of their functioning and relevance in the context of water management, which hence remained open, but permanent questions. A large number of people including scientists, public officials, as well as national and international experts have started to take an interdisciplinary approach to understanding water resource management in general, but more particularly with respect to irrigation. The scope of my research addressed an unique aspect of water resource management in Uzbekistan, while integrating technical as well as social/cultural knowledge. Consequently, the focus was on the establishment of WUAs as a fundamental part of the national water reform package and its significance for local people, officials and international donors.

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KURZFASSUNG

Die Gründung von Wassernutzerorganisationen (WNO) in Usbekistan gehört zu den wichtigen und wesentlichen Reformschritten, die unter dem Bewässerungsmanagementtransfer-Programm in der Republik gegenwärtig laufen. Trotz dieser Bedeutung der WNOs wurden keine Studien über die Erfolgsfaktoren ihres Funktionierens durchgeführt.

Die Hauptforschungsfragen dieser Dissertation sind (1) die Faktoren, die den Erfolg oder Misserfolg von gegründeten WNOs im lokalen Wassermanagement beeinflussen, zu definieren und (2) die Rolle, die Pilotprojekte für khorezmische WNOs spielen könnten, zu untersuchen.

Für die Forschung wurden vier WNOs in Khorezm und vier Pilotprojekte in Syrdarya und im Fergana-Tal ausgewählt. Die durchschnittliche Bewässerungsfläche einer WNO in Khorezm betrug 2 400 ha, und die durchschnittliche Anzahl der Mitglieder war 143 Farmer. Die Spannbreite der Bewässerungsfläche der WNOs in Khorezm schwankte von 1 232 ha (in Pitnyak) bis zu 4 096 ha (in Gurlen). Die minimale Anzahl der Mitglieder (45 Farmer) wurde in Pitnyak, das Maximum in Shavat - wo eine WNO 240 Farmer umfasste - festgestellt.

Der Forschungsansatz basiert auf modernen Methoden der empirischen Sozialforschung, die innovativ für Usbekistan sind. Die Befragten konnten Problemlösungsansätze durch eigene Bemühungen und Partizipation entwickeln. Die Methoden beinhalten auch einen standardisierten Fragebogen, mit dem 89 WNO Mitglieder in Khorezm, 20 - in Syrdarya und 21 - in Fergana befragt wurden.

Die erwarteten Ergebnisse wurden auf drei Themen, die für das Funktionieren einer WNO in Usbekistan essentiell sind, fokussiert. Diese Themen waren 1) die Rolle der Vorsitzenden, 2) die Bezahlung der Nutzerbeiträge und 3) Konfliktlösungsmechanismen.

Der Vorsitzende spielt in der Aufklärungsarbeit vor und bei der Gründung der WNO, bei der Konfliktlösung und bei den Maßnahmen für die Festlegung der Reihenfolge bei der Bewässerung eine wesentliche Rolle. Bei der letzten Aufgabe wurde neben dem Vorsitzenden auch der Wassermeister als Verantwortlicher von den Befragten genannt.

Bezüglich der Konfliktlösung nahmen die Befragten der WNO Vorsitzenden als Konfliktschlichter wahr. Dies wurde von allen Befragten in den drei Forschungsregionen bestätigt. Die Wassermeister sind nach Angaben der interviewten Farmer auch in die Konfliktlösungen involviert. Nach der Meinung der Befragten spielen der WNO-Rat und Hauptversammlungen eine kleinere Rolle bei Konfliktlösungen.

Die Befragten nehmen die Wasserknappheit und die Kanalreinigung als wichtigste Konfliktthemen zwischen Farmern wahr. Als Hauptthemen der Auseinandersetzung zwischen der WNO-Verwaltung und der Verwaltung der Bewässerungssysteme (Staatliche Organisation, die Wasser in die WNOs zuleitet) wurden die Menge des zugeteilten Wassers, der Zustand der Kanäle, und der Zeitpunkt und die Konditionen der Wasserversorgung gesehen. Zwischen Farmern und den WNOs sind nach den Antworten der Befragten die Nicht-Erfüllung der Wasserzustellungsverträge und der Bewässerungsplan die Hauptgründe für Konflikte. Die Nicht-Bezahlung der Nutzerbeiträge halten die Wassernutzer für ein weiteres potenzielles Thema für Konflikte.

Bezüglich Konfliktlösungsmechanismen bevorzugten die Befragten so genannte „friedliche“ Konfliktlösungsmechanismen oder sogar die Konfliktvermeidung, was bedeutet, dass die Farmer dem Übeltäter nur ins Gewissen reden oder beim ersten derartigen Vorfall sogar gar nichts unternehmen. Erst bei wiederholtem Regelverstoß gibt die Mehrheit der Befragten an, den WNO-Vorsitzenden zu Rate ziehen zu wollen.

Das dritte Thema, die Bezahlung der Nutzerbeiträge, ist durch finanzielle Schwierigkeiten der Nutzer charakterisiert. Das erste Hindernis für die Zahlungen von Beiträgen ist das gegenwärtige Banksystem für die Farmer, das die Bezahlung der Nutzerbeiträge für eine WNO nicht berücksichtigt. Der nächste Grund für die Nichtzahlung von Nutzerbeiträgen liegt in den verzögerten Zahlungen von Baumwollefabriken an Farmer für die von ihnen gelieferte

Baumwolle. Der willkürliche Zugriff auf die Konten der Farmer durch lokale Funktionäre ist die dritte Ursache für die Nichtzahlung von Nutzerbeträgen.

Die Untersuchung der Pilotprojekte hat gezeigt, dass ihre Erfahrungen nur teilweise in WNOs in Khorezm nutzbar gemacht werden können. Dies betrifft die Verfügbarkeit von Schwermaschinen, wie Kräne oder Bagger, und Landtechnik für den Maschinen- und Traktorenpark (MTP), die Durchführung von Instandhaltungsarbeiten im Bewässerungssystem, technische Zusammenarbeit bezüglich Messgeräten, Capacity Building im Sinne von Trainings, die Gründung permanenter Beratungszentren, Aufklärung der Bevölkerung über WNOs durch Medien, mehr Partizipation im Bewässerungsmanagement, z. B. durch Kanalkomitees, die sich selbst verwalten.

Basierend auf oben genannten Ergebnisse können folgende Empfehlungen für verschiedene Ebene des Managements gegeben werden:

- Auf nationaler Ebene sollte der Staat in Bau und Instandhaltung dieses Systems investieren, da die Mehrzahl des Bewässerungsnetzwerkes (bis zu den Kanälen sekundärer Ordnung) vom Staat kontrolliert wird. Eine weitere Perspektive wäre, den staatlichen Einfluss zu verringern. Hier ist eine Interdependenz mit der Rentabilität der Farmen festzustellen. Außerdem sollte das Managementprinzip geklärt werden, ob man WNOs im Rahmen des existierenden sozialen Netzwerkes, also administrativ-territorial, oder gemäß der Bewässerungsstruktur, nach dem hydrographischen Prinzip, gründet.
- Die nationalen, provinzialen, regionalen und lokalen Ebenen des Bewässerungsmanagements sollten sowohl vertikal, als auch horizontal enger zusammenarbeiten.
- Auf der lokalen Ebene sollte den WNO-Vorsitzenden mehr reale Macht gegeben werden. Der Einfluss auf Entscheidungen einer WNO durch lokale Funktionäre sollte reduziert werden.
- Auf WNO Ebene ist es empfehlenswert, die Partizipation der Farmer zu erhöhen. Dies benötigt eine solide Aufklärungsarbeit und Schulungen in technischen, ökonomischen und rechtlichen Fragen.

Schließlich ist ohne das Recht der Farmer, Art und Umfang der Anbauprodukte selbst zu bestimmen, ist ihre Anpassung an die Erfordernisse der WNOs nicht möglich.

ABSTRACT

The establishment of Water Users' Associations (WUAs) in Uzbekistan is the most important and an integral step in the reforms under the irrigation management transfer programs which are currently underway in the country. Although WUAs have gained importance, there have been no studies about the factors of their functioning.

The objectives of the research presented are: (1), to determine the factors which influence the success or failure of the emerging local water management organizations (the WUAs) and, (2), to investigate the possible roles of pilot WUAs.

Four established WUAs in Khorezm and four pilot projects in Syrdarya and Fergana Valley were selected for the research. By 2004 the average irrigated area of the WUAs in Khorezm was 2 400ha, and the average number of WUA members was 143 irrigators. The range of the irrigated land of WUAs in Khorezm varies from 1 232ha (in Pitnayk) to 4 096ha (in Gurlen). The minimum number of WUA members (45 farmers) was observed in Pitnayk, the maximum in Shavat, where one WUA includes 240 farmers.

The research approach was based on modern methods of sociological empirical research, atypical and new for Uzbekistan, which directs the water users to problem-solving through their own strength and participation. The methods also include one standardized questionnaire which was presented to 89 WUA members in Khorezm, 20 in Syrdarya and 21 in Fergana.

The expected outputs were guided by and concentrated on three topics that are essential for the functioning of WUAs in Uzbekistan: (1) leadership, (2) conflict resolution mechanisms, and (3) users' fee payments.

The role of the WUA Chairman is essential not only for the overall execution and guidance of work, but also for conflict resolution and the activities related with water rotation. Apart from the Chairman, the Water Master was mentioned as another authority responsible for the issues of water rotation.

Respondents also perceived the WUA Chairman as an important conflict mediator in relation to conflict resolution. That was confirmed by all respondents in all three Uzbek regions. The Water Masters are also involved in conflict resolution and play a major role as well. Less contribution to the conflict mediation, in respondents' opinion, comes from the WUA Council and general meetings.

The respondents regarded the shortage of irrigation water as well as the lack of canal cleaning as the main causes of conflict between users. The main topics of disputes between the WUA administration and the management board of irrigation systems (State organization of Water Supply) were seen, for example, in the volume of water delivery, the state of the irrigation system and the terms and conditions of water supply. According to the interviewees' opinion, the main reasons for conflict between farmers and the WUA are non-compliances concerning water delivery contracts and irrigation schedules. The non-payment of user fees was perceived by water users as a potential conflict issue.

Regarding the conflict resolution mechanisms, the respondents preferred the so-called peaceful conflict resolution method: they favour talking to the offender, and forgiving the violation. Only when this proves to be ineffective, do the respondents then report the case/violation to the Chairman.

The third issue, fee payment, was characterized by the financial obstacles which the WUA members face. The first reason for farmers not to pay was that the current credit systems do not really consider user fees. The next obstacle for fee payment were the untimely payments from the cotton mills to the farmers. The local officials' arbitrary use of money stemming from the farmers' bank accounts was the third type of obstacles that hampered the payment by water users.

The investigation of the pilot projects proved that their experiences are only partially transferable to the Khorezmian WUAs; useful experiences include the availability of heavy equipment such as cranes, excavators, and machinery for tractor fleet (MTP), modification

works on the irrigation system, technical assistance regarding measurement devices, capacity building in terms of trainings, the creation of consulting centres, rising public awareness through the mass media, and increasing participation of WUA members in water management, e.g. through canal committees.

Based on the findings summarized above, several recommendations can be made with regard to different levels:

- At the national level, the state should invest in the construction and maintenance of the system, since the major irrigation network (up to the secondary level) is under state control. A further perspective could be the alleviation of the state influence. It was observed that state orders, e.g. the production quota for cotton and wheat, considerably effect the profitability of farms. Besides, the management principles should be clarified as to whether WUAs should be established within the framework of existing social networks, administrative-territorially or according to the canal networks hydrographical principle.
- National, provincial, district, and local levels should collaborate more with each other, vertically and horizontally.
- At the local level, more real power should be given to the WUA Chairmen. The influence on the WUA decision-making authority, namely the intervention of local officials into decision-making processes, should be reduced.
- At the WUA level it is advisable to increase members' participation in everyday activities. For this purpose, the users should be given a solid and clear explanation of the work in technical, economic and legal terms.

Finally, the farmers will not be able to adapt to the WUA requirements if they do not have the right to determine the kind and amount of their production or to sell their agricultural products on free sales markets.

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АБСТРАКТ

Создание ассоциаций водопользователей (АВП) в Узбекистане является одним из важных шагов реформ, проводимых в рамках программ передачи управления ирригационных систем в республике. АВП играют важную роль,однако до настоящего времени не проводились исследования о факторах, влияющих на функционирование АВП. Целями, представляемого исследования являлись:

1) Определить факторы, влияющие на успех или несостоятельность возникших организаций (АВП): на управление водой на местах

2) Исследовать роль, которую играют пилотные проекты международных доноров, для АВП в Хорезме.

Для исследования были выбраны четыре АВП в Хорезмской области и четыре пилотных проекта в Сырдарьинской области и Ферганской Долине. Средняя орошаемая площадь АВП в Хорезме составляет 2 400га, а среднее число членов АВП -143 водопользователя. Орошаемая площадь АВП в Хорезме колеблется от 1 232га (в Питняке) до 4 096га (в Гурлене). Минимальное число членов (45 фермеров) наблюдалось в Питняке, максимум - в Шавате, где АВП объеденила 240 водопользователей.

Подход исследования основывался на современных методах эмпирических социологических исследований, новых и нетипичных для Узбекистана, которые направляли водопользователей на решение их проблем посредством собственных сил, размышлени, дискуссий и участия.Метод включал стандартизированный письменный опросник, с помощью которого всего было опрошено 89 членов АВП в Хорезме, 20 - в Сырдарьинской и 21 - в Ферганской долине.

Ожидаемые результаты были направленны на три основных темы, жизненно важных для современной работы АВП в Узбекистане. Это темы: (1) руководства (председательства); (2) разрешения конфликтов и их механизм: а также (3) оплаты взносов водопользователями

Роль председателя АВП существенна при разъяснительной работе об АВП и при достижении поставленных задач, в разрешении конфликтов, и. в деятельности, относящейся к очередности водопользования. В вопросах выполнения последней задачи водопользователи также называют гидротехника полномочным.

Относительно разрешения конфликтов респонденты воспринимают председателя АВП важным примирителем конфликтов. Это было подтвеждено всеми респондентами, во всех трех регионах исследования. Гидротехники также вовлечены в решение конфликтов и играют в этом большую роль. По мнению респондентов, в примирение конфликтов Советом АВП и общими собраниями АВП,- вносится меньший вклад.

Основными причинами конфликтов между водопользователями, респонденты считают дефицит оросительной воды и неочистку каналов. Основными темами разногласий между администрацией АВП и Управлением ирригационной системы (Государственная организация, подающая воду в АВП) являются: объем поданной ирригационной воды, состояние ирригационной системы, время и условия подачи воды.

По мнению интервьюированных, причинами конфликтов между фермерами и АВП может быть невыполнение контрактов по водоподаче и схема водораспределения. Невыплату взносов водопользователи также считают потенциальной темой конфликтов.

Относительно механизмов решения конфликтов респонденты предпочитают так называемый метод «мирного разрешения», что означает, когда фермеры сами беседуют с нарушителем или прощают нарушителя. Если это не успешно, то лишь тогда респонденты обратятся за помощью к председателю АВП для разрешения спорной ситуации.

Третья проблема - оплата взносов, характеризуется финансовыми сложностями членов АВП. Первое препятствие невыплаты взносов фермерами – это система кредитов, используемая в настоящее время, которая не учитывает взносы. Следующая помеха для выплаты взносов – несвоевременные выплаты денег фермерам хлопковыми заводами за

сданную продукцию, а также третья причина - своевольное использование денег местными чиновниками со счетов фермеров - тормозит выплату взносов водопользователями.

Исследование пилотных АВП показало, что их опыт может быть лишь частично внедрен в АВП в Хорезме. Это касается наличия «тяжелого» оснащения (кранов, эксаваторов) и техники для МТП, проведение реабилитационных работ на ирригационных системах, введение технической поддержки относительно измерительных приборов, укрепление мощностей за счет тренингов, создание перманентных консультативных центров, пропаганда общественности об АВП через средства массовой информации, больше участия в управлении ирригацией с помощью, например, самоуправляемых коммитетов канала.

Основываясь на вышеизложенном резюме результатов исследования, для разных уровней могут быть представлены следующие рекомендации:

- На национальном уровне: так как основная ирригационная сеть (до второго порядка) находится под контролем государства, государство должно инвестировать в строительство и ремонт системы. Дальнейшая перспектива могла бы основываться на уменьшении влияния государства. Здесь установлена взаимосвязь с рентабельностью ферм Кроме того, принцип управления АВП (административно-территориальный или гидрографический) должен быть выяснен.
- Национальный, областной, районный уровни и на местах, управление ирригацией должно основываться на совместной работе по вертикали и горизонтали.
- На местном уровне, необходимо предоставить больше реальной власти председателям АВП. Должно быть сокращено внешнее влияние на процессы принятия решений в АВП, а именно: вмешательство местных властей.
- На уровне АВП, рекомендуется повысить участие членов в каждодневной деятельности. Для этой цели необходима непрерывная и ясная разъяснительная работа по техническим, экономическим и правовым вопросам с водопользователями.

В заключение, без права установки собственной программы выработки сельскохозяйственных продуктов или свободного рынка сбыта продукции адаптация фермеров к требованиям АВП невозможна.

TABLE OF CONTENTS

GLOSSARY AND ABBREVIATIONS

AMTP	Alternative tractor fleet
Arna	Main canal
Arykaksakal	Experienced person responsible for water management
Beda	Network or branch of a canal
BUIS	Basin department of irrigation systems
BVO	Basin Water Union
Canal Water Committee	Self-governing organization on canal level for the strengthening of stakeholder participation
Chigir	Water mill
CMO	Canal Management Organisations
Dekhkan	Households
Djabdi	“Equipper”, Association for the water distribution in Khorezm before Soviets
Djabdiboshi	Leader of Djabdi
FDA	Fermers and Dekhkans Association
Ferm	Family farm
Fermer	Farmer
FVP	Fergana Valley Project
Hujalik	Enterprise in Uzbek
ICWC	Interstate Coordination Water Committee
IFS	Irrigation Service Fee
Ketmon	“Mattock”, Association for the water distribution in Fergana Valley before Soviets
Ketmonboshi	Leader of Ketmon
Khakim	Region or district governor
Khakimiyat	Office of governor
Khashar	Joint activities
Khasharchi	Body which carries out the joint activities, e.g. cleaning of canals
Khlopkoprom	Cotton industrial organization
Kishlok	Village in Uzbek
Kolkhoz	Collective farm in the Soviet Union

Kush	"Double", Association for the water distribution in Zarafshan Valley before Soviets
Kushboshi	Leader of Kush
Mahalla	Local definition of a community in Uzbek and Farsi
MAWR	Ministry of Agriculture and Water Resources
Militia	Police
Mirob	Water master in Uzbek, Farsi
MTP	Tractor fleets
Oblselvodkhoz	Region Department of MAWR
OGME	Regional hydro-land reclamation expedition
PMK	Mobile mechanized construction organization
Rayon	District
Rayselvodkhoz	District department of MAWR
RBAC	Rural Business Advisory Center
Shirkat	Collective farms
Sokka	Head of large canals
Solma	Inter-farm canal
Soum	Local currency
Sovkhoz	Soviet farm
SWIP	Special Initiatives Water Project
Tranche	Special type of purposeful providing of inputs by the government
Tuganchi	Constructor
UIS	Department of irrigation systems
Union of canal users	Renamed "Canal Water Committee"
Uzkishlokkhujjatkimye	State mineral fertilizer plant
WUA	Water Users Association
Yap, yab	Distributive canal
ZEF	Zentrum für Entwicklungsforschung (Center for development research)

1 INTRODUCTION

From their first days of independence the countries of Central Asia began to reform land use and agriculture. As a result of these reforms, thousands of water users appeared on the regional level replacing the former *kolkhozes*[1] and *sovkhozes*[2]. Since the first reforms focused on the restructuring of land use, little was done to coordinate the reform processes between land and water sectors (ICWC, 2004, p. 34).This gap worsened the conditions of on-farm irrigation and drainage systems.

The economic reforms in the agricultural sector of the Republic of Uzbekistan started in 1992 and continue till today. These reforms address mainly organisational aspects of agricultural enterprises and deal to a lesser degree with macroeconomic aspects such as the liberalization of agricultural production and sales markets, and the establishment of water markets. Three types of agricultural enterprises were established: *shirkats*[3], *ferms*[4] and *dekhkans*[5]. However, the legislation on land property types such as private, public or semi-private has not been clarified till now (read more about the reforms in chapter 2).

The recent reforms in the agricultural sector in Uzbekistan have brought about many changes in the farmers' lives. Furthermore, local officials have also been struggling with the implementation of the reforms. The first changes took place under orders and legislative regulations from the Ministry of Agriculture and Water Resources (MAWR) as well as from the Cabinet. The changes in the agricultural sector occurred rapidly, including the adjustment and adaptation processes of *ferms*.

In sum, the governmental focus on reforms addressing land distribution, the worsened conditions of irrigation and drainage systems, as well as the lack of awareness by *fermers* for ongoing reforms in different sectors, motivated me to investigate the theoretical and practical pre-conditions of water management in Uzbekistan.

The reforms were the driving force for the establishment of a new organisation at the local level of water management in Uzbekistan. The Water Users Associations

[1] Collective farm in Soviet Union

[2] Soviet farm

[3] Collective farms

[4] Family farms

[5] Households

(WUAs) were established as a "bridge" between state irrigation management organisations and private (or semi-private in the case of Uzbekistan) water users.

So far there has been hardly any experience of WUAs in the Republic of Uzbekistan. The first WUAs were established in 2000. In some regions of the Republic international donors expanded their activities in the irrigation sector in the form of pilot projects, while in other regions the government supported the establishment of WUAs in place of unprofitable collective farms. The first WUAs did not have a sound legal basis and their establishment was legitimated only by Cabinet decrees and regulations. The question of the WUAs' legitimacy as a law was disputable and is still open. At the time of this study, there were only three WUAs with two or three years of experience in Khorezm. All the others were only founded in 2003. These circumstances did not allow the investigation of the performance of WUAs in the Khorezm region. Therefore the research focused on the perceptions of water users, officials and international donors.

The research was undertaken in the context of the ZEF[6]-UNESCO Project "Economic and ecological restructuring of land- and water use in the Region of Khorezm (Uzbekistan)" (Vlek et al, 2001; Vlek, 2003). In order to show how the present study is embedded in the project, it is essential to emphasize the project philosophy. The project is located in the Khorezm region of Uzbekistan. This region belongs to the lower Amudarya basin and is part of the Aral Sea basin. The inhabitants of Karakalpakstan[7] and Khorezm, suffer most from the accumulated effects of low water use efficiency, soil degradation and salinization in the basin, as well as from the economic and administrative legacies inherited from the Soviet era that are leading to poverty and poor health (Vlek et al, 2002). However, Khorezm, as a research area or region of international donors' support, has received little attention so far.

ZEF is carrying out an interdisciplinary, application-oriented research program with the aim of providing appropriate regional development concepts based on sustainable and efficient land and water use. The program started in 2001 and aims at integrating natural resource management, economic studies and studies of institutions in a philosophy of a long-term, participatory commitment to deliver de-centralized

[6] Zentrum für Entwicklungsforschung

[7] Autonomous Republic of Uzbekistan

development options based on a system where markets function and sound ecological principles are adhered to (Vlek, 2003).

In February 2004, project employees as well as Uzbek and western scientists met for the formulation of the second phase of the project. After intensive discussions, the project focus has been shifted to the direction of institutional analysis: legal framework, decision-making processes, and the attitude and strategies of *fermer*s. This shift was noticed in the project document "Project Phase II: Action Plan", Chapter 3 "Changes in the Activities in the four Research Areas", Subchapter 3.4. "Economy". The project document stresses: "Beyond modelling, a shift of research interest will be made towards "institutions". This analysis is needed to provide inputs for the on-going reform process in Uzbekistan" (Martius et al, 2004, p. 4). The current PhD topic is strongly based on the framework of attitude analysis of *fermer*s. In order to propose alternative restructuring concepts, one should gain the necessary understanding of natural, economic, and social processes.

This thesis has two goals:

1. Identify factors that influence success or failure of local water management (WUA) in Khorezm, Uzbekistan;
2. Discuss the role that pilot WUAs can play for real WUAs in Khorezm, Uzbekistan

The achievement of the first goal was enabled through and based on empirical analysis of WUAs in Khorezm as well as a theoretical framework that was created from different literature sources.

The collection of empirical data was guided by theories on irrigation management by Bruns (1999; 2003; 1998), Vermillion (2004; 1998; 1999), Cernea (1994), Meinzen-Dick (1999; 2002; 1995; 2002), the theoretical contribution to collective action by Olson (1965), Ostrom (1990; 1992), the theoretical framework on common-pool resources management by Ostrom (1992), Agrawal (2001; 2002). The academic contribution of the current thesis is the further theoretical-methodological development of interdisciplinary analysis applied to irrigation systems in Uzbekistan, with a focus on Khorezm Region, Uzbekistan.

Besides the political situation in terms of irrigation management reforms, which were developed during the last decade in Uzbekistan, and strengthened attention to WUAs, international donors play important roles in the processes of reforms.

The pilot WUAs in Uzbekistan created by international donors, have the character of an "island of salvation" (Chambers, 1988). Consequently, it is to be expected that the process of top-down creation of WUAs in Uzbekistan will show similar problems of not being embedded in local contexts. With these premises, the suitable components of pilot projects that are transferable to or advisable for real WUAs in Khorezm Region will be identified in this thesis.

The type of resource management systems that this thesis discusses is a large irrigation system inhabited by *fermers*. Research has been carried out on examples of four WUAs in the Region Khorezm and four pilot projects in two other Uzbek Regions: Syrdarya and Fergana Valley.

The average irrigated area of the investigated "normal" unsupported WUAs was 2400 ha. The average number of these WUA members was 143 irrigators. In Khorezm, two WUA types exist: one based on administrative-territorial and the other on hydrographical principles. WUAs of both types were selected for the investigation. This allowed the collection of different opinions and perceptions regarding the functioning of WUAs. Furthermore, it was essential to see first hand how different or similar WUAs are and which advantages or disadvantages the different establishment principles brought.

Following the derived goals of research, this PhD thesis includes two levels of field investigation. The first is the regional level for which the field research was carried out in Khorezm region. The second level consists of the pilot projects of international donors. The cases were selected in Syrdarya and the Fergana Valley.

The study was based on qualitative approaches. Semi-structured interviews were conducted in Khorezm with officials and persons who were in some way related to WUAs and irrigation management. In addition, a standardized questionnaire was created that took into account important factors for the functioning of WUAs as mentioned by Agrawal, Ostrom, Meinzen-Dick and Bruns.

The questionnaire was designed to acquire data in a consistent form by considering the farm size, the location to the canal as well as the specification of farm

activity. This allowed to display the data in a way that was suitable for scientists from other fields by enabling data visualization. The answers were subsequently coded and summarized in a spreadsheet.

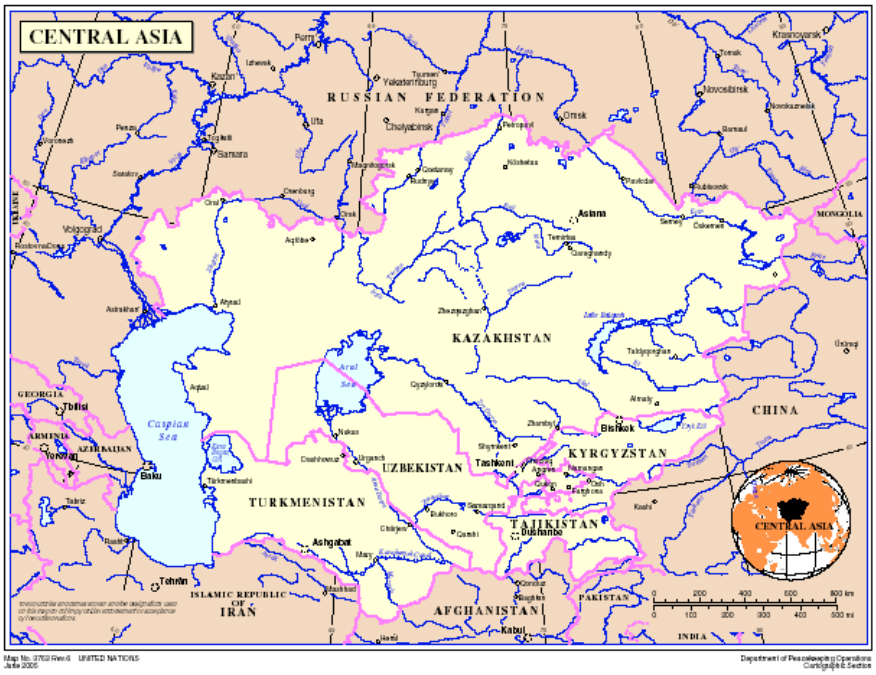
The thesis is built up as follows: after giving a detailed introductory background of regional characteristics and the historical development of water resources, Chapter 2 will present the management and WUA concepts. Chapter 3 will give the theoretical background of the research. In this chapter the basic instrument for arranging and discussing the findings will be established. The methodology will be described in Chapter 4. The type of methodology and its purpose will be elaborated in this chapter. Descriptive results will be presented in Chapter 5. The embeddedness of a WUA in the whole system and its specific characteristics will be discussed in this chapter. Chapter 6 focuses on the analysis. In this chapter the perceptions of water users on WUAs will be presented and analysed. The book ends with the chapter “Conclusions and recommendations”

2 BACKGROUND

This chapter gives an overview of the specific regional characteristics of the Republic of Uzbekistan and the Khorezm Region in particular. In addition, the historical background of the irrigation management from ancient times through the Soviet period until today will be described. Starting from section 2.4 the reader will notice that some phrases in the text are boldface. Their purpose is to systematically guide the reader through the factors influencing the success or failure of water management which will be discussed in the theoretical chapter 3. The chapter ends with information about the WUA concepts that are applied in the Republic nowadays.

2.1 Geophysical information about Uzbekistan

The Republic of Uzbekistan covers a territory of 447 000 km^2. It is situated in Central Asia between the rivers Amudarya and Syrdarya (Map 2.1-1) and shares borders with Kazakhstan, Kyrgyzstan, Tadjikistan, Afghanistan and Turkmenistan.



Map 2.1-1General Map of Central Asia (Oct, 1998, UN Cartographic Section)

Uzbekistan is characterized by an arid and sharply continental climate and a quick change from an unstable winter to a warm rainy spring, then to a dry summer and a warm autumn. Winters are very changeable: frequent light frosts are very often followed by intensive and long thaws. The average temperature in July is +30°C, in

January +3°C. It is much colder in the mountains and foothills. Typical for Uzbekistan is also a large number of sunny hours reaching 2 500-3 000 hours per year. On average 240-250 days a year are sunny days. The largest rivers of Uzbekistan are the Syrdarya (2140 kilometres) and Amudarya (1400 kilometres). There are many other smaller rivers, lakes and large man-made reservoirs. The republic is divided according to the types of landscape into mountains (9 % of the territory), foothills (12%), desert-steppe zone (5%), deserts (60%), and irrigated oases (14%) (Uzbek Embassy in, 2005).

The research area, Khorezm, an ancient and medieval state of central Asia, was situated in and around the basin of the lower Amudarya River. It is now a part of a region, namely North West of Uzbekistan. Khorezm is one of the oldest centres of civilization in Central Asia. (Encyclopedia, 2005). Khorezm belongs to the catchment area of the Aral Sea.

2.2 Natural characteristics of Khorezm Region

Khorezm differs from other regions of Uzbekistan by its hydro-geological, soil and climatic conditions. The topsoil of this region was formed on alluvial sediments of the Amudarya River. The climatic conditions in Khorezm can be described for the period 1990-2001 with data from the representative meteorological station “Urgench” (Glavgidromet, 2003) (Figure 2.2-1).

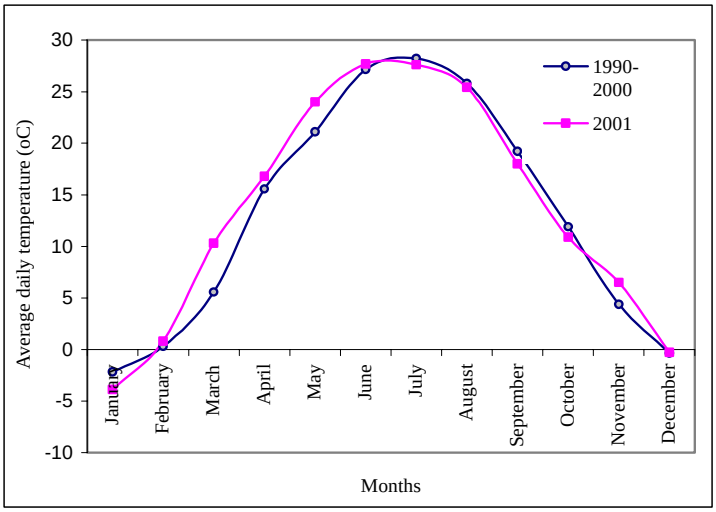


Figure 2.2-1 Air temperature (Urgench meteorological station) (Glavgidromet, 2003)

In this period, the coldest month was January with an average temperature of -2°C and a minimum temperature of -23°C. The hottest month is July with an average temperature of 28.2°C and a maximum of 43°C (Forkutsa, 2005).

Winter usually starts at the end of November and ends in the middle of February. Periodical night frosts may be observed until mid-April (Atashev et al, 1966, p.9). In terms of air humidity the region is very dry. In 2001, the average relative humidity reached a minimum of 35% in June. The most humid month in 2001 was January with a relative humidity of 81%.

The distribution of precipitation is irregular (Figure 2.2-2). Most rain falls between winter and spring. The average annual rainfall does not exceed 80-90 mm (Forkutsa, 2005). In some years only 40 mm of rainfall are recorded. Considering the annual evaporation rate of 1 600-2 000 mm, this means that the crop production in Khorezm is dependent on irrigation (Atashev et al, 1966, p. 10).

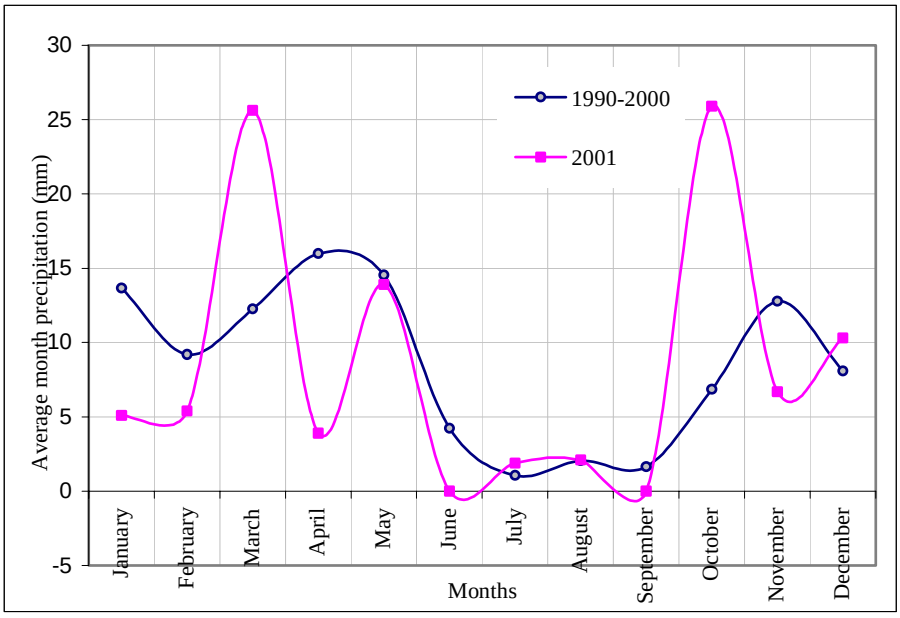


Figure 2.2-2 Precipitation ("Urgench" meteorological station) (Forkutsa, 2005)

The growing period is the least humid with a total rainfall of 21.8 mm, with a maximum in May of 13.9 mm and a minimum in July of 1.9 mm. In July (period of the most intensive evaporation) evaporation surpasses the amount of precipitates by 50 – 60 times. All this points to a significant importance of the contribution of groundwater and irrigation water for crop production (Atashev et al, 1966, p. 10).

The Aral Sea regulated the circulation of atmospheric air masses. Because of the large reduction in its surface area, this effect has been reduced (Popov et al, 1992, p. 13). Intensive wind erosion has occurred from the desiccated Aral zone to the adjacent irrigation areas, causing heavy economic losses in agriculture.

The leaching of soil salts generally occurs from mid-February till the end of March before planting.

2.3 Agriculture of Khorezm

In 1926, the Khorezm Oasis included irrigated land of the Khorezm Region in Uzbekistan, the regions Turtkul, Beruniy, Amudarya, and Ellikali in the Autonomous Republic of Karakalpakstan, and the Tashaus Region in Turkmenistan. The Oasis was a large cultivation region for cotton, wheat, rice and other crops.

The earliest data about the crop pattern of the Khorezm region is available from 1926. In this year, in the Khorezm region, 26 308 ha (18%) out of 148 480 ha of arable land were under cotton, 21 834 ha (15%) were under alfalfa and the rest (33%) was mainly occupied with grain crops (Atashev et al, 1966). Water use in the irrigation farming of Khorezm in 1926 remained sustainable. Crop types, their seeding and the timing of irrigation were determined by considering the water regime and peculiarities of the Amudarya River.

The production of cotton expanded from 18% of irrigated area in 1926 to 65.8% in the early 1930s. Later, by the early 1960s, the production of cotton remained stable and occupied about 54% of arable land (Khamidov, 1993, p. 4). In 1993, the annual production on irrigated land was 850-900 thousand tons of raw cotton and 150 thousand tons of rice with a total of 14.5 million m^3 of water per year being used for irrigation.

2.4 Irrigation of Khorezm Region

According to Tolstov (2005), “the ancient written sources about Khorezm remain very poor to this very day” (Tolstov, 2005, p. 21).

Ancient Khorezm remains a historical mystery. One of the reasons that I discovered during the field research was that Khorezm never belonged to Russian Turkestan or to the later established Turkestan Soviet Socialist Republic[8], and therefore little has been written about the historical background of Khorezmian irrigation.

[8]Khiva Khanate was a quasi-independent vassal under mutual obligation towards a lord, for military support or mutual protection, in exchange for certain guarantees. Later Khiva Khanate became a Protectorate (state territory controlled by a more powerful authority). After the October Revolution in February 1920, Khanate Khiva became the Khorezm People’s Soviet Republic, which was officially

The Khorezm Oasis is one of the most ancient regions of irrigation in the world (Hillel, 1992; Tolstov, 2005). According to historians and archaeologists, such as V. Bartold, A. Yakubosvky, S. Tolstov, Ya. Gulyamov, and B. Andrianov, the construction of canals in Khorezm started in the middle of the second century B.C. Originally, farming was based on the natural flood of the Amudarya. Later it was based on natural delta channels, from which water was directed into irrigation canals.

2.4.1 Organisation of irrigation system management and water use in the period from the 17th to the middle of the 20th century

The Khorezmian management of irrigation systems in the 17th century was based on the so-called "Khorezmian model" which originated from mahalla9 rules and conditions (Kadirov, 1998, p. 43) that were in place long before the Soviets introduced their irrigation system. The "Khorezmian model" of irrigation therefore differs from the approach used in other parts of Uzbekistan in that the administration is more based on customary local rules. Some names of the current Khorezmian canals and locations still refer to the "model".

The head part of large canals was called "*Sokka"*, the main canal was named "*Arna*", the distributive canal was called "*Yap, yab*", a network or branch of a canal was called "*bedaklar*", and the canals that provide water to the fields were named "*solmalar*". The first three terms *Sokka*, *Arna* and *Yab* are still in use, and are found in today's names of canals such as Tashsokka, Daryalik-Arna and Shikhyab.

The organization and maintenance of this highly sophisticated irrigation system required skilled as well as disciplined professionals and users. The local officials became responsible for the organization and supervision of irrigation works. In the Khan period, these officials were elected by the community. For example, in the epoch of Feruz Khan (late 14th – early 20th century) the secretary of the Khan's court, the poet Ogakhi, was responsible for the irrigation management. Ogakhi was named the "main *Mirob*[10] of the State".

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declared in April 26, 1920. In October 20, 1923 it was transformed into Khorezm Socialist Soviet Republic, which only survived for a year. In 1924, it was finally incorporated into the USSR and divided between the Uzbek SSR, the Turkmen SSR and the Karakalpak Autonomous Republic.

[9] Mahalla is a local term for 'community' in Uzbek and Farsi.

[10] Mirob is "water master" in Uzbek, Farsi.

In Kadirov's (1998) view, the application of self-financing and self-governance principles in the organization of irrigation works includes practices such as water use, the maintenance and establishment of water or irrigation districts for the improvement of water use, as well as the transfer to a democratically selected board of representatives, all of these principles being inherited from the far or near past.

The term of WUA might be new for Uzbekistan, but not the principle of common use, governance and management of water resources. In the 19th as well as in the beginning of the 20th centuries, institutions such as *arykaksakals*[11], *mirobs* and *tuganchi*[12] had been widespread in Central Asian countries and especially in the territory of Uzbekistan (Kadirov, 1998). *Arykaksakals* dealt with water supply from the head to the tail-end of the canal ("*aryk"*). They knew exactly to whom, when, and how much water needed to be supplied. An *arykaksakal* was responsible for the main (large) "*aryk*", which irrigated the land of a few villages. Several *mirobs,* under the direction of one *arykaksakal,* were responsible for the other canals. The promotion to a post as *arykaksakals* was arranged between *mirobs*, whereas the most enterprising and competent *mirob* was selected as *arykaksakal* (Kadirov, 1998). The terms '*arykaksakal*' and '*mirob*' referred on one hand to the title of a post and on the other hand to the status of knowledge and experience of the person holding this post. With time, in some districts the posts of *arykaksakal* and *mirob* were transferred from the father to the son by right of succession. This way, dynasties of *arykaksakals* and *mirobs* were established. However, the public control of their activities and assessment of their work persisted (Kadirov, 1998).

Little has been written about *arykaksakals* and *mirobs* in ancient Uzbekistan. However, there is a general definition for the meaning of "*mirob*". According to Future Harvest (2002), O'Hara (2003), and Lightfoot (2005) a *mirob* is the official in charge of the distribution of irrigation water and a key figure in the operation and maintenance of the irrigation system. The inspection of the system and its pertinent structures is carried out periodically by *fermer*s and the *mirob*. Although regular maintenance is scheduled

[11] Aksakal means an old, experienced person. It is translated as a "white beard". Aryk means canal. Arykaksakal therefore means experienced person who is responsible for water management

[12] Tuganchi means "someone who builds dams"

to be carried out periodically whenever sufficient self-help labor is available, major repairs cannot be carried out without governmental support.

Besides the institutions of *arykaksakals*, *mirobs* and *tuganchi*, small territorial village associations responsible for the distribution of water from its source to the users played an important role. The name of these associations varied from region to region. So, for example, in Khorezm they were called "*djabdi*" (equipper), in the Zarafshan valley – "*kush*" (double, twin, pair of ox) and in the Fergana valley – "*ketmon*" (kind of mattock) (Kadirov, 1998, p. 46-52).

In all regions these associations had a leader or *aksakal* (*djabdi*boshi – main *djabdi*, *kush*boshi – main *kush*, *ketmon*boshi – main *ketmon*) who collaborated with the *mirobs*. These leaders or *aksakals* helped in organizing *khashar*s[13] and were responsible for conducting them. However, according to Kadirov (1998) literature contains no information about their responsibility to higher level organizations (Kadirov, 1998, p. 46-52).

The goal of the associations' work was to supply and distribute irrigation water in co-operation with the users on a self-sufficient basis (Kadirov, 1998, p. 46-52).

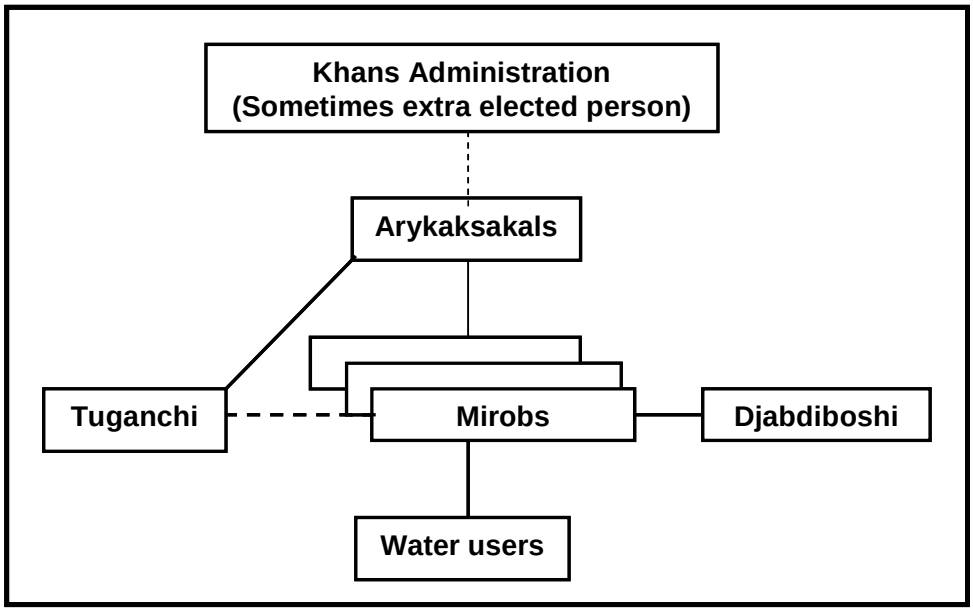


Figure 2.4-1 The structure of the water management in the Middle Asian countries, Middle of 19th century (Kadirov, 1998)

[13] Joint activities in everyday interactions, such as a cleaning of the village canals or streets, planting of trees etc.

The presence of the above-mentioned leaders shows that the socio-political and economic opportunities, as well as the overall conditions of the organization of irrigation works were based on democratic principles, because *aksakals* and other responsible personnel were elected by the communities. Such administrative-organizational management of irrigation was a promoting factor in the development of irrigated agriculture.

In addition, these examples are ***evidences of widely developed social networking***. Similar structures can be found today in the WUAs. This is essential for the understanding of the processes in irrigation management that occur nowadays (for more details see chapter 3).

As in every feudal system in Khorezm, farmers had two types of duties towards landowners: corvee (in form of labor) and tribute (in kind). Kadirov (2003) describes the corvee as follows: "Since their emancipation from slavery the Uzbek ancestry, who lived in the Central-Asian region, learned how to jointly implement large-scale and labor-intensive irrigation works such as digging canals with a length of more than tens and thousands of kilometres, yearly cleaning and maintenance of canals, as well as construction and maintenance of different devices from local materials. These joint activities were called *'Khashar'"* (own translation from Uzbek, Kadirov, 2003). Undoubtedly, these activities could be organized only members realized their common interests, were disciplined, and fulfilled the instructions of work organizers (*arykaksakals*, *mirobs* and *tuganchi*) in a clear and quick way. Kadirov (2003) stresses that "since the '*Khasharchi*'[14] generally were ordinary farmers, certain human characteristics such as decency, diligence, self-discipline, call of duty and feeling of solidarity were needed". E. Pokrovskii (1927) mentioned: "….the nations of Central Asia, before the occupation of the land by the Russian government, had a formed land and water regime, which was built on customs and traditions. The field of application was restricted by tight limits of tribal and intertribal interaction as well as water-land communities. Nevertheless, we encounter a heterogeneous water regime due to the influence of heterogeneous customs" (Pokrovskii, 1927).

[14] "*Khashar*chi" is someone who carries out joint activities such as the cleaning of canals etc.

The *Khashar*, which was included into the duties of the central authorities, played an extremely important role in the maintenance and development of the irrigated facilities. In Central Asia, the population, by way of labor duty, carried out the repairs and services, such as the construction of new channels, the clearing of heads of main channels, and the construction of dams and coastal dams (CENTER, 2002).

Irrigation-related work and the distribution of water were carried out between small territorial rural communities of water-users as part of the *Khashar*. During the *Khashar period,* each member of a water-user community took part in the joint activities, regardless whether he directly benefited from them or not. The collective maintenance of irrigating systems and water-intake constructions in serviceability, and also the maintenance of water administration demanded the establishment of a strict account of irrigated water and its distribution between water-users.

The *Khashar* as a social element contributes to the ***predictability of resource supply*** and also indicates the farmers' ***shared norms***. One can argue whether such behavior was voluntarily or forced. The *Khashar* nevertheless has characterized the Uzbek community over generations. It survived the Soviet period and is still an essential element not only in irrigation management.

The above-mentioned examples show that in Uzbekistan and particularly in Khorezm farmers were quite likely committed to the idea of collective user-based water management.

It is precisely this ability to collective action, which characterized the Khorezmian irrigation management in Pre-Soviet times. In these times, irrigation was labor intensive and entirely based on group effort. The irrigation method was gravity/surface irrigation. The next section of the present thesis gives detailed information about its technical, management and socio-economic characteristics.

2.4.2 Specialities of irrigation

The land reclamation system of pre-Soviet Khorezm differed markedly from other Uzbek irrigation systems due to its dual function: in the vegetation period it served as an irrigation system, whereas during the vegetation-free period it served as a drainage system by lowering the ground water table and reducing the intensity of soil salinization (Khamidov, 1993, p. 3). The method of lowering the ground water level in order to prevent salinization is still used nowadays.

After its incorporation into Russia in 1940, the Southern Khorezm territory was irrigated by five large main canals that were probably dug between the 17th and 19th century. These canals received their water inlets, which were maintained by local people, from the Amudarya River. The water level in the canals depended on the water availability in the river (Atashev et al, 1966). This reliance on river water availability still exists up till the present time.

Since the Amudarya River often changes its river-bed, its water carries huge amounts of sediments. During a year, the river carries away about 250 million m^3 of sediment (alluvium), part of which settle in the flood-plain of the river, while the other part is deposited in the irrigation network. Already in the 1930s, the population of Southern Khorezm alone (not clearly defined by the authors) removed by hand up to 15 million m^3 of sediments from irrigation canals, while only about 2 million m^3 were removed by machinery every year (Atashev et al, 1966). The small fractions of sediments accumulate on the fields and contribute to the salt concentration on the surface.

The abundance of sediments characterized and still characterizes the Khorezmian irrigation system. It has an influence on ***the condition of the allocation system*** which is difficult to maintain due to the natural peculiarities of the region and river Amudarya.

Every year the rural population used to bring a large amount of loose sandy soil mixed with organic fertilizer to their fields in order to improve the soil structure. The volume of the soil which was imported to the fields every year reached 30-40 million m^3 and required about 6-7 million working hours (Atashev et al, 1966).

The works on irrigation and improvement of the soil structure in Khorezm made up 60-70% of the total agricultural work (Atashev et al, 1966).

The population of southern Khorezm had to draw water from the canals to the fields, which was a big burden for the Khorezmian landowners. Before the revolution this was done mainly with *chigir*s[15] (Figure 2.4-2), which were only 25-40% effective and characterized by high water losses. The irrigation capacity of the water mill did not exceed an average of two ha. The irrigation with *chigir*s was time and labor consuming.

[15] Water mills

The total number of water mills in Southern Khorezm in 1966 amounted to 47-50 thousand (Atashev et al, 1966).

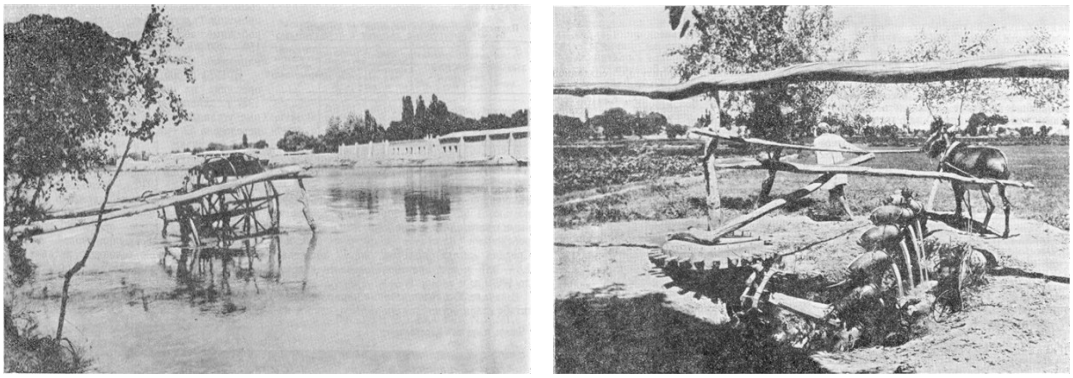


Figure 2.4-2 Chigirs (Atashev et al, 1966)

2.4.3 Stages of irrigation and land-reclamation constructions, its objects

Since little literature is available about the irrigation development in Khorezm, this overview will start with the year 1929. This was the beginning period of Soviet power, when many technical and managerial changes were introduced. This section gives a detailed description of this period.

In 1935, the *chigir*s started to be replaced by pump irrigation. In 1937, gravity irrigation was widespread throughout the major part of the region. The total irrigated area of Khorezm (213.8 thousand ha) was divided in compliance with the irrigation types (Table 2-1) (Atashev et al, 1966). By 1941, rotary pumps with tractor drive and immovable pumping stations were predominantly used.

Table 2-1 Types of irrigation in Khorezm in 1966 (Atashev et al, 1966)

Irrigation	Area (ha)
Gravity irrigation	29 700
With water mills	51 600
Pumps with tractor drive	19 600
Immovable pumping stations	16 600
Propeller pumps	0.3

With the introduction of pump irrigation the irrigation expenses of Khorezm were economized. While the costs for irrigating one hectare with *chigir* were about 60-70 rubles, it cost about 30-35 rubles to irrigate with a tractor pumping station and 15-20 rubles when using an immovable pumping station (Atashev et al, 1966).

The cleaning of canals was also first mechanized in 1935. By 1940 the total volume of cleaning works in the canals was reduced from 7 462.2 thousand m^3 in 1938 to 2 643.1 thousand m^3, a decline of 64%, while the total labor inputs for cleaning declined by 56% (from 1241 thousands of man-days in 1938 to 555 thousands of man-days in 1940). These changes were due to the construction of control devices in the irrigation systems which improved the hydro-geological conditions of the oasis.

The realization of large reconstruction projects of the South Khorezmian irrigation system between 1932 and 1941 allowed the transition to gravity irrigation (F. Morgunenkov, V. Poslavsky, 1932-1941 cited in Khamidov, 1993). This led to the extension of irrigation land, the increase of the land use coefficient and increased agricultural production (Khamidov, 1993). With the transition to gravity irrigation, water losses due to infiltration have increased, leading to a raised groundwater table and increased soil salinity (Ibrakhimov, 2005). In order to prevent secondary salinization, the construction of a drainage system was started by the end of 1941 (Khamidov, 1993). The introduction of gravity irrigation and open drainage in Khorezm raised the economical strength of the agricultural enterprises (*kolkhozes*) from 1.0-1.2 t/ha (cotton) in the 1930s to 2.5-3.0 t/ha in the 1950s and early 1960s[16].

The systems were equipped with modern hydro-technical structures, high-powered mechanisms, and the structure and staff of operation services were re-organized.

However, since then no new irrigation devices have been built and no new constructions have been carried out till today. The large-scale irrigation system of Uzbekistan was ***neither extended nor rehabilitated*** in the last 30 years. This lack of maintenance of the irrigation networks hampers current irrigation management on different levels (national, regional and local).

[16] Today the production capacity of cotton in Khorezm is the highest in the whole Republic. In 2003 the capacity was 4.4 t/ha, but in the drought year of 2002 it reached a low 2.3 t/ha.

Figure 2.4-3 Condition of irrigation network in Khorezm, 2003 (Own presentation)

2.5 Transformation in the agricultural sector

As mentioned in chapter 1, reforms in the agricultural sector in Uzbekistan started directly after the independence in 1991 and still continue. At first, the reforms focused on land restructuring. Three different new types of agricultural enterprises were introduced: *shirkats*, *ferm*s and *dekhkans*.

In order to give an idea about the ***legislative framework*** of the newly established agricultural enterprises, this section begins with extracts from the Land Codex of the Republic of Uzbekistan. Since the present thesis focuses on WUAs, their establishment and current functioning, and since the members of WUAs are *fermer*s, the legal status of the *fermers* will be described in detail.

According to the Land Codex, land for agricultural purposes is given to: (1) *shirkat*s and other agricultural enterprises for running a farm-market agriculture, (2) citizens of the Republic of Uzbekistan for running *ferms*; (3) citizens of the Republic of Uzbekistan for running *dekhkan* enterprises, individual gardening, vegetable gardening and livestock farms; and (4) citizens of the Republic of Uzbekistan for collective gardening, vegetable gardening and viticulture (Government, 1998, Land Code, Article 16, p. 25).

*Shirkat*s, *ferms* and *dekhkans* belong to the group of agricultural producers. Agricultural land used for the large-scale agriculture is predominantly given to *shirkat*s as a continued tenure (Government, 1998, Land Code, Article 47, p. 26). Members/shareholders, who participate in the production activity of the *shirkat*, usually join on the basis of a (collective) family contract. The executing agency of a *shirkat* is the board, which is led by a chairman.

Shirkats. The experience of the last years has shown that the reorganization of the former *kolkhozes* and *sovkhozes* in *shirkats* did not bring about an increased economic effectiveness in agriculture because the reforms had only a vague character. Per se, these reorganizations did not lead to the de-bureaucratisation of the *shirkat* management, and they did not introduce the desired market relations between family contractors[17] and the *shirkat* board. As a result of such management the economic indices of *shirkats* decreased. So, while in 1999 the average profitability of *shirkats* in the Republic was up to 0.5%, it decreased to -8.9% and -9.6%, in 2000 and 2001 respectively. (Bocharin, 2004, p. 9).

The *ferms*, located on the territory of *shirkats*, have the same legislative conditions as *pudratchis*.

Ferms. Besides the *shirkats*, there is another form of organization of agricultural production – the *ferms*. A *ferm* has the rights of a juridical person. The legislative basis of the functioning of *ferms* is the law of the Republic of Uzbekistan "On *ferms*".

As defined in the Land Code of the Republic of Uzbekistan from April 30, 1998, the activity of a *ferm* is based on the joint activities of its members, who carry out farm-market agriculture on long lease land.

According to this definition, at the beginning of 1999 there were 26.4 thousand *ferms*, whose gross volume of production accounted for 4.4% of the total volume. However, unclear formulation of the law and its free interpretation led to a decrease of the production volume to 1.3% in March 2000, in spite of the fact that the number of *ferms* increased to 37.6 thousand (Bocharin, 2004, p. 7-8).

Still, the *ferm* was seen as a promising perspective for the agricultural economy. Therefore, in 2000 the government of Uzbekistan made the decision to dismantle the majority of unprofitable *shirkats* and replace them by *ferms* (Bocharin, 2004, p. 9; Uzbekistan, 1999). However, these expectations were not justified, because existing organizational and socio-economic conditions did not promote the broad development of *ferms.* The *ferms* experienced huge difficulties in obtaining privileged credits. They did not have enough own capital to purchase the necessary machinery,

[17] *Pudratchi*

equipment, spares, fuel and seeds. Many owners of *ferms* lacked the knowledge on independent farm keeping and farm management. Moreover, *ferms* were and still are constrained by the government in their choice of crops, cropping patterns and sale markets. They bear losses from the arbitrariness of officials and monopolists of agricultural services. Finally, the extensive development of *ferms* (and also *dekhkans)* out of dismantled *shirkats* disturbed the continuing centralized infrastructure of state sub-divisions and agencies.

The area for *ferms* had to be taken out of *shirkat* land, but they generally did not receive the best land. According to the Land Codex, *ferms* receive reserve land, land from a special foundation of the Uzbek Republic, land from enterprises with insufficient labour resources, and land in newly irrigated areas. *Ferms* also receive land from unprofitable agricultural enterprises. The land of *shirkats* can be provided to *ferms* based on a decision of the General Assembly of *shirkat* members. The *khakim*[18] then makes the corresponding decision. Usually, the territories of the *ferms* are scattered over the area of a *shirkat*. One *shirkat* can comprise from one to 14 *ferm*s, with an average land plot of 16 ha each. The *ferms* obtain the land plots for lease. The term of lease can be as high as 50 years, but not less than ten years.

Dekhkans. Since 1999 the term *'dekhkan'* has been used for a formalized form of household (plot) farm. The *dekhkan* farms (formerly personal subsidiary plots) have access to land with life-long inheritable usufruct rights. The maximum size is 0.35 ha of irrigated land per capita, and up to 0.5-1.0 ha of non-irrigated land or land in steppe and desert areas. (Spoor, 2004, p. 7).

Van Dusen (2004, p. 6) and Kandiyoti (1999, p. 511) refer to the independent character of *dekhkan* farms. The *Dekhkan hujalik*[19] can operate independently from the *Shirkat* and market its own produce. *Dekhkan* farms basically grow potatoes, melon crops, vegetables, fruits and feed crops. While only a household plot with farmland is considered a *Dekhkan hujalik*, this form of land tenure offers small garden *ferms* an opportunity to become independent.

According to TACIS, "the household or subsidiary plots numbered 3 362 400 in 2001. Of these, 1.8 million are *dekhkan* farms (which, since 1998, refer to the

[18] Regional or district governor

[19] 'Enterprise' in Uzbek

formalized household farm), covering 290 000 ha of land, with an average of 0.16 ha/*dekhkan* farm" (TACIS, 2001, p. 73-74).

With respect to water use, *shirkats* are primary users, *ferms* secondary and *dekhkans* even tertiary users. By 2004, the position as primary water user was occupied by WUAs and *shirkats*. This was due to the organizing of the newly established *ferms* in WUAs, through which the structure of the *shirkat* lost its importance. The focus of the reforming processes was on the extension of *ferm* establishment. Dekhkans still do not receive a clear position in water management. While *ferms* have obligations and duties as members of WUAs and legalize this relation by signing a contract about water supply, *dekhkans* sign contract with WUAs without being granted any membership rights.

2.6 Transformation in the water management sector

According to an interview with experts and scholars in irrigation issues in Uzbekistan, before the establishment of WUAs there were many considerations about the ***unit of management*** of the local irrigation system. However, the deliberations concentrated strongly on the management structure alone, without considering the prevailing technical aspects of the irrigation system.

The study of the international experiences in the operation of on-farm irrigation systems under market conditions led to the conclusion that the most appropriate form of irrigation management at the grass-roots level in Uzbekistan would be WUA; i.e. groups of users, consisting of people who depend on the same water resources, which would participate in the irrigation management and bear the costs for operation, maintenance and development of the WUA.

The first WUAs in the Khorezm Region appeared in 2000 based on six liquidated *shirkats* and recommendations by SANIIRI, a research institution in Tashkent. Later, after the scaled liquidation of unprofitable *shirkats* according to the regulation of the Ministry, WUAs became the dominant form of operation of on-farm irrigation systems.

According to Bocharin and Ergashev (2004) "the establishment of WUAs in Uzbekistan before 2000 was not expanded further due to the specific development conditions of *ferm*s" (Bocharin and Ergashev, 2004, p. 18). The role of *ferm*s was marginal at that time, in terms of either their number or their land area in each *shirkat*.

Being only secondary water users in contrast to the *shirkats*, *ferm*s were already provided with maintenance of irrigation and drainage at the level of on-farm system, because the operation and maintenance was carried out by the *shirkat* as primary water user. Moreover, it was difficult to manage the irrigation of *ferms*, because their territories were located as enclaves, dispersed throughout the *shirkat* areas, and they did not have a common goal such as managing any united water thoroughfare.

The resolution of the Cabinet of Ministers in 1999 on the dismantlement of non-profitable *shirkats* and the distribution of their land to the *ferm*s established the WUAs in Uzbekistan. Also Bocharin (2004) mentions that the initiator of WUAs in Uzbekistan was the Ministry of Agriculture and Water Resources (MAWR).

My investigation, however, shows that the initiators of the WUA establishment in Uzbekistan were international donors as well as local administration (provincial and district departments of the MAWR).

In order to establish WUAs, the local administration convokes a general assembly of potential WUA members, where it explains the goals, objectives and tasks of WUAs (See 9.1). In accordance with a decision of the general assembly, the WUA establishment commission (later, commission) is created. This commission has different tasks such as carrying out the explanatory work among potential WUA members, organizing an inventory of the means of the liquidated *shirkat*, drawing up a transfer balance, and preparing the constituent documents.

The procedure of the WUA establishment is carried out under strong supervision of the state, leading to a restriction of the "***decision-making authority***". A WUA was conceived as a *fermer*-run organization. However, as a start the state acted as an initiator taking the full responsibility for the establishment and first run of the WUA.

The water users are obligated to pay user fees for the services of water distribution provided to them. These user fees are a frequent issue of debate regarding the ***fairness in payments of services.*** The tendency among payers and non-payers will be described in the analytical part of this thesis in chapter 6 (6.1.3).

On average 22% of the actual WUA expenses were paid for in 2003 (Bocharin, 2004). According to Bocharin (2004), the lowest payment for WUA service was observed in the regions Kashkadarya (15% of actual expenses), Syrdarya (10% of actual expenses) and Tashkent (7% of actual expenses). In Andijan, Bukhara and Navoy

the payments for WUA services and works have increased. In 2003 in Andijan they increased up to 61%, in Bukhara up to 41% and in Navoy up to 40% of the actual WUA expenses (Bocharin, 2004, p. 31). The difference in payments is covered by the government.

On average, the actual cost per WUA amounted to 1 000[20] Soums/ha (prices for 2003) (Bocharin, 2004). At the same time considerable a differentiation among the regions of Uzbekistan was observed: in the regions Samarkand and Khorezm the average actual cost per unit increased up to 3 570 and 3 910 Soums/ha, respectively (Bocharin, 2004). In the regions Syrdarya and Navoy these costs made up 256 and 454 Soums/ha, respectively (Bocharin, 2004). It is essential to mention that WUAs are weakly equipped with repair and construction machinery. On average one WUA has 0.29 items of excavators, 0.28 bulldozers, 0.1 tractors and 0.25 car transport (Bocharin, 2004, p. 31).

In the section about the historical development of irrigation management in Uzbekistan and Khorezm it was particularly mentioned (2.4.2, 2.4.3) that the abundance of sediments complicates both maintenance and water distribution. The availability of proper machinery (e.g. excavators, bulldozers and tractors) to counteract sediments is essential in a WUA. If the primary equipment is lacking, ***the condition of the allocation system*** cannot be maintained and gradually degrades.

The majority of the established WUAs has pump irrigation. On average, every WUA has three pump facilities. Every pump facility serves approximately 7 740 ha of irrigated land (Bocharin, 2004, p. 31).

2.7 New wave of the reforms in irrigation management in 2003

A new wave of reforms in the agrarian sector of Uzbekistan started in March 2003. The reforms were initiated by the presidential decree from March 24, 2003 № УП-3226 “On the most important extension directions of reforms in agriculture”.

Until 2003 the further ***legal framework*** of a WUA had been developed, although this reform wave did not directly aim at transforming the water sector. In the decree № УП-3226 the main emphasis was placed on a development to make *ferms* the main producers of agricultural production in the future (Government, 2003).

[20] 1 USD = 994,33 Uzbek Soum (2003 average) (Source: Central Bank of Uzbekistan)

The ***roles*** of newly established players at the national, provincial and district levels were defined and ***specified***.

In the decree № УП-3226, the focus was laid on the fundamental review of management systems of agricultural production, having in view to absolve the MAWR from its distributive functions and to refrain from administrative command methods of governance in agriculture.

According to Taksanov (2003) "such forms of 'governance' remained from Soviet times and carried negative impacts on the management of agricultural systems, often braking whole reform processes of the agrarian sector" (Taksanov, 2003, p.3).

In the decree № УП-3226, the main goals of the MAWR were determined. One of the goals was formulated as follows: water resources management providing transition from a administrative-territorial to a basin[21] principle of irrigation systems and introduction of market principles in irrigation water use at all levels (Government, 2003, section 6).

In pursuance of the presidential decree № УП-3226 and in an effort to radically improve the management of systems of agricultural production in accordance with market economy requirements, the organizational structure of the MAWR was revised (Uzbekistan, 2003). The new structure included basin management boards of irrigation systems (*BUIS*), management boards of main canals as well as management boards of irrigation systems (*UIS*) (See annex 1 of № 290).

The system became complicated but clearer, with additional ***nested levels of appropriation, provision, enforcement and governance***.

The reforms gathered up speed and one month later the next regulation was passed. In pursuance of the decree № УП-3226 and with the prospect to transfer from a administrative-territorial to a basin principle of irrigation systems management, the resolution of Ministry of the Republic of Uzbekistan from July 21, 2003 № 320 "The improvement of water management organisation" was passed (Uzbekistan, 2003). As result, 10 *BUIS*es were established based on existing structures of water management.

The accomplished reforms led to a significant decrease in the amount of units covered by the water distribution which existed between water users and irrigation

[21] Hydrographical principle, according to canals and irrigation systems

source. The water management organizations were reduced from 237 to 73 organizations and agencies.

2.8 Reforms in water management in Khorezm in 2003

The Khorezm region is a pioneer in the field of the complex formation of the new form of water governance. Two types of WUAs exist: administrative-territorial and hydrographic.

The first WUAs were organized in 2000 on the basis of the liquidated and unprofitable *shirkats*. The organizational setup of WUAs on the basis of abrogated *shirkats* is referred to as an "administrative-territorial" form of WUA.

The hydrographic WUA refers to the association of *ferm*s according to the location of irrigated area and canals; in this case users obtain their water from the same canal. These WUAs were established in 2003 in the Yangibazar district (Khorezm) according to the above-mentioned decrees and regulations. Yangibazar belongs to the first district in Khorezm that was fully restructured. In mid 2003, a total of ten *shirkats* were dismantled in this district and replaced by *ferms* (Table 2-2). By July 2003, 7 WUAs were established in Yangibazar. All these WUAs were created in accordance with the hydrographical principle, i.e. every WUA includes itself two-three *shirkats* (Table 2-3).

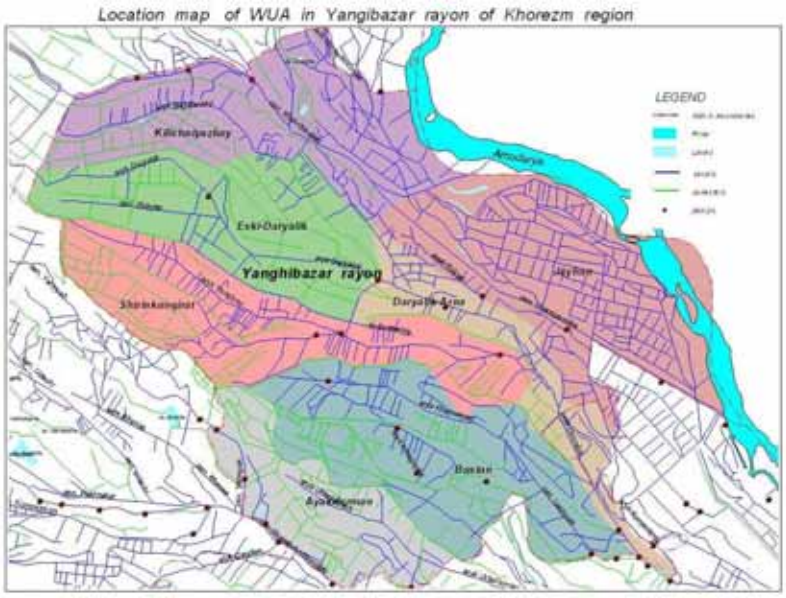
Table 2-2Characteristics of the various districts in Khorezm Province (Wegerich, 2003, pp. 13-15)

District	Irrigated area (ha)	*Shirkats*	Ha/shirkat
Bagat	20,196	16	1,262
Gurlen	25,776	12	2,148
Koshkopir	26,504	19	1,508
Urgench	38,680	13	2,975
Khazarasp	18,117	10	1,818
Khanka	24,976	18	1,388
Khiva	17,566	10	1,757
Shavat	25,807	15	1,720
Yangiarik	15,217	10	1,522
Yangibazar	21,471	10	2,147
Pitnak	5,910	3	1,970
Total/Average	**240,220**	**136**	**1,838**

Table 2-3WUAs in Yangibazar District (Own investigation, December, 2004)

№	Name of WUA	Irrigated area (ha)	Number of ferms
1	Buston	4855,4	238
2	Shirin-Kungirot	3553	222
3	Jaykhun	3142	125
4	Daryalik-Arna	1765	80
5	Eski Daryalik	2772	86
6	Ayek Durman	2947	175
7	Kilich Niyazboy	3746	216

Frequently, one *shirkat* was taken over completely while others were only partially included depending on the location of canals (Map 2.8-1).



Map 2.8-1 Location map of WUAs in Yangibazar

By the end of 2003, 109 *shirkats* existed in Khorezm, 102 of which were unprofitable. According to a presidential resolution (2003), all these *shirkats* would have to be dismantled by the beginning of 2006.

During the conduct of the current investigation, at the end of 2004, 72 *shirkats* were already dismantled. The *Oblselvodkhoz*[22], which is represented by the chairman of

[22] Region Department of MAWR

the WUA federation, was commissioned to establish 55 WUAs based on the hydrographical principle until Jan. 15, 2005.

2.8.1 Establishment process of (hydrographical) WUAs in Khorezm

The dismantling of *shirkats* and the establishment of further WUAs is carried out according to a uniform scenario. *Shirkat* leaders, such as the director and vice-director, and other administrative staff, such as the main water masters and agronomists, are invited to the *Khakimiyat*[23]. There the dismantling of the *shirkats* is announced, as well as the further procedures for the creation of *ferms* and for the division of land between them. The distribution of water within the framework of *ferms* is not discussed.

Usually, the head of the WUA is assumed by either the former main water master of one of the dismantled *shirkats* (if a WUA includes many *shirkats*) or by the representative of the *Rayselvodkhoz*[24]. The former *shirkat* director normally becomes a leader of the *MTP*[25]. Both, the head of the WUA and the leader of the *MTP*, remain in their social networks if they have already worked together in a *shirkat* or even a *kolkhoz* or *sovkhoz*. However, the state did not transfer full authority to them. The *Khakim* decided about the water scheduling in situations of water deficit since he was responsible for the state order fulfilment. *Fermer*s-WUA members knew about this responsibility and utilized their personal connections to the *Khakim* while excluding the leader and staff of the WUA who are actually responsible for water allocation and distribution.

2.9 Concept of WUAs

Since the focus of this thesis lies on WUAs in Uzbekistan, this section will present the different concepts of WUAs which can be observed throughout the country. I distinguish between unsupported WUAs, which were established by the Uzbek government, and supported WUAs, which were funded by international donors.

2.9.1 Unsupported WUAs

Regarding unsupported WUAs, their variety of forms and conditions of land use does not allow for a unified form of WUA. The following types of WUAs are possible:

- on the territory of liquidated *shirkats*;

[23] Office of governor

[24] District department of MAWR

[25] Tractor fleets

- on the land plots of existing *ferms;*
- on the basis of *ferms* located within the *shirkats*.

The prevalent type of WUA is the one established on the territory of liquidated *shirkats*.

The management unit in WUAs is either based on the administrative-territorial or the hydrological principle. As was mentioned above, the administrative-territorial principle of WUA establishment, which was based on the former boundaries of *shirkats*, was replaced by the hydrographical approach. The hydrographical approach is characterized by the organization of users according to the canals. Some WUAs included different former *shirkats*, other WUAs adopted the boundaries of former *shirkats* without any changes (**Figure 2.9-1**). These latter *shirkats* had already implemented the hydrographical approach.

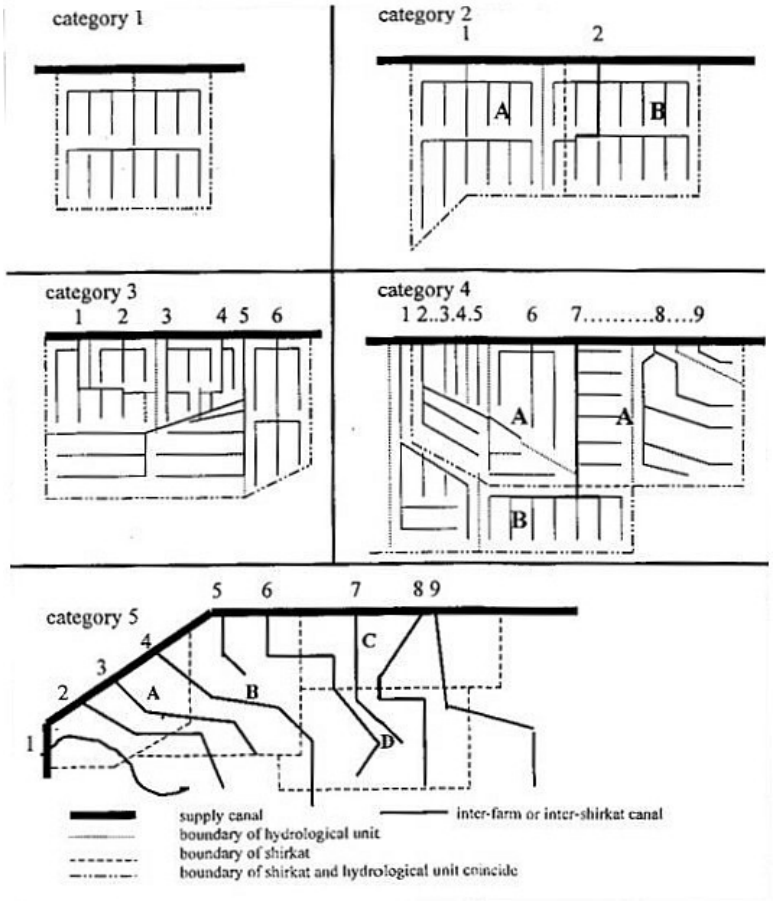


Figure 2.9-1 Schematic overview of hydrological boundaries, as compared to WUA boundaries and farm boundaries (Source: World Bank, 2003, Manual on Formation and Empowerment of WUA)

The structure of an unsupported WUA in Khorezm involves only managing players. This is explained by the fact that the WUAs in Khorezm were initiated by the state. The future members did not have any idea about this kind of organization. This could be observed by the author in the case of the establishment of new WUAs in 2004. Since the formation of *ferms* is a first step to the establishment of a WUA, the interest of this investigation was on the principle of *ferms* creation based on unprofitable *shirkats*. The investigation showed that land distribution was the first main task and problem for future *ferm*s. The issue of water use under the conditions of *ferms* was not considered nor discussed. There were only assumptions about further water use under *ferms* in Khorezm.

Under these pre-conditions regarding the lack of knowledge about a WUA as a self-governing organization, WUAs were established as a next step directly after the land allocation between *ferms*. Since the government took the function of the governing body, as shown by the above-mentioned example, it was essential for Khorezmian WUAs to have local leaders who could develop and implement a WUA.

The structure of a Khorezmian WUA includes advanced staff such as book keepers, main water masters with several sub water masters, and technical personnel (Figure 2.9-2).

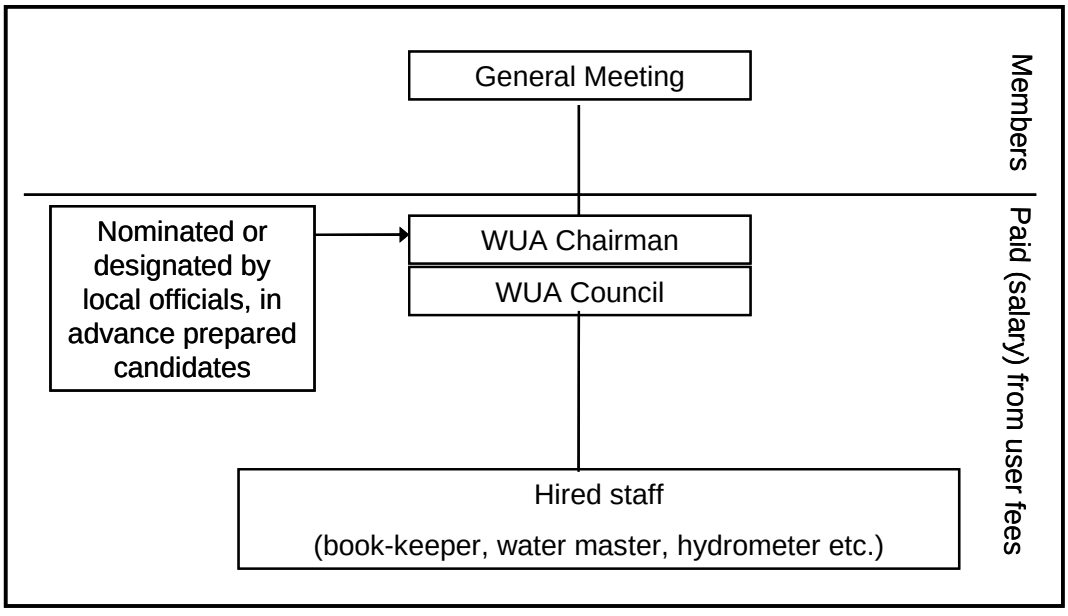


Figure 2.9-2 Structural chart of khorezmian WUA (own presentation)

According to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan (decree №8 from Jan. 5, 2002, appendix 7, item 2.4) “the association fulfils the work in compliance with the legislation of the Republic of Uzbekistan, constituent contract and regulation, at the expense of the financial and material fees of the members”. The ideal form of the association includes three types of water user fees: a constituent fee, a current fee and a development fee (this information emerged from an informal interview with MAWR specialist A. Ibraimov). The current water user fee that is used for the payment of the WUA staff salary is the only fee raised by the WUAs in Khorezm. The fee is estimated and listed in the attachment of the contract on water supply between the WUA and the *fermer*. The attachment of the contract also determines the crops to be grown, the area of each crop in ha, the irrigation requirements for each crop, the service cost for $1m^3$ of delivered water, and the total amount of water to be delivered.

2.9.2 Supported (pilot) WUAs

The pilot projects include loans by ADB projects and development aid projects, such as IWMI or USAid.

In the currently run ADB project, the *fermer*s-WUA members have to return the money from 2009 on. Every *fermer* has to repay approximately 4000 US $. However, this money will be repaid over a period of 20 years.

The development aid projects provide support in technical and social issues.

The structure of a pilot WUA is similar throughout all projects of international donors. The pilot projects have a democratic policy in terms of the election of an administration and its function.

A pilot WUA has managing and governing bodies in the organizational structure (Figure 2.9-3). The president (sometimes called Chairman) of such a WUA is elected by a general assembly that includes all WUA members.

The chairman (sometimes called Director) of a WUA is hired by the president or the Council.

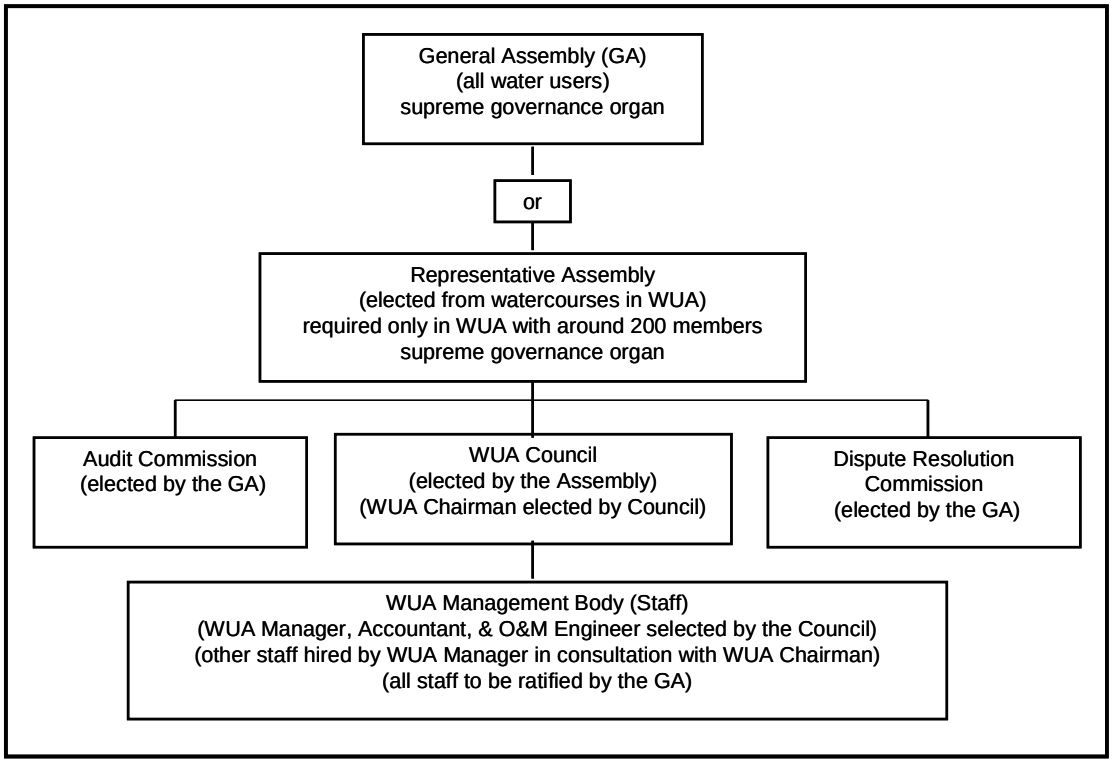


Figure 2.9-3 Structure of typical pilot WUA

The governance functions aim at setting the irrigation and drainage service objectives based on the members' needs, formulating policies to meet the service objectives, and appointing staff for the implementation of those policies. Finally the staff performance needs to be monitored, evaluated, and overseen in order to ensure that procedures and practices lead to the implementation of policies so that the desired objectives, dispute resolution, and auditing can be achieved. Governance functions are the responsibilities of the members' representatives (General or Representative Assemblies, the WUA Council, the Chairman of the WUA Council, and the Dispute Resolution and Audit Commissions).

The management functions of a WUA aim at devising and implementing procedures and practices to ensure adequate, efficient, reliable, and equitable service delivery (irrigation, drainage) to all members, in line with the policies set by the governance bodies. According to the Manual for Water Users Association in Uzbekistan (IWMI et al, 2005) "management includes, among other things:

- day to day handling of irrigation and drainage related tasks at the WUA irrigation and drainage infrastructure;

- seasonal, annual, medium, and long-term identification and planning of maintenance related tasks;
- preparation of cost estimates and budget needs;
- calculation of water charges for various members and non-members, issuing bills and collection of water charges;
- collection, processing, and analysing the required data for reporting to the governance structures, and regulatory authority (governmental ministries and departments); and
- any other water and land related tasks identified by the governance or regulatory authorities".

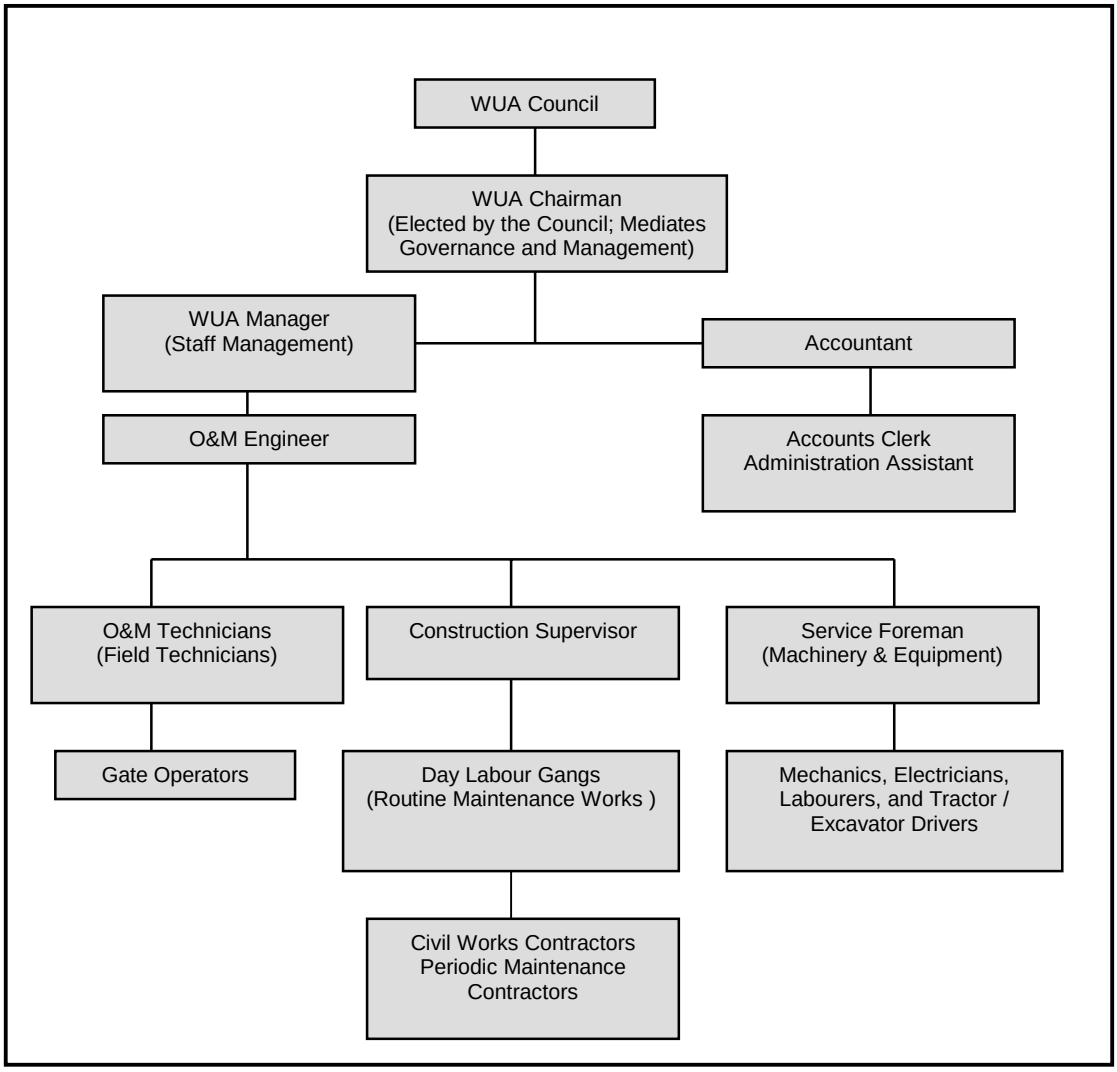


Figure 2.9-4 Structure of a fully developed WUA management body

According to the Manual for Water Users Association in Uzbekistan (IWMI et al, 2005) “without funds, the WUA cannot begin to function successfully. Therefore, the WUA should levy an Initial Membership Fee of $5-7 per member and $3-5 per year per member for each succeeding year. The WUA members should be informed of this, as well as the (separate) Irrigation Service Fee in advance of the WUA Formation Meeting. The Initial Membership Fee will provide the salaries and part of the operations and maintenance costs for the first few months of the WUA’s existence, after which the Irrigation Service Fee will cover these costs. Membership Fees for succeeding years should be placed in a Reserve Fund for WUA development and contingencies (such as floods, droughts, accidents, etc.)”.

Although pilot WUAs were established in consideration of all WUA principles such as the election of chairman and staff, the two level structure of a WUA, and the introduction of different fee types, pilot WUAs still face obstacles concerning their functioning that will be discussed in the chapters 5 and 6.

2.10 Summary and conclusion

To conclude, the chapter summarized the specific natural characteristics of Khorezm such as low rainfall, saline soil, and the necessity of leaching salt from the surface of the soil. In addition, initial information was given on the most widespread crops such as cotton, wheat and rice.

The central theme of the historical background of the Khorezmian irrigation management is, besides the topic of self-management characteristics, the transition from a less complex, labour intensive system to a new type of irrigation (surface/gravity flow, mechanized maintenance, centralized management, USSR concept). Soviets introduced a package of changes in terms of technical and managerial innovations. Nowadays a new transition is starting that is characterized by changes starting on the management side. It is probably not wise to neglect the technical side of transformation.

The main developments in history were not only the expansion of irrigation areas in the Soviet/Russian period (from 1929-1930), but also the enormous reduction in the labour input required for irrigation, which was at least as important.

This chapter presented the following essential historical phases:

1. Pre-Soviet/USSR period – characterized by labor-intensive work, introduction of small scale lift, and other technical, management-related and socio-economic features
2. Soviet/USSR period – characterized by technical progress, mechanisation, and collective farming
3. Post independence period – characterized by beginning transition

The third section of the chapter dealt with the concepts of WUAs that are presently used in Uzbekistan. There are unsupported (real) WUAs in the Republic, for whose establishment Khorezm is a pioneer throughout Uzbekistan, and there are pilot projects by international donors that provide best practices for real WUAs. The function and characteristics of the project WUAs will be discussed in chapters 5 and 6 of this thesis. These chapters present the findings of this investigation and contribute to the understanding of achievements and obstacles of real WUAs in Khorezm.

3 THEORY

Irrigation systems worldwide face similar challenges. The main challenge is that the public funds formerly available for system maintenance have become inadequate and hence many systems are deteriorating rapidly, leading also to a decrease in the productivity of irrigated agriculture (Biltonen, 2005; Hussain, 2005; Scheumann, 2002). In response, responsibility is shifted from the public to the private sector. This process also takes place in Uzbekistan, where Water Users Associations have been selected as an instrument to devolve responsibility for system maintenance to water users, building a bridge between state management and the farmers' responsibility. The new group of private farmers (*fermers*) that came into existence with the land reform is expected to share the costs of system management. How effective this change is for both the physical and financial management of irrigation systems, depends on many factors, including the functioning of the designated WUA. The effectiveness of WUAs obviously involves a large number of factors, such as the financial capacity of the Water Users Associations and the institutional arrangements.

This chapter discusses the theoretical motivation of this thesis. As mentioned in the introductory chapter 1, the objective of this thesis is to define those factors that influence success and failure of local water management in Khorezm. These "factors" will then be used to organize my discussion.

This chapter starts with the definition of success, giving a special emphasis to the social, political and economic context in Uzbekistan. This will not only help to understand the theoretical background *per se*, but will also be the key to understand the typical issues that are of influence to success or failure of Khorezmian water management. Although previous studies[26] addressing successful management extensively used key words such as "successful", "robust", and "sustainable", most authors do not clearly define what they understand by "success" itself. In order to compare findings from different studies, at least a common framework is necessary. This explains the motivation to define the term "success", not only for its use in this study, but also for the comparison of findings.

[26] Done by R. Wade (1994), J.-M. Baland & J.-P. and Platteau (1996), E. Ostrom (1990) and A. Agrawal (2001)

Institutional development and its functioning, from an economic or a sociological point of view, involve various aspects such as resource system characteristics, group characteristics, institutional arrangements, and external environment.

For their interpretation, these aspects will be linked and embedded in a suitable theoretical framework, which is based on the new institutional economics (NIE). In particular, contributions originating from a systematic approach by Agrawal will be considered. Agrawal (2001) analyzes and summarizes three important theoretical contributions by Wade (1994), Baland and Platteau (1996), and Ostrom (1990), which address successful self organized common-pool resource systems. Agrawal's work includes among other things three critical "attempts to produce theoretically informed generalizations about the conditions under which groups of self organized users are successful in managing their common dilemmas" (Agrawal, 2001, p. 1650). The reasoning, arguments, statements and conclusions of the different authors will be used to identify and introduce those promoting and obstructing factors that are keys to the well-functioning of a WUA. These aspects will also form the basis for the structuring of findings and their discussion in the subsequent chapters.

3.1 Definition of successful management of irrigation water resources

This section starts with an overview of the initial work by Ostrom, Wade, Baland and Platteau regarding the conditions of successful management, as they are considered the pioneers who phrased the success conditions of the commons. Following the summary of the criticisms, the section ends with a definition of success, which is then further used in the framework of the thesis.

Ostrom sees "success" in the robustness of common pool resource settings that exist over longer periods of time. Hence, she phrases eight design principles (see Table 3-1), all illustrated by long-enduring common pool resource institutions (1990). The main ideas behind the design principles are commitment of, and reciprocity between users. Seven principles refer to robust common-managed systems, whereas Ostrom proposes the eighth principle for larger and complex cases.

Table 3-1 Ostrom's design principles as identified with long-duration common pool resource institutions.

For CPRs:
1. Clearly defined boundaries
2. Congruence between appropriation and provision rules and local conditions
3. Collective-choice arrangements
4. Monitoring
5. Graduated sanctions
6. Conflict-resolution mechanisms
7. Minimal recognition of rights to organise
For CPRs that are parts of larger systems:
8. Nested enterprises

Source: summarized from Ostrom (1990)

Wade explains that a "successful organisation" is rooted in "successful collective action", which should have an effective set of rules. He argues that "we would not expect to find effective rules of restrained access organised by the users themselves when there are many users, when the boundaries of the common-pool resources are unclear, when the users live in groups scattered over a large area, when undiscovered rule-breaking is easy" (Wade, 1994, p. 215).

Since Ostrom's design principles show several parallels with Wade's facilitating conditions, Agrawal (2001) summarizes that "her (Ostrom's) first design principle refers to clearly defined boundaries of the common-pool resource and of membership in a group, and is in fact listed as two separate conditions by Wade" (Agrawal, 2001, p. 1652).

Ostrom's design principles and Wade's facilitating conditions mainly focus ***on local institutions, or on relationships within the local context***. They describe the general features of ***long-lived (successful) commons management.***

The conditions for successful collective action as defined by Baland and Platteau (1996) overlap in some ways the suggestions made by Wade (1994) and Ostrom (1990). Baland and Platteau emphasize topics such as the small size of user group, well-delineated boundaries of resources, homogeneity in groups, and internal enforcement mechanisms as significant for successful cooperation in groups. Baland & Platteau. (1996) were among the first authors to pay special attention to external forces

such as the external provision of appropriate economic incentives in situations involving conversation problems, external sanction systems in case of deficiencies in decentralized punishment mechanisms, and external assistance in cases where collective action is not rooted in long tradition cooperation. Also others criticize the lack of consideration of external forces in Wade's (1994) and Ostrom's (1990) contributions (Agrawal, 2001). Agrawal (2001) finalizes that "these three landmark works make evident some of the patterns in their conclusions. They all conclude that members of small local groups can design institutional arrangements to help manage resources sustainably" (Agrawal, 2001, p. 1653).

Wade (1994), Ostrom (1990), and Baland and Platteau (1996) persist in the importance of case studies and define the appropriate influencing factors of successful natural resource management. These criteria of influencing factors or necessary conditions will determine "success", although the explanations are merely descriptive as pointed out by Agrawal (2001). Although the latter summarizes and supplements the ideas of the four above mentioned authors, he does not define "success" itself either. An extended list of success criteria may help in the understanding of what success may be. In order to make outcomes comparable, it is necessary to define "success". This definition would then be independent of concrete case studies and generally applicable.

In the case of Uzbekistan, a state-driven, centralized system that was not able to manage the growing number of water users has characterized the irrigation water management before the introduction of WUAs in 2000. Thus, the definition of "success" in this thesis is:

Success means ***to bring functions from an insufficient quality level (lack of decision-making mandate, payments and conflict-resolving mechanisms) to a better one (authority in own rights and obligations, stable financial situation, aware members) and keep them there over a long period.***

In Uzbekistan, the situation we face in local water management is characterized by, for example, (a) unsatisfactory conditions of the irrigation system; (b) lack of machinery to maintain the system; (c) restricted decision-making mandates for WUAs, (d) restrictions on farmers' decisions. Therefore, success in this context means (a) improved water supply due to rehabilitation of the irrigation and drainage system; (b) appropriate leadership; (c) understandable rules and roles; (d) supportive external

institutions. A synthesis of the facilitating conditions identified by Wade, Ostrom, Baland and Platteau could be used as a guideline for the success criteria of WUAs in Uzbekistan.

3.2 Synthesis of facilitating conditions identified by Wade, Ostrom, Baland and Platteau

This section describes the synthesis of the conditions grouped by Agrawal. Agrawal divides the factors determined by the four above mentioned authors in categories. My discussion follows these categories and explains every category through its characteristics.

Table 3-2 gives Agrawal's summary of the conditions for successful local organization as identified by Wade, Ostrom, and Baland and Platteau, supplemented by a number of factors identified by Agrawal himself. This table is divided into six main sections.

Table 3-2 Critical enabling conditions for sustainability on the commons

1. Resource system characteristics	
(i) Small size	(RW)
(ii) Well-defined boundaries	(RW, EO)
(iii) Low levels of mobility	(AA)
(iv) Possibilities of storage of benefits from the resource	(AA)
(v) Predictability	(AA)
2. Group characteristics	
(i) Small size	(RW, B&P)
(ii) Clearly defined boundaries	(RW, EO)
(iii) Shared norms	(B&P)
(iv) Past successful experiences – social capital	(RW, B&P)
(v) Appropriate leadership – young, familiar with changing external environments, connected to local traditional elite	(B&P)
(vi) Interdependence among group members	(RW, B&P)
(vii) Heterogeneity of endowments, homogeneity of identities and interests	(B&P)
(viii) Low levels of poverty	(AA)
1. and 2. Relationship between resource system characteristics and group characteristics	
(i) Overlap between user group residential location and resource location	(RW, B&P)
(ii)High levels of dependence by group members on resource system	(RW)
(iii) Fairness in allocation of benefits from common resources	(B&P)

(iv) Low levels of user demand	(AA)
(v) Gradual change in levels of demand	(AA)
3. Institutional arrangements	
(i) Rules are simple and easy to understand	(B&P)
(ii)Locally devised access and management rules	(RW, EO, B&P)
(iii) Ease in enforcement of rules	(RW, EO, B&P)
(iv) Graduated sanctions	(RW, EO)
(v) Availability of low cost adjudication	(EO)
(vi) Accountability of monitors and other officials to users	(EO, B&P)
1. and 3. Relationship between resource system and institutional arrangements	
(i) Match restrictions on harvests to regeneration of resources	(RW, EO)
4. External environment	
(i) Technology	
(a) Low cost exclusion technology	(RW)
(b) Time for adaptation to new technologies related to the commons	(AA)
(ii) Low levels of articulation with external markets	(AA)
(iii) Gradual change in articulation with external markets	(AA)
(iv) State:	
(a) Central governments should not undermine local authority	(RW, EO)
(b) Supportive external sanctioning institutions	(B&P)
(c) Appropriate levels of external aid to compensate local users for conservation activities	(B&P)
(d) Nested levels of appropriation, provision, enforcement, governance	(EO)

Note: AA - Arun Agrawal, RW-Robert Wade, EO-Elinor Ostrom, B&P-Baland and Platteau.
Source: (Agrawal, 2001, p. 1654)

In the following, the synthesized conditions are discussed in detail and enriched with explanations of every category through its characteristics.

3.2.1 Resources system characteristics

In the first category ‘resource system characteristics’, the variables are size, boundaries and resource availability (see Table 3-2, section 1)

In the literature, resource system characteristics are frequently confused with group characteristics. The size of the resource system is not the same as the size of the group that manages the resource system. Theesfeld (2001) agrees with Ostrom that the “failure to distinguish between subtractability of the ‘resource units’ (water spread on one farmer’s field cannot be spread onto the field of someone else) and the jointness of the ‘resource system’ (all appropriators benefit from maintenance of an irrigation canal)

leads to confusion about the relationship of common pool resources to public resources (or collective resources)" (Ostrom, 1990; Theesfeld, 2001). Theesfeld refers to resource system characteristics as infrastructure settings that include features of the resource water, size/features of the resource system, top/tail-end village, gravity/pumped irrigation, and cropping patterns.

Agrawal (2001) also stresses that Wade (1994), Ostrom (1990), and Baland and Platteau (1996) pay too limited attention to resource characteristics and therefore add other variables, such as mobility of resources, stationarity and storage, and predictability of resource availability (Table 3-2). The mobility of wildlife, e.g., makes this resource less suitable to local management. Stationarity refers to the mobility of resources and storage concerns to "collect and hold resources". Agrawal (2001) points out that stationarity and storage also "have an impact on management because of their relationship to information". The predictability of resource availability has an impact on the ability of users to allocate resources and carry out activities that would expand their supply. The last variables seem to fit the conditions in Uzbekistan very well.

3.2.2 Group characteristics

The second category of factors that might influence the successful management of commons are the group characteristics (Table 3-2, section 2). Size, boundaries, social capital, interactions of the group members, and their homogeneity delineate the group characteristics.

Previously, the size of a resource system has been associated with the degree of its success (see e.g. (Baland and Platteau, 1996)). Also, smaller groups are more likely to engage in successful collective action, as postulated by Olson's (1965) fundamental work on the commons and collective action and as confirmed by others (Baland and Platteau, 1996, p. 773). According to Marwell and Oliver (1993, p. 38) even "a significant body of empirical research […] finds that the size of a group is related to its level of collective action". Yet, the slogan "The smaller the group, the stronger its ability to perform collectively" as underlined by Olson also met with criticism, e.g. by Hardin (1982), who points out ambiguities in his argumentation and suggests that the relationship between group size and collective action is far more complex than indicated by the size alone. He claims that the impact of group size on collective action is usually mediated by many other variables and may include the production technology of the

collective good, its degree of excludability, jointness of supply, and the level of heterogeneity in the group (Hardin, 1982, pp. 44-49).

Size still is the most debatable aspect. Plusquellec et al. (1985) explain that the size of service area, e.g in most Thai systems, was a "result of how the main system was designed e.g., the spacing between lateral canals, and not of conscious decisions about optimum size" (Plusquellec and Wickham, 1985, p. 49). Moreover, Plusquellec et al. (1985) share the opinion of Cernea et al. (1994), that in the discussion about size the criteria (small, medium, large) should be based both on the number of farmers and on the total area, not on the area alone, which indeed seems to make also a lot of sense in the Uzbek context .

Clearly defined roles are also considered to be of crucial importance as group characteristics. However, the specific definition of needed leadership roles depends obviously also on the size of organizations and on the range of the functions that WUAs are to perform (Cernea and Meinzen-Dick, 1994, p. 11). According to Meinzen-Dick (1999), leadership, e.g., may be formally designed by titles such as association president, vice president etc., or the leaders may be people who play an important role in initiating co-operation, without any formal title or designation (Meinzen-Dick, 1999, p. 16). Based on various experiences with WUAs, leadership is regularly named as a critical factor in the emergence and sustaining of co-operation among irrigated farmers (Meinzen-Dick, 1999, p. 16) or as some form of catalyst or focal point (Baland and Platteau, 1996). Leaders are generally required "to communicate with potential members about the organisation, and to provide assurance that if they participate, others will also – to create a critical mass of optimistic co-operators to launch successful co-operation" (Baland and Platteau, 1996, p. 334). The character of the leaders will play an important role in creating trust – or in undermining trust among the members, in case the leaders are seen to be in it for personal gain (Weber, 1966).

The structure of an irrigation organization such as the WUA should reflect local priorities (Meinzen-Dick, 1999, p. 17). Meinzen-Dick (1999) argues that in the case where outsiders contribute to an irrigation organization, it is crucial that they cultivate local leadership to ensure that local organizations do not become dependent on outsiders. Here, the shared norms of future members, regarding the understanding of on-going reform processes in irrigation management, could play an essential role.

Developing an understanding and acceptance of irrigation organizations at the grassroots level goes beyond the naming of a president or other officials. The selected administration needs to be endorsed by the members as well. This argument parallels Baland and Platteau's statement that "collective action is probably most satisfactory when it is led by relatively young, literate persons who have been exposed to the outside world and who can find some way of collaborating with traditional structures of authority and leadership"(Baland and Platteau, 1996, p. 345). The context of Uzbekistan reflects the argument, stressed by Meinzen-Dick, that top-down established WUAs have difficulties to clarify and strengthen their independence.

3.2.3 Relationship between resource system characteristics and group characteristics

The resource system characteristics and group characteristics overlap at various issues. Hence, a third group of conditions for sustainability on the commons, which describes this overlap between variables, is appropriate (Table 3-2). Variables that indicate interaction between user groups usually include their affiliation to the system, fairness in the allocation of benefits, and levels of demand.

Cernea et al. (1994) stress that there are four alternative principles "that may govern how water users arrange themselves into organized groups": hydrological, residential, social unit and ownership principles (Cernea and Meinzen-Dick, 1994, p. 6).

The first principle of membership affiliation is hydrological. Coward (1980) writes that the "for purposes of irrigation organisation critical unit is the "irrigation community", composed of field neighbours, and not the village community, composed of residential neighbours" (quoted in Baland and Platteau, 1996, p. 299). However, attempts to form irrigation organizations purely based on hydrological units have often experienced problems. A key weakness has been that without support from village leaders, WUAs lack the authority to enforce rules, collect funds and carry out other necessary tasks (Bruns and Meinzen-Dick, 1997, p. 5).

The next principle of membership recruitment in irrigation management is membership based on residential neighborhood or on social unit such as kinship. These principles are appropriate as a form of multipurpose social organization such as tribes, local government or functional co-operatives (Cernea and Meinzen-Dick, 1994, p. 6).

Regarding the residential neighborhood principle, Wade (1994) argues that the villages he studied in Andhra Pradesh, where water organization is based on the village rather than the outlet, were likely to be successful, and that the effectiveness of this pattern of collective action has been amply demonstrated by experience. Wade attributes this success to features of the social organization and to the economies of organizational scale, which were achieved by combining water and grazing (Wade, 1994, p. 213-214). Essentially, Wade's position is that existing social ties and authority structures assume greater importance in determining the optimal size of user groups (in this case, irrigation groups) than strictly ecologically defined parameters.

Another principle of membership is based on ownership. It can be the basis for membership or strengthen the ties within WUAs (Cernea and Meinzen-Dick, 1994, p. 7). This principle is meaningless if the irrigators' organizations do not own the irrigation infrastructure.

Regarding the irrigation organization, Uphoff (Uphoff, 1986) stresses that „the size as well as the structure of Water Users Associations should correspond to the hydrological features of the irrigation system". Indeed research observations and past experiences show that ideally farmer-run irrigation management organizations should be developed based on hydrological boundaries, not on village base or other administrative boundaries as is often the case (Uphoff, 1986). The establishment of an irrigation organization according to the hydrological principle complies with an integrated watershed and river basin management. In accordance with Sarmett et al. (2005), hydrological instead of administrative principles contribute to conflict reduction between up- and down-stream users. Although this is obviously seen as the ideal solution, the reality is recurrently different, e.g. in the case that the irrigation network to be managed has been established on other historical arguments. For operational reasons, e.g., it is desirable to decentralize water management to the level of hydrological boundaries, i.e. basins and sub-basins, but these boundaries seldom coincide with the administrative boundaries. Defining the most appropriate boundaries is a key challenge for which there is no simple answer (AfDB, 2000).

In contrast, Kurian (2001) stresses that in most cases, it may be appropriate to ensure that hydrological boundaries coincide with socially and culturally accepted boundaries in order to facilitate the organization of farmers. He insists to focus on the

possible combination of hydrological and sociocultural boundaries to enhance organizational sustainability, which is a very important issue when dealing with WUAs in Uzbekistan. The discussion at national level about the suitable "management unit"- administrative-territorial or hydrographical - continues even after the establishment of the majority of WUAs in the country.

Agrawal (2001) stresses that the scholarship on the commons suggests that a fairer allocation of benefits is more likely to lead to sustainable institutional arrangements. Adhikari (2001) supports the argumentation of Agrawal and believes that "the basic theme of economic reasoning in the domain of institutional changes is that of the propensity to achieve equity and economic efficiency in the allocation of resources". Yet this is a rather economic point of view, which is relevant but not the only perspective. In a social context characterized by highly hierarchical social and political organization, institutional arrangements specifying asymmetric distribution of benefits may be more sustainable even if they are entirely unfair. Agrawal (2001) referred to the caste system in India and to racial inequalities, which constitute "two familiar examples of such hierarchical social arrangements" (Agrawal, 2001, p. 1660).

Yet, there is consensus that the hydrological boundaries need to be set, that in the end they need to become sustainable, and that the right modus needs to be found to deal with potential pitfalls.

3.2.4 Institutional arrangements

There are three key aspects in any irrigation organization network: rules, roles, and recognition. Bruns (1999), Meinzen-Dick (1999), and Ostrom (1990) stress further that the rules, e.g., should be modified by the water users themselves. According to Ostrom (1990), "… rules have been established by the appropriators that have severely constrained the authorized actions available to them" (Ostrom, 1990, p. 43). Bruns (1999) mentioned that "imposing responsibilities without authority to allocate water is a recipe for failure" (Bruns, 1999, p. 92). In the case of irrigation, this means that the irrigation organizations and their members must be able "to make their own rules, resolve conflicts, enforce sanctions against those who violate rules, and be able to require payment, in money, labour or other suitable form, from those who benefit from irrigation services" (Bruns, 1999, p. 92). Meinzen-Dick supports the arguments of Bruns and points out that for sustainability, an organization must establish rules and

governance structures that are accepted and understood by its members (Meinzen-Dick, 1999, p. 18). Unless the rules are discussed and accepted or evolved by the members of an organization, they are likely to remain on paper only.

According to Meinzen-Dick (1999) another key aspect of irrigation organizations concerns roles. There are three basic types of roles that are important in irrigators' organizations: general membership, leadership and technical specialists (Meinzen-Dick, 1999, p. 16). Also, there has been a consensus that it is essential for the leaders of an organization to be accountable to their members. Hence, accountability to members should be an integral part of the organizational framework of WUAs (Cernea and Meinzen-Dick, 1994, p. 12). Accountability becomes increasingly important if roles become more specified (Meinzen-Dick, 1999, p. 19).

Yet, accountability has two dimensions: first, accountability to water users at the grassroots level rather than to government agencies and second, accountability to all WUA members or just a subset of these, such as large farmers or those in one part of the system (Cernea and Meinzen-Dick, 1994, p. 12). To ensure accountability, associations must be considered as belonging to the water users. When members and staff interact directly on a regular basis, further accountability mechanisms may not be required (Meinzen-Dick, 1999, p. 19).

Carroll (2001), for example, mentions the lessons learnt from Indonesian traditional irrigation groups – the *sobak* – where accountability is high because the manager is directly elected by the farmers and is from their neighborhood (Carroll, 2001, p. 51). Siamwalla et al. (2001) stress that "community based systems have rules of accountability: irrigation leaders serve small groups of water users; are selected by members; are subject to review and replacement; and receive some compensation from the members, mostly in kind" (Siamwalla, 2001, p. 188).

The recognition by outsiders of roles and rules existing within the organization is also considered to determine the functioning of a WUA. According to Meinzen-Dick (1999), "the roles and rules within the organisation are no doubt critical, but irrigators' organisations in irrigation systems do not operate totally on their own" (Meinzen-Dick, 1999, p. 20). Recognition by outsiders, especially government agencies, is therefore critical. Even small-scale, farmer-managed irrigation systems are affected by government policies and the activities of government agencies (Meinzen-Dick, 1999, p.

20). In large-scale systems, where government agencies continue to play a role in the management of higher irrigation system levels, the need for recognition is much stronger than in small-scale systems. When governments or their officials presume that only they have the right to set and administer the rules, the prospects of community-based organizations contributing towards their own governance will be seriously diminished (Marshall, 2004, p. 26). Even if an organization is able to agree on rules to govern itself in such a context, a disgruntled minority can appeal to the government to overturn the rules.

Therefore, a community-based organization is better off if the government acknowledges and supports the level of autonomy that it would be granted under the subsidiarity principle. This is the gist of the following design principle illustrated by long-enduring common pool resources (CPR) systems enunciated by Ostrom (1990:101): “The rights of [CPR] appropriators to devise their own institutions are not challenged by external governmental authorities”. She describes this aspect as a minimal recognition of rights to organize. Aside from not interfering with the rights of community-based organizations, governments can also play a positive role by supporting these organizations to assert their rights in an effective and fair way (Ostrom, 1990).

However, the above mentioned perspective is one-sided when it comes to institutional arrangements. It is clear that the government has some functions which cannot be taken over by private farmers. Nevertheless, farmers are the members of an irrigation organization and they should cope with the internal processes.

Governments can take on a key role in developing strategies for the evolution of organization systems. They can concentrate on policy formulation and analysis, on quality control and regulatory functions, and on targeting assistance and establishing mechanisms which should benefit farmers and the agricultural sector as a whole. They could also place more attention on resource-poorer farmers and the development of emerging sectors.

However, WUAs and WUA members should create their self-governing system.

3.2.5 Relationship between resource system and institutional arrangements

The characteristic of how restrictions on harvest are matched to the regeneration of resources refers to the **relationship between resource system and institutional arrangements** (Table 3-2**,** section 1.&3.)

Criticism of the variable "match restrictions on harvest to regeneration of resources" suggests that restrictions on the harvest of resources should be related to local conditions. Agrawal (2001) points out that this variable is better to be redefined by saying that "the lower (or higher) the level of withdrawal, the more (or less) likely would be success on management" (Agrawal, 2002, p. 49). Thus, if sustainability is threatened by high levels of withdrawals, this will weaken the institutions.

3.2.6 External environment

The external environment, in which WUAs have to manage their irrigation systems, obtains priority by the technology and obviously by the state (Table 3-2, section 4). Agrawal criticizes the set of factors identified by others (Wade (1994), Ostrom (1990), and Baland and Platteau (1996)) and criticizes their deficient attention to the external social, institutional, and physical environment. Instead, Agrawal suggests three key aspects for the sustainability of common-pool resource systems: demographic, market and state oriented. The demographic issue addresses the question of local migration, e.g. as a result of changes in demographic pressure or environmental degradation via population growth.

Markets play a critical role in the change of institutions, as well as community behavior in common pool resource systems. A better connection of local economies to large markets promotes increasing harvesting levels in order to increase cash benefits (Agrawal, 2001, p. 1656; Carrier, 1987; Colchester, 1994, p. 86-87). But of course the other side of the coin may be an increased competition or the request for increased quality, to mention only two aspects.

New technologies together with markets could trigger changes in existing resource management (Oates, 1999). The role of the state as a guarantor of property rights arrangements is central to the functioning of common-pool resources. New institutional arrangements could be crafted and implemented by communities and local user groups. At the same time, unspecified rights and the settlement of major disputes often cannot be addressed without the intervention of the state (Rangan, 1997).

Agrawal (2001) argues that his attention to markets, demography, and the state "addresses the nature and importance of contextual factors only to a partial degree" (Agrawal, 2001, p. 1657). The context of any study encloses more than just these issues. In the context of research, surrounding variables may be determined that remain constant for a given study, but not across studies. Studies of the commons "that examine institutional sustainability can afford to ignore the nature of markets and market-related changes, population and demographic changes, and the state and its policies only when these remain constant" (Agrawal, 2001, p. 1657).

3.3 Success factors for local water management in Uzbekistan

The extended set of conditions (Agrawal, 2001) for the sustainability of the commons will serve as the theoretical backbone of this thesis. Although this set of criteria is well suitable, the criteria still need to be adapted to the context of the Uzbek agricultural water sector. Subsequently, the factors influencing success or failure of local water management within the Uzbek context need to be determined. They will be based on the combined contributions from secondary sources on the commons and irrigation management. In addition, specific factors for the local Khorezmian irrigation management will be derived from the empirical studies carried out for this thesis.

There are various reasons that could predict the inadequateness of Agrawal's framework for the Uzbek situation.

First, his framework is elaborated for small-sized resource systems and group characteristics. Authors such as Wade (1994) and Baland and Platteau (1996) argue that a small size system is more likely to be successful than a large system. It has also been suggested (Grossman, 2000; Singleton, 1992) that with the privatization of land to individual farmers the setting was transformed into a smaller one. This, however, is not the case in the Uzbek context. The Uzbek irrigation system is a large irrigation system compared to the relatively small community based systems. With the progress of the agrarian reform in the past 15 years, the irrigation system has gradually turned into a large system inhabited by private farmers. Besides this, some variables in Agrawal's framework such as low levels of mobility do not fit the irrigation water resources that need to be dealt with in Uzbekistan. These variables are rather applicable to renewable resources than to irrigation.

Second, Agrawal's framework is a general framework that would need specification for practical use in any concrete context, including Uzbekistan. Hence, with respect to the social cultural frame conditions in Uzbekistan, the framework needs an adaptation to the social environment of the investigated region. In addition, this thesis investigates irrigation water and its management in Uzbekistan, thereby addressing completely different resources than those used to built up the theoretical background. This in particular applies to factors such as matching restrictions on harvest to regeneration of resources, low levels of articulation with external markets or gradual change in articulation with external markets, and appropriate levels of external aid to compensate local users for conservation activities.

Third, decentralized governance in the sense of self-rule-making principles is not the present reality in Uzbekistan. It is only possible to comment on the discrepancies between the Uzbek case and the decentralized governance cited in the literature.

But if decentralized governance cannot exist in Uzbekistan, neither now nor in the future, why was the discussion about community-based or farmer-run resources management started in the first place? For example, a local decision-making authority (on WUA level) is presently lacking while the former nomenclature and other elite groups are still active and predominant in the decision-making process. In addition, Uzbekistan has a successful history in terms of social networking. Hence, also structures such as Water Users Associations (WUAs) and Fermer and Dekhkan associations (FDAs) are established based on the old complex structures – kolkhozes or sovkhozes. There is close co-operation between WUAs and FDA leaders regarding land and water management. Thus, Uzbek WUAs have rather special internal leadership mechanisms compared to the forms of self-governance described by Agrawal. This difference is important to have in mind when judging WUAs in Uzbekistan based on Agrawal's theoretical framework.

Fourth, Agrawal's framework does not have a process element and does not apply to the Uzbek situation, that is, Uzbekistan seems to find itself in a very different condition. The land and water sector, particularly in WUAs, is in flux. All of the above mentioned pioneer-authors such as Wade, Ostrom, Baland and Platteau, and Agrawal refer to surroundings that have settled over decades, such as the Indian case described

by Wade or the cases from Switzerland and Spain mentioned by Ostrom. In these cases it is reasonable to speak about robustness and durability.

Taking into account the differences and gaps, the factors influencing success or failure of local irrigation management in the Khorezmian context need to be determined and fit to the above mentioned theoretical framework of Agrawal (2001). The selection of these factors was based on empirical field research findings and readings. It reflects the state-of-the-art problems that hamper Uzbek local water management in its functioning.

Given that some variables mentioned in the framework are completely new for the settings in Uzbekistan, several need to be adapted to the context of this investigation. The variables are newly defined as follows:

As a first aspect, "**predictability"** (see Table 3-2, 1(v)) can be adopted. However, Agrawal refers in his explanation to the predictability (or unpredictability and volatility) in the flow of benefits from a resource. In case of water management, we speak about predictable water supply due to a proper system.

From the **"group characteristics"** (Table 3-2) in Agrawal's framework **"shared norms"** (Table 3-2, 2 (iii)), **"past successful experience - social capital"** (Table 3-2**,** 2(iv)) and **"appropriate leadership"** " (Table 3-2, 2 (v)) can be used in the Uzbek context. Other aspects listed under the category "**group characteristics**" are not relevant to the current situation of WUAs in Uzbekistan, because WUAs in Uzbekistan are neither small (200-300 farmers) nor will they be smaller in the future, rather bigger; boundaries are defined formally and there are no problems related to boundaries. There is a certain interdependence among group members due to the unsolved management units of WUAs in Uzbekistan. However, this issue fits more in the category "**relationship between resource system characteristics and group characteristics**".

Baland and Platteau stressed that a large group is likely to be successful if the group shares common norms under a well-recognized authority. In the case of Uzbekistan, post-soviet structures of agricultural enterprises create a shared interest among group members regarding agro-technical activities and everyday interactions in agriculture. Even after the dismissal of the collective farms, the 'skeleton' of the kolkhoz system remains intact. In this context, the appropriate leadership seems to be - against Baland and Platteau's assumption - local traditional elites, who are educated and

accepted by the members, rather than leaders who are "young, familiar with changing external environments".

Regarding **"past successful experience - social capital",** Lam (1999) refers to Ostrom (1992) and points out that the construction of physical capital and the development of social capital are intricately related and should not be considered as two isolated domains (Lam, 1999; Ostrom, 1992). Lam stresses that attention should be paid to the questions of how institutions should be developed and designed to support the maintenance of engineering infrastructure and of how the social capital that has already existed in the local community can be better utilized (Lam, 1999, pp. 288-289).

The category **"relationship between resource system characteristics and group characteristics"** (Table 3-2, 1.& 2.) characterises problems in water supply in irrigation management at the local level.

The variable "**overlap between user group residential location and resource location**" fits the context of Uzbekistan, because there are frequent problems with the local management regarding the membership recruitment at the local level. This concerns especially those locally managed organizations that are based in already existing structures. The issue of locally organized water management ("**management unit**") gains importance in Uzbekistan. As mentioned in chapter 2.8, the concept of management units, either hydrological or administrative, is debatable in Uzbekistan. Before the year 2000, WUAs in Uzbekistan were created within the framework of dismantled shirkats. Since 2003, there was a trend to establish WUAs according to the canals. The selection of one or another procedure depends on the setting of the irrigation system and on political and economic changes in the particular environment.

The next variable that fits the Uzbek context is "**fairness in allocation of benefits from common resources**". In the case of irrigation management, the classical problem of inequity is between the head and tail reaches of all levels of the irrigation system. This situation is commonly encountered in present day operations of irrigation systems, revealing different degrees of severeness (Bandaragoda, 1995; Bhutta, 1992; Kuper, 1993; LASHARI, 2000; Murray-Rust, 2000; VISSER, 1998).

The next problem of fairness concerns the payment of services (in the sense of operating costs, not benefits). Local irrigation management based on farmer participation is unimaginable without a "return service" by water users. The "return

service" can be provided in form of work (Cernea and Meinzen-Dick, 1994; Yoder, 1994), payment in kind (Uphoff, 1986) or money. All of these forms occur; however in large-scale systems cash becomes more important, involving monetary contributions for organization and operation, e.g. for salaries and purchases of materials and equipment (Uphoff, 1986, p. 68). According to Svendsen (2001) "the fairness of fee establishment and assessment depends on a number of things, including the competence of the system managers and, especially, the oversight and guidance provided by the governing body. The adequacy of the established fees depends on the time horizon of the governing body and the incentives they face. Their time horizon, in turn, depends on such things as the perceived security of land tenure, the perceived security of access to water, the profitability of agriculture, government policies and practices allocating financial responsibility for future rehabilitations, and whether they expect their children to follow them into farming.

The most basic requirement for effective fee collection is to be seen in sound "**institutional arrangements**" (Table 3-2, 3) such as administrative and record-keeping systems. Additionally, it is important for irrigation organizations to have the intrinsic ability to set their own rules for the collection and management of user fees, which Ostrom (1990) refers to as "collective-choice arrangements". Farmers must be able "to make their own rules, resolve conflicts, enforce sanctions against those who violate rules, and be able to require payment, in money, labour or other suitable form, from those who benefit from irrigation services" (Bruns, 1999, p. 92). Svendsen even broadens this issue and stresses that "land holding size and water use figures must be accurate and comprehensive. Bills must also be accurate and must be prepared and distributed in a timely way. Missed payment deadlines must be followed up quickly with additional requests for payment". Often, the failure of an irrigation organization administration to generate fee-based income results from its failure to collect competently rather than from the farmers' refusal to pay.

The enforcement rules should be comprehensive (Baland and Platteau, 1996; Ostrom, 1990; Wade, 1994). According to Svendsen (2001), irrigators will be much more likely to respond to incentives to pay if they believe that an unpleasant penalty will ultimately be imposed if they fail to pay. This has the effect of reducing the need to actually apply the penalties. The penalties available to service providers vary. Most of

the providers can impose financial penalties by increasing the interest rates on the amount owed for service if the payment is not received on time. All can expose late-payers or non-payers to social shame by publicizing names and arrears. Service providers, such as irrigation associations, can also cut off water to non-payers. However, because of the severity of this measure and its impact on the farmers livelihoods, there is often considerable reluctance to apply it. Depending on their legal status and on the measures available by law, some service providers can also apply sanctions through the court system.

An irrigation organization has a scope of "**external conditions**" (Table 3-2, 4) that influence its existence and functioning. Baland and Platteau (1996) point out the supportive external sanctioning institutions. One of the key aspects of external conditions is the legal framework of local water management. Frequently, the existing laws cannot provide a complete legal status for newly established local water management organizations. "They often start their activities without being supported by a law defining how such associations (organisations) acquire a legal identity" (Abernethy, 1996, p. 102). Abernethy (1996) points out that "such a law should also define the scope of rights and duties of such associations, including rights to representation in higher levels of water resource management. The law should also specify the scope of the association's authority to enforce its own decisions" (Abernethy, 1996, p. 102). Wang (2004) argues that „to achieve self- governance, the law must specifically limit the potential intrusion into the autonomy by other organizations, especially the governmental branches, so as to achieve self-governance on the part of participants by freeing them from any unnecessary outside interference and control".

Another key aspect is "**recognition of roles and rules within the organization by outsiders**" (supplemented aspect, not in the Table 3-2). There is no doubt that the roles and rules within local farmer-run organizations are crucial, but no organization operates totally on its own (Baland and Platteau, 1996; Chaudhry, 1997; Meinzen-Dick, 1999; Merrey, 1996; Ostrom, 1990; Ostrom, 1992). This especially concerns cases within larger irrigation systems, where it is impossible to exclude the levels of resource management located above. For instance, since the upper levels of the irrigation and drainage system belong to the state, improved irrigation conditions at

WUA level (e.g. clean canals for more predictable water supply) cannot guarantee that sufficient water will be distributed among farmers.

According to Vermillion (2004), the sustainability of WUAs increasingly depends on their relationships with external actors, which is primarily due to increasing economic specialization, population density, and interaction among resource users (Vermillion, 2004)). A partnership of mutual accountability between WUAs, the government, third parties and consumers (**the principle of nestedness** " (Table 3-2, 4 (iv)(d)) (Lele, 2004; Ostrom, 1992) is needed to enable irrigation to be both productive and sustainable. This variable of nestedness is linked to the variable that characterizes Uzbek agriculture today. As a "dirigiste" state, the Uzbek government still controls many levels of the national economy and has failed to abolish the state order on strategically important agricultural crops as a main source of foreign dividends. The state persists in the fulfilment of state plans without any consideration of irrigation water availability. There is a restriction on farmers' decisions that hampers the development of farmer movements and the success of local water management among other things.

To conclude the chapter, the factors influencing success or failure of local water management in the Uzbek context will be summarized within Agrawal's framework according to their affiliation to the respective group.

1. Resource system characteristics

(i) Predictability of water supply due to a proper system

2. Group characteristics

(i) Shared norms

(ii) Past successful experience – social capital

(iii) Appropriate leadership

1.& 2. Relationship between resource system characteristics and group characteristics

(i) Overlap between group residential location and resource location – Unit of management

(ii) Fairness in payment of services and water supply

3. Institutional arrangements

(i) Rules and roles are simple and easy to understand

(ii) Ease in enforcement rules

4. External environment

(i) State:

(a) Supportive external institutions

(b) Embeddedness of appropriation, provision, enforcement, governance

(c) Restrictions on farmers' decisions

The factors determined in this thesis represent the combination of internal structure and external conditions, which are interrelated in the Uzbek context due to the "dirigiste" state. I assume that some of the defined factors are not only specific to Uzbekistan, but may also characterize other transformation countries. However, these factors will also form the basis for the structuring of the findings and their discussion in the subsequent chapters.

4 METHODOLOGY

This chapter describes the methods that were used in the field research. Three main methods were applied in this field research: expert interviews, a case study approach, and a benchmarking approach. This chapter explains which methods were used for which purpose. The first section explains the expert interviews, which were used to collect initial information about the establishment of WUAs and their current working as well as about the ideal concept and necessary pre-conditions of WUAs. The next section deals with the case study of real (unsupported) WUAs, which included a survey based on a standardized questionnaire. The third section describes the benchmarking approach used to analyze pilot projects of international donors. It gives information about the selection of projects and their main achievements, which provide the basis for the benchmarking of the real WUAs. The chapter finishes with a summary of the applied methods and a description of their place in this research.

4.1 Expert interviews on evaluation of WUAs

The first step of the survey was to study the development of WUAs in the Republic of Uzbekistan. In order to obtain an impression of how WUAs in Uzbekistan have developed over the last two to three years[27], I started to collect information on WUAsby conducting semi-structured interviews with experts in Tashkent and in the Khorezm Region. The respondents were local and international scientists and officials who are in some way related to WUAs and irrigation management.

Three blocks of questions were asked in each interview: (1) why and how have WUAs in the Republic of Uzbekistan been established?, (2) how should WUAs be shaped?, and (3) is it good to have WUAs, and why?

The first block of questions concerned the reasons for the establishment of WUAs as well as their current working. The second block aimed at the experts' perspectives on the possible shape of a WUA. The intention was to find out about the original concept of WUAs, their roots and initiators. The last group of questions addressed the future of WUAs, their opportunities for improvement, and their importance.

[27] The data for my master thesis about WUAs was collected in the years 2001-2002.

Within a month, 19 interviews were carried out with representatives from IWMI, NRMP[28], UNESCO[29], MAWR, *ICWC*[30], SANIIRI and the Parliament.

Findings from the interviews can be roughly divided into the eight following categories: finance, leadership, social condition and mentality, capacity building, technical conditions, legislation, organization, and policy.

Figure 4.1-1 Expert interviews (Own presentation, 2003-2004)

4.2 The case study approach

The data for the research was collected by using qualitative methods, which focused on the *fermer*s' perceptions of the WUA as a self-governance organization. The data was collected during two stages of field research: from November 2003 to March 2004 and from November 2004 to January 2005.

The case study approach contains a standardized survey of four selected WUAs. The case selection itself will be described in detail later in this chapter.

The standardized questionnaire proved to be an appropriate instrument to record the *fermer*s' unbiased opinions about WUAs. Based on new and old data[31], a strong influence of officials and other key persons was observed in the region. Therefore, the aim was not to allow present officials to bias the data collection, neither by actively participating in group discussions and even assuming the moderator's role, nor by social desirability. Before going into details, it is necessary to explain the principle of attitude questions that were used for the survey. The questionnaire is built

[28] National Resources Management Project donated by USAid

[29] Colleagues of ZEF-UNESCO-Project

[30] Interstate Coordination Water Committee

[31] From my Master thesis (2002).

up as a group of questions that are coordinated with each other thematically. So, for instance, the main question is “Why do you pay user fees?”. In order to gain complex information about the actors’ perceptions, the answers to this question cover all possible aspects such as “The WUA is our main organization. It is necessary to maintain it with our own means and my user fee is an opportunity to contribute to the common business!”, “I can take water from the canal and do the cleaning of the canal independently”, “I would like to, but I don’t have money.” This is detailed in reference to Figure 6.1-4 in chapter 6.

Figure 4.2-1 Survey (Own presentation, 2003-2004)

In addition to the questions derived from literature, other questions were formulated based on the author’s primary observation. Informal talks and interviews were conducted with water users, WUA chairmen and staff, regional officials, and chairmen of other organizations connected to the WUAs, such as *FDA*s and *MTP*s. These interviews provided some ideas for further possible answers in the questionnaire, e.g. regarding the educational work on the WUA and its functioning as a local water management organization, carried out by different players such as chairmen and representatives of governmental organizations.


Figure 4.2-2 Interviews with local representatives in Khorezm (Own presentation, 2003-2004)

The selected WUAs represent all types of WUAs in the research region (Table 4-1). The WUA "Mirob" was one of the first WUAs in Uzbekistan and represents an experimental (but not pilot) WUA. Another two WUAs ("Buston "and "Yangibazar") were established in accordance with the hydrographical principle based on the complete transfer of *shirkats* to *ferms*. The forth WUA ("Shikhyab") was created in 2000 in compliance with the Presidential decree. It collapsed in 2001 but was re-established with the *fermer*s' support in 2003.

Table 4-1 Investigated WUAs on the local level

№	Rayon	WUA's name	Members	Served area, ha	Respondents
1	Khiva	"Mirob"	90	1426	20
2	Yangibazar	"Buston"	239	5043	25
3	Yangibazar	"Eski Daryalik"	93	2822	21
4	Kushkupir	"Shikhyab"	148	1841	23

In order to carry out the field research with less influence and bias from the officials and WUA leaders, as a first step, a meeting with the WUA chairmen was organized to explain the research goals. Furthermore, they were asked for their approval regarding the methods of research. The meeting was successful and the investigation received a go-ahead.

Figure 4.2-3 Meeting with WUA chairmen (Own presentation, November, 2003)

The next step was to select approximately 40 potential respondents per WUA. This was done by using the stratified example method with the member lists of all selected WUAs. The method was based on the three indicators ‘farm size’, ‘location at the canal’, and ‘type of agricultural activity’, which had been developed with the members lists.

Figure 4.2-4 Gathered data about WUA members

The potential respondents were invited to an awareness seminar, which was organized in each of the selected WUAs. These seminars had been asked for by the WUA chairmen at the previous meeting. From every selected WUA at least 20 *ferm*s

were chosen, based on their location with respect to irrigation water access (downstream, mid-stream or upstream), kind of activity (agriculture, gardening or livestock farm) and size of farm (small, medium or large).

The total amount of respondents amounted to 89 *fermer*s. The following table shows the groups of respondents taking into account the size, location, and specification of their farms (Table 4-2).

Table 4-2 Respondents selected according to location at the canal, farm size and specification (2003-2004)

Farms	Frequency
Upstream; lower than 9ha farming	1
Upstream; lower than 9ha silk production	1
Upstream; from 10 to 14ha farming	3
Upstream; from 10 to 14ha farming and gardening	1
Upstream; from 15 to 28ha farming	6
Upstream; 28 and above ha farming	3
Middle; lower than 9ha farming	3
Middle; lower than 9ha vegetable-growing	1
Middle; lower than 9ha gardening	3
Middle; lower than 9ha animal production	1
Middle; lower than 9ha farming and gardening	1
Middle; from 10 to 14ha farming	3
Middle; from 15 to 28ha farming	3
Middle; 28 and above farming	10
Downstream; lower than 9ha farming	8
Downstream; lower than 9ha gardening	1
Downstream; lower than 9ha animal production	1
Downstream; lower than 9ha farming and gardening	1
Downstream; from 10 to 14ha farming	13
Downstream; from 15 to 28ha farming	10
Downstream; from 15 to 28ha farming and gardening	1
Downstream; 28 and above ha farming	7
Downstream; 28 and above farming and gardening	1
Total	89

In order to use the triangulation[32] method, additional activities such as group discussion, role-playing games, and social mapping were included into the research. They addressed, for example, the general meetings of water users and their intensity.

[32] Cross-check of the collected data

Supporting information could be provided by the minutes of a meeting. The availability of minutes was controlled by the author.

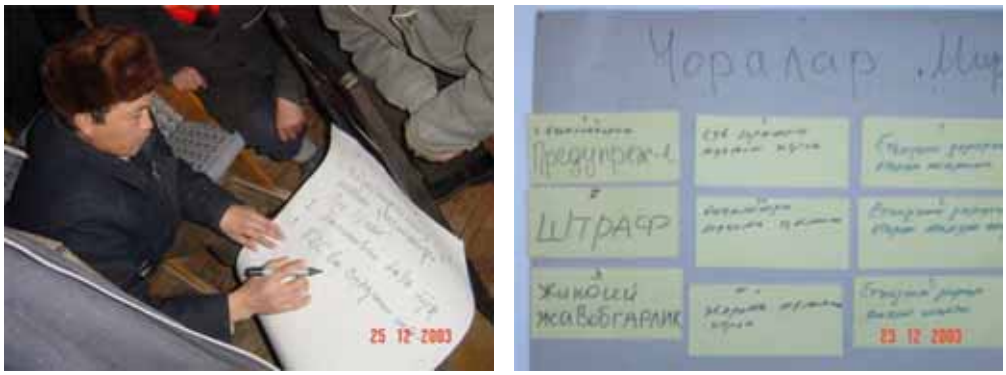


Figure 4.2-5 PRA exercises (Own presentation, December2003-Januar 2004)

4.3 The benchmarking approach

The benchmarking approach was used to obtain an impression of WUAs in other regions of Uzbekistan which are supported by international organizations, and to compare them with Khorezm. Such pilot projects are often favored by the government and represent experiments undertaken with special inputs, management, care, and attention (Chambers, 1988). The best practices of WUAs among pilot projects were identified due to primary observation and informal discussions with members as well as project reports.

At the national level, the study areas were selected in accordance to their regional location in Uzbekistan. They included two pilot WUAs linked to a USAid project on natural resources management, one WUA linked to an IWMI-*ICWC*[33] project on integrated water management, and one WUA funded by ADB as part of the so-called Ak-Altin Agricultural Development project. Two of the WUAs (USAid and IWMI) are located in the Fergana valley and the other two (USAid and ADB) in the Syr Darya Region (Table 4-3).

[33] Interstate water coordination committee

Table 4-3 Summary of the investigated pilot projects (Own presentation)

Nr.	Region	International Donor	Project's title	WUA's name
1	Fergana Valley, Kuva Rayon	IWMI	Integrated water resources management (IWRM)	WUA "Akbarabad"
2	Fergana Valley, Ezovon Rayon	USAid	Central Asia Natural Resources Management Program (NRMP)	WUA "Ak Altin"
3	Syr Darya Oblast, Ak Altin Rayon	ADB	Ak Altin Agricultural Development Project	WUA "Vodiylik Suvchi", WUA "Suv Agro"
4	Syr Darya Oblast, Mirzaabad Rayon	USAid	Central Asia Natural Resources Management Program (NRMP)	WUA "Kushkulak"

Before the collection of information at pilot project level, several interviews were held in Tashkent with representatives of international donors such as IWMI[34], ADB[35] and NRMP[36] (USAid) as well as with local specialists on WUAs.

As mentioned in section 2.9, two types of pilot projects are to be distinguished: development aid projects and loans. Development aid projects establish the proper conditions for the functioning of the new structure and attract the target group into the establishment process. Loan projects oblige the target group to repay the investments within the next five years.

This variety of the pilot projects was important for collecting different views on design, implementation and every-day interaction. The survey for the benchmarking approach was based on a modified standardized questionnaire.

In conclusion, it can be said that the fundament of the survey was the standardized questionnaire, whereas the expert interviews served as an initial source for information and also for the triangulation. The benchmarking helped to collect additional data about pilot projects outside of Khorezm and their achievements.

[34] International Water Management Institute

[35] Asian Development Bank

[36] Central Asia Natural Resources Management Program

5 DESCRIPTIVE RESULTS

This chapter starts with an analysis of the expert interviews, which provided information about the emergence of WUAs in Uzbekistan. In order to describe the embeddedness of Uzbek WUAs in the agricultural system, the development of the WUA concept will be delineated. In addition, the relation between WUAs and other economic organizations will be addressed. The second part of the chapter deals with the characteristics of pilot project WUAs in Fergana and Syrdarya and unsupported WUAs in Khorezm. Their description will focus on how they are perceived by their members. The analysis will give a general characterization of supported and unsupported WUAs without going to every single case.

5.1 Embeddedness of WUAs in the whole agricultural system

The reform processes in the agricultural sector of the Republic of Uzbekistan led to several structural and institutional changes. Complex hierarchical structures are more and more modified by new elements, e.g. collective farms are replaced by private *fermers*. The establishment of a WUA is a burning issue, which triggers discussions at different levels of Uzbek politics, involving international expertise, scientists, and local officials and stakeholders. WUAs have obtained a place in the strongly hierarchical structure, which is still controlled by the government. The embeddedness of WUAs in the whole system can be illustrated by their development as described by different actors who contributed to the emergence of WUAs in Uzbekistan.

5.1.1 How were WUAs designed?

5.1.1.1 Selection of proper structure: WUA vs. other potential organisations

In the interviewees' opinions, international experience has contributed a lot to the establishment of WUAs in the Republic of Uzbekistan. Besides neighbouring states like Kazakhstan or Kyrgyzstan, countries such as Turkey, Mexico, Indonesia, Italy, China, Japan, and France were mentioned.

The naming of certain countries can be explained by the experience of the interviewees, who have different backgrounds and different fields of activity. For example, Italy, Turkey and Kyrgyzstan were mentioned by an employee from the Ministry of Agriculture and Water Resources. During the interview, it turned out that before WUAs in the Republic of Uzbekistan had been established, the Ministry organized excursions to Italy and Turkey in order to learn about international

experiences in water management issues. The Kyrgyz experience with its extraordinary reforming steps (land privatization, market economy, introduction of WUAs, etc.) is well-known in the Republic of Uzbekistan. The experiences of Mexico and Indonesia were pointed out by experts who are working in a joint project with the IWMI. The experiences from China and Japan were mentioned because of the number of donors from and the cooperation with these countries. These donor activities consist in educational programs and trainings abroad. The participants of these trainings are mostly employees of scientific institutes. After the trainings there is some kind of multiplication effect. In weekly meetings at the institutes, the participants inform about their trips and the newly gathered experience and also submit their reports.

5.1.1.2 Causes of WUA establishment

The respondents explain the reasons for the establishment of WUAs in the Republic of Uzbekistan by using similar arguments. Three out of 19 interviewees mentioned the collapse of the Soviet Union and linked it to the appearance of a great number of water users instead of collective farms, which then resulted in the creation of WUAs.

> *"After the collapse of the Soviet Union, the water management was chaotic. The collective farms were reorganized into ferms. The irrigation service, which consisted of a water master, a specialist in land-reclamation, and an irrigator, became unnecessary. The question about responsibilities for water distribution among fermers arose. Consequently, the transfer to Water Users Associations was reasonable"*

This is how A. Alimjanov[37] from SANIIRI describes the reasons for the establishment of WUAs. It is quite plausible that the government of the Republic of Uzbekistan had difficulties to manage water resources at the local level after the breakdown of the Soviet Union. In the Soviet Union, the whole large-scale irrigation system had been adapted to huge collective farms (*kolkhozes*). The first steps of the reform involved the re-design of *kolkhozes* into *shirkats*. Until today, there is uncertainty about what distinguishes collective farms from *shirkats*, except for the

[37] Source: own interview

name. Rasanayagam (2002) suggested the following explanation of the establishment of *shirkats*: "The *shirkat* system will in effect convert the *kolkhoz* into a hierarchy of 'mini-*kolkhozes*', each responsible for its own delivery plan. These reforms, however, are largely cosmetic and the *kolkhoz* continues to act as a state institution" (Rasanayagam, 2002).

Over time, some *shirkats* became unprofitable and were abolished. The land of these abolished *shirkats* was handed out to the farmers. This way, in 1990, the first *ferms* were established. Under these conditions, there was need for an organization, some kind of bridge between state and water users, in order to manage water resources at the local level. However, the financial condition of the farms was hampered due to the fact that the newly established farms inherited the debts from the *shirkats*. These debts were a burden for the *fermers* who just started to adapt to the transformation from centralized command to market economy. After issuing crucial presidential decrees and resolutions concerning reforms in the water sector, the Republic of Uzbekistan decided to establish the *BUISes* to facilitate the establishment of new WUAs in accordance with the hydrographical principle.

The next aspect regarding the **design** of WUAs is the substitution of *shirkat* water management by cooperatives, joint-stock companies or Water Users Associations. Previous experiences such as the transformation of *kolkhozes* show that it is crucial to change the functions of an organization, not only its name. The new local organizations for water resources management were named 'Water Users Associations' because of the following reasons. All three types, cooperative, joint-stock company and Water Users Association, came up in connection with the experience of neighbouring Central Asian Countries. For example, in Kazakhstan, WUAs are built up as cooperatives. For Uzbek conditions this is not suitable, because cooperatives have to pay taxes. On April 14, 1999, a law concerning non-profit and nongovernmental organizations was passed in Uzbekistan (Uzbekistan, 1999). According to the taxes codex from 1999, nongovernmental organizations are relieved from any taxes such as profit tax, value added tax, assessed tax etc. Their activities are financed by membership fees.

5.1.1.3 Legal basis of a WUA

The legal status of WUAs at the national level is still not clear. The crucial documents for the transformation in water management are presidential decrees[38]. According to these decrees the following resolutions of the Cabinet of Ministers were issued: № 290 from June 28, 2003 "Concerning the perfection of an MAWR organization", № 320 from July 21, 2003 "Concerning the improvement of water management organizations" and № 476 from Oct. 30, 2003 "Concerning arrangements for the achievement of farm development conceptions for 2004-2006". At the ministerial level, a separation of agricultural units and water resources units took place. According to the Resolution № 290 from June 28, 2003, the structure of the MAWR was rethought and supplemented by additional elements such as *BUIS*, *UIS*, and management organizations for main canals. The establishment of *BUIS*, mentioned in section (2.7) means that the transfer to the hydrographical management of irrigation water resources takes place at the national as well as at the regional levels.

The resolutions of the year 2003 were followed by a discussion about the unit of management. During the interviews, very contradictory opinions were expressed concerning the hydrographical principle of WUA establishment. On the one hand, the hydrographical principle breaks social ties and dismantles fixed communities (interview with N. Mirzaev), on the other hand "the new principle of water management brings water users near to efficient water management" (interview with I. Kalandarov). It could be assumed that the contradiction is due to the fact that the latter opinion was expressed by an official, who is working in national governmental structures (Parliament), and the first opinion by a scientist, who is working for a local scientific institute and the *ICWC*/IWMI project. This latter expert has a strongly marked opinion due to his activities in the IWMI project. Although N. Mirzaev is an engineer, he has an interest in the social aspects of reforms in the irrigation sector of the Republic of Uzbekistan and has published many articles e.g. in local newsletters. To him, the suitable principle of WUA establishment and membership recruitment for Uzbekistan would be the residential principle.

[38] №УП-3226 from March 24, 2003 "Concerning the most important extension directions of reforms in agriculture" and №УП-3342 from Oct. 27, 2003 "Concerning the development conception of farms for 2004-2006"

In my opinion, the pre-condition for the hydrographical principle is the mutual recognition among water users. The evidence that strengthens this statement was found during field research in the surveyed WUAs of Yangibazar (Box 5.1.1-1). The respondents know only members of their old *kolkhoz* or *sovkhozes*. They do not recognize that a WUA can also include members from other former *shirkats*.

Box 5.1.1-1 Hydrographical principle of WUAs' establishment in the case studies

Buston
The WUA "Buston" covers the whole territory of the former shirkat "Uzbekistan" (50% of the WUA) and part of the reorganized shirkats "Khamza" (30% of the WUA) and "Buston" (20% of the WUA).
Eski Daryalik
The WUA "Eski Daryalik" covers part of the territory of the former shirkat "Buzka'la" (46% of the WUA) and part of the shirkats "Bogolon" (37% of the WUA) and "Sanjar" (17% of the WUA).

Source: Own investigation, 2003

Apart from the issued presidential decrees and resolutions of the Cabinet of Ministers, there is no law concerning WUAs in Uzbekistan. Such a law is discussed at different governmental levels: in the MAWR, in Parliament and in the Cabinet of Ministers. However, there is no clarification about the responsibilities of these entities regarding the new legislation on WUAs. It is still unclear whose version will be accepted. The Water Resources Department in the MAWR and the Committee on Agronomy, Water Resources and Food Issues in Parliament are responsible for the elaboration of a draft concerning WUAs. The Cabinet of Ministers also submits a draft of the law and controls the final decision.

At present, the legal basis for WUAs consists in the 10th article of the Water Law (1993), the resolution № 8 from Jan. 05, 2002 "Concerning arrangements for the reorganization of agricultural enterprises in *ferms*" (2002) and the article № 77 of the Civil Code (1997) of the Republic of Uzbekistan about the establishment of associations[39]. M. Pinkhasov, employee of *ICWC*/IWMI, mentioned in his interview: "For their real functioning, WUAs don't need a gentleman's agreement[40], but a well elaborated legal basis".

[39] In common meaning

[40] Gentleman's agreement means conditional consent

At the regional level, there are other obstacles and challenges. Even by-laws and contracts on water supply in WUAs did not receive any legal back-up. The lack of legislation on WUAs hampered their activities. The farmers in the Republic of Uzbekistan are not legally trained and do not orient their actions to the law. Many farmers have not even read the actual water law or by-law of their WUA. Existing legal documents on the activities of WUAs should be used to convey the rights to water and land. Since the key organizational documents of WUAs in Uzbekistan such as by-laws and contracts between WUAs and their members were elaborated and prepared by either the Water Resources Department in the Ministry of Agriculture and Water Resources or by the responsible employee of the *Oblselvodkhoz*, at the regional level, the implementation of the legal status of WUAs is debatable.

5.1.1.4 Embeddedness into the water management structure

WUAs in Uzbekistan are structurally embedded into the large-scale irrigation system. Indeed, on paper, WUAs are nested in large-scale irrigation management structures, building a connection between government bodies and *fermers* who are responsible for their on-farm irrigation canals. Figure 5.1-1 illustrates the position of WUAs in the irrigation management before 2003.

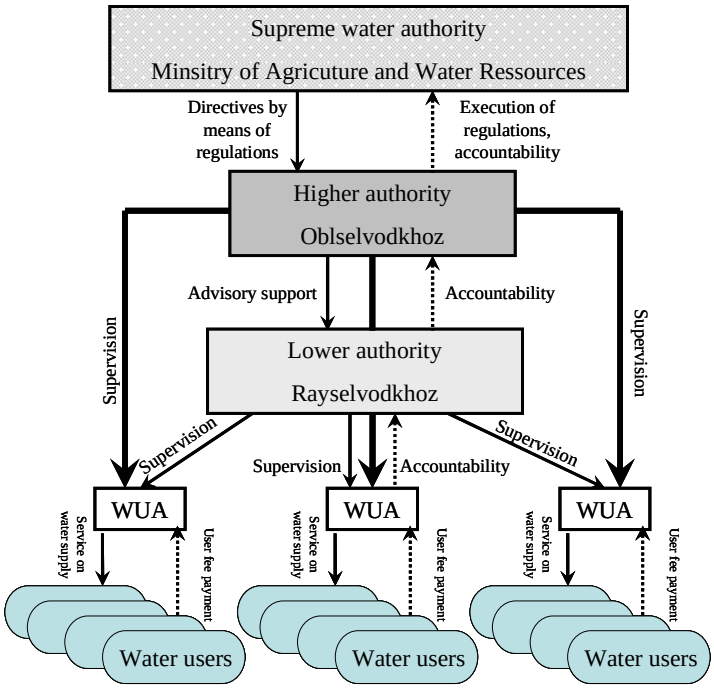
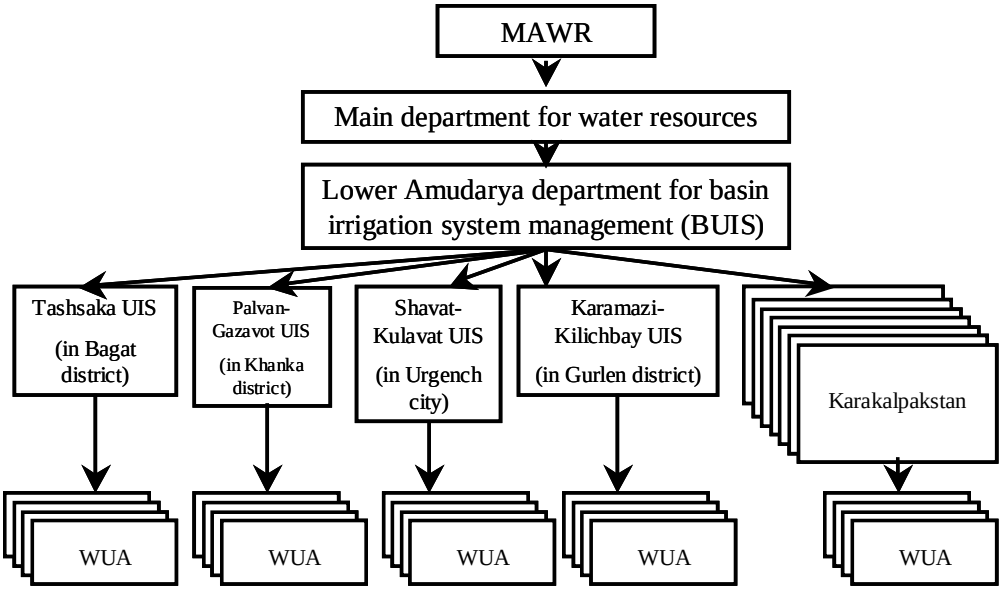


Figure 5.1-1 Structural embeddedness of unsupported WUAs (Own presentation, 2003)

The supreme water authority was the MAWR, in particular the deputy minister on water issues, who gave his directions in form of regulations to the different authorities at the lower levels. The *Oblselvodkhoz* together with the *Rayselvodkhoz* (water issues departments) had the duty to execute the regulations passed by the MAWR. The *Oblselvodkhoz* advised the *Rayselvodkhoz* and supported and controlled its execution of regulations. Executive decisions seemed to be more or less politically opportunistic rather than purely professional. For instance, the *Oblselvodkhoz* could obligate the *Rayselvodhoz* to establish a prescribed number of WUAs. However, this creation principle contradicted the idea of non-governmental, farmer-driven organization. In addition, the local officials of the *Oblselvodkhoz* felt obligated to establish these prescribed WUAs as quickly as possible. Under such conditions, the level of provided awareness work (if any) was very low. Later on, WUAs were supervised by both, *Rayselvodkhoz* and *Oblselvodkhoz*. The information flow should also be bottom-up, e.g. in form of reports. However, there was only a weak exchange of information between the different organizational levels.

After 2003, the structure of water management in Uzbekistan was restructured according to the hydrographical principle. Figure 5.1-2 illustrates the changes for the Khorezm region and the transfer to integrated water management.



From Annex No. 3, Resolution of Cabinet No 320, 21.07.2003

Figure 5.1-2 Structure of water management (Resolution of Cabinet, № 320, June 21, 2003)

The modern water management system in Uzbekistan represents a multilevel "tree" of water supply and distribution, including basin, main canal, canals of first and second order, network of Water Users Associations or organizations, and *ferm* plots.

The main water losses as well as the disruption of water supply occur at the borders between the levels of the above-mentioned hierarchy, which characterize the modern system of resources management in Uzbekistan. There is no water deficit, rather a management deficit. The main idea of integrated water management is to tie up these hierarchic levels. The mechanisms for the vertical cooperation between the different levels are organizational structures together with public participation.

5.1.2 How do WUAs function?

5.1.2.1 Structure of supported and unsupported WUAs

There is a wide variety of bodies within WUAs. The structure of supported WUAs[41] includes two levels: governing bodies (unpaid, working on the voluntary basis) and managing bodies (paid from user fees) (Figure 2.9-3). Unsupported WUAs usually have a one-level-structure with a managing body (Figure 2.9-2).

When a WUA is started, it may be confusing for the members to have many different bodies, such as managing and governing bodies. Therefore, it is essential to have local leaders who can develop and run a WUA. The investigation showed that in Uzbekistan and particularly in Khorezm the government acts as the governing body of WUAs. This aspect is linked to the legal matter discussed above regarding the preparation of WUA by-laws and contracts by the government.

5.1.2.2 General meetings

The General Assembly is designed as the Supreme Body of a WUA. However, in reality, the General Assembly does not assume the designated role. All instructions about the convocation of the General Assembly are delegated by the WUA chairman. He, in turn, works in close cooperation with either the chairman of the *MTP* or the chairman of the *FDA*. In fact, these three types of chairmen are the ones who jointly manage WUAs in Khorezm.

[41] From here the pilot projects will be called supported WUAs, and Khorezmian WUAs - unsupported

The members of a WUA are “strongly invited” to participate in the General Assembly either with the above mentioned leaders, the *militia*[42] or the local officials (*Oblselvodkhoz, Khakimiyat*).

The members of WUAs often confuse these general assemblies with the meetings of other farmer-related organizations (MTP, FDA)[43](Box 5.1.2-1). During the field research the number of General Assembly meetings could not be clearly determined. The by-law of a WUA states: “The General Assembly is convoked no less than twice a year (Article 24, chapter IV Managing and governing bodies of a WUA)”

[42] Police

[43] Meetings of MTP, visit of *Khakim*, speeches of Representatives of Oblselvodkhoz or MAWR and so on.

Box 5.1.2-1 General meetings in case studies (Own investigation)

"Buston"

The *fermers* accept any other meeting as General Assembly of the WUA. In one case, it was the meeting of several *fermers* with a chairman of MTP. During the interview the *fermers* referred to the gatherings or so called five-minute meetings with a chairman of MTP, when asked about the WUA meetings. But the administration of the WUA "Buston" stated that the General Assembly of WUA members was held just once at the very beginning when the WUA "Buston" was established.

WUA "Eski Daryalik"

During the interview, the WUA chairman acknowledged that a culture of general meetings is lacking. Usually *fermers* get together at some place or/and somebody's house for a maximum of 15 minutes and discuss the ongoing issues. The meetings are mainly held among the WUA staff, i.e. hydrotechnicians, accountant etc., as the WUA staff gathers for the efficient meetings, while the WUA members just gather periodically.

"Mirob"

The last general assembly of WUA members was held on December 18, 2003. The meeting was concerned with issues like the beginning of winter works and the preparation for leaching. Besides the water users, 21 representatives of the *mahalla committee* ('*mullah*') attended the general meeting. The general meetings were held eight times since the creation of the WUA (Data from 2003). The discussion of issues concerning all fermers without exception guarantees complete attendance. Examples of such issues are the sowing of cotton, winter works, leaching, the beginning of irrigation, water rotation and the irrigation sequence of the *fermers* and others.

Records were kept only for the first 3 meetings: the constituent assembly was held on January 5, 2000, the meeting of the WUA staff was held on February 1, 2000, and the meeting on water supply was held on March 4, 2000. The attendance list was not attached to the protocols. The other conducted general meetings of the WUA members were not recorded.

"Shikhyab"

The General Assembly that was considered a constituent meeting of the WUA members was held just once in "Shikhyap". The meeting was conducted in November 2003, at the former culture house. The minutes and the attendance list confirm the conducted meeting.

However, the *fermers* do not differentiate between WUA meetings and meetings of other farming organizations (for example MTP).

The analysis of meaning of bodies in different issues will be elaborated in the subsections 5.4 and 5.5

According to data from December 2004, eleven meetings were convoked in four investigated WUAs (Table 5-1).

Table 5-1 Number of conducted general meetings and their minutes (Own investigation)

№	WUA	Conducted meetings since WUA's establishment (before 2003)	Records (minutes) of meetings by 2003	Conducted meetings in 2004	Records of meetings in 2004
1	Mirob	8	3	5	0
2	Buston	1	1	2	0
3	E.Daryalik	1	1	2	0
4	Shikhyab	1	1	2	0

During the survey, *fermers* named topics of the General Assembly such as the sowing of cotton, winter works, leaching, the beginning of irrigation, water rotation, and the irrigation sequence of the *fermers*.

The WUA chairmen also said that they inform the members about water abundant/scarce years, irrigation requirements for different crops and the amount of user fees per hectare. Due to the absence of minutes these facts could not be confirmed.

Since other bodies of WUAs in Khorezm such as the Council or the Auditing and Conflict Resolution Commissions do not gain in importance, this investigation will concentrate on the chairmen's role in a WUA.

5.1.2.3 Transparency and accountability in WUA

In my point of view, transparency means the development of conditions under which information about the existing situation, relevant decisions and activities is made accessible and clear for all members of the market (here, of large-scale irrigation management). The opening of information implies the process and the methodology of providing information and notifying about strategic decisions for their timely and public dissemination.

Accountability means the responsibility of market members (including the government) to substantiate their activities and policies as well as to account for their decisions and results.

According to Cernea and Meinzen-Dick (1994), "accountability has two dimensions: accountability to water users rather than to the agency and accountability to all members, or just a subset such as large farmers or those in one part of the system" (Cernea and Meinzen-Dick, 1994, p. 12). To ensure accountability, associations must be

considered as belonging to the water users. When members and staff interact directly on a regular basis, further accountability mechanisms may not be required (Meinzen-Dick, 1999, p. 19). This is only partly the case in Khorezmian WUAs, which are managed under the strong control of the government, executed either by the *Oblselvodkhoz* or the *Khakimiat*. These actions are intended to hamper the accountability and competence of the staff as well as the management efficiency.

Huppert (2005) explains the importance of transparency and accountability by referring to the "moral hazard trap" based on the example of irrigation. He stresses that the irrigation systems are locked in an inefficiency trap "due to the fact that inefficient water delivery and maintenance may provide sources for additional income or at least offer non-material advantages to the providing managers or technicians" (Huppert, 2005, p. 16). As a result, "incomplete" contracting situations are observed in irrigation management.

In Khorezm, information asymmetry was observed, for example, in the way local officials deal with the *fermers*' bank accounts. User fees are transferred from the *fermers*' accounts to the WUA account. The details of these transfers are highly intransparent for *fermers*. Banks and *Khakim* are better informed about the provision process than the *fermers.* This lack of transparency is, on the one hand, necessary and desirable since it reflects the division of labour and the specialization of the user. On the other hand, it leaves the user who is not as well informed at the risk of being exploited by the better informed user. In turn, the BUIS or *Rayselvodkhoz* might use the "hidden information" about available discharges to their advantage, provide preferential water allocation to selected farmers and extract illegal side payments for a service they are supposed to provide anyway. In such a situation it will be difficult for the WUA to hold the other party accountable, since discharges actually fluctuate and the BUIS or *Rayselvodkhoz* might refer to the unpredictability of this fluctuation as an excuse.

As illustrated in Figure 5.1-1, the whole chain of water management has to be accountable for the superior stakeholders.

As mentioned above, the members' affiliation to the organization strengthens the accountability.

In Khorezm, WUA members do not pay properly according to the signed contract. They often lack the knowledge about the contents of a contract, because they

sign it “blind“ under compulsion of the WUA administration. Also, insufficient service provision by the WUA causes non-payments and vice versa are reasons for this behaviour.

In the case that a WUA administration uses “hidden information” about these contracts to its own advantage, it will be difficult for the *fermer* to hold the other party accountable.

5.1.2.4 Payment of user fees

Payment problems appear in different ways. Farmers in the interviews argued that payments for water supply are either completely unnecessary or that there is lack of importance of use fees.

One of the assumptions of this thesis, regarding the question why water users do not pay use fees, is that they do not really understand the necessity of payments. For 70 years throughout the Soviet period, farmers in the Republic of Uzbekistan have been supported by government. Therefore, they are used to receive all necessary inputs for sufficient agricultural production free of charge. Moreover, water resources were and still are considered as a public good. Even people without any economic education used this term in order to stress that water is a free resource.

Furthermore, the Muslim mentality influences people’s behaviour. From 89 interviewed water users from four different WUAs in Khorezm in 2003 more then 30% mentioned that they consider water as a gift from God. O’Hara (1998) confirms the argument that water is viewed as a gift from God and could neither be owned nor controlled by an individual. She gives an example from the ancient time of Uzbekistan, when the *mirob* oversaw the water distribution under the supervision of village elders elected by the people.

The existence of the public opinion that water is a gift from God hampers payment processes in the Central Asian countries. The local experts Hadjamberdiev et al. (2002) point out that one of the problems of water management at the local level is caused by the perception of Nature (including water) as God’s gift and the resistance to water-payment in the contemporary market economy.

Another reason for the non-payment of user fees is the weak financial condition of *ferms*. The *fermers* in Uzbekistan have instable incomes. One of the

reasons is the state order[44] on strategically important crops[45]. It is economically not lucrative for the *fermers* to grow strategic crops (navigator, 2003). Whether a *fermer* has to grow strategic crop or not depends on the total area of his farm and its specialization[46]. In short, after harvest these *fermers* have to submit 25-30% of their production volume to the government. The fixed prices on cotton and wheat determined by the government of the Republic apply only to those volumes purchased by the government (Khusanov, 2000).

In addition, the *fermers* have to sell the rest of the harvested cotton to the cotton mills, which also use government prices. According to Rudenko (2005) the "share of cotton accepted by the government of Uzbekistan at a fixed state price was set at 30%, at a contractual price for 20% and the remaining 50% of the cotton harvest the *fermers* could sell at their discretion. However, there are no free cotton markets in Uzbekistan, so all cotton was and still is sold to the government of Uzbekistan and at a fixed state price" (Rudenko, 2005, p. 3). These prices are much lower than world market prices. According to Rudenko (2005) "state procurement prices in the last years remained below world market levels: about one third of the Cotlook A Index for cotton Combined with state production targets this hinders optimal crop choices and kept incomes below potential (e.g. Asian Development Outlook 2004 and Baffes 2004)".

The whole procedure of production procurement is supported by legislation[47]. In the end, *fermers* are reliant on cotton mills and their arbitrariness. Often, the *fermers* are waiting for their money for months. However, a WUA needs to collect user fees at the end of the growing season in order to pay at least the staff salaries.

Despite of the financial circumstances described above, which concern the majority of the Uzbek *fermers*, some of them have slowly started adapting to the market economy. To them, the payment of user fees is already important. However, the *Rayselvodkhoz* gives *fermers* incorrect information about the charges that they have to

[44] The state order is a planned assignment of the government to the agriculture producers for growing a certain crop. The government sets the price of such crops.

[45] The strategically important crops include cotton and winter wheat.

[46] The rules and rights are determined in the „Law about farms of the Republic of Uzbekistan"

[47] Annex № 10 of Cabinet Regulation № 476 from Oct. 30, 2003 presents a model agreement of contracts between farm and supplier.

pay. Because of the lack of knowledge in technical (measurement) issues, it also occurs that the *fermers* overpay the user fees (interview with R. Ma'sumov). This way, WUAs smooth out their budget deficits.

5.1.2.5 Machinery availability in WUA

Since the WUAs in Khorezm were established based on dismantled *shirkats*, they also inherited their assets (Box 5.1.2-2). The lack of equipment is explained by the circumstances of the dismantling process, when powerful *fermers* or persons responsible for the machinery (e.g. main engineers or machine-servicers) sold the assets to Turkmenistan or to other regions.

Box 5.1.2-2 The status of assets in the case studies

Buston
The status of assets of the WUA includes nine pumps and one excavator of mark EO 3211. But de-facto, the excavator is in a non-operating condition (at repair). All the pumps (49 pieces) belong to the statement of assets of the fleet of machinery and tractors (MTP). The WUA doesn't have an office. At present, the WUA occupies 2 rooms in the MTP building. The WUA staff includes 8 hydrotechnicians. 4 of them, who work on the territory of the former *shirkats* "Khamza" and "Buston", have bicycles. The hydrotechnicians serving the area of the former shirkat "Uzbekistan" do not own any means of transport and perform their tasks by foot.

Eski Daryalik
The status of assets of the WUA is empty. The WUA doesn't own an office. For the meeting on February 1, 2004 it occupied one room in the building of the former shirkat department. After February 1, 2004 the makhallya committee assigned a private office for "Eski Daraylik".

Mirob
Physically, the WUA is equipped with 8 electric and 4 diesel water pumps. WUA doesn't own an office. For the time being, it occupies the building of the former dekhkan and farm association. The WUA chairman has his own car. The WUA staff includes 1 hydrotechnical engineer and 1 ranger. None of them has any means of transport. The statement of assets of WUA includes 2 tractors, 1 loader and 1 lorry.

Shikhyab
The WUA has 11 electric and 10 diesel pumps. The pumps still belong to the statement of assets of the dekhkan and farm association. The WUA doesn't own an office. The room of the chairman is in the office of the dekhkan and farm association "Akhunbabayev". The WUA chairman has a bicycle. The staff of the WUA includes 3 hydrotechnicians. Each of them has a bicycle. The statement of assets of the WUA doesn't include any machinery. After the disorganization of the WUA in 2001 all excavators were sold. The year 2003 was a hard time for the fermers because there was no control over water use, only voluntary management of the irrigation water.

Source: Own investigation, 2003

5.1.2.6 Fermers' participation

Mirzaev (2003) stressed in his article "The role of public opinion in the increase of effectiveness of irrigation water management and ecological sustainability in Central Asian Republics" that the *fermers*' participation is a driving force for successful irrigation water management. "Deficit of public participation in governance of agriculture and water resources is, at present, one of the main constraining and limiting factors on the way to the increase of water use effectiveness in the region" (Mirzaev, 2003).

IWMI employees carried out a project for the training of social mobilizers and published the brochure on "Social Mobilization and Institutional Development Approach and Strategy" (ul Hassan and Nizamedinkhodjaeva, 2002). "Social mobilization is a continuous, complex process of two-way dialogue, where new ideas

from the stakeholders[48] are well received, examples from elsewhere are presented to communities and the communities are encouraged to think and put forth ideas that will generate truly users owned, managed and governed organizations, which are self-sustaining to the maximum possible extent“ (ul Hassan and Nizamedinkhodjaeva, 2002).

Another aspect concerning the ***fermers'* participation** is the lack of knowledge on technical issues. The introduction of WUAs is invariably accompanied by the introduction of water pricing. The lack of capacity in Uzbek WUAs and also in the government hampers the strengthening of WUAs and their sustainability. During the measurement of the amount of water supplied to their fields, *fermers* are often cheated by the hydrotechnical staff of the WUA (interview with R. Ma'sumov). Hydrotechnical personnel is trained and educated in terms of hydrometry. Farmers may have only a weak idea about this.

The hydrotechnical staff, in turn, is cheated on by higher water supply organizations (*UIS*, *Rayselvodkhoz*). Since external conditions are reliant on actual water availability that is fluctuating, it is only the higher water supply organization that can claim to have information about the frequency and occurrence of water discharges available for distribution. WUAs have no access to such information. Hence, they will not know in advance when and how much water they will receive.

Under these conditions, it is obvious that awareness work and trainings in topics such as hydrometric issues, accounting, bank relations are essential for WUA staff as well as for the water users themselves. Furthermore, building measurement devices requires private investments in construction.

In Uzbekistan, it was observed that donor activities have changed the opinions of Uzbek scholars. There is a certain consensus among Uzbek scientists and WUA experts about the constraints to effective management. Three fundamental constraints have been identified: financial weakness of *ferms*, lack of awareness and skills concerning governance, lack of participation of *fermers*. With respect to the last aspect,

[48] Stakeholders are individuals and groups of individuals having vested interest in the water resources. These can be agricultural users, managers, inspectors, legislators, or others who in one way or the other benefit or are harmed by the way in which water is managed ((ul Hassan and Nizamedinkhodjaeva, 2002))

one needs to understand how civil society organizations emerged in post-Soviet contexts.

5.2 Characteristics of WUAs in contrast: Supported vs. unsupported WUAs

The following two subsections describe the features/characteristics of WUAs in Uzbekistan. Supported and unsupported WUAs will be presented in contrast. The features are elaborated according to the theoretical background specified in chapter 3. The features will be arranged according to the following groups: **1. Resource system characteristics** ((i) Predictability of water supply due to proper system – Condition of canal system/technical infrastructure), **2. Group characteristics** ((i) Shared norms, (ii) Past successful experience – social capital, (iii) Appropriate leadership), **1.& 2. Relationship between resource system characteristics and group characteristics** ((i) Overlap between group residential location and resource location – Unit of management, (ii) Fairness in payment of services and water supply), **3. Institutional arrangements** ((i) Rules and roles are simple and easy to understand, (ii) Ease in enforcement rules), **4. External environment** ((i) State: (a) Supportive external institutions, (b) Nestedness of appropriation, provision, enforcement, governance, (c) Restrictions on *fermer*'s decisions). Some elements of the groups do not fit to one nor the other WUA type. However, the structure of the basic characteristics will be followed strictly.

5.2.1 Resource system characteristics

5.2.1.1 Unsupported WUAs: unpredictable water supply caused by lack of equipment and bad conditions of canal infrastructure

Water supply in unsupported WUAs is complicated by silted canals (Figure 5.2-1) due to the peculiarity of the Amudarya water (see chapter 2).

Figure 5.2-1 Uncleaned canal (winter 2003)

The cleaning of secondary and tertiary canals and of the drainage system is carried out by the farmers themselves based on the "*Khashar*" principle. The respective share of the canal each farmer has to clean is determined in accordance with his farm area. This means: the bigger the farm size, the larger the share of the canal to be cleaned. This work is fulfilled in winter and conducted mainly by women (Figure 5.2-2).

Figure 5.2-2Manual cleaning of canals (winter 2002)

Therefore, even if the cleaning of the tertiary canals is done by the water users themselves, due to the lack of necessary equipment, they can not afford the technical part of cleaning the large irrigation canals and maintaining the pumps (Table 5-2).

Table 5-2 Equipment availability in the investigated WUAs (Own presentation)

No	WUA	Equipment	Members in 2004	Number of served canals
1	Mirob	2 Tractors T28 1 loader EO 2621	102	5 with total length 42,6 km
2	Buston	1 excavator EO3221 (at the repair)	246	4 with total length 41 km
3	E. Daryalik	0	94	2 with total length 26 km
4	Shikhyab	0	150	2 with total length 23 km

These circumstances hamper the predictability of water supply for water users in an unsupported WUA. WUA staff therefore has strived to obtain an excavator for the cleaning of the main canal either from the MTP or the PMK (Figure 5.2-3).

Figure 5.2-3 Cleaning of the canal by excavator (winter, 2002)

In addition to problems with the cleaning and maintenance of canals, respondents in Khorezm reported that they need mobile pumps for proper and timely irrigation. Electric and diesel pumps are registered in the accounting balance of a WUA. In general, they were inherited from the dismantled shirkats. However, large farmers located at the tail part of the irrigation canal have private pumps, which are not registered in the balance asset of a WUA. The usual procedure to request water for irrigation in Khorezm is to ask a pump operator to switch on the pump. The private farmers, however, do not file applications for irrigation water but rather use their pumps at their own discretion.

5.2.1.2 Supported WUAs: predictable water supply through technical infrastructure in good condition due to availability of appropriate equipment

The international donors facilitated the predictability of water supply in the WUAs they supported. This was made possible by, on the one hand, modernizing the technical infrastructure and, on the other hand, introducing irrigation measurement devices.

The SIWP[49] had found an innovative way to provide every member of the pilot WUAs supported by USAid with the irrigation measurement devices and other necessary control structures. According to SIWP project specialist U. Islamov, "projects usually contract professional construction companies (as happened in the ADB Ak-Altin Project in Syrdarya), which are responsible for all irrigation network modifications in the WUA". In contrast, in the SIWP, the staff provided materials such as cement and gravel. The members of the pilot WUAs, in turn, had to construct all water measurement devices and control structure with the given materials. This approach "trains WUA members how to work under conditions of transparency and corporate liability" (Personal communication with Islamov from May 31, 2005). Interviewed members of the WUA confirmed their contribution to and active participation in the construction works.

Two groups of players were responsible for the construction process:

1. The WUA Council (Sovet) and the Auditing Commission controlled the materials and resources used for construction;
2. Specialists of the Natural Resources Management Project (USAid) conducted training and monitoring of construction works to make sure that the constructions were built according to their design.

In addition to the measurement devices, the earthen as well as the concrete-lined canals were rehabilitated. Table 5-3 lists the activities carried out in the investigated WUAs supported by USAid.

Table 5-3 Project implementation, Component: Irrigation System Modification Works (USAID et al, 2004)

Activity / Inputs	Kushkulak	Ak Altin
Irrigated area (ha)	4,000	3,191
Reconstruction of earthen canals (in m.)	10,000	
Repairing of concrete lined canals (in m.)		1,500

The best known achievement of the USAid project was the provision of heavy equipment to its WUAs. Much of the procurement focused on earth-moving equipment,

[49] Special Initiatives Water Project

such as excavators, backhoes, and crane trucks. According to USAid, regulation titles and ownership of the equipment have been transferred to the WUAs. Part of the agreement with the project was that farmers will pay the WUA for the use of such heavy equipment in order to develop a revolving maintenance fund for repairs and spare parts. The project responded to an overwhelming request from WUAs for the provision of vehicles and heavy amelioration equipment for irrigation system repairs, maintenance, and improvements (PA Consortium Group and Inc, 2004, p. 17).

In the interviews, the farmers confirmed the high demand for and use of heavy equipment. The lack of agricultural equipment throughout Uzbekistan is a huge deterrent to increased agricultural production and farmers are willing to pay for these services. The SIWP contribution of heavy equipment to these organizations thus helps to insure their sustainability. An immediate impact was that the supported WUAs were able to start using previously unavailable heavy equipment for the efficient cleaning of water channels and drainage collectors and to construct new irrigation structures as well as to repair existing ones. Within the first three months of equipment availability, these WUAs had effectively cleaned and maintained over 61.5 kilometres of canals and drainage collectors, and they are also now using heavy equipment to install water measuring and regulatory structures.

Moreover, farmers from other WUAs have witnessed the results and realize the need to regularly clean canals and collectors in order to assure a reliable water distribution as well as a balanced and secure water table level. They have started to rent equipment from the project WUAs. The generated funds are utilized by the project WUAs in order to maintain the equipment and replace spare parts as and when necessary.

5.2.1.3 Supported versus unsupported WUAs

The characteristics of both groups of investigated WUAs regarding the resource system are summarized as follows:

Factors	Supported WUAs	Avail.	Khorezmian WUAs	Avail.
1. Resource system characteristics				
(i) Predictability of water supply due to proper system	Water supply is improved due to the rehabilitation of the irrigation and drainage system and availability of machinery	+	Water supply is impeded due to the unsatisfied condition of the irrigation and drainage system and lack of machinery	-

The table illustrates an influencing factor for the successful functioning of WUAs (predictability of water supply due to proper system). The column Availability (Avail.) indicates either presence ("+") or absence ("-") of this factor.

5.2.2 Group characteristics

5.2.2.1 Unsupported WUAs: shared norms

Agrawal et. al. (1999) stress that "the concept of community as shared norms and common interests depends strongly upon the perceptions of its members" (Agrawal, 1999, p. 7). Ostrom points out that "when individuals live in such situations for substantial periods of time, they tend to develop shared norms and patterns of reciprocity".

In the Khorezmian WUAs, common shared norms are observed in different aspects. First, the social status that results from having a job is appreciated or ranked higher than material wealth. Under the conditions of high unemployment, for example after the liquidation of the *shirkats*, WUA employees had practically no alternative to find another job. Some WUA staff members had not received their salary for many months.

Second, the shared common norms were observed in the (non)acceptance of the WUA shape/structure indicating the members' identification with their WUA. In 2003, approximately 25% of the farmers interviewed in Khorezm still had only weak ideas about what a WUA is (Figure 5.2-4). They did not see the reasons for payments in WUAs. During my field research from 2003 to 2004, when crosschecking these statements, farmers in newly established hydrological WUAs reported that WUA payments were perceived as an additional burden. In fact, they were perceived as taxes. In contrast to 2003-2004, in 2004-2005 farmers began to accept the WUA as a water management organization (Figure 5.2-4).

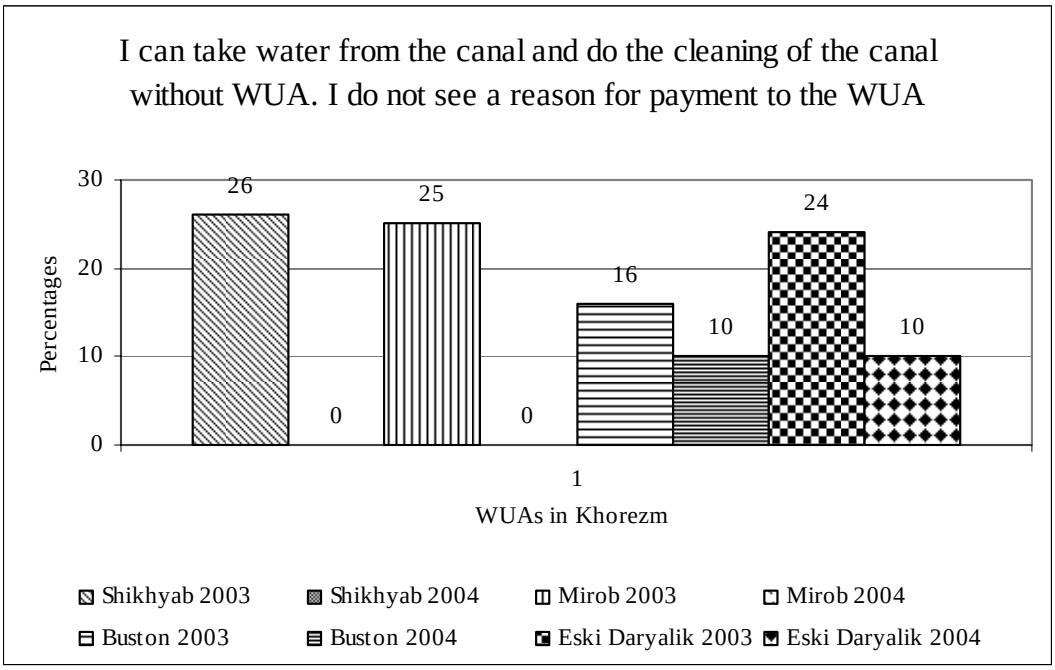


Figure 5.2-4 Importance of the user fees to users

However, users expected more contribution from their WUA, such as the maintenance of pumps and canals and the availability of heavy equipment.

A general improvement in the understanding of WUA purposes was observed during the questionnaire survey. The three most mentioned tasks of a WUA were water supply (85%), cleaning of canals and drainage system[50] (50%), and water distribution (22.5%).

Water distribution should be carried out in accordance with crop water requirements and submitted requests (schedules). The distribution should be arranged independently of a user's farm location, farm size and kind of activity (gardening, animal production etc).

Third, farmers in Uzbekistan have different educational backgrounds. Over the years, teachers, doctors, accountants as well as traders have become farmers. Some farms are officially registered on a certain person, but actually belong to local officials or public prosecutors. The evidence of such cases was described by Trevisani (2005): "the patriarch of an influential extended family de facto exerts control over several

50 Farmers insist in the interviews that the cleaning of canals and drainage system should be done by excavators. According to the respondents, the purpose of such cleaning is to avoid water losses

fermer enterprises through sons, man of straw other affiliated. Even the role of the farmers is not clarified" (Trevisani, 2005, p. 17).

Table 5-4 The variety of farmer profession (Own survey)

Profession	Percent
chemist	2.1
tractor operator	6.4
hydrotechnician	6.4
doctor	4.3
land surveyor	4.3
mechanician	8.5
accountant	17.0
agronomist	10.6
teacher	8.5
engineer	10.6
trader	4.3
farmer	2.1
farm manager	2.1
cattle-breeder	2.1
secondary education	4.3
economist	6.4

Forth, shared norms in Khorezm can be exemplified by conflict handling in WUAs. The conflict resolutions do not occur according to the gravity of infringement as provided by the by-law, but rather by talks or at worst by (contra) violence. One informant explained that "in Uzbekistan it is important to consider family bonds as a manifestation of traditions promoting the violation of rules" (Interview with WUA administration representative, Nov. 21, 2004). This statement illustrates the formation of shared norms.

5.2.2.2 Supported WUAs: high degree of awareness regarding WUAs and related issues such as financial, technical and legal by the members

The members of supported WUAs share the knowledge and norms regarding the WUA as a self-governing organization. Evidences of this are shown in chapter 6.

International donors carry out plenty of awareness work for the common understanding of purposes and functions of a WUA .

For instance, in its initial phase, the SIWP, funded by USAid, focused on the explanation of democratic principles for the creation of sustainable and productive farmers' organizations, responsive to the farmers' needs and objectives. This first phase

of the pilot projects resulted in the re-election of WUA governing bodies such as the WUA chairman, the auditing and conflict resolution committee, and the WUA Council. The re-election was based on democratic principles.

The next objective, as stressed in the final report of the SIWP (2004), was that "members of WUAs identified the major topics for training, as well as the primary mechanisms for conducting the training (WUAs selected the method of the one-day field training.)" (PA Consortium Group and Inc, 2004, p. 17).

According to the final report of the SWIP (2004), seven training series were conducted between 2002-2004. Their topics show a strong focus on technology/hardware approaches: (1) farm-level agriculture and irrigation techniques and (2) hydraulic measurement/ behaviour of canals. In contrast, other projects (e.g. by the IWMI) propagate the idea of integrated water resources management and the creation of an approach to social mobilization. A training program for social mobilization and institutional development was prepared (ICWC, 2003). The Ministry of Agriculture and Water Management asked the FVP[51] to organize trainings on the subject "How can WUAs be created through Social Mobilization?" ADB, in turn, supports the conduction of seminars for newly established private farms on topics such as "Use of biologic fertilizers and stimulators for growing of grain crops", "Effectiveness of utilization of biologic fertilizers and stimulators for growing of grain crops", "The business plan and its elaboration", "Legalization procedure of contracts", "Measurement methods of water use", "Foundations of function of hydro-modules[52]". These seminares are carried out by the *RBAC*[53] together with the regional department of the MAWR Research and Production Center. Such trainings increase the competence of farmers. The organization of permanent training centers for the technical and legal education of WUA members contributes to the intensive support of trainings carried out by international donors. The success rate of these meetings and training units can be seen in the large voluntary participation of farmers in the trainings. Another evidence of success of the trainings is the establishment of farmer schools in different parts on Uzbekistan (e.g. DWIP project in South Karakalpakstan).

[51] Fergana Valley Project

[52] Crop Water Requirements

[53] Rural Business Advisory Center

5.2.2.3 Unsupported WUAs: leaders with the previous occupation in the state structure (kolkhozes, sovkhozes or department of Ministry)

During the survey respondents named the following characteristics of leadership as desirable for Khorezmian WUAs:

- Competent chairman who is a water management specialist
- Chairman should maintain good relations to the local officials and have the ability to oppose their often arbitrary decisions
- WUAs profit from support by local, regional, and district powers which promote material and technical resources.

The first two characteristics show the current status of leaders. However, the strong influence of local officials (*Oblselvodkhoz*, *Khakimiat*) challenges the decision-making authority and mandate of WUA leaders .

In two of the investigated WUAs, the WUA chairmen were water specialists; in the other two investigated WUAs, the chairmen were construction workers or civil engineers and mechanics. Nevertheless, the latter receive professional support from educated water masters who fulfil the water-related functions of WUA chairmen.

Table 5-5 shows that in most cases the respondents know about the former occupation of their WUA chairman. This is explained by the fact that water masters of former *kolkhozes* and later *shirkats* obtained the position of WUA chairmen (Trevisani, 2005). Since there is a strong influence from the *Oblselvodkhoz* on the establishment of a WUA, some candidates that were suggested or nominated belong to the former staff of the *Oblselvodkhoz*. 25% of the respondents did not know about the occupation of their WUA chairman. This occured in cases where WUAs were established based on the hydrographical principle and the merging of different shirkats.

Table 5-5 The former occupation of WUA chairmen (Own investigation)

Answers	%
Hydrotechnical specialist	43
Don’t know	25
Deputy of former WUA chairman	2,5
Other profession	30

5.2.2.4 Supported WUAs: past successful experience - social capital

The primary observation in the investigated WUAs is that in each of them, one or two crucial players serve as bridges either between farmers and WUA administration,

between donors and WUA and farmers, or between outsiders-researchers and WUA and farmers. Those players seldom were on top of the hierarchical structure of a WUA. They were either the main mechanical or hydrotechnical engineers (main water master) or even "outsiders" such as social mobilizers or employees of the *RBAC*. The water masters (*mirobs*) were trained to provide the service of water distribution.

The following statements were given in different interviews with respondents from supported WUAs.

In Fergana, in the Ezovon district, "both, the WUA chairman and the chief hydrotechnician have an education in hydroengineering. The chairman graduated from Andijan University and used to work in a *kolkhoz* as a hydrotechnician. The chief hydrotechnician graduated from technical school and worked in the *Rayvodhoz* also as a hydrotechnician" (Interview on Nov. 19, 2004).

In Syrdarya, in the Ak-Altin district, "the chairman (OKh) graduated from a hydromeliorative technical school and worked as an accountant in the *sovkhoz*. In 2003, he was chairman of the WUA "Vodiylik Suvchi" and since 2004 he is chairman of the WUA "Suv-Agro". From his father, who died recently, he received the work training of hydrotechnical personnel. The farmers elected OKh to the position of chairman, in which he was confirmed by the General Assembly. In the first WUA "Vodiylik Suvchi", there was also another candidate for the election but in "Suv-Agro" there was no other candidate" (Interview from Nov. 23, 2004).

The question about the age of the chairman was addressed to one informant. He answered that "he (chairman) is a hereditary hydrotechnician. His father was a hydrotechnician and taught his son his work. There was no election because the hydrotechnician of the *sovkhoz* was approved by all the farmers to take the position of the WUA chairman. After the death of the WUA chairman his son took his chair".

In the Mirzaabad district of Syrdarya, the chairman (AA) is an educated accountant. He graduated from Tashkent cooperative technical school. From the very beginning of his work experience he dealt with agriculture. He had worked for 6 months in the Farmers' Association as an assistant of the chairman. Afterwards, he was the chairman of the Farmers' Association for 8 years. According to the main water master of the WUA „AA is a respectful man in the WUA"(Interview from Nov. 25, 2004).

5.2.2.5 Unsupported WUAs: old nomenclature, but bound up staff of WUAs

Table 5-6 presents empirical data about the procedure of election/nomination of the WUA chairman.

Table 5-6 How was a WUA chairman elected? (Own investigation)

Answers	%
There was only one candidate who was elected by the farmers during the general assembly	43
I do not know	23
From many candidates one was elected by farmers at a general meeting	18
Was re-elected by farmers	2,5
Was appointed	15

The majority of respondents pointed out that the chairmen are elected. However, the data from expert interviews with local officials indicate that the *Oblselvodkhoz* receives the instruction to establish new Water Users Associations from the MAWR and passes it on to the *Rayselvodkhoz*. The position of the chairman is often filled in advance and only formally confirmed by the WUA members at the establishing general meeting. This way, in November 2004, the *Oblselvodkhoz* began to establish 55 new Water Users Associations based on 71 dismantled shirkats (personal communication with the chairman of the Khorezmian WUA Federation). By the beginning of 2005, the process of establishing the planned WUAs was completed. Thus, the system of top-down approach was kept, which indicates that the state maintained its power through the ministry's district and regional departments. Spoor (1995) called the state influence through local officials the "nomenclature". The highly hierarchical structure of MAWR, *Oblselvodkhoz*, and *Rayselvodkhoz* remained from the past times and was even partly extended through the Basin Management Organizations of the Irrigation System and their sub departments (BUIS and UIS).

Khorezmian WUAs have a settled staff, which has been approved over years. Thus, the main water masters are hydro-technicians or even hydrotechnical engineers and the WUA chairmen hold the position either according to their professional ability, or with a water master as assistant (Table 5-5).

5.2.2.6 Supported WUAs: appropriate leadership - good staff

In supported WUAs, the decision-making mandate is characterized by a governing body which functions without strong external influences, e.g. from the *Oblselvodkhoz* or the FDA. (At least these influences are not as obvious as in

Khorezm). This statement is supported by the affiliation of the members to their WUA through the acceptance of its governing body. For instance, the WUA council is perceived by water users as a governing body. This is shown in the empirical analysis in chapter 6.

USAid supported the WUA in Syrdarya in the election of the WUA chairman and other members of the governing body. Five candidates were nominated by the farmers. All candidates were irrigators, employees of the *Rayvodkhoz* or other water management personnel. The election was held by secret vote. AA has been chairman of the WUA Council for three years. The elections of the WUA administration in Fergana were carried out based on the same principle. The WUA Chairman was elected by secret vote, as well. As a result of the election, two candidates received the most votes. Both are known to the farmers, because of their background: one worked for the *Rayvodkhoz* and the other worked as a water master in a *sovkhoz*.

In addition, the supported WUAs are provided with trained and educated personnel. For instance, eleven *mirobs* work in the WUA "Ak Altin" supported by USAid. Each *mirob* is responsible for approximately 300 ha of the WUA area. One respondent in the WUA "Ak Altin" explained that "one *mirob* serves one water outlet, which serves seven farmers" (Interview in "Ak Altin" from Nov.30, 2004). The service area is workable and optimal. However, not all *mirobs* are water specialists. For this purpose, the *mirobs* were trained by hydrotechnicians and USAid. Apart from poor skills, *mirobs* face the problem of not having any transport devices. They survey the territory under their responsibility on foot, which reduces the operating efficiency of their activities.

The control of the territory of the ADB-WUA "Suv Agro" is carried out by 2 hydrotechnical staff members with the help of tractors. The WUA is only responsible for one secondary canal PR-3. The farmers themselves arrange the canal cleaning. They collect the money for renting the excavator from the OGME (regional hydro-land reclamation expedition), provide the fuel and organize dinner for the workers.

5.2.2.7 Supported versus unsupported WUAs

The following table presents a summary of the factors discussed above, comparing the group characteristics of supported and unsupported WUAs in Uzbekistan.

Factors	Supported WUAs	Avail.	Khorezmian WUAs	Avail.
2. Group characteristics				
(i) Shared norms	High understanding of reforming processes in irrigation management due to conducted awareness work about WUAs	+	Sense of satisfaction and status regarding employment in a WUA, but low level of awareness about WUAs	-
(ii) Past successful experience – social capital	Less available due to newly introduced elements of democratic election	-	Available due to former occupation of the WUA leaders in the state structure and continued cooperation between leaders of different agricultural structures	+
(iii) Appropriate leadership	Clear decision-making mandate, but the management of WUAs is performed by water masters, mechanics	+	Restricted decision-making mandate, however appropriate personnel	+/-

5.2.3 Relationship between resource system characteristics and group characteristics

5.2.3.1 Unsupported WUAs: unit of management based on both the administrative and hydrological principles

As mentioned in chapter 2, the first WUAs created by the state were established on the territory of former *shirkats*. This administrative-territorial principle helps to maintain the social networks already existent in the communities, as described in sections 5.2.2.4 and 5.2.2.5. However, these WUAs do not consider the hydrological system of canals and drains. As a result, WUAs served and maintained up to 5-6 canals only partly. The remaining parts fell under the responsibility of other WUAs or *shirkats*.

First in 2003, with the introduction of new organizations of water management at basin level, WUAs were extended and established according to irrigation and drainage systems.

Later on, in 2004, during the establishment of more WUAs, many restructured *shirkats* were already based on the hydrographical principle. There was no need to break settled social structures.

5.2.3.2 Supported WUAs: unit of management based on the hydrographical principle

In some cases, establishing a WUA in Uzbekistan according to the hydrographical principle requires to cover a large area. One informant, a leader of component “pilot canals” in the Fergana-Project, mentioned that in other regions, where the irrigation system looks like a fir-tree (Figure 5.2-5), the hydrographical principle should be applied at the level of the main canals, not at the WUA level. In contrast, in the Fergana valley, all irrigation systems are connected in a way similar to a circular road system (Figure 5.2-6), which means that they already have the prerequisites for integrated water resources management.

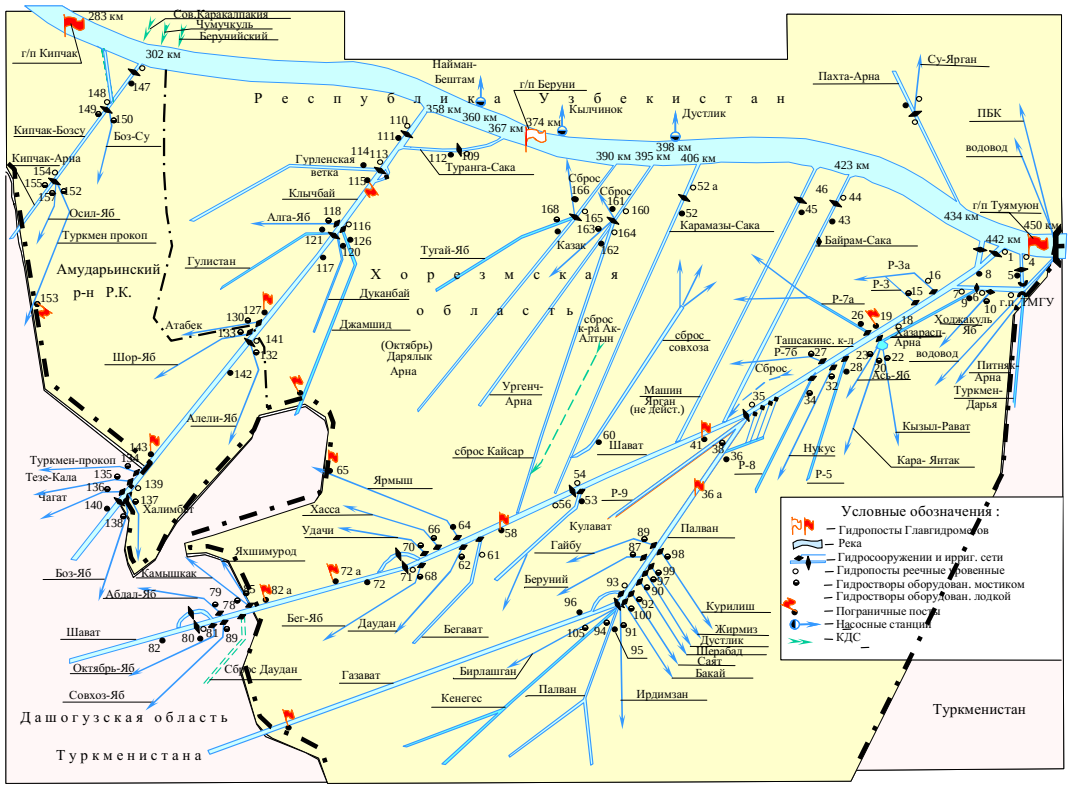


Figure 5.2-5 An example of the Khorezmian irrigation system (Source: BVO “Amudarya”, PPT presentation, 2006)

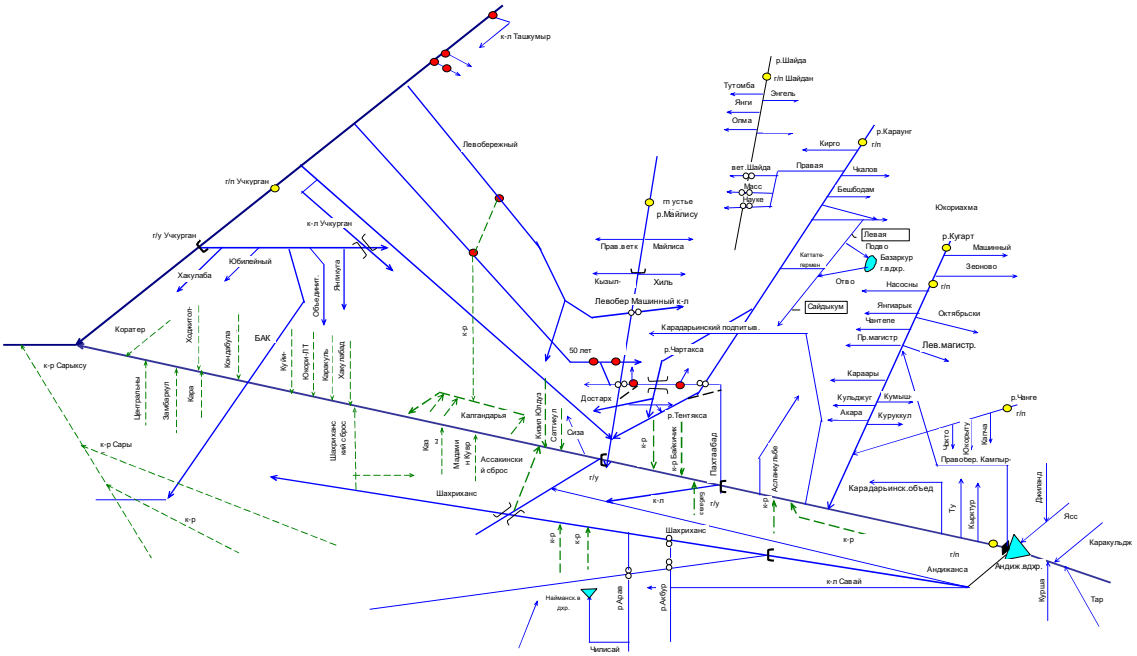


Figure 5.2-6 An example of the irrigation systems in Fergana (Source: Data from the research institute "Vodproject")

Donor-supported WUAs cover relatively large geographic areas and include many former shirkats. For example, the total area of the WUA „Ak Altin" is **3 191ha** with **163 members**. The territory of the WUA comprises five shirkats. The number of members is similar to that of Khorezmian WUAs, whereas hydrological WUAs in Khorezm consist of not more than three shirkats.

The WUA "Kushkulak" in the Mirzaabad rayon of Syrdarya has **4 000ha** and serves **126 members**.

The IWMI WUA "Akbarabad" in the Kuva rayon, Fergana covers **2 820.8 ha**. In 2004, the WUA consisted of **55 farmers**. It includes three shirkats and three mahallas.

The territory of the ADB project in Syrdarya comprises 10 WUAs, which include 866 private farmers. However, in the first phase of the project only four WUAs ("Andijan Suv", "Vodiylik Suvchi", "Suv-Agro", and "Ung Tarmok") participated in the project. The average size of an ADB-supported WUA is **4 000 ha,** its average number of members is **80 farmers**. In its first phase, the project covered 15 924 ha, including 4 WUAs with 346 farmers.

For comparison: the smallest WUA in Uzbekistan has 770 ha (in Namangan) and the largest one amounts to 4 090 ha (in Khorezm). The number of members varies from 45 to 240 (Own data from Khorezm).

5.2.3.3 Unsupported WUAs: inequity in water distribution (tail-end conflicts) as well as inequity in payments

Two major issues indicate the inequity in resource allocation in Khorezmian WUAs: water supply and payments of user fees.

The inequity in water supply is caused by random water withdrawal without application for irrigation water, the availability of private pumps to single farmers and the use of personal networks.

According to the WUA by-law, water users have to file an application for irrigation water five days prior to water supply. However, only 26% of respondents asserted that they follow this rule (Table 5-7).

Table 5-7 Filling an application for irrigation water (Own survey)

Time span between application and water supply	Percentage
No application	38
Two days	10
Five days	15
Seven days	8
15 or 30 days	3

The farmers just ask the pump operator to switch on the pump without informing the responsible main hydro-technician of the WUA.

In areas with pump irrigation, the temptation to use water without taking other water users into account is higher than in gravity irrigated areas where the water is distributed by hydro-technical staff and where a WUA provides actual service. In addition, the availability of private pumps, which are not fixed to the economic balance of a WUA, hampers the equal water supply provided by a WUA.

Besides this, the water users are sure that in case they do not obtain water, they can always ask the responsible *Khakim* for irrigation water by referring to the special entitlements for strategically important crops on their fields and thus avoiding the WUA as water providing organization. This manoeuvre is used by farmers who have a closer relationship with the local officials.

The next issue of inequity concerns the payment of user fees. Non-payments or untimely payments by water users to WUAs still are a huge hampering factor for the functioning of WUAs. This was recognized after discussions with WUA administrations and their personnel. Two of four WUA chairmen did not receive any salary for months[54].

In addition, the major obstacles that are caused irrespective of the farmers' behaviour are the following: 1. Target credits do not consider payments for water providing services that render a WUA; 2. Untimely payment by cotton mills for the delivered cotton; 3. Arbitrary use of the farmers' bank accounts by local officials (even for non-agricultural purposes, e.g. building a sport school); 4. Relations between the WUA and other resource supply organizations.

The first hindrance to the payment of user fees is the specification of the current credit systems for farmers. Starting from 2005, target credits replace the *tranche*[55] system. This change and its probable consequences were discussed by the author with farmers from selected WUAs and some responsible officials such as the chairman of the WUA federation. Following a government decree, the first credit systems were launched in Fergana, Khorezm, Bukhara and Namangan Regions in 2003. Later on, following another government decree, the credit system was introduced in Andijan, Djizak, Navoi and Samarkand oblast in 2004 and in Karakalpakstan, Kashkadarya, Surkhandarya, Syrdarya and Tashkent oblasts in 2005.

However, according to experts' opinions[56] the credits are not profitable for farmers, because they have to pay a high interest rate (7.5% per year). At the same time, *tranches* implicate the following problem. Money is primarily transferred for fuel and electricity. There is evidence that instead of charging the accurate amount, the farmers' money was often transferred several times without taking into consideration that the farmers had already paid for the respective items. Both systems, either *tranches* or credits, do not consider user fees. The target credits are intended for agricultural inputs such as seeds, fuel and fertilizers.

[54] Empirical evidence in investigated WUAs in Khorezm
[55] Special type of earmarked provision of inputs by the government
[56] Personal communication with WUA specialist U. Islamov, USAID, Uzbekistan

The next obstacle to the payment of user fees are the untimely payments from cotton mills to farmers for the delivered cotton.

The Arbitrary use of money from the farmers' bank accounts by local officials is the third kind of obstacle that hampers the payments by water users. The misuse of the farmers' money is made possible by their lacking knowledge about accounting methods. Local officials such as the *khakim*s are usually more informed than the WUA administration regarding the account of every subordinate farmer. The officials have access to every infrastructure of agricultural enterprises. They have the power to order the transfer of money from farmers' accounts[57] to other on-going strategic projects like the construction of a new school or a new station.

Another obstacle of the user fee payment to WUAs is the fact that WUA members owe money to other supply organizations (e.g. electricity providing organizations and fuel bases), which can transfer their money faster from the farmers' accounts than the WUA. According to Bocharin (2004), the majority of the established WUAs in Uzbekistan[58] have pump irrigation. On average, every WUA has 3 pump facilities. Every pump facility serves approximately 7 740 ha of irrigated land (Bocharin, 2004, p. 31).

For example, in Khorezm, where pump irrigation prevails, the payments for fuel and electricity are considered as a priority. Money is transferred from the farmers' bank accounts without their knowledge.

Bocharin (2004) also points out, that "on average the actual cost per unit of WUA amounted to 1000 sums/ha (prices for 2003). At the same time, a considerable differentiation is observed among the regions of Uzbekistan. So in the regions Samarkand and Khorezm the average actual cost per unit increased up to 3570 and 3910 sums/ha, respectively. In the regions Syrdarya and Navoy, these costs made up 256 and 454 sums/ha, respectively" (Bocharin, 2004, p. 31).

The internal problems of a WUA leading to non-payment are related to its ability to provide proper service as well as to the farmers' behaviour.

The absence of financial funds constrains WUAs to repair the existing machinery or buy a new one. Their very weak equipment with machinery and technical

[57] The precondition for this is the availability of money on the particular account

[58] The total number of WUAs in the Republic of Uzbekistan amounts to 562 (March, 2005).

devices hampers the further development of WUAs, because they are not able to provide the appropriate services to their members. Under such conditions farmers are unmotivated to pay user fees.

In addition, the inequity in payments is also caused by the so-called "free rider" problem, which means that water resources are being used without payment. The roots of the problems range from the unwillingness to pay to the missing opportunity to pay.

Table 5-8 Signed contracts and payments, 2003-2004 (Own survey)

WUA	Members in 2003	Members in 2004	Signed[59] contracts by 2003	Members paid user fees,2003	Debts[60] to WUA by members
Mirob	90	102	84 (93%)	27 (30%)	2,5 Mio
Buston	239	246	127 (53%)	30 (13%)	21,7 Mio
E. Daryalik	92	94	76 (83%)	10 (11%)	7,5 Mio
Shikhyab	148	150	n.a.	n.a.	2,7 Mio

One type of "free riders" are farmers who refuse to pay for water and abstain from signing a contract with the WUA (Table 5-8). Some farmers reportedly used wastewater from the drainage system for irrigation (informal interviews with WUA chairmen and FDA chairmen).

5.2.3.4 Supported WUAs: equity in resource allocation through installed and functional (including some computer-controlled) measurement devices, and through trained water masters

In each of the WUAs supported by USAid, state-of-the-art, cost-effective, and automatic waterflow measuring devices with software were installed. These devices provide regular and consistent data to the WUA, helping to plan and schedule deliveries based on real need.

In the supported WUAs, farmers share the perception of unequal water distribution. Unequal water distribution is caused by the installation of irrigation measurement devices, the purchase of heavy equipment, and the training of WUA staff,

[59] The contract with a WUA is signed one in three years

[60] In local currency – Sum (1 USA Doll. Is approx. 1500 Sums)

particularly water masters. Table 5-9 shows improvements in the irrigation infrastructure due to the installation of new measuring structures or the repair of existing ones.

Table 5-9 Irrigation System Modification Works (PA Consortium Group and Inc, 2004)

Activity / Inputs	Kushkulak	Ak Altin	Total over all pilot WUAs
Irrigated area (ha)	4 000	3 191	15 748
Regulated hydraulic gates	37	46	280
NRMP standard measuring structures (GK- type)	41	37	237
NRMP electronic automatic water measuring devices	18	22	124
Repair of original measuring structures on main canal	3		6
Small gates for backyards intakes		20	20

5.2.3.5 Supported versus unsupported WUAs

The table below summarizes the aspects of the relationship between resource system characteristics and group characteristics in supported and unsupported WUAs in Uzbekistan.

Factors	**Supported WUAs**	**Avail.**	**Khorezmian WUAs**	**Avail.**
1.& 2. Relationship between resource system characteristics and group characteristics				
(i) Overlap between group residential location and resource location – Unit of management	Hydrographical principle of establishment	+	Administrative and hydrographical principle of establishment	+/-
(ii) Fairness in payment of services and water supply	Due to installed and functioning measurement devices on the on-farm canals and trained water masters	+	Due to free rider problem among the member groups regarding water use and payment of user fees	-

5.2.4 Institutional arrangements

5.2.4.1 Unsupported WUAs: unclear competences of bodies: WUAs are managed by actors from other related organizations such as farmers' association or MTP

Another aspect influencing the success or failure of local water management in unsupported Khorezmian WUAs concerns the definition of competences.

First, the WUAs are managed jointly with representatives from MTP and Associations of Farmers and Dekhkans. The position of the WUA chairman is usually filled by an accountant or hydrotechnician.

The organizational structure and distribution of powers resembles that of water management organizations and collective farms. The functions of general assemblies and meetings are minimal and the organization is centred on its chairman. The functions of governance and execution are fulfilled by the chairman, who is a member of the council and also the director of staff. The WUA acts as a service organization under the local government and not as a civil society association embedded in the community.

5.2.4.2 Supported WUAs: roles such as president, chairman etc. are clarified

The respondents report that in the USAid-WUAs every farmer group (e.g. *mahallas* or *kishloks*[61]) presented candidates for the post of the WUA chairman, the WUA Council, and the Auditing Commission. Based on these candidates, USAid printed out sets of three ballot papers. The employees of the USAid project initiated the convocation of the General Assembly, during which the water users elected the WUA manager, the members of the Council and the Auditing Commission by secret vote. For the counting of votes, a voluntary and independent commission from respected and experienced water users was established.

In Uzbekistan, it is a usual practice to elect the WUA administration based on the nomination of candidates by local officials (*Oblselvodkhoz, Khakim*iyat). This procedure is criticized by Uzbek and international scientists and experts. However, regarding this practice of nomination, an employee of USAid stated that „when the *Oblselvodkhoz* nominates its candidates for the positions of WUA chairman, Council, or Auditing Commission, it does not mean that these candidates are not fit for this job or

[61] Villages

are non-specialists in the appropriate area. It is a question of principle that the farmers have to elect and re-elect their chairman and other staff of a WUA". With this, the interviewee stresses the possibility for every WUA member to contribute to the election of the WUA governing body.

5.2.4.3 Unsupported WUAs: rules are not discussed, just posted

The key organizational documents of unsupported WUAs in Uzbekistan such as by-law and contracts between WUAs and their members were elaborated and prepared by the Water Resources Department in the Ministry of Agriculture and Water Resources at the national level. They were then transferred to the *Oblselvodkhoz*, where they were modified by the responsible employee at the regional level. These by-laws and contracts on water supply in WUAs have not received any legal back-up. The implementation of the legal status of WUAs is debatable. Water users in the Republic of Uzbekistan do not adopt or discuss the actual water law or by-law of their WUA.

72% of respondents mentioned that sanctions are provided by the by-law. In order to obtain more information, the question was deepened in oral conversation. The respondents had to give examples of sanctions from the by-law (reprimand, penalty, refusal of water delivery). 20% of interviewees did not know about sanctions that are fixed in by-laws. This could be explained by the fact that water users often do not read the by-laws and do not participate in their design process.

5.2.4.4 Supported WUAs: rules

The capability of supported WUAs to have easy and comprehensive rules might be highly due to sufficient awareness work and continuous capacity building. However, the investigation could not validate this assumption empirically.

5.2.4.5 Unsupported WUAs: top-down conflict resolution approach

The mechanisms of conflict resolution in unsupported WUAs are a mix of informality and the top-down imposition of resolutions. Farmers are used to complaining and appealing to authorities (e.g. *Khakims*) regarding issues such as water supply or irrigation of certain fields under strategically important crops.

It was observed that conflict resolution at the local level is largely informal and involves several key stakeholders such as the *Khokimiyat*, water managers and water users, who seek to use their influence and power within the local system to achieve their ends.

The respondents have been questioned on the matter of known sanctions. The most frequent answers were: peaceful conflict resolution[62] (85% of respondents), notification (80%), private reprimand from the WUA chairman (69%), compensation of the caused harm (63%), public reprimand (56%), written reprimand (51%), and imposition of fine (58%). Less significant were: refusal of water supply (33%), public work order (30%) and exclusion from WUA membership (28%).

However, the refusal of water supply can not be applied as a sanction, because farmers have to grow strategically important crops and to achieve their prescribed contribution to the state plan. The *Khakim* is in charge of the control of agro-technical arrangements regarding cotton and wheat.

5.2.4.6 Supported WUAs: enforcement of rules

According to the respondents, in supported WUAs the "*mirobs* are responsible for conflict resolutions" (interview in "Ak Altin" on Nov. 30, 2004). Reasons for conflicts are the irrigation water applications[63], which are filed by WUA members and non-members concurrently. However, this can not be discussed within a WUA. *Mirobs* can only secure the water supply for their members, whom they are responsible for.

Furthermore, any dispute among farmers about water is resolved by a *mirob*. Respondents named the following sanctions as common for conflict resolution:

- reprimand,
- penalty, and
- break of water delivery.

The key informants stressed that during the first two years of work it was very difficult to resolve such conflicts, but that nowadays it has become easier. However, some farmers still do not stick to hard and fast rules and do not file their irrigation water applications in time. Of the respondents in the WUA "Akbarabad", an IWMI-supported pilot project, only one farmer is reported to pay on term and to be diligent in filing irrigation applications. The investigation of conflicts within the supported WUAs is an important aspect for further research.

[62] No sanctions, just internal talks and promises

[63] The applications for the amount of water to be provided are filed in written form.

5.2.4.7 Supported versus unsupported WUAs

The issues of institutional arrangements that characterize supported and unsupported WUAs are summarized in the following table:

Factors	Supported WUAs	Avail.	Khorezmian WUAs	Avail.
3. Institutional arrangements				
(i) Rules and roles are simple and easy to understand	Differentiation in the roles such as president, director, several committees	+	Management of WUA is undertaken by actors from other related agricultural service organizations	-
(ii) Ease in enforcement rules	*Mirob* oriented	+	Top-down approach	-

5.2.5 External environment

5.2.5.1 Unsupported WUAs: legislation of WUA is not clear

The first established unsupported WUAs did not have a sound legal basis; their establishment was legitimated by Cabinet decrees and regulations. The question of the legitimacy of WUAs has been legally contentious and thus is open to the present day. However, WUAs were created and standardized in by-laws and other necessary documents such as water supply contracts were provided by the government.

The legal framework must address and define the enforcement powers that a WUA must have in relation to its members. It includes, for example, graduated sanctions, which WUAs could impose on their members for non-payment, non-performance of essential duties, or violation of the internal rules of the association.

Organizations that do not form legal entities, in practice do not have any legal rights and do not have the opportunity to timely provide for the repair of irrigation systems or the solution of water distribution issues. In addition, the legal status of WUAs is necessary to monitor their performance in managing irrigation systems, to identify obstacles they face and to present possible solutions. Bruns (1993) stresses that "if WUAs are to fulfil their responsibilities for operating, maintaining and improving irrigation systems then in some cases they need legal status to be able to accomplish this" (Bruns, 1993, p. 7). Having the legal status, a WUA can open bank accounts, borrow money and enter into contracts, enforce their rules, and gain recognition from outside as an organization.

So Geijer et al. (1996) stress that "if farmer organisations lack the legal recognition they will have difficulty generating support from members, raising revenues, purchasing equipment, applying sanctions and entering into contractual relationships with the government and third parties" (Geijer et al, 1996, p. 13).

WUAs may need to be legally established, either with a new law or under an existing law, e.g. one on cooperatives (as carried out in the Republic of Uzbekistan). Under conditions where new irrigators' organizations are established, it is not usual that the proper legislation is already prepared in form of a law. However, due to the weak legal framework, WUAs in Uzbekistan do not have real power. The key stakeholders are not motivated to contribute to common activities of irrigation management. Therefore, it is necessary to interlink the administrative (legislative) level with the operative (farmer) level.

5.2.5.2 Supported WUAs: external (government) support regarding special regulations and introduction of privileged quote system

In the investigated supported WUAs, indications of support by some external institutions were observed. Supported WUAs are not secured by WUA legislation, either. Nevertheless, the government of Uzbekistan supports the ADB/ Ak Altin project. To stimulate improvements in farm income and productivity, the government has introduced phased reforms in crop production and marketing in the Ak Altin region, where the ADB selected pilot districts for its project. More specifically, in connection with the implementation of the Ak Altin Agricultural Development Project (AADP), beginning in 2002, the government abolished the production targets for wheat and cotton and lowered their procurement quotas by more than 50% (ADB, 2003).

5.2.5.3 Unsupported WUAs: no embeddedness of WUA into communities

Since WUAs in Uzbekistan were introduced within the framework of large-scale irrigation systems, the question of their embeddedness in the communities as well as in the higher levels of water management is essential.

Unsupported WUAs in Uzbekistan were developed and introduced by the government. They are not embedded into communities because the *Rayselvodkhoz* propagandizes, establishes and supervises them. This supervision is absolutely independent of the design principle of the WUA.

According to institutional analysis carried out by the IWMI in 2002, “WUA mobilization is mainly carried out by the staff of water management organisations and the local government agencies (Khakimiyat)” (IWMI and ICWC, 2002, p. 151). The WUA chairmen do not know each other; members of the WUAs established with the hydrographical principle often do not accept each other as members of the same organization.

The need for embedding individual property rights and private production in a civil society, where individuals and their families recognize their social responsibilities towards common goods as well as their benefits, is not as yet understood by most farmers. They repeatedly shift from their newly found individualism to complaints about authorities that no longer function satisfactorily, but they fail to see the need for their own initiative. The legacy of the authoritarian soviet management system has deprived rural Central Asia of a functioning civil society with legitimate institutions managing collective goods. WUAs need to be strengthened to fulfil their task of managing common water resources through cooperative action by free individual producers, rather than through compulsory state organizations. At present they are in danger of being merely another government organization besides or within the *Khokimiyat* that manages irrigation systems by supervising farmers.

With the establishment of the basin management organization and its subordinate local department, WUAs based on the hydrographical principle became formally embedded in the higher levels of water management (Figure 5.1-2). However, this integration into different levels is purely based on a top-down approach and does not have any mutuality.

5.2.5.4 Supported WUAs: embeddedness in the national and regional water management system and establishment of self-government organizations such as canal committees

Supported WUAs are very well embedded in the national and regional water management system. This is observed in the IWMI project FVP, which proposes a strategic vision for the organization of water management in the Ferghana Valley along hydrological boundaries. The new organization was built up by using existing

structures, namely the Basin Water Organization (BVO[64]). The newly established Canal Management Organizations (CMO) started to manage the main canals and the off-take structures of secondary (inter-farm) canals. WUAs became responsible for the management of the secondary and tertiary (inter-farm and on-farm) canals, including their operation and maintenance, as well as the assessment and collection of the Irrigation Service Fee (IFS) (IWMI and SIC-ICWC, 2001, p. 4). This embeddedness of the supported WUAs in the water management structure positively influences the introduction of farmers' participation in irrigation water management.

In addition to the clearly defined roles of higher and lower irrigation organs, Canal Authorities were introduced as a new alternative organizational structure. Canal Water Committees[65] were established specifically to strengthen the stakeholders' participation. According to Mirzaev et al.(2005), the establishment of the Union of Canal Users in the Constituent Assembly is the origin of a long-time creation process of really democratic, stable, and effective public structures, which represent the interests of water users. The establishment of the Union of Canal Users and of Canal Management marks the beginning of a transfer from state-dominated to participative management of water resources distribution, with Canal Management as a state water management organization and the Union of Canal Users as a public association (Mirzaev et al, 2005, p. 18).

5.2.5.5 Unsupported WUAs: state order

In my opinion, the state order on strategically important crops is still one of the issues that hamper the functioning of a WUA. As mentioned above, the farmers have remained obligated to the state order system. This system constrains farm incomes and exerts pressure on water resources.

In addition, in Uzbekistan, the mismatch between state order production plans and water availability is among the major causes of water resource competition.

In a demand-based system, especially under the pressure to achieve state order targets, cultivators tend to maximize their cropping intensities, rather than to adjust their cropping patterns to water availability. This prevents the adaptation of the production to the carrying capacity of the hydrological system. After the production plans are

[64] The commonly used Russian acronym is retained in this report: BVO, literally Basin Water Union.

[65] Later on they were renamed into Union of Canal Users

determined and the demand has been registered, it is difficult to motivate cultivators to subsequently adjust their production decisions. Instead, they seek to receive water as close to demand as possible.

5.2.5.6 Supported WUAs:waived state order - quota principle

In some supported WUAs, the restrictions on the farmers' decisions were mitigated. For example, all members of the ADB project signed contracts for 2004 regarding the quoted and over-quota agricultural production required by the state.

ADB (2001) wrote in its report that "pursuant to policy dialogue with ADB, the government took a major step to pilot-test policy reforms in Ak Altin district by issuing on May 2, 2001 Minister Cabinet Resolution № 201. The main features of the resolution include (i) commencing from the cropping season 2001, the annual state production target of 50,000 t for wheat and cotton will be replaced by a fixed procurement quota of 17,000 t for seed cotton and 12,500 t for wheat, (ii) production above the procurement quota can be sold at mutually agreed upon prices, (iii) each agricultural enterprise will be independently responsible for fulfilling its procurement quota, and (iv) a steering committee would monitor preparation and implementation of the Ak Altin Agricultural Development Project and the impact of policy reforms introduced"(ADB, 2001, p. 14-15).

The issuance of the Resolution № 201 is the first major policy reform for cotton and wheat procurement. Considering that the above-quota cotton will be sold to private traders in a competitive environment, the government, taking into consideration the more efficient management by private traders, has estimated the price of above-quota cotton at 40 percent above the State procurement price[66].

These calculations indicate the price the government may have to offer if it wants to buy the above-quota cotton. The government, however, has no intention of imposing this price or compelling farmers to sell their above-quota cotton to the government at this price.

The cotton harvest of the year 2001 in Ak Altin Rayon was the first to experience the implementation of the Resolution № 201. It is likely to take a couple of

[66] These calculations, presented by the government, use international prices for cotton converted at the official rate and taking into consideration the processing, transportation, storage, insurance, other trading costs, and profit margins of the local private firms.

years to develop proper procurement and trading procedures. Although the farmers were free to sell their above-quota production to any legal trading agency, it was envisaged that in 2001, the above-quota cotton production continued to be procured by Khlopkoprom[67], albeit at prices significantly above the State procurement price. As farmers gain confidence and experience, they are likely to directly enter into contracts with local private trading firms (Ministry, 2001, para. 16), paying the service charges for processing to Khlopkoprom. In the long term, particularly if more procurement reforms similar to those implemented in Ak Altin are undertaken in other parts of the country, more trading firms and processing facilities in the private sector are likely to be established, thereby creating a more competitive environment. (ADB, 2003, p. 14-15).

Despite the achievements mentioned above, deficiencies remain in the policy environment of the overall economy and of agriculture. They include (i) state interventions in farm operations, especially the state procurement; (ii) the multiple exchange rate system and the overvalued official exchange rate that generate significant price distortions; and (iii) the lack of market competition in farm input supply, machinery services, output processing, and marketing[68].

[67] Cotton industrial organization

[68] There are no specific regulations to prevent private sector participation in farm input supply, machinery services, output processing, and marketing. The lack of such participation is largely due to the low profitability of the cotton and wheat production (paragraph 14).

5.2.5.7 Supported versus unsupported WUAs

The table below compares the external environments of supported and unsupported WUAs.

Factors	Supported WUAs	Avail.	Khorezmian WUAs	Avail.
4. External environment				
(i) State: (a) Supportive external institutions	Governmental regulations regarding privileged quota system, WUA legislation is weak	+	Destructive external institutions due to weak WUA legislation	-
(b) Nestedness of appropriation, provision, enforcement, governance	• Embeddedness in the national and regional water system • Self-government organizations	+	• Embeddedness in the water system on paper only • No information exchange between different organizational levels • Hydrographical principle discomposes social networks in the community	-
(c)No restrictions on farmers' decisions	Waived state order	-	State order	-

This chapter presented insider views on WUA design and implementation processes in Uzbekistan, which were gained in interviews with WUA initiators and establishers. Based on their perspectives, further investigation such as semi-structured interviews and questionnaires were used to find out about the perceptions of WUA members. As a result, it was shown that in certain aspects supported WUAs differ markedly from unsupported ones. These aspects influence the successful management of water resources in supported WUAs. Since these pilot projects are often temporary phenomena with a certain experimental character, I suggest that interesting lessons can be learnt from them. Whether these lessons are best practices for Khorezmian WUAs and whether they can be transferred is the subject of the chapter 6.

6 EMPIRICAL TESTING: ANALYSIS OF FARMERS' PERCEPTIONS IN SUPPORTED AND UNSUPPORTED WUAS

This chapter analyzes the differences between supported[69] and unsupported[70] WUAs as pointed out by the *fermers* in a standardized questionnaire. In addition, the chapter seeks to answer the question whether supported WUAs can be used as a benchmark for other WUAs in Uzbekistan and whether they have better premises than Khorezmian WUAs. The chapter concludes with the lessons learned from supported WUAs, which can be applied to WUAs in Khorezm, and some unattainable characteristics, which can not be reached in Khorezm due to financial constraints.

6.1 Supported project versus khorezmian WUA

The perceptions of *fermers* regarding WUAs in Uzbekistan vary from project to project and from WUA to WUA. During the field research there were no stable statements given by the members of supported WUAs that could be taken as a benchmark. However, trends were observed concerning the development of WUAs and their significance for *fermers* in Uzbekistan.

Since supported and unsupported WUAs in Uzbekistan have different characteristics, which were described in detail in Chapter 5, the distinctions or similarities in their *fermers*' perceptions were tested. The data for these tests was collected with a standardized questionnaire.

First of all, it is essential to explain what is being compared here. The questionnaire included several attitude questions. The possible answers were ranked in a scale from 1 (I absolutely agree) to 5 (I do absolutely not agree). For the empirical testing the means were seen as score means.

Two sided t-tests for the score means of perceived importance (μ) were performed,

$$H_0^i : \mu^i_{supported} = \mu^i_{unsupported}$$

Table 6-2 presents an example of a t-test for the score means of the perceived importance of five information sources, where i describes the source of information.

[69] Pilot projects of international donors.

[70] WUAs that were established based on a top-down approach.

i: Representatives of Regional department of water management (*Oblselvodkhoz*),

Representatives of district department of water management (*Rayselvodkhoz*),

Representatives of the foreign organizations

Khakimiyat

WUA chairman

Based on the broad description in Chapter 5, I will now only focus on the following issues: leadership, conflict resolution mechanisms, and payment of user fees. These issues help in understanding the shared norms and their variety in the investigated WUAs.

6.1.1 Leadership issue

The importance of chairmen was determined by evaluating the respondents' answers. Three topics characterize the role of a WUA chairman: awareness raising, water rotation, and conflict resolution. The weight of one or the other varies depending on the origin of the WUA.

Figure 6.1-1 shows that the respondents of unsupported WUAs acknowledge the awareness raising activities by their chairmen.[71] In addition, the explanation work in Khorezm was not only carried out by the chairmen, but also by the *Rayselvodkhoz*. Considering evidences that the *Rayselvodkhoz* is still very active in the management of WUAs, one might assume that it is probably an even more important information provider for *fermers*. As mentioned in Chapter 5, the *Rayselvodkhoz* nominates the chairman and even the staff of a WUA. However, the *Rayselvodkhoz* as a governmental organization contributes less to awareness raising than the chairmen. Since the chairman is both leader and part of a WUA esteemed, but with equal rights as regular members), it is a positive indicator that *fermers* agreed to the statement that chairmen provide information rather than the *Rayselvodkhoz*. Nevertheless, the chairmen do not manage their WUAs without control from the *Rayselvodkhoz*. In supported WUAs established by international donors, the explanation work was mostly done by the donors (Figure 6.1-1 and Table 6-1).

[71] The data for the Khorezm Region was collected in 2003-2004, when the primary field research was conducted. In 2004-2005, additional monitoring was carried out in the investigated WUAs in Khorezm.

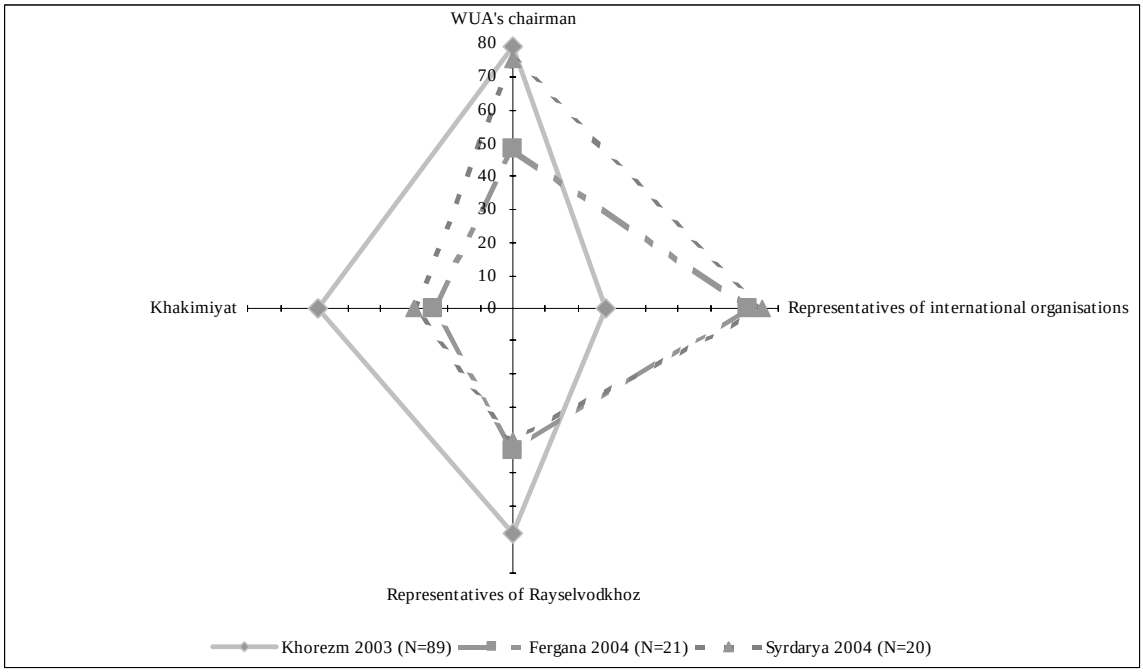


Figure 6.1-1 Importance of different information providers about WUA

Table 6-1 Awareness raising in the WUAs (Own investigation) (In percentage)

	WUA chairman	Representatives of international organizations	Representatives of the *Rayselvodkhoz*	*Khakimiyat*
Khorezm 2003 (N=89)	79	28	68	59
Fergana 2004 (N=21)	48	71	43	24
Syrdarya 2004 (N=20)	75	75	40	30

Table 6-2 presents the results of t-statistics[72] for the means of supported and unsupported WUAs. The t-statistics for the "importance of different providers of information about WUA" indicate that both groups differ significantly in the majority of items regarding the provided awareness raising.

Of the above mentioned information providers, users in the unsupported WUAs ascribe significantly more importance to the representatives of Oblselvodkhoz

[72] The t-statistics are based on qualitative data derived from the standardized questionnaire, which was applied in the field survey. The answers were scaled from 1(I absolutely agree) to 5 (I absolutely disagree).

and Rayselvodkhoz as well as to the WUA chairman. Thus, it appears that the establishment approach of unsupported WUAs is usually guided by the government. However, this does not guarantee a high level of understanding of or affiliation to WUAs by their members, because the state agencies or organizations, which are in flux and under transformation, do not follow the procedure of self-initiated WUA establishment.

In contrast, members of supported WUAs perceive the representatives of international donors as significantly more important providers of information (farmers in unsupported WUAs were also asked about contributions from international donors in terms of seminars or awareness raising). This result indicates that members of supported WUAs are significantly more likely to be informed by representatives of an international organization. International donors contribute a lot to capacity building activities in supported WUAs, as the corresponding t-statistics are highly significant.

Table 6-2 T-test results for the perceived importance of the five information sources in supported and unsupported and unsupported WUAs

Source of awareness work	Percept importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD	M	SD	p
Representatives of Regional department of water management (Oblselvodkhoz)?	3,7	1,99	2,8	1,75	0,016*
Representatives of district department of water management (Rayselvodkhoz)?	3,6	2,01	2,4	1,57	0,001**
Representatives of the foreign organizations?	2,4	1,88	3,9	1,64	0,000***
Khakimiyat	2,8	1,98	2,6	1,67	0,572
WUA chairman	2,5	2,06	1,5	0,74	0,004**

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05;** - p < 0,01; *** - p < 0,001*

It is also obvious that for unsupported farmers the assistance of foreign organizations was the worst source of assistance (even though a series of seminars and round tables were organized in Khorezm by international donors, but no supported

WUAs were established), whereas it was felt to be the most valuable source of information by supported farmers.

Remark: Although the results for *Khakimiyats* are in line with the conclusion above, significance could not be formally proved by this survey.

What is not directly derived from the statistical test, but contributes to the development of shared norms in Uzbek WUAs, is the fact that the methods of awareness raising used by the international donors differ from those used by the information providers of the Uzbek government. MAWR, Oblselvodkhoz and Rayselvodkhoz followed the order to establish, as soon as possible, as many WUAs as prescribed by the government. These governmental approaches influenced the members of the investigated WUAs in the shaping of reform-oriented thoughts regarding the WUA and its role. Under certain given conditions, members of supported WUAs had – and still have – better chances to develop democratic norms. In this way, the test also illustrated the different structural models of WUAs: a democratic model with goals of self-administration in supported WUAs and a hierarchic model with a strong position of the chairman in unsupported WUAs.

The importance of WUA chairmen in the organization of water rotation was also recognized by the respondents (Table 6-3). However, in this context, WUA chairmen are assisted by water masters, who are directly responsible for the water supply. They collect the applications for irrigation water. These written requests for irrigation water can be a catalyst for disputes either among water users in the WUA or with water users from neighboring WUAs or *shirkats*. Disputes within a WUA often occur when *fermers* submit their requests for irrigation water at the same time. Disputes between neighboring areas could be observed in Fergana. Water masters usually resolve both kinds of disputes.

Table 6-3 Water rotation – information flow (Own investigation) (In percentage)

	WUA chairman informs me about water rotation	Come to an agreement with other *fermers*	The *fermer* who receives water before me informs me	At random
Khorezm 2003 (N=89)	79	75	51	29
Khorezm 2004 (N=40)	33	0	0	18
Fergana 2004 (N=21)	100	5	0	0
Syrdarya 2004 (N=20)	80	85	35	25

Most frequently, the chairman of a WUA was regarded as conflict mediator (more than 65% of the respondents from all investigated regions agreed to this) (Figure 6.1-2, Table 6-4). On average, 49% of interviewees mentioned the water masters and 37% mentioned the general meetings as conflict mediators.

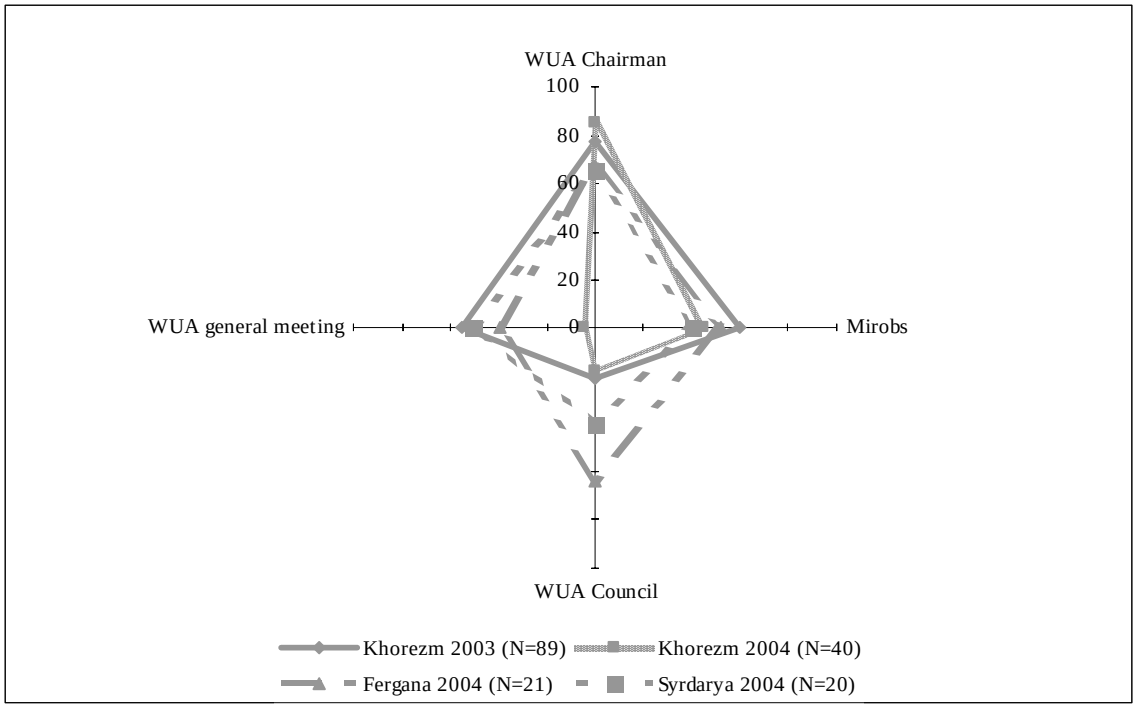


Figure 6.1-2 Conflict mediators in investigated WUAs

Other authorities, who were offered as alternative conflict mediators in the questionnaire, such as the special commission, the council, and other respectful members, received less importance.

Table 6-4 Conflict mediators in WUAs (Own investigation) (In percentage)

	WUA Chairman	*Mirobs*[73]	WUA Council	WUA general meeting
Khorezm 2003 (N=89)	77	60	21	55
Khorezm 2004 (N=40)	85	45	18	5
Fergana 2004 (N=21)	67	52	64	39
Syrdarya 2004 (N=20)	65	40	40	50

The test of means regarding conflict mediators in supported and unsupported WUAs shows that both groups differ in the items of WUA Council and WUA chairman.

Members of supported WUAs significantly perceive the WUA Council as a conflict mediator, while members of unsupported WUAs see the WUA chairman as a conflict mediator with higher significance (Table 6-5).

Farmers in supported and unsupported WUAs did not indicate significant differences in the means regarding *mirobs*.

Table 6-5 Mean differences regarding conflict mediators in supported and unsupported WUAs

Items	Percept importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD	M	SD	p
WUA Council	2,3	1,55	3,3	1,69	0,001**
WUA chairman	2,9	2,15	1,6	1,05	0,001**
WUA general meeting	2,8	1,97	2,7	1,61	0,855
Mirobs	2,8	1,86	3,4	1,55	0,087

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

This again supports the statement, mentioned above, that members of WUAs established by international donors accept democratic structures (such as WUA Council as a members-elected organ) more easily than members of state-organized WUAs in Khorezm, who still focus their affiliation with the WUA on a certain leader.

[73] Water masters

All in all, the following trends were observed regarding the *fermers*' perceptions of the chairmen's role in WUAs.

In Khorezmian WUAs, chairmen and *Rayselvodkhoz* played a crucial role in initiating educational activities about WUAs and their functions. The *Khakimiyat* also contributed to this end, while less information was received from international organizations. In supported WUAs, international organizations contributed largely to awareness raising among water users. In Syrdarya, the WUA chairmen helped by providing the *fermers* with initial information about WUAs. The role of the *Khakim* regarding awareness raising in supported WUAs is low. The t-test shows significant differences in means between unsupported and supported WUAs.

In the view of the water users, the chairmen and the water master are responsible for water rotation issues. In addition, the possibility of personal water delivery arrangements with other *fermers* was mentioned by Khorezmian and Syrdarya *fermers*.

Respondents perceived the WUA chairmen as conflict mediators. This was confirmed by all respondents from the three Uzbek regions. Water masters are also involved in conflict resolution. In the respondents' opinion, the WUA Council and the general meetings contribute less to conflict mediation. The significant difference in perception between the two groups was shown by the t-test.

6.1.2 Conflict resolution mechanisms

Table 6-6 presents the modes of conflict resolutions. These modes were first determined through primary observation and then introduced in the questionnaire. The answers such as "I would talk to the offender" and "I would wait for my turn"[74] prevail. However, when in 2003 the Khorezm *fermers* ranked "wait for the turn" to the first place (72% of respondents), in 2004 most of the respondents (88% of respondents) answered that they would talk to the offender. In the Fergana and Syrdarya regions, the most frequent answer to the question about the conflict resolution mechanisms was "I would forgive the offender for the first time" (72% of respondents in Fergana Valley and 80% of respondents in the Syrdarya Region).

[74] Apart from Fergana fermers.

The answers to whether *fermers* would inform chairmen in order to resolve the problem situation were called in similar frequency over three regions (66% in Khorezm Region, 67% in Fergana Valley and 55% in Syrdarya Region). In 2004 in Khorezm 88% of the respondents admitted that the chairmen of WUA would be informed in case of rules were broken. However, *fermers* stressed that the water master is an active, operative conflict mediator in the field of water distribution issues.

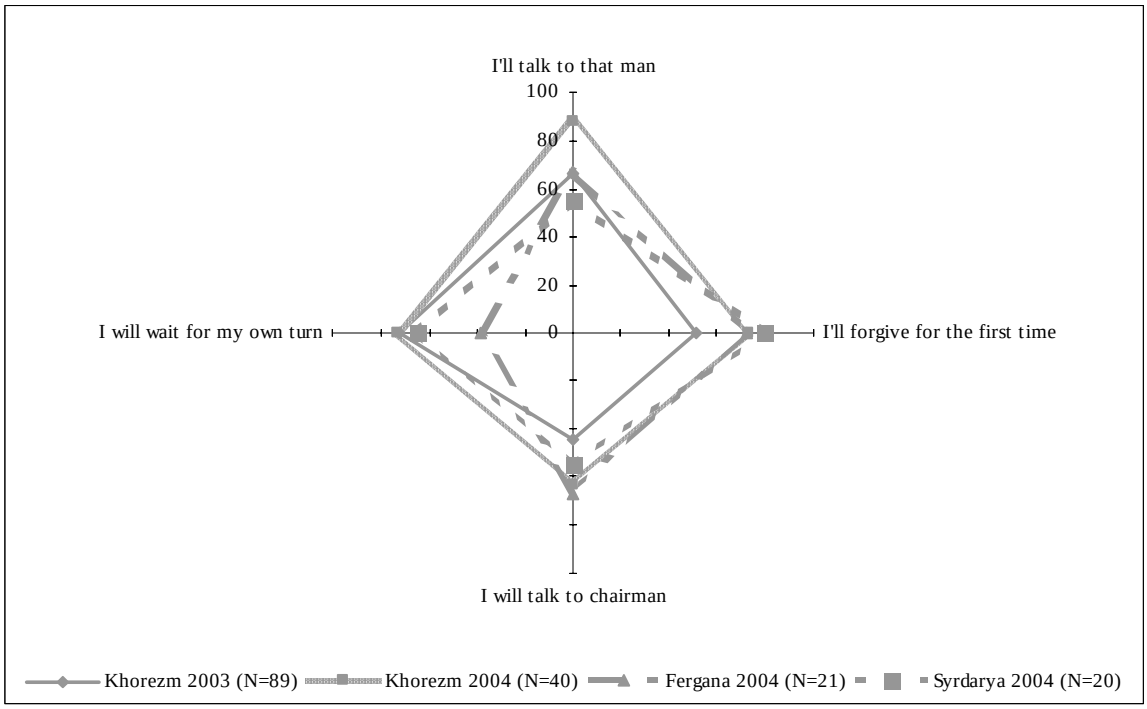


Figure 6.1-3 Modes of conflict resolution

Table 6-6 Modes of conflict resolution (Own investigation) (In percentages)

	I'd talk to that man	I'd forgive the first time	I would talk to chairman	I would wait for my own turn
Khorezm 2003 (N=89)	66	51	44	72
Khorezm 2004 (N=40)	88	73	63	73
Fergana 2004 (N=21)	67	72	67	38
Syrdarya 2004 (N=20)	55	80	55	65

Table 6-7 presents the results of the t-statistics for the intermediate variables on conflict resolution modes.

The t-statistics in Table 6-7 show that unsupported WUAs are significantly more likely to resolve conflicts by waiting for their turn than supported WUAs.

However, the effect size is small. In contrast, the members of supported WUAs resolve their disputes rather verbally (by forgiving or talking to a rule breaker). Although the t-statistics show significant differences in means, the analysis does not indicate systematic discrepancies in the conflict resolution mechanisms of the investigated groups.

Both groups do not show significant differences in the means of contacting the WUA chairman in case of infringement.

Table 6-7 T-test results for conflict resolution mechanisms in supported and unsupported WUAs

Items	Percept importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD	M	SD	p
It happens, I'd forgive for the first time	2,7	1,74	3,6	1,24	0,003**
It happens, I'd talk to that man	2,4	1,70	3,6	1,17	0,000***
I'd talk to chairman	2,9	1,92	3,4	1,51	0,173
I'd wait for my own turn	3,0	1,75	2,3	1,16	0,027*

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

Numerous possible conflict topics among different actors were discussed with respondents from the three selected regions. The predominant matters of dispute among *fermers* were water shortage and canal cleaning (Table 6-8).

Table 6-8 Causes of conflict among water users (Own investigation)

	Water shortage	Lack of canal cleaning	Terms of water supply	Quantity of water supply
Khorezm 2003 (N=89)	85	71	29	34
Khorezm 2004 (N=40)	39	55	7	16
Fergana 2004 (N=21)	86	33	14	29
Syrdarya 2004 (N=20)	85	55	20	25

Table 6-9 [75] presents t-statistics for conflict causes among WUA members that supported the conclusion which was already drawn above based on frequencies analysis. The supported WUAs are significantly more likely to have clean canals and less shortage of water than unsupported WUAs.

Supported and unsupported WUAs do not indicate significant differences in the means regarding the sequence of water delivery.

Table 6-9 T-test results for conflict causes among water users in investigated WUAs

Items	Percept importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD	M	SD	p
Term of water supply	1,5	1,89	0,3	0,46	0,000***
Sequence of water delivery	0,2	0,43	0,2	0,41	0,707
Shortage of water	0,5	0,50	0,9	0,35	0,000***
Lack of cleaning of the canals	0,3	0,46	0,7	0,46	0,000***

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

The most frequently named causes of conflict between water users and WUA were irrigation schedules and non-compliance with delivery contracts (Table 6-10).

Table 6-10 Causes of conflicts between water users and WUA (Own investigation)

	Compliance with water delivery contract	Irrigation schedule	Service fee for water supply	Compliance with resolutions of general meetings
Khorezm 2003 (N=89)	52	64	40	46
Khorezm 2004 (N=40)	50	60	55	25
Fergana 2004 (N=21)	67	48	33	33
Syrdarya 2004 (N=20)	50	40	45	30

Common opinions among *fermers* regarding the reasons for conflicts between WUA and its higher echelon (board management of irrigation systems) were also inquired. *Fermers* reported that the major problems concern the volume of water supply, the condition of the irrigation system and the terms of water delivery (Table 6-11).

[75] Means are derived from the item set, where only two possible answers were offered and coded by 0-does not occur and 1-occurs.

Table 6-11 Causes of conflict between WUA and board management of irrigation system (Own investigation)

	Volume of water delivery	Contract compliance	State of irrigation system	Terms of water delivery
Khorezm 2003 (N=89)	56	22	46	40
Khorezm 2004 (N=40)	20	55	30	20
Fergana 2004 (N=21)	48	29	24	24
Syrdarya 2004 (N=20)	45	30	55	35

In the survey, the respondents repeatedly mentioned the so-called peaceful conflict resolution method. With the help of in-depth interviews the meaning of this "peaceful" solution became clearer. First, respondents prefer to talk to the offender. Second, they would forgive the violation or the break of a rule. Third, the respondents would report the rule breaker or case to the chairmen. In Khorezm and Syrdarya, the interviewees accepted to wait for their own turn. The t-test shows significant differences in means between unsupported and supported WUAs. However, the effect size was small to medium.

The respondents (except for Fergana *fermers*) perceive the shortage of irrigation water as well as canal cleaning as causes of conflict between users. The t-test shows the significant difference in means. In the interviewees' opinion, non-compliance with water delivery contracts and irrigation schedules are the reasons for conflicts between *fermers* and WUA.

Water users from Khorezm and Fergana stated that the non-payment of user fees is a potential conflict issue. In their point of view the volume of water delivery, the state of the irrigation system and the terms of water supply can be matters of dispute between WUAs and the board management of irrigation systems which is responsible for the water distribution to WUAs.

6.1.3 Fermers perceptions toward payment of user fees

The survey conducted in Khorezm in 2004 revealed that, compared to 2003, 14% fewer respondents considered the WUA as their own *fermer*-run organization (Figure 6.1-4). This shows a change in the *fermers*' perception and indicates that they now better understand the meaning of WUAs as potentially self-governing organizations. It can also be interpreted that the *fermers* themselves feel obligated to go to the meetings instead of doing this voluntarily. Fewer respondents stated that for them the WUA is useless (5% in 2004 compared to 22% in 2003).

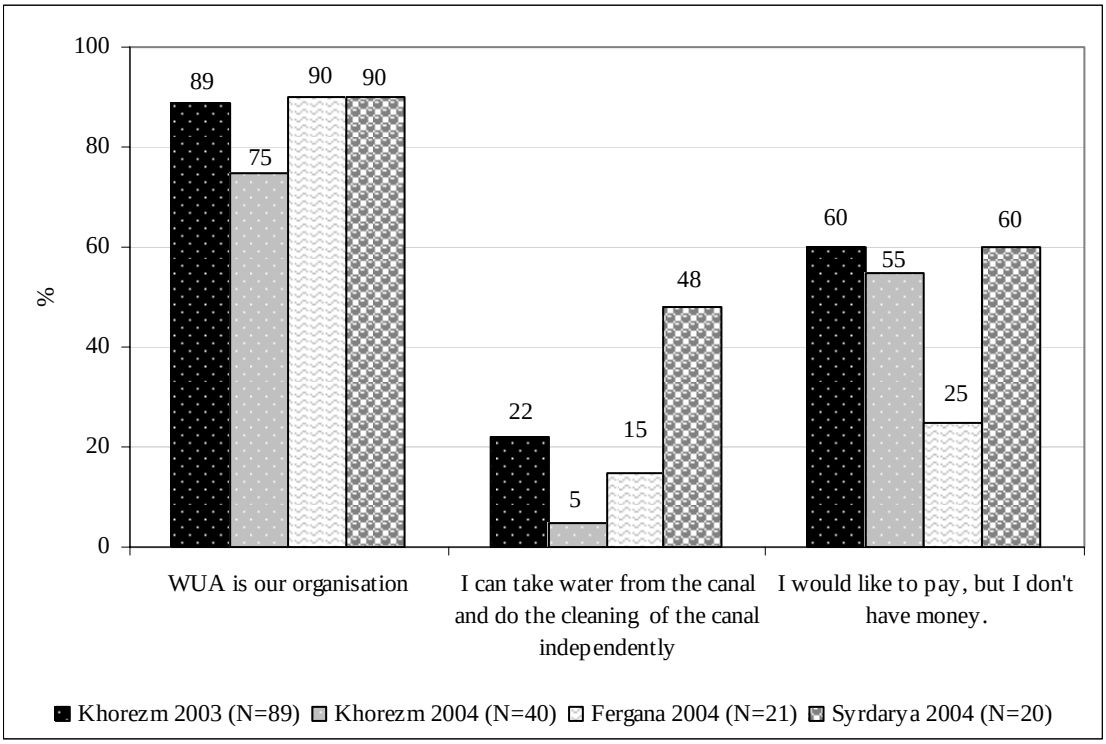


Figure 6.1-4 Why do you pay user fees?

The t-test confirms the aspect of increased understanding in unsupported WUAs. Table 6-12 presents t-statistics for reasons of user fee payments in supported and unsupported WUAs. It shows that the means regarding the item "I can take water from the canals and do the cleanings of the canal independently, without WUA" differ significantly with the medium effect size between the two groups. Unsupported WUAs in 2003-2004 are significantly more likely than supported ones to serve themselves with water without taking into account the WUA as a water distribution organization. In 2004-2005, the perceptions have changed; members of unsupported WUAs are significantly more likely to refer to the WUA in issues of water supply and canal cleaning.

The means regarding the perception of the WUA as a farmer-run organization as well as the payment issue itself differ less significantly between supported and unsupported WUAs.

Table 6-12 T-test results for reasons of user fee payments in supported (2004-2005) and unsupported (2003-2004) WUAs

Items	Perceived importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD		M	SD
WUA is our farmer-run organization. It is necessary to maintain it within our own means. And my user fees is an opportunity to contribute to common business!	2,5	1,64	1,9	0,70	0,033*
I can take water from the canal and do the cleaning of the canal independently	3,4	1,56	1,9	1,37	0,000***
I would like to, but I don't have money.	3,7	1,60	3,2	1,57	0,064*

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

Table 6-13 T-test for reasons of user fee payments in supported (2004-2005) and in unsupported (2004-2005) WUAs

Items	Perceived importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=40)		
	M	SD		M	SD
WUA is our farmer-run organization. It is necessary to maintain it within our own means. And my user fees is an opportunity to contribute to common business!	2,5	1,64	2,4	1,24	0,906
I can take water from the canal and do the cleaning of the canal independently	3,4	1,56	4,8	0,78	0,000***
I would like to, but I don't have money.	3,7	3,60	3,0	1,51	0,031*

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

The results of this statistical test indicate the development of shared norms in Uzbek WUAs, i.e. how members understand the functions of a WUA. Since the unsupported WUAs were established with a top-down approach somewhat lacking in awareness raising, it is essential that the members themselves accept the WUA and realize the value of this organization. The positive changes in the perceptions of *fermers* illustrate their increasing acceptance of WUAs.

The increased understanding by Khorezmian *fermers* of the importance of WUAs is also shown in Figure 6.1-5. In 2004, noticeably more respondents answered that they do not go to WUA meetings in order to meet friends (56% more than in 2003). The importance of these meetings as an information exchange forum has slightly increased. In all three regions a similar trend in answers was observed. This is supported by the t-test for means that shows highly significant difference with medium size (Table 6-14).

Respondents in Khorezm and Syrdarya showed similar frequencies in their answers regarding issues of social force or obligation to go to the meetings as well as the potential to become a chairman due to active participation in the meetings. Respondents in Fergana differed in their awareness level of WUA duties and tasks. The t-test in Table 6-14 shows highly significant differences in means regarding both aspects.

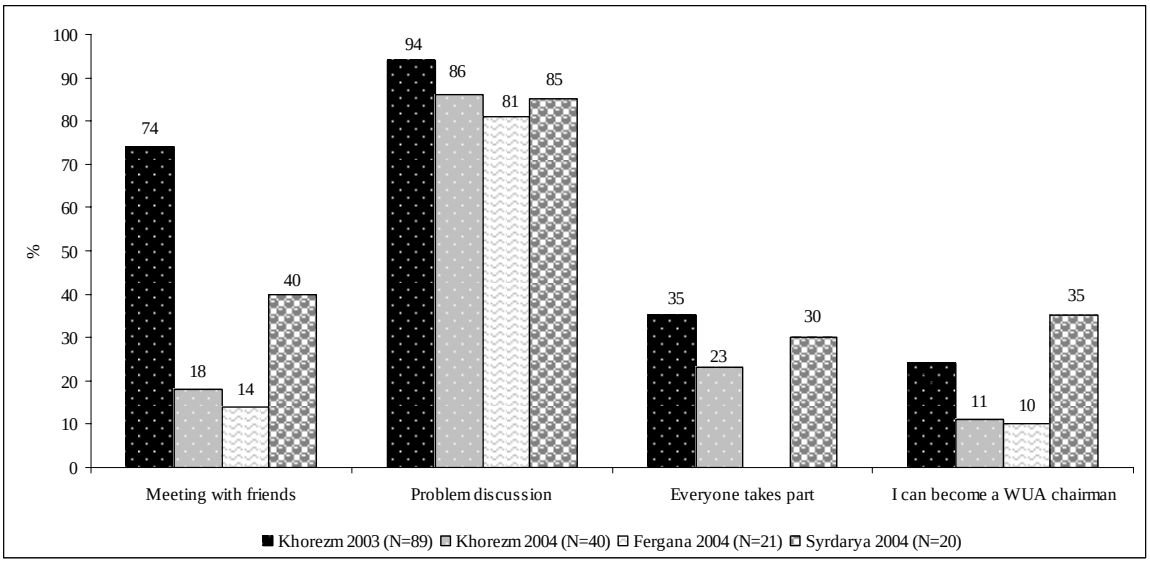


Figure 6.1-5 Purposes of the general meetings of WUA

Table 6-14 T-test results for purposes of the general meetings in supported and unsupported WUAs

Items	Perceived importance to farmer groups				Significance
	Supported (n=41)		Unsupported (n=89)		
	M	SD		M	SD
At the meetings I discuss problems arising from the water using process	2,7	1,73	1,6	0,63	0,000*
At the meetings I meet my friends whom I have not seen for a long time	3,1	1,80	3,6	1,28	0,145
I participate in the meetings in order to be seen, to avoid rumors (everyone takes part).	3,2	1,81	2,4	1,59	0,020**
I can be nominated for the post of WUA chairman if I participate regularly and actively in the meetings	3,7	1,70	1,9	1,39	0,000*
The meetings are useless for me, they just waste my time	4,0	1,67	1,6	1,11	0,000*

M - mean score of percept importance
SD - standard deviation of score of percept importance
** - p < 0,05; ** - p < 0,01; *** - p < 0,001*

However, the weakest and most sensitive aspect was the question of payments. The problems with payments in Khorezm have increased. In 2004, 60% of the respondents (compared to 8% in 2003) agreed with the statement that they cannot afford to pay user fees (Figure 6.1-4). Also in Syrdarya, 60 % of respondents answered that they cannot afford to pay money.

In Khorezm, the low payment level can be explained by reasons such as the untimely payment for delivered cotton, which were discussed in detail in Chapter 5 (5.2).

However, 50% of the respondents in Syrdarya participate in the ADB loan program. As described in Chapters 2 and 5, they receive a reduced state order. The questions why they are not able to pay and why they cannot manage their money need to be further investigated in follow-up studies. In Fergana, 25% of the respondents reported not to be able to manage their money.

As illustrated in the Figure 6.1-4, many *fermers* are not able to control their own money. They would like to pay, but cannot. As mentioned in Chapters 2 and 5, the problems lie in the relationships between *fermers* and, for instance, cotton mills. Figure 6.1-6 compares the payments to Khorezmian WUAs in 2003 and 2004. There are four

different groups of *fermers*: those who paid the whole sum, those who paid less than 50%, those who paid more than 50%, and those who did not pay at all. The number of *fermers* who paid the whole sum decreased from 78% in 2003 to 30% in 2004. At the same time, the number of defaulters increased significantly from 5% in 2003 to 38% in 2004. Governmental behaviour has created conditions within payment systems (for example, untimely cotton payments) that make it difficult for *fermers* to pay their user fees.

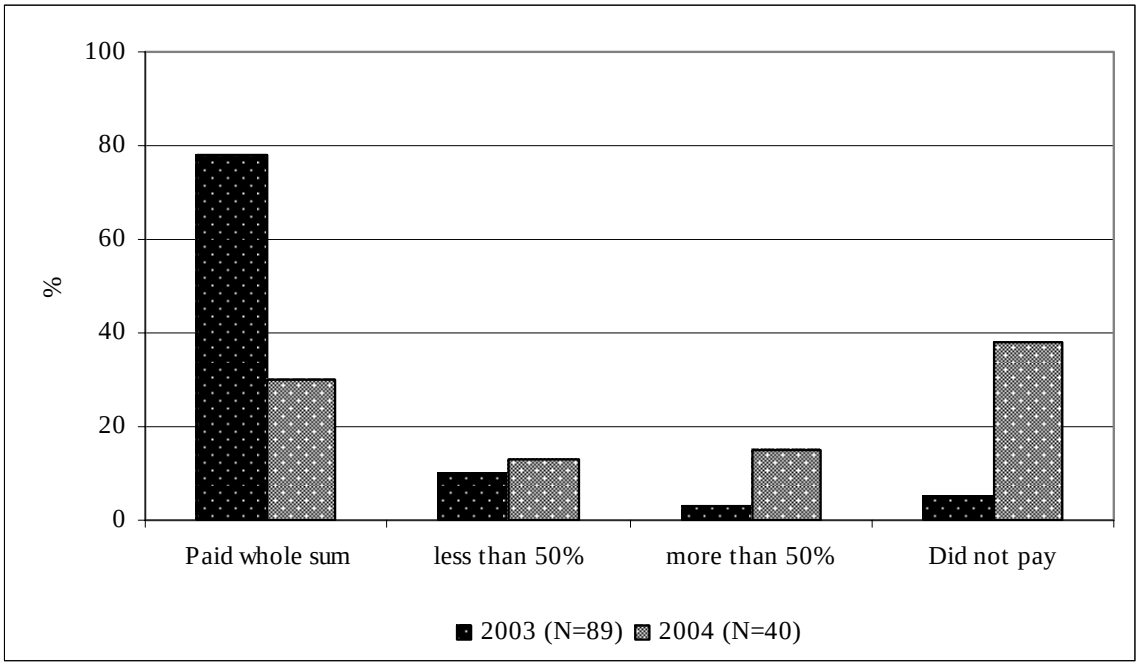


Figure 6.1-6 Regularity of payments from 2003 and 2004

Regarding the payments in the supported IWMI-WUA in Fergana, social mobilizers stated:

> "*Concerning the payments of water fees - during the first year after the creation of the WUA, just 3% were paid by the water users and that payment was only for service but not for the water itself. And this year (2004), 87% of the water users – the fermers – paid water fees. Shirkats make payments in kind (vegetables)".*

In the USAid-WUA in Fergana, WUA employees reported:

> *"Compared to last year, the WUA service payments have increased: in 2004 the WUA received 7 Mio Soum, while in 2003, 6 Mio Soum were received from the water users".*

The payment in USAid-WUAs is made for each hectare. The tariff/table of charges for one hectare is 10 000 *Soum*s. Water limit excess is 1.5 *Soum* per 1м^3. The simple calculation shows that the total payment amount would be approximately 32 Mio *Soum*. The above-mentioned payments (see quotation from the interview of USAid-WUA) of 6 or 7 Mio *Soum* make up 19 or 22% of the total expected amount. In this respect, the USAid-WUA does not differ considerably from Khorezmian WUAs where payments were fulfilled to 30% max. (WUA "Mirob", see Chapter 5)

The chairman of one of the ADB-WUAs gave the information that in 2003 "none of the WUA members paid water user fees" (Personal communication from Nov.23, 2004). One of the employees explains the problem of non-payments in the WUAs as follows:

> *"The existing WUAs have a big problem – non-payment of water user fees by fermers, which is connected with purposeful tranches and a lack of possibility to take out money from the bank account. There is only one possibility: to pay the WUA chairman directly in cash"*

However, cash payments to a WUA are not permitted by the Uzbek legislation. The usual procedure of payment is the transfer from a *fermer* account to the WUA account.

In Syrdarya, USAid-WUA employees reported that "the cost of water delivery service per hectare is 5 400 *Soum*, which equals the minimum salary in Uzbekistan. Since the first establishment of a WUA, *fermers* have paid 1 Mio *Soum* in 2004[76]".

The presented results can be summarized as follows:

- In Khorezmian WUAs, the *fermers'* understanding of the functions of a WUA increased between the years 2003-2004. The t-test for means supports this statement;
- The WUAs in Uzbekistan, particularly those in Khorezm, face financial obstacles that were typified by untimely payments to WUAs.

6.2 Best practice of supported WUAs vs. untransferable practices

Based on the characteristics of supported WUAs described in Chapter 5 and their differences to Khorezmian WUAs, the advantages and disadvantages were pointed out in correspondence to the resource system characteristics, group characteristics,

[76]That is taking into account that this WUA has 121 members and 3 607 ha.

relationship between resource system characteristics and group characteristics, institutional arrangements, and external institutions that were derived from literature and considered applicable for the Uzbek context. It is essential to stress that the projects of international donors had different goals and did not follow the objective to establish or strengthen the WUA as local water management organization (Table 6-15).

Table 6-15 Summary of investigated pilot projects (Own presentation)

No	Region	Project Name	Donor	Main goals of the project
1	Fergana Valley	Central Asian Natural Resources Management Program (NRMP)	USAid	- Technical assistance - Training - Providing limited equipment - Commodity support to assist the CA Republics in improving their management of critical natural resources, primarily water and energy
2		Integrated water resources management (IWRM)	IWMI	- Contribute to the security of livelihoods - Contribute to environmental sustainability - Contribute to social harmony in the context of rural restructuring in the participating republics of Kyrgyzstan, Uzbekistan and Tajikistan, by introducing and pilot-testing integrated water resources management and water users' participation among the water management institutions in the Fergana Valley
3	Sydarya Oblast, Ak Altin Rayon	Institutional Support for Sustainable Agricultural Development	ADB	- Rehabilitation of irrigation and drainage network - Rehabilitation of collector networks - Introduction of new management methods for water resources - Establishment of an alternative park of machinery and tractors
4	Syrdarya Oblast, Mirzaobod Rayon	Central Asian Natural Resources Management Program (NRMP)	USAid	- Technical assistance - Training- Providing limited equipment - Commodity support to assist the CA Republics in improving their management of critical natural resources, primarily water and energy

As can be seen in the summary above, these pilot projects focus on technical assistance and the rehabilitation or modification of irrigation and drainage system. Only the IWMI project deals with livelihood strategies, the participation of local farmers, and social dynamics among water users. Basically, the contribution of international donor

projects in terms of benchmarks or lessons that could be learned does not cover all issues mentioned in the theoretical framework in Chapter 3. They only consist of either technical or institutional aspects.

However, based on four theoretically defined categories, some practices in the four investigated supported projects, could be identified as transferable to the unsupported, top-down WUAs (Table 6-16).

Table 6-16 Best practice of supported WUAs (Own presentation)

Categories	**Transferable practices**
1. Resource system characteristics	Availability of heavy equipment
	Machinery for MTP
	Irrigation system modification works
	Technical assistance regarding measurement devices
2. Group characteristics	Capacity building (trainings)
3. Institutional arrangements	
	Consulting center
	Public awareness work, propaganda
	Canal authorities (more participation, new irrigation structure)
4. External environment	

In Chapter 3 and later on in Chapter 5, I discussed the theoretical anthology and its applicability to the supported WUAs. The first characteristic of these WUAs was the predictability of resource supply as part of the resource characteristics (Table 6-16, section 1).

One of the major problems for WUAs in Uzbekistan is their poor technical equipment for activities such as irrigation (pumps and measurement devices), cleaning of canals (excavators) and construction of new devices or maintenance of existing devices (cranes). Experiences from the supported projects show that the availability of heavy equipment leads to enhanced water security. In unsupported, top-down established WUAs the question of whether to purchase such equipment is raised as well.

The same question exists regarding the machinery for *MTP*. Some international organizations (e.g. ADB) have supported WUAs with the machinery for

MTP. Currently, the services of the equipped *MTP*s are very costly and several *MTP*s do not have any equipment.

The **next practice** of supported projects that can be applicable to Khorezmian WUAs are irrigation system modification works. However, the rehabilitation or new construction of an irrigation and drainage network is very expensive and demands additional financial sources. It seems to be realizable if water users pay user fees, properly taking into account a special fund for the rehabilitation of the irrigation system.

The **forth practice** concerns the technical assistance with measurement devices. *Fermers* in Khorezmian WUAs have to build measurement devices without proper instructions and material supply. They have difficulties building uniform measurement devices, because they do not have exact technical drawings and use improvised means for the constructions (wood, concrete). The technical assistance in this context is transferable to the unsupported WUAs. However, it is not clear who could be responsible for such assistance in Khorezm.

Regarding the improvement of group characteristics (Table 6-16, section 2), the members of supported WUAs obtained new knowledge which changed their shared norms and understanding of the on-going processes into the direction of market economy or adapted them to new economic circumstances such as new water management structures and new credit systems. This obtained knowledge is referred to by the common term “capacity building”. In this context, Khorezmian WUAs can learn from supported WUAs.

The basic structures of the service-providing organizations in Uzbek agriculture are similar. *AMTP*s[77] were established parallel to WUAs after the collapse of the *shirkat* system. This occurred according to the Resolution of the Cabinet of Ministers Nr. 8 from Feb. 05, 2002 “About arrangements on reorganization of agricultural enterprises into *fermers*”. Besides *AMTP*s and WUAs, other facilities like branches of commercial banks, storage facilities of the fertilizer supplier “Uzkishlokkhujjatkimye”, and branches of the fuel base “Uznefteproduct” were established. The *AMTP*s inherited machinery and equipment from dismantled *shirkats*. Even though machinery is available, there is a lack of qualified staff. An unsupported,

[77] Alternative MTP

top-down WUA needs equipped *AMTP*s and trained personnel. **The practice** of organizing trainings for the mechanics is useful for unsupported, top-down WUAs.

In addition, the experience of the IWMI-WUAs regarding social mobilization through the training of members and staff is transferable to the conditions of WUAs in Khorezm.

For more intensive support, it is advisable to establish permanent training centers for the technical and legal education of WUA members. The concept of the *RBAC,* which provides consultation to *fermers* in the ADB-WUA, can be extended to Khorezmian WUAs. **The practice** of having training sessions on a permanent basis and not only within the framework of international projects can be transferred to unsupported WUAs. A similar idea was presented in the "Manual for Water Users Associations in Uzbekistan, Manual 2: Formation and Development" where it says: "Because the temporary support of donor projects is inadequate for long term WUA development, it is necessary to create permanent support institutions that provide advice and training, either as part of a donor project or a program implemented by the government" (IWMI, 2005). These capacity-building efforts contribute to the development of institutional arrangements (Table 6-16, section 3).

In addition, for the increase of public awareness about WUAs, **the practice** of publishing popular articles, brochures and leaflets about their goals and objectives and of distributing them among the *fermers* can be adopted from supported projects.

The next practice concerns two categories - institutional arrangements and external environment (Table 6-16, sections 3 and 4). It aims at establishing the nestedness of water management institutions. One of the supported projects (IWMI) has worked on the development of institutional dynamics. Regarding institutional development, the extension of the irrigation management system through the introduction of additional new alternative organizations such as the Union of Canal Users is a solution for attracting experienced and respectable people – specialists as well as marginal groups such as female *fermers* and female representatives of the local government. These committees are established to strengthen the stakeholder participation and present another useful practice for Khorezmian WUAs.

According to Mirzaev et. al. (2005), the establishment of a Union of Canal Users at the Constituent Assembly is the starting point for a long-time creation process

of truly democratic, stable, effectively functioning public structures that represent the interests of water users. The establishment of a Union of Canal Users and Canal Management means the beginning of a transfer from state to participative management of water resources distribution, where the Canal Management is a state water management organization and the Union of Canal Users is a public association (Mirzaev et al, 2005, p. 18)

The above-mentioned elements are partially or completely adaptable to unsupported, top-down WUAs.

However, there is a set of elements that are not priorities for unsupported, top-down WUAs. Such superfluous elements can be divided in two groups: technical equipment and know-how of social structure. Technical elements refer to radio communication systems (USAid), automatic waterflow measurement devices (USAid), provision of office and field equipment (USAid), mail communication system between all management levels, (IWMI), geographical information system (GIS) (IWMI), demonstration fields (USAid; IWMI) and rehabilitation of irrigation system on two different levels (ADB). Radio communication systems and state-of-the-art but cost-effective automatic waterflow measuring devices with software are not appropriate for Khorezmian conditions. Radio communication systems make sense in areas where large and gravity flow irrigation is dominant. Automatic measurement devices with software are rather luxurious equipment in the areas where no computers are available.

As for the latter issue, activities such as the propaganda of measurement devices and their expansion are a good practice but not applicable to unsupported, top-down WUAs.

Social structures of the projects were improved through social mobilization by employed social mobilizers. However, the social mobilization with specially trained staff such as mobilizers seems to be unsuitable for the Khorezmian context, because social mobilizers are not full members of the community and the WUA in particular. They are paid by an outside source (in case of the IWMI by project means).

In my opinion, the practices of supported projects that are applicable for the unsupported, top-down WUAs are capacity-building issues such as the training of WUA members, administration and personnel as well as the strengthening of public participation in water management, and the creation of new public organizations. The

issues of equipment and machinery are also vital. However, the implementation of these issues demands the financial stability and sustainability of the WUA members. Another opportunity could be governmental support in terms of subsidies or privilege credits to *fermers* or even to WUAs.

7 SUMMARY AND CONCLUSIONS

This chapter presents an integrative summary of the main findings. First, the characteristics of WUAs in Khorezm will be organized in relation to the theoretical framework presented in Chapter 3 as well as the farmers' perceptions analyzed in Chapter 6. The functions of supported WUAs that were taken as benchmarks will be described in consideration of the applicability or (non-) transferability of their practices. The chapter ends with policy recommendations for different levels.

For this thesis, success was defined as bringing functions from one quality level to a higher one and keeping them there over a long period.

Hence, successful WUAs in Khorezm should have predictable water supply provided by an improved irrigation and drainage system, water users who are aware about the WUA as a farmer-run organization for irrigation management, leaders with a decision-making mandate, equal distribution of water and costs among WUA members, clearly defined roles and rules for the empowerment of a WUA, a well-adapted legal framework, and the free determination of agricultural production by farmers/members. The availability of these factors, which contribute to a proper WUA functioning, could be observed in supported WUAs.

Table 7-1 summarizes the differences in WUA characteristics. The summary is organized according to the theoretical framework described in Chapter 3. For a better understanding of the different factors and their influence on the success or failure of local water management, they are explained in an exemplified form. In addition, two columns show the availability of the factors in supported or unsupported WUAs, thus indicating either positive (+) or negative (-) influence on the functionality of a WUA. The symbol "+/-" means that the current state of a characteristic, on the one hand, has a positive impact on irrigation management, but, on the other hand, to a certain degree negatively affects its success.

Table 7-1 Comparison of WUA characteristics (Own presentation)

Factors	Supported WUAs	Avail.	Khorezmian WUAs	Avail.
1. Resource system characteristics				
(i) Predictability	Water supply is improved due to the rehabilitation of the irrigation and drainage system and availability of machinery	+	Water supply is impeded due to the unsatisfactory condition of the irrigation and drainage system and lack of machinery	-
2. Group characteristics				
(i) Shared norms	High understanding of reforming processes in irrigation management due to conducted awareness work towards WUAs	+	Sense of satisfaction and status regarding employment in a WUA, but low level of awareness towards WUAs	-
(ii) Past successful experience – social capital	Less available due to newly introduced elements of democratic election	-	Available due to former occupation of the WUA leaders in the state structure and continued cooperation between leaders of different agricultural structures	+
(iii) Appropriate leadership	Clear decision-making mandate, but the management of WUAs performed by water masters, mechanicians	+	Restricted decision-making mandate, however appropriate personal	+-
1.& 2. Relationship between resource system characteristics and group characteristics				
(i) Overlap between group residential location and resource location – Unit of management	Hydrographical principle of establishment	+	Administrative and hydrographical principle of establishment	+-
(ii) Fairness in allocation	Due to installed and functioned measurement devices on the on-farm canals and trained water masters	+	Due to free rider problem among the member groups regarding water use and payment of user fees	-
3. Institutional arrangements				
(i) Rules and roles are simple and easy to understand	Differentiation in the roles such as president, director, several committees	+	Management of WUA occurs by actors from other related agricultural service organizations	-
(ii) Ease in enforcement rules	*Mirob* oriented	+	Top-down approach	-
4. External environment				
(i) State: (a) Supportive external institutions	Governmental regulations regarding privileged quota system	+	Destructive external institutions due to weak WUA legislation	-
(b) Nestedness of appropriation, provision, enforcement, governance	• Embedded in the national and regional water system • Self-government organisations	+	• Embedded in the water system is on the paper • No information exchange between different organisational levels • Hydrographical principle discomposes social networks in the community	-
(c) Restrictions on farmers' decisions	Waived state order	-	State order	-

Thus, for example, in Khorezmian WUAs the factor “appropriate leadership” is, on the one hand, characterized by a weak decision-making mandate, which was explained as “old nomenclature” and the intervention of the Khakim into the internal processes of the WUA, and, on the other hand, by proper specialists being part of the WUA staff.

The next example of a “+/-” issue regards the unit of management in Khorezmian WUAs. As described in Chapters 2 and 5, WUAs in Khorezm were established according to two principles: administrative and hydrographical. We also held an expert discussion meeting about this issue. On the one hand, the hydrographical principle provides equal water supply to all users, but, on the other hand, the social networks and roles of former players are disturbed. However, in some cases in Khorezm the administrative and hydrographical structure of WUAs coincide.

Since the hydrographical principle of WUA establishment was suggested by the IWMI to improve water distribution and accepted by the Uzbek government, its adoption means a transfer from one quality level to another, which corresponds to our definition of “success”. Hence the factor “unit of management” in Khorezmian WUAs is marked with “+/-”.

These examples of indifferent marks show again that the Uzbek society is in flux and in a very uncertain state. Having different years and types of establishments, no fixed factors or conditions can be named for success or failure.

The comparison itself (Table 7-1) illustrates that the positive changes in supported WUAs occur due to their intensive supervision by international donors, e.g. regarding the election of the WUA governing body, training in essential issues, and, obviously, their financial contribution to purchase machinery and other equipment.

The WUAs established by the government that I observed in Khorezm can improve their functioning by applying some of the lessons learned from supported WUAs. However, as I described in Chapter 6 there are transferable and non-transferable practices of supported WUAs.

The following practices are transferable: providing heavy equipment such as cranes and excavators, and machinery for tractor fleet (MTP), carrying out irrigation system modification work, technical assistance with measurement devices, capacity building in terms of training, creating consulting centers, awareness raising through

mass media, increased participation in water management, e.g. through canal committees. Their applicability within the conditions characterizing Khorezm was shown in detail in Chapter 6. It depends on the necessity of the respective practices for the Khorezmian context.

In some cases we have identified transferable practices that cannot currently be adapted to Khorezm due to the lack of financial means or even of potential government sources. These practices include: the purchase or donation of machinery for WUAs and MTP as well as the rehabilitation/modification of the irrigation and drainage system.

The practices of supported WUAs that are non-transferable to Khorezmian WUAs are concerned with mostly technical issues, e.g. sophisticated modern computer driven measurement devices, radio communication systems, and their propagation.

Besides technical issues, the introduction of new social structures characterized supported WUAs. As already mentioned in Chapter 6, social mobilizers are usually project employees rather than community members. This makes them inappropriate for Khorezmian WUAs which lack the additional funds for such positions. However, these activities could be based on altruistic initiatives by members themselves.

Before recommendations are given for water management in Uzbekistan, unsupported WUAs will be evaluated regarding the roots of their problems.

Thus, for example, from a legal perspective (regarding the introduction of by-laws and registration), experience has shown that the establishment of WUAs takes a short time. However, WUAs need a clear legal status to embed and function as intended.

Bruns(1999) and Vermillion (1999) also stress the importance of a sound legislation for irrigation organizations. Both authors argue that its legal status will empower the WUA and provide it with legal authority in “governing irrigation operation and maintenance, collecting fees, sanctioning those who violates rules, contracting for services, and holding water use rights on behalf of farmers” (Bruns, 1999, p. 93).

In addition, the law “must specifically limit the potential intrusion into the autonomy by other organizations, especially the governmental branches, so as to

achieve the self-governance on the part of participants by freeing them from any unnecessary outside interference and control" (Wang, 2004, p. 4).

This is connected with another problem that concerns the mandate in the decision-making process, which the leaders receive from the members of a WUA. The mechanism of the democratic election of WUA leaders often does not work. (The leader of a WUA is either imposed from the top or selected on the basis of kinship or other considerations). Consequently, some leaders turn out to be unsuitable from a moral as well as from a qualifying point of view, which is reflected in the quality of water management. This argument is supported by Meinzen-Dick (1999, p. 18).

The weak collaboration among WUAs and its subordinate organizations shows the low embeddedness of these organizations in the whole water management structure. According to Vermillion (2004), increasing economic specialization, population density, and interaction among resource users, has caused the sustainability of WUAs to be increasingly dependent on its relationship with external actors (Vermillion, 2004). A partnership of mutual accountability between WUAs, government, third parties and consumers (the principle of nestedness (Lele, 2004; Ostrom, 1992)) is needed to enable irrigation to be both productive and sustainable. Bureaucracies that focus on narrow sector interests, seeking "rent" from farmers and creating dependency among water users must be transformed into agencies whose purpose (formal and informal) is to build capacities for WUAs to manage irrigation in a productive and sustainable way (Vermillion, 2004).

The third problem is the acceptance of the WUA by its members. The members in Uzbekistan equate WUAs with fees or taxes collectors that do not improve the water management structure. Abernethy and other authors (2000) wrote about this phenomenon "the organizations established by government tend to remain dependent on the government, and their leaders look to government agencies (rather that to their own members) as the source of their legitimacy, and in many cases, the source of their financial support" (Abernethy et al, 2000, p. 12).

Based on the summary of findings above I will complete my thesis with the following recommendations for different levels of management:

- On the national level, the state should make additional investments in the construction and maintenance of the system, since the major irrigation network (up

to the secondary level) is under state control. A further perspective could be to reduce the state influence on farmers' activities. Here we observed the interdependence between the increasing profitability of farms and a decreasing state control. Besides clarifying the management principle, it should also be clarified, whether WUAs should be established within the framework of existing social networks (administrative-territorial), or according to canal networks (hydrographical principle).

- National, provincial, district, and local levels should collaborate more with each other: vertically and horizontally.
- At the local level, more real power should be given to the WUA chairmen. The external influences on the decision-making authorities of WUAs, namely the intervention of local officials in the decision-making processes in WUAs, should be reduced.
- At the WUA level, it is advisable to increase the members' participation in everyday activities. For this purpose, it is necessary to give water users a solid and clear explanation about the technical, economic and legal terms of water management.

Finally, without the right to determine their production program or to freely sell their agricultural products on markets, the adaptation of farmers to WUA requirements is not possible.

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9 APPENDICES

9.1 Appendix A

Appendix A presents extractions from the model by-law elaborated by SANIIRI as well as a crucial annex of Regulation No. 290 from June 28, 2003.

Appendix A begins with the description of a constituent contract of a WUA (Figure 9.1-1).

Figure 9.1-1 Content of a constituent contract

The constituent contract includes:
List of contract participants (water users);
Establishment of a WUA;
Goals of the WUA establishment;
Legal status of a WUA;
Collective investment fund;
Duties and rights of contract participants;
Distribution order of profits and losses of a WUA.

The following boxes (Figure 9.1-2, Figure 9.1-3, Figure 9.1-4) list tasks, functions and duties of a WUA.

Figure 9.1-2 Tasks of a WUA

The main tasks of a WUA are:
- The scheduling of water use;
- The water delivery from the state irrigation systems and its distribution between WUA members;
- The maintenance of the on-farm irrigation system;
- The attraction of private and public financial means for the governance and development of a WUA.

Figure 9.1-3 Functions of a WUA

In order to perform the above-mentioned tasks a WUA is able to:
- Establish structural sub-departments for the provision of production activity;
- Obtain, lease, build and establish movables and immovables, and charge them off to the book-keeping balance;
- Sell to other persons, exchange, lease and leave the WUA property for temporary use;
- Render its service in accordance with the prices and tariffs that are fixed by WUA. If tariffs are provided by legislation, the services of a WUA can be sold in accordance with state tariffs;
- Use bank credits;
- Keep WUA money in the settlement and other bank accounts;
- Carry out all types of cleaning, crediting and cash transactions;

Figure 9.1-4 WUA's duties

A WUA has the following duties:

- To design a water use schedule and allocate water limits to water users according to the determined rules of water use;
- To maintain the interfarm irrigation and drainage network;
- To provide drain and waste discharge;
- To carry out book-keeping, control and accounting concerning the water distribution and use;
- To raise fees and payments from WUA members for provided works and service;
- To apply sanctions and fines on WUA members who infringe WUA by-laws or contracts ;
- To conclude treaties with the state irrigation systems and WUA members.

Members of a WUA have governing and managing rights. For instance, election and participation in decision-making forums belong to the governmental rights. Water control issues cover managing rights. The members' rights and duties are presented in Figure 9.1-5, Figure 9.1-6, Figure 9.1-7.

Figure 9.1-5 Governing rights of a WUA member

A WUA member has the following rights:

- To elect and be elected to the executive organs of a WUA;
- To participate in the discussion of questions representing their interests, in verbal or written form;
- To receive fixed water limits for each member;
- To determine the maintenance forms of their own hydroeconomic units independently;
- To obtain information on the activities of executive organs of a WUA having public as well as private interests;
- To use privileges foreseen for the WUA members;
- To give any suggestions on their requirements in works and service provided by a WUA;
- To assert property claims to a WUA board concerning infringement of members' rights.

Figure 9.1-6 Managing rights of a WUA member

A water user has the following rights:

- To control the actual water outlet considering its fixed limits ;
- To make suggestions for work and service of a WUA;
- To control the quality of WUA work and services carried out in accordance with the user's request;
- To assert material claims of the WUA administration, in case a WUA does not perform the contract duties.

Figure 9.1-7 Duties of a WUA member

A water user has the following duties:

- To pay the WUA for its work and services in proper time;
- To observe the water limits fixed for him;
- To maintain the hydroeconomic units according to his accounting balance;
- To make a prior agreement with the WUA administration on the time and volume of water supply as well as other works and services;
- To guarantee the safe keeping of measurement devices on his own water outlets.

A WUA member can lose his membership. The reasons for the exclusion from WUA membership are listed in Figure 9.1-8.

Figure 9.1-8 When can a WUA member lose his membership?

The exclusion from WUA membership occurs in the following cases:

- Own will;
- Non-payment of user fees within the time fixed by the General Assembly;
- The repeated infringement of the WUA by-law, the contract and legal requirement entailing material losses of WUA or WUA members;
- On the announcement of a WUA member as bankrupt according to the legal procedure of bankruptcy.

The tasks and duties of some WUA bodies are shown in Figure 9.1-9, Figure 9.1-10, Figure 9.1-11, Figure 9.1-12, Figure 9.1-13, and Figure 9.1-14.

Figure 9.1-9 Tasks of a General Assembly

The General Assembly undertakes the following tasks:

- To approve the WUA by-law and a model agreement on providing chargeable services to the WUA members;
- To incorporate corrective actions into WUA documents;
- To elect board, chairman and auditing commission of a WUA;
- To approve current and perspective work plans, the reports on their implementation;
- To approve the WUA budget and a report on its implementation;
- To approve tariffs and payments of service and work provided by a WUA;
- To approve the amount of user fees for WUA members;
- To approve the types and amounts of sanctions and fines for infringements of a by-law or contract duties;
- To consider claims for refusal of WUA membership, exclusion from and leaving a WUA;
- To approve the schedule of WUA water use;
- To take up reports of the auditing commission and make decisions according to the reports;
- To determine the degree of WUA participation in collective or other enterprises, public associations.

Figure 9.1-10 Tasks of a WUA board

The board of a WUA has the following tasks:

- To prepare suggestions for consideration and discussion during the General Assembly;
- To control the implementation of Assembly decisions, regulations of by-laws and legal requirements on regulation of water use and protection;
- To approve of sanctions and fines for infringements of a by-law or contract duties;
- To resolve disputes and conflicts among WUA members and their claims to the WUA administration;
- In extraordinary cases, the board makes decisions normally under the competence of the General Assembly with the subsequent approval of the latter;
- To decide on calling a General Assembly;
- To organize the General Assembly;
- To consider the issues of WUA membership, exclusion from and leaving a WUA.

Figure 9.1-11 Tasks of a WUA administration

The WUA administration (directorate) has the following tasks:

- To design a water use schedule and allocate water limits to water users;
- To maintain the interfarm irrigation and drainage system;
- To design plans for current and future works as well as for the WUA budget;
- To design tariffs and prices of WUA services;
- To guarantee the collection of user fees and payments for WUA services and work;
- To guarantee the implementation of sanctions and fines for infringements of contract duties;
- To care for WUA property;
- To make bargains and operations with juridical and natural persons;
- To issue attorney letters;
- To open settlement and other accounts in banks;
- To hire and to fire WUA employees;
- To issue orders and instructions;
- To draw up financial reports and other documents;
- To act on behalf of the WUA and to represent the WUA in courts, organizations and other institutions.

Figure 9.1-12 Duties of a WUA administration

The duties of a WUA administration are the following:

- To supply water to the users according to the fixed limit and irrigation schedule;
- To provide proper conditions for drainage;
- To maintain on-farm irrigation and a drainage network;
- To equip the users' water outlet with measurement devices, to carry out their assessment, maintenance and periodical check-up;
- To collect user fees and compulsory payments for the rendered service and other works.

Figure 9.1-13 Rights of a WUA administration

The WUA administration has the following rights:

- To change the fixed limits for users depending on the irrigation water supply coming from the irrigation system;
- To reduce the water outlet of a user whose water use exceeds the fixed limit;
- To introduce water rotation among users under the conditions of water shortage or drought.

Figure 9.1-14 Functions of an auditing commission

The functions of the auditing commission are as follows:

- Financial control on money flows;
- Analysis and control of bank accounts;
- Presentation of audit results on financial activities to the general Assembly and WUA board.

The Figure 9.1-15 gives an overview about the WUA property and WUA budget

Figure 9.1-15 WUA property and budget components

The WUA property consists of:
- Capital assets and other valuables that are transferred to the WUA;
- The property purchased by a WUA.

The sources of budget forming of a WUA are:
- Financial and material fees from WUA members;
- Incomes obtained from the sale of work, service, and other activities;
- Credits from banks and other creditors;
- Other sources that are permitted by legislation.

describes the reasons for the sanctions and fines that could be imposed to WUA members.

Figure 9.1-16 describes the reasons for the sanctions and fines that could be imposed to WUA members.

Figure 9.1-16 Reasons for sanctions in a WUA

Sanctions and fines are imposed for:
- Unauthorized water inlet exceeding a fixed limit;
- Expiration of the compulsory payment time;
- Construction of dams and crossroads into the farm irrigation and drainage network;
- Damage of devices of the on-farm irrigation network;
- Other infringements of by-law and contract duties of a WUA.

Not only WUA members sign a contract with a WUA, the WUA itself has to sign a contract with the state irrigation system (management of irrigation systems). The items of a contract are summarized in the Figure 9.1-17.

Figure 9.1-17 Contract items

The relation between a WUA and the state irrigation systems are determined by contracts including the following items:
- The schedule of water supply in accordance with the terms and volumes;
- The calculation of water to be supplied;
- The rights and duties of the parties concluding the contract;
- The responsibility of the parties, sanctions and fines for infringement of the contract;
  Resolving of the mutual claims.

As pointed out in the chapter 2, 2.7 Figure 9.1-18 presents the peculiarities of the new structures. The most interesting elements for this thesis are marked with the red box.

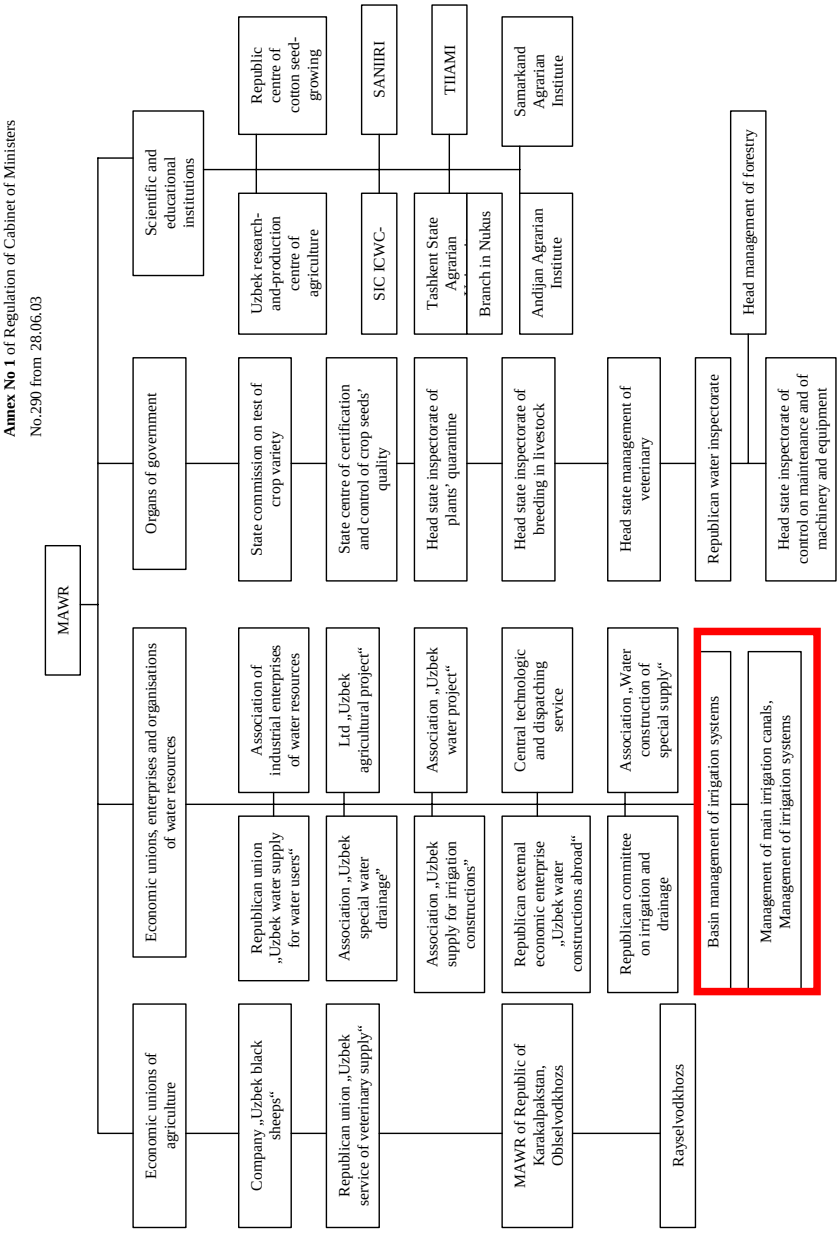

Figure 9.1-18 Organizational structure of MAWR

9.2 Appendix B

The annex B consists of maps of WUAs prepared by respondents during the field research within the framework of PRA.

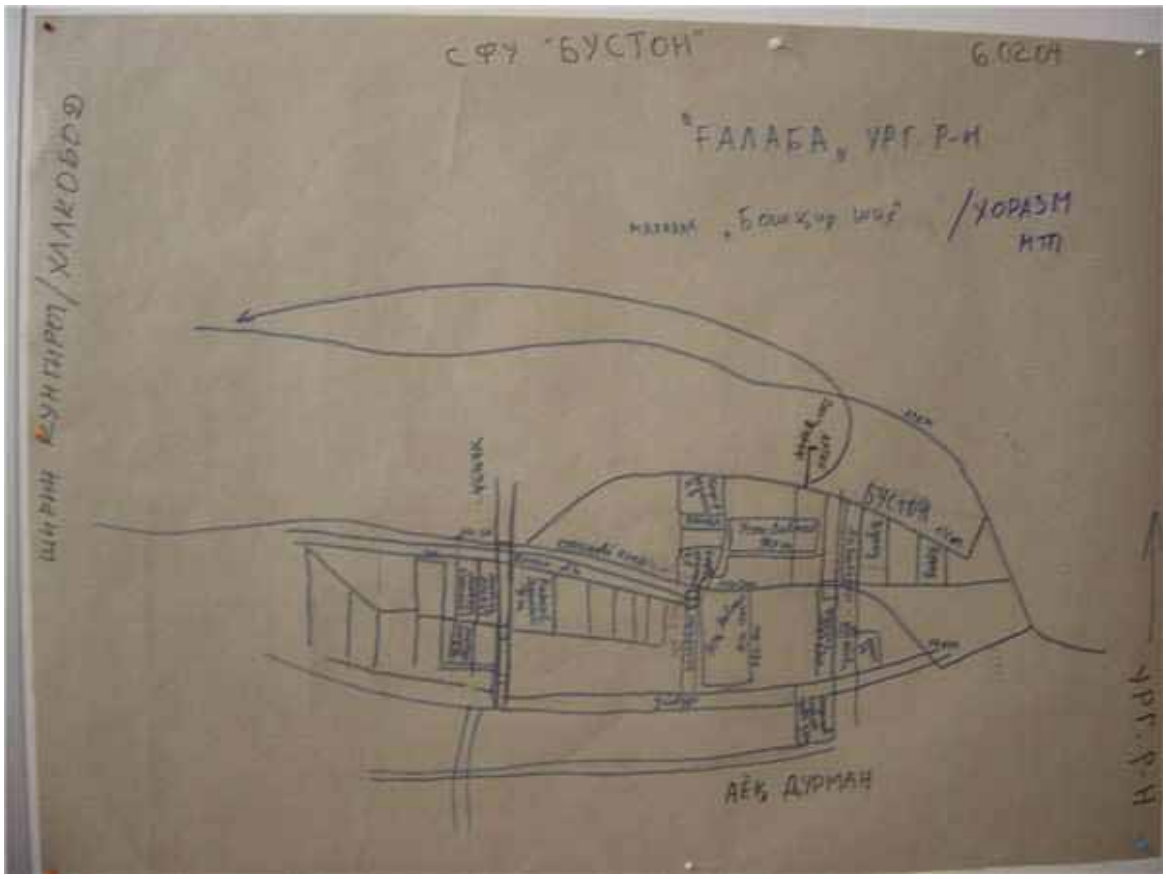

Figure 9.2-1 Map of WUA "Buston" (January 2004)

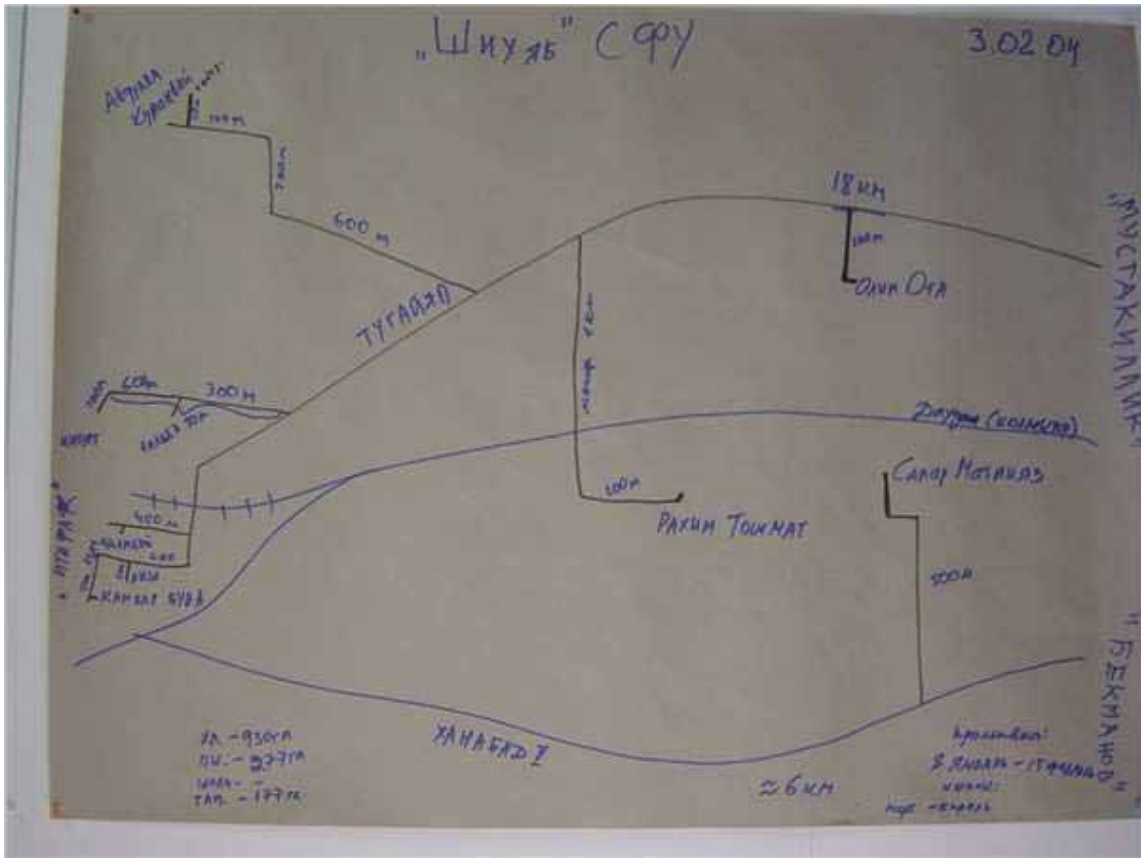

Figure 9.2-2 Map of WUA "Shikhyab" (Januar, 2004)

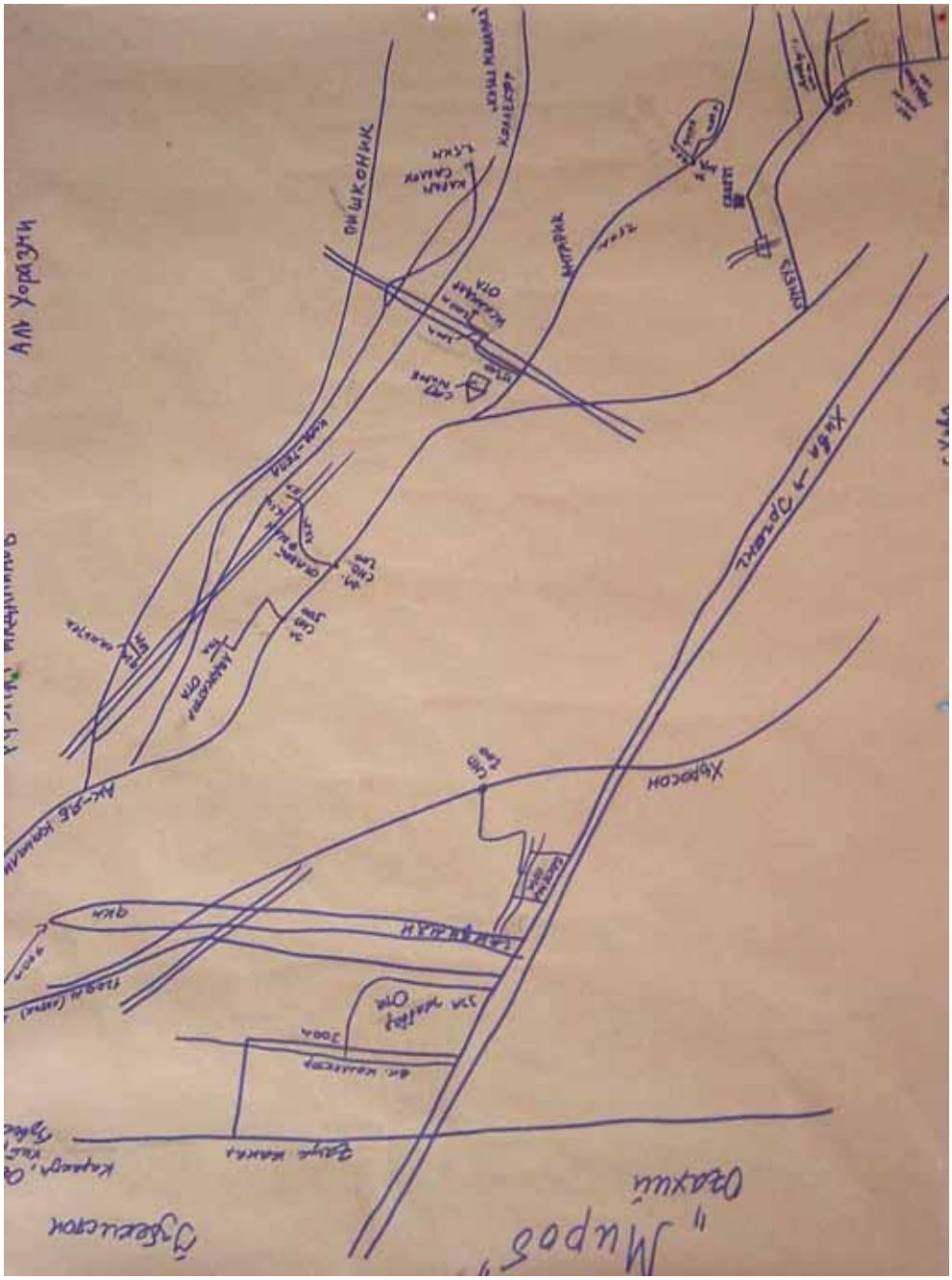

Figure 9.2-3 Map of WUA "Mirob" (January 2004)

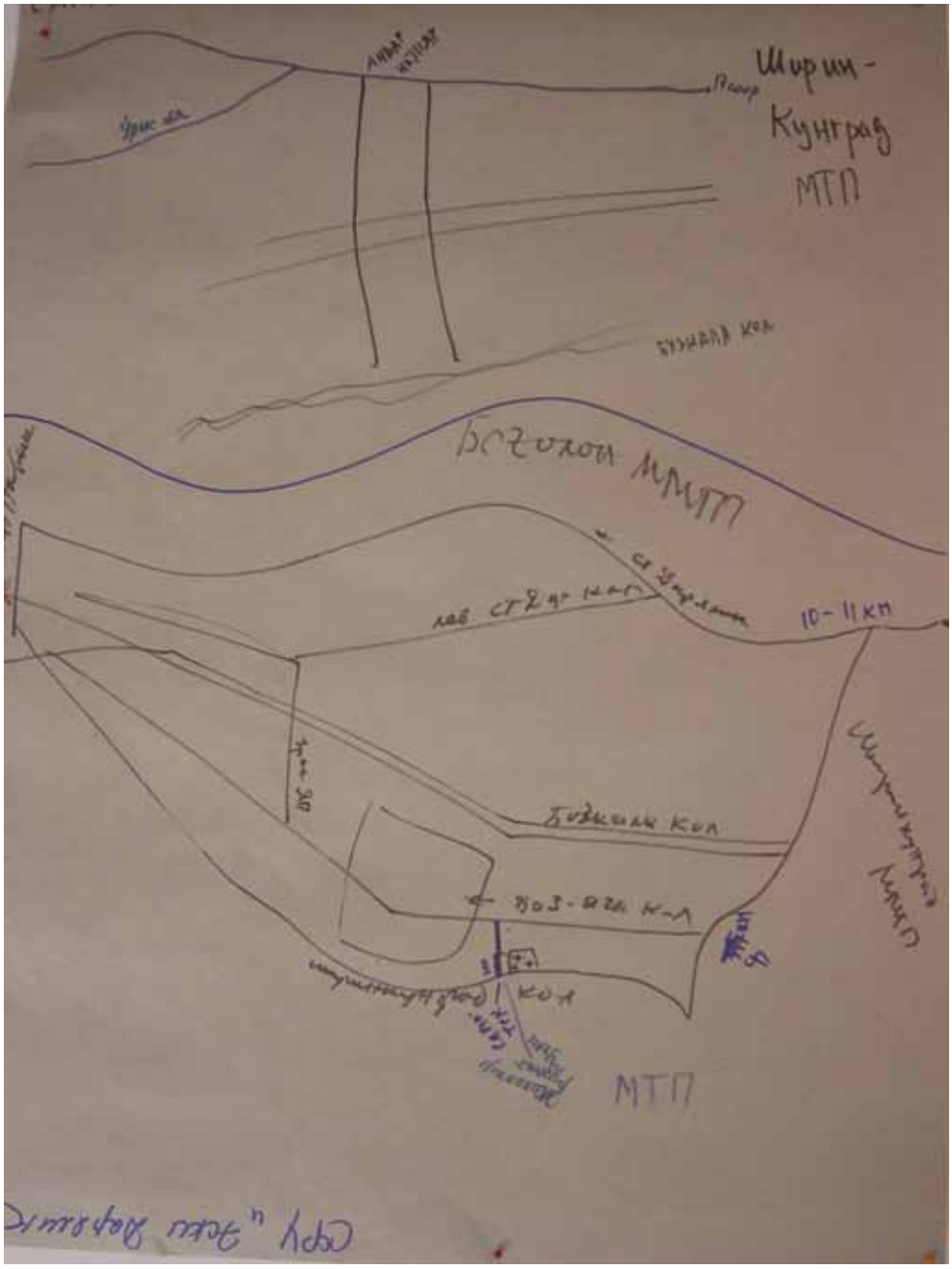

Figure 9.2-4 Map of WUA "Eski Daryalik" (January 2004)

9.3. Appendix C

9.3.1 Standardized questionnaire

Semi-structured questionnaire

for the field research on «Factors influencing the identification of water users association (WUA) members»

in the Khorezm region of the Republic of Uzbekistan

0.0.Region ☐ 0.1WUA ☐ 0.2. Farm ☐ 0.3. Farmer ☐

0.4. When was your WUA established? 2000 2001 2002 2003

0.5. Were any consultation meetings held before the creation of your WUA? ☐ ☐

0.6. Who conducted these meetings?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

a) Representatives of the Ministry?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

b) Representatives of the regional department of water management (Oblvodkhoz)?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

c) Representatives of the district department of water management (Rayvodkhoz)?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

d) Representatives of foreign organizations?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

e) Khakimiyat

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

f) WUA chairman

0.7. How many water users does your WUA have? < 100 100-150 >150

0.8. How many water users do you know?

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

1. Are dehkans members of the WUA?

2. What document is used by dehkans as proof of entitlement to receive water?

a) A contract with the WUA chairman	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it
b) A contract with hydroeconomic organizations	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it
c) There is no contract	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

1. 3. How, by which method, do dehkans receive water?

a. Fully take part in water rotation	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it
b. Receive water after farmers	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it
c. Dehkans and farmers receive water together at the same time	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it
d. Receive water by a normative principle	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

2.1. Why does the WUA need water user fees?

a. To have me pay for the water delivery	Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

b. The WUA needs to pay the salary of its administration and attendants

Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

c. The user fee is used for the maintenance of the irrigation network and the construction of new canals and hydrotechnical facilities

Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

2.2. Are you willing to pay user fees to the WUA?

a. User fees guarantee the fair water use as the one who takes a lot of water pays accordingly more

Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

b. Water is God's gift. Nobody has the right to demand water fees.

Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

c. Introduction of user fees is useless. At first water will be received only by those who are situated upstream or who have a lot of money.

Absolutely sure of it	Sure of it	Partially sure of it	Not quite sure of it	unsure of it

2.3. Do you feel the necessity for paying user fees?

a. The WUA is our farmer-run organization. It is necessary to maintain it within our own means. And my user fee is an opportunity to contribute to common business!

Fully agree	agree	Partially agree	Do not quite agree	disagree

b. I can take water from the canal and do the cleaning of the canal independently

Fully agree	agree	Partially agree	Do not quite agree	disagree

c. I would like to, but I don't have money.

Fully agree	agree	Partially agree	Do not quite agree	disagree

2.4. How important to you is the document specifying the reason and concrete amount of your payment? (as the telephone or gas bill)

Very important	important	Partially important	Not very important	Not important

2.5.Farmers who own a lot of land need a lot of water. Suppose that a particular farmer always supports the community (financial support, construction of new roads and others). Could he pay less for the water supply?

Fully agree	agree	Partially agree	Do not quite agree	disagree

3.1. Do you participate in general meetings?

always	often	sometimes	never

3. 2. What do these meetings inform you about?

a. At the meetings I discuss problems arising from the water using process

Fully agree	agree	Partially agree	Do not quite agree	disagree

b. At the meetings I meet my friends whom I have not seen for a long time

Fully agree	agree	Partially agree	Do not quite agree	disagree

c. I participate in the meetings in order to be seen, to avoid rumors (everyone takes part)

Fully agree	agree	Partially agree	Do not quite agree	disagree

d. I can be nominated for the post of WUA chairman if I participate regularly and actively in the meetings

Fully agree	agree	Partially agree	Do not quite agree	disagree

e. The meetings are useless for me, they are just waste my time

Fully agree	agree	Partially agree	Do not quite agree	disagree

3.3. I'll list the characteristics of the perfect leader. Please give me your opinion

a) Honest

Fully agree	agree	Partially agree	Do not quite agree	disagree

b) Fair

Fully agree	agree	Partially agree	Do not quite agree	disagree

c) Hard working

Fully agree	agree	Partially agree	Do not quite agree	disagree

d) Responsible

Fully agree	agree	Partially agree	Do not quite agree	disagree

e) Smart

Fully agree	agree	Partially agree	Do not quite agree	disagree

f) Educated

Fully agree	agree	Partially agree	Do not quite agree	disagree

g) Enjoying people's confidence and support

Fully agree	agree	Partially agree	Do not quite agree	disagree

h) Good speaker

Fully agree	agree	Partially agree	Do not quite agree	disagree

i) Having time for public work

Fully agree	agree	Partially agree	Do not quite agree	disagree

3.4. By what characteristics did (would) you elect your WUA's chairman?

a.	Good organizer	Fully agree	agree	Partially agree	Do not quite agree	disagree
b)	Professional competence	Fully agree	agree	Partially agree	Do not quite agree	disagree
c)	Having many children	Fully agree	agree	Partially agree	Do not quite agree	disagree
d)	Fair	Fully agree	agree	Partially agree	Do not quite agree	disagree
e)	Active participation in public life	Fully agree	agree	Partially agree	Do not quite agree	disagree
f)	Intelligent	Fully agree	agree	Partially agree	Do not quite agree	disagree
g)	Communicative	Fully agree	agree	Partially agree	Do not quite agree	disagree
h)	Careful	Fully agree	agree	Partially agree	Do not quite agree	disagree
i)	Person supporting rigid discipline	Fully agree	agree	Partially agree	Do not quite agree	disagree
j)	Person with a broad outlook	Fully agree	agree	Partially agree	Do not quite agree	disagree

k) Hard working	Fully agree	agree	Partially agree	Do not quite agree	disagree
l) Experienced	Fully agree	agree	Partially agree	Do not quite agree	disagree
m) Person of principle	Fully agree	agree	Partially agree	Do not quite agree	disagree
n) Clear-sighted	Fully agree	agree	Partially agree	Do not quite agree	disagree
o) Conscientious	Fully agree	agree	Partially agree	Do not quite agree	disagree

4.1. The chairman controls the water delivery for 24 hours a day. What do you think about it?

a) It is an old soviet method that the chiefs control everything	Fully agree	agree	Partially agree	Do not quite agree	disagree
b) It is right, otherwise someone else could dispose of water without authorisation	Fully agree	agree	Partially agree	Do not quite agree	disagree
c) The chairman controls in shifts (with hydrotechnicians)	Fully agree	agree	Partially agree	Do not quite agree	disagree
d) Water control is necessary for 24 hours a day	Fully agree	agree	Partially agree	Do not quite agree	disagree

4.2. How do you know that it is your turn to receive water from the canal?

a)	The sequence is discussed at the general meetings	Fully agree	agree	Partially agree	Do not quite agree	disagree
b)	The WUA chairman informs me	Fully agree	agree	Partially agree	Do not quite agree	disagree
c)	The farmer who receives water before me informs me	Fully agree	agree	Partially agree	Do not quite agree	disagree
d)	At random	Fully agree	agree	Partially agree	Do not quite agree	disagree
e)	Come to an agreement with farmers	Fully agree	agree	Partially agree	Do not quite agree	disagree

5.1. Who resolves the conflicts and disputes in your association:

a)	Commission for the resolution of disputes	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
b)	WUA Council	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
c)	WUA Chairman	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
d)	WUA General Meeting	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
e)	Other respectful WUA members	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

f) Mirabs

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

5.2. If anyone takes water without permission and out of turn?

a) It happens, I'll forgive the first time

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

b) It happens, I'll talk to that man

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

c) I'll start a conflict

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

d) I'll also take water out of turn

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

e) I'll ignore that man

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

f) I'll talk to the chairman

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

g) I'll appeal to the community committee (mahallya)

Absolutely approve	approve	Partially approve	Do not quite approve	disapprove

h) I'll wait for my own turn

5.3. Are fines or other forms of punishment stipulated in case of offences against the WUA chart

yes	no	Don't know

7.1. What, in your opinion, is the reason for water disputes between farmers:

a) Quality of water delivery ☐

b) Term of water supply ☐

c) Sequence of water delivery ☐

d) Shortage of water ☐

e) Lack of canal cleaning ☐

7.2. What, in your opinion, is the reason for water disputes between farmers and the WUA:

a) Irrigation schedule ☐

b) The fee for water supply services ☐

c) Performance of water delivery contract ☐

d) Performance of obligations by WUA members ☐

e) Performance of resolutions by general meetings ☐

7.3. What, in your opinion, is the reason for water disputes between the WUA and water delivering organizations:

a) Terms of water delivery ☐

b) Volume of water delivery ☐

c) Fee for water delivery services ☐

d) State of irrigation system ☐

e) Contract performance ☐

7.4. What kinds of conflicts and disputes have occurred in your WUA:

a) Non-compliance with the water delivery contract ☐

b) Excessive withdrawal of water from the canal ☐

c) Violation of irrigation schedule ☐

d) Untimely payment of water user fees ☐

e) Non-observance of obligations by WUA members

f) Terms of water supply

7.5. What types of mechanisms for resolution of problems/conflicts do you know?

a) Peaceful conflict resolution	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
b) Notification	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
c) Private reprimand from the WUA chairman	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
d) Public reprimand	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
e) Written reprimand	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
f) Public work order	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality
g) Imposition of fine	Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

h) Refusal of water delivery

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

i) Compensation of the caused harm

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

j) Exclusion from WUA membership

Fully corresponds to reality	Corresponds to reality	Partially corresponds to reality	Not absolutely corresponds to reality	Does not correspond to reality

9.3.2 Semi-structured interview guidelines (2003-2004)

Technical Issues/Technical details/Inventory

Establishment of WUAs

- How were WUAs established in Uzbekistan?
- Which role did international organizations play in the establishment of WUAs?
- On the experience of which countries was the process of WUA establishment based?
- Why exactly these countries?
- Were the peculiarities of Uzbekistan taken into account?
- Which difficulties appeared in the establishment of WUAs in Uzbekistan?
- How do WUAs work nowadays?
- How high is the interest in establishing a WUA?
- What about the willingness to pay?
- Where lie the problems?
- How are water charges presented?
- How could farmer determine how much water the individual farm or a household plot uses?
- What about measurement devices?
- I've heard about the introduction of water pricing. What can you say about that?
- A WUA is a non-commercial organisation. What do elections look like?
- Do farmers nominate their own candidates?
- What about non-members of WUAs? May they participate in elections?
- Who is the leader of WUA?
- According to which criteria is the chairman elected?
- Which role do former high-level farm employees play?
- Are members of a WUA interested in their WUA?
- How can this be proved?
- What is the driving force in a WUA: neighbourhood or membership?
- Are farmers well informed about the constitutional framework of a WUA?
- What are farmer interested in: practical or administrative issues?
- Were there any initial training sessions for the farmers?

- Did everyone participate in training sessions?
- Did training sessions also take place for farmers who joined a WUA at a later date?
- What was the duration and intensity of the training?
- Which conflict management mechanisms do you know?
- How should WUAs be designed?

(Optimal present situation) – Expert's advice

- What is important for WUAs?
- At which level should WUAs be created?
- Where should the farmers' participation be increased?
- What should water pricing tariffs look like?
- Which advantages does the establishment of WUAs bring?
- How can WUAs work under market conditions?
- Why should farmers cooperate with each other?
- How is it possible to make water governance effective?
- What about experiences from the past: self-management of water use e.g. *mahalla*?
- Which principle is more suitable: hydrological or administrative?
- How can it be realized in the Uzbek context?
- Should WUAs be established by people which were selected by the water users themselves?
- What can be appropriate incentives?
- How important are sanctions?
- Is it good to have WUAs?

(Future, opportunities for improvement, Importance) – Experts' opinion

- Are WUAs survivable, long-term organisations?
- Which water-related advantages do WUAs offer?
- Which economic advantages do WUAs offer?
- Which role do WUAs play?
- Is it only for securing water and providing for its equitable distribution?

- Could the purchasing of agricultural inputs and machinery become a task of WUAs?
- Do WUAs play a role in the sustainability of the environment?
- If yes, how?

9.3.3 Guidelines for the interviews with international donors

Question 1: Предпосылки для создания проекта (Как международные доноры начали свою деятельность в Узбекистане по осуществлению и улучшению ирригационного менеджмента?)

Why (on what basis) did they decide that it was necessary (worthwhile) to start a WUA programme in Uzbekistan?

What induced/forced/triggered them to start the programme?

How did they do it (how did they begin and so forth)?

Preconditions for the project creation (How did international donors for the performance and improvement of irrigation management begin their activities in Uzbekistan?)

Question 2: Концепция и основная мысль/цель проекта

What are the objectives? Are there any hidden objectives? (How do we need to read between the lines?)

What is the problem analysis of the projects/programmes? How do they phrase it?

What is the strategy that the projects/programmes have developed?

Concept and main issue/goal of a project

Question 3: Основной состав и форма работ, площадь исследований, число фермеров, форма вовлечения местных кадров (фермеров)

Main structure and type of the activities, area of the project, number of water users, how is the local staff (farmers) involved in the project?

Question 4: Основные результаты проекта (создание АВП, обучение, материальные вложения(реконструкция систем, строительство сооружений, изменение взаимодествия субъектов водопользования и т.д.)

Main results of the project (establishment of a WUA, training, financial investments (e.g. reconstruction of irrigation systems, building of devises etc.))

Question 5: Оценка проекта (успехи, сложности, достижения)

What did the projects actually do?

Does the project have an internal monitoring and evaluation system? What does it look like?

What are the results and how have they shaped the project? External M&E? What are the outcomes?

Assessment of a project (success, obstacles, progress)

Question 6: Льготы/благоприятствование для водопользователей/фермеров/ирригаторов со стороны проекта (согласованность проекта с правительством)

Preferential treatments of a project for water users/farmers/irrigators (Coordination of a project with governmental decisions)

Question 7: Опыт жизнеспособности проекта (Какова гарантия того, что созданные АВП будут продолжать функционировать по окончании проекта? Имеет ли проект планы по усилению и укреплению АВП после окончания проекта?)

Evidence of the viability of WUAs after finishing the project (What is the guarantee that the established WUA will function after the project ends? Does the project have any plans in terms of the strengthening of WUAs? How sustainable are they?)

9.3.4 Guidelines for the field research 2004-2005

Field research questions with further possible coding (based on the literature)

Topic: WUA Chairman and his importance

Main questions	Operationalization	Evidence from the literature
How do chairmen get elected or appointed?	How long do you know your chairman? What did he do before he got this job? How did he get this job?	The types of authority: legal, traditional and charismatic (M. Weber, 1966) "Leadership may even be embedded in other social leadership roles, such as tribal chief" (Hunt and Hunt, 1976). "The character of the leaders will play an important role in creating trust – or in undermining trust among the members, if the leaders are seen to be it for personal gain" (Meinzen-Dick, 1999).
Which powers do they have?	Have you ever asked the chairman for advice? What are the functions of a chairman?	"The leaders need to be endorsed by the members"(Meinzen-Dick, 1999). "Role of Leaders are (1) promote appropriate and modern agricultural technologies and practices and monitor their application; (2) participate in the preparation of water delivery schedule and cropping calendars; (3) mediate in water distribution when problems arises; (4) chair meetings" (mod. from The Siew Keat et al., 1999).
What is their legitimacy in the eyes of irrigators?	What is the chairman allowed to do in the WUA? Whose opinion do you rely on concerning irrigation water use?	"Some measures to ensure the accountability of leaders and employees to the farmer members are essential" (Meinzen-Dick, 1999). "Accountability means that managers should be the servants of their clients, the farmers, and should be answerable to them for a good service" (Chambers, 1988).

Topic: User fees and their importance

Main questions	Operationalization	Evidence from the literature
Willingness to pay	When do you pay irrigation service fees? After the harvest? Before a vegetation season? At the end of the year? Do you pay always the same sum or it is dependant on the yield? Did you pay last season? Have you ever paid to WUA? Do you know, whether your neighbour pay?	"Farmers themselves usually express a willingness to pay ISF, as long it is equitably implemented and properly used" (Bruns, 1999). "International experience has shown that WUA need adequate cash flow to keep going even during droughts or other emergencies when members may not receive water services and so may not pay fees for water" (Bruns, 1999). "Water fees are collected to cover the maintenance and to repair expanses" (mod. from Nguyen Xuan Tiep et al., 1999).
For what purposes is it used?	What happens with the money? How is the money allocated? Does the money go to salaries? Does the money go to physical works? (evidence)	
Is there any influence of user fees on water distribution?	How is the amount of the fees determined? How is this procedure explained and by whom?	
What are the mechanisms?	Can someone, who pays more, decide more in the WUA?	
If you would decide on how user fees would be spent, how would you allocate the money?		

Topic: Conflict resolutions and sanctions

Main questions	Operationalization	Evidence from the literature
Who resolves conflicts?	Do you have any disputes in your WUA? Have you ever had disputes? How often and among whom do you have disputes? How serious are these disputes? Does anybody help you to resolve these disputes? Have you ever been involved into a dispute? What was a matter? How have you overcome this?	Successful local management systems generally have rules to control shrinking and free riding (Yoder, p.85, 1994). If water is taken out of turn or from an illegal outlet, graduated sanctions are applied that take into account the extend and damage caused by the infraction (Yoder, p. 85, 1994). Verbal warnings at meetings issued specifically to deal with an infraction and other forms of public disclosure put strong social pressure on members living in proximity to each other (Yoder, p. 85, 1994). Most conflicts among members are handled internally (Yoder, p. 85, 1994). When cooperative methods do not achieve the desired result, the authority may require specific enforcement and punitive powers (Constable et al, p.96, 1996). These can include action to be taken in the event of: (1) Damage to the authority's works; (2) Theft or illegal use of water, or other actions which affect the rights of other water users supplied by the system; (3) Failure to maintain farm channels in good condition; (4) Threatening or assaulting agencies' employees; (5) Failure to pay rates and charges (where applicable) (Constable et al., p. 96, 1996). "The deterrence effect of fines is reinforced by considerations of reputation" (Akerloff 1980, Runge 1986).
How do they do this?	Who plays a role in resolving disputes? Does someone have a special authority to decide who has to be fined?	
Which sanctions exist?	Are there any rules to resolve a dispute? Do these rules dependent on the seriousness of the dispute? Can you give an example?	

9.4 Appendix D

List of cooperation partners in the field

№	Date	Name	Position	Organisation
1	16.10.03	Caleb R.L. Wall	Social Development Consultant	ZEF/UNESCO Project
2	20.10.03 27.09.04 29.11.04	Mehmood Ul Hassan	Office In charge/Institutions Specialist	International Water Management Institute (IWMI) Central Asia and Caucasus office, Tashkent
3	20.10.03	Alexander Bocharin	Senior Researcher	Department of Exploitation of hydromeleorative systems The Central Asian Irrigation Research Institute (SANIIRI)
4	20.10.03 27.09.04	PhD. John Baxter	Irrigation and Drainage Specialist Chief of party	USAID Tashkent (till 2004) Winrock International, Water Users Associations Support Program (WUASP) in Uzbekistan
5	21.10.03	Dr. Ravshan Nazarov	Senior researcher Consultant	Department of Ethnology, Institute of History of Academy of Science of Uzbekistan ICWC/IWMI Project "Integrated water resources management in Fergana Valley"
6	21.10.03	Ashikmamut Ibraimov	Head of a department of restructuring	Ministry of Agriculture and Water Resources of the Republic of Uzbekistan
7	07.11.03	Dr. Econ. Mir A. Pinkhasov	Senior staff	Interstate Commission on Water Coordination (ICWC)
8	10.11.03	Abrar A. Kadirov	Chairman	Committee on drainage of the Republic Uzbekistan
9	10.11.03 17.11.04 18.11.04	Nazir Mirzaev	Expert	SANIIRI IWMI/ICWC
10	11.11.03	Olga Demidova	Head	State Enterprise South-Kazakhstan hydrogeological-ameliorative expedition of Ministry of Agriculture, Republic of Kazakhstan
11	12.11.03	Iskander Kalandarov	Chairman	Committee on agronomy, water resources and food issues Oliy Majlis (Parliament of the Republic of Uzbekistan)
12	13.11.03 27.09.04	Iskander Abdullaev	Researcher	IWMI, Central Asia and Caucasus office, Tashkent
13	13.11.03 27.09.04	Murat Yakubov	Researcher	IWMI, Central Asia and Caucasus office, Tashkent
14	18.11.03	Bakhtiyar Babajanov	Head of the department of	Regional water management

	19.11.03 22.11.03 13.11.04		water use and exploitation of interfarm irrigation networks, Chairman of federation of water users associations	department, Khorezm
14	22.11.03	Bobojan Fayzullaev	Chief	Khorezm department of SANIIRI
15	19.12.03 21.12.04	Tullybay Matnazarov	Chairman	Water Users Association "Buston", Yangibazar, Khorezm
16	20.12.03 23.01.04 05.02.04	Maksud Babajanov	Chairman	Water Users Association "Eski Daryalik", Yangibazar, Khorezm
17	24.12.03 15.01.04 06.02.04 20.12.04 21.12.04 24.12.04	Davletyer Kamolov	Hydrotechnician	Water Users Association "Buston", Yangibazar, Khorezm
18	06.01.04 28.09.04	Akhmat Alimjanov	Senior staff Specialist on water distribution	SANIIRI ICWC/IWMI Project "Integrated water resources management in Fergana Valley"
19	06.01.04	Vadim Sokolov	Deputy Director	ICWC
20	06.01.04	Umarkhon Azimov	Chief of administration National Coordinator	Ministry of Agriculture and Water Resources of the Republic of Uzbekistan ICWC/IWMI Project "Integrated water resources management in Fergana Valley"
21	09.01.04	Rustam Masumov	Consultant on water measurement	ICWC/IWMI Project "Integrated water management in Fergana Valley" http://www.iwrm.icwc-aral.uz/index/i_en.htm
22	14.01.04 29.01.04 03.02.04 17.12.04	Kadam Kurbanbaev	Chairman	Water Users Association "Shikhyap", Kushkupir, Khorezm
23	17.01.04 19.01.04 04.02.04	Abdulla Matmuratov	Chairman	Water Users Association "Mirob", Khiva, Khorezm
24	24.03.04 17.11.04	Norbay Gaipnazarov	Senior Researcher	Laboratory of management of meleorative processes SANIIRI
25	25.02.04	Khakim Ishanov	Deputy head	Main department of water resources management, Ministry of Agriculture and Water Resources of the Republic of Uzbekistan
26	27.09.04 29.11.04	Kakhramon Jumoboev	Fergana office manager	ICWC/IWMI Project "Integrated water management in Fergana Valley" http://www.iwrm.icwc-

				aral.uz/index/i_en.htm
27	16.11.04	Ian Houseman	Team leader	TA 3706 ADB "Institutional support for sustainable agricultural development" (ISSAD)
28	17.11.04	Rakhmatjon Kholmatov	Director	WUA "Akbarabad", Kuva Region, Fergana, IWMI pilot project
29	17.11.04	Ne'matjon Baratov	Social mobilizer	WUA "Akbarabad", Kuva Region, Fergana, IWMI pilot project
30	17.11.04 02.12.04	Mirkomil Bakirov	Social mobilizer	WUA "Akbarabad", Kuva Region, Fergana, IWMI pilot project
31	18.11.04	Renat Kondrakov	Project Specialist	USAID, NRMP, Uzbekistan
32	19.11.04	Sadikjan Tashpulatov	Chairman	WUA "Ak Altin", Ezovon Region, Fergana Valley, USAID, NRMP pilot project
33	19.11.04 01.12.04	Yunusali Juraev	Mechanical personnel	WUA "Ak Altin", Ezovon Region, Fergana Valley, USAID, NRMP pilot project
34	19.11.04	Khusanbay Teshaboev	Water master (Mirob, hydrotechnician)	WUA "Ak Altin", Ezovon Region, Fergana Valley, USAID, NRMP pilot project
35	23.11.04 25.11.04	Khaytboy Narkulov	Water master (Mirob, hydrotechnician)	WUA "Kushkulak", Mirzaabad Region, Syrdarya, USAID, NRMP pilot project
36	23.11.04 25.11.04	Abduraim Adbukadirov	Chairman	WUA "Kushkulak", Mirzaabad Region, Syrdarya, USAID, NRMP pilot project
37	23.11.04	Orzikul Artikov	Project leader of realization group	ADB Project, Ak Altin Region, Syrdarya
38	23.11.04	Djuraboy Melikulov	Engineer and potential special on development of WUA	ADB Project, Ak Altin Region, Syrdarya
39	23.11.04	Oybek Khamidov	Chairman	WUA "Agro Suv", Ak Altin Region, Syrdarya, ADB Project
40	23.11.04 24.11.04	Aydin Nusretov	Chief hydrotechnical personnel of project realization group	ADB Project, Ak Altin Region, Syrdarya
41	24.11.04	Gaybulla Kholbekov	Chief	RBAC, ADB Project, Ak Altin Region, Syrdarya
42	24.11.04	Khusan	The head of training department of project group realization	ADB Project, Ak Altin Region, Syrdarya
43	24.11.04	Tursunali Kodirov	Chairman	WUA "Vodiylik Suvchi", Ak Altin Region, Syrdarya, ADB Project
44	24.11.04	Mukhiddin	Former chairman	WUA "canal KTR 1 a", TACIS
45	01.12.04	Turdali Askarov	Chairman of WUA Council	WUA "Ak Altin", Ezovon Region, Fergana Valley, USAID, NRMP pilot project
46	02.12.04	Mahammadjon Bobojanov	Chairman	WUA "Akbarabad", Kuva Region, Fergana, IWMI pilot

				project
47	06.12.04	Ulugbek Islamov	Coordinator of new sub-project “Water share cost”	USAID, NRMP
48	06.12.04	Martin Herman	Project leader	“Overview and planning of agricultural sector”, ADB project
49	10.12.04 20.12.04	Kadam Vaisov	Accountant	WUA “Mirob”, Khiva Rayon, Khorezm Region
50	10.12.04 20.12.04	Inoyat	Chief water master (*Mirob*)	WUA “Mirob”, Khiva Rayon, Khorezm Region
51	16.12.04	Bakhtiyar	Chief water master	Water Users Association “Eski Daryalik”, Yangibazar, Khorezm
52	16.12.04	Jumanazar Kurbanov	Water master	Water Users Association “Eski Daryalik”, Yangibazar, Khorezm
53	18.12.04	Atamurad Ruzibaev	Main agronomist	*Shirkat* “Uzbekiston”, Pitnyak city, Khazarasp
54	18.12.04	Ruslan Madaminov	Chief of trade union committee	*Shirkat* “Uzbekiston”, Pitnyak city, Khazarasp
55	18.12.04	Saidjon Razzakov	Main water master	*Shirkat* “Uzbekiston”, Pitnyak city, Khazarasp
56	18.12.04	Khudobergan Sherbaev	Brigadier	*Shirkat* “Uzbekiston”, Pitnyak city, Khazarasp
57	20.12.04	Matnazar Ruzimov	Chief	MTP “Kafolat”
58	23.12.04	Adambay Botirov	Deputy Chairman	*Shirkat* “Al Khorezmy”, Khanka, Khorezm
59	23.12.04	Otabay Ruzmetov	Land surveyor	*Shirkat* “Al Khorezmy”, Khanka, Khorezm
60	24.12.04	Shermamat Matkarimov	Chairman	*Shirkat* “Beruny”, Shavat, Khorezm
61	24.12.04	Yakubboy Sautov	Brigadier	*Shirkat* “Beruny”, Shavat, Khorezm
62	24.12.04	Ravil Kurbonboev	Main water master	*Shirkat* “Beruny”, Shavat, Khorezm