MULTIPLE BARRIERS TO TECHNOLOGY CHANGE IN RURAL UZBEKISTAN: A DEVELOPMENT PERSPECTIVE

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ABSTRACT (ENGLISH)

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Technology transfer in rural Uzbekistan is constrained by a complex of interrelated barriers. These barriers to technology transfer include the economic, political and social dependencies created during the period of Russian Soviet rule. These created dependencies are shown to coalesce with the repressive nature of the post-Soviet regime. This thesis examines the nature of the multiple barriers to technology transfer that exist for a specific development project working in Khorezm, Uzbekistan. By adopting a dependency theory perspective, complemented by Black feminism, three interconnected facets of technology transfer are discussed. Farmer priorities and preferences are analysed in light of the unique regulatory framework of agriculture in Uzbekistan. These preferences are compared to the opinions of farmers on acute problems in Khorezm. Finally the intersection of farm decision making autonomy, negative incentive systems and the economic system are considered. This is then positioned within a model of multiple barriers to technology transfer, which tests the ability of dependency and Black feminist theories to 'travel' beyond their intended locations.

The field research conducted for this thesis adopted an ethnographic approach, placing a primacy on the locally articulated views of farmers in Khorezm. It was assumed that farmers had the best understanding of the manifold challenges to affecting change in the farming systems of Uzbekistan. To access these opinions a variety of individual and group-based methodologies were used, including focus groups, decision trees, informant-structured interviews and simplified H-Forms.

КОНСПЕКТ (RUSSIAN)

Главный научный руководитель: Профессор Джон Овертон
Второй научный руководитель: Профессор Мэрилин Уэринг
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Технологическому переходу в сельской местности препятствует комплекс взаимосвязанных барьеров. Данные преграды включают в себя экономические, политические и социальные зависимости, возникших в период Советского правления. Такие созданные зависимости показаны для соединения в одно целое с репрессивным характером пост-советского режима. Данная диссертация рассматривает характер многочисленных существующих преград на пути перехода в рамках особого проекта развития, работающего в Хорезме, Узбекистан. Применив перспективу теории Зависимости в совокупности с Чёрным феминизмом, обсуждаются три взаимосвязанных стороны технологического перехода. Проводится анализ приоритетов и преимуществ фермеров в свете уникальной системы управления сельского хозяйства в Хорезме. Такие преимущества сравниваются с мнением фермеров по вопросам насущных проблем в Хорезме. И наконец, рассматриваются пересечение автономии на принятие хозяйственных решений, негативных систем поощрения и самой экономической системы. Затем это размещается внутри модели множественных преград к передаче технологий, которая тестирует возможность теорий зависимости и Чёрного феминизма «путешествовать» выше предназначенного расположения.

Полевые исследования по этой теме были проведены по этнографическому подходу, уделяя особое внимание на местных выраженных фермерами точек зрения. Предполагалось, что у фермеров существует лучшее понимание множественных проблем, влияющих изменению в сельскохозяйственной системе Узбекистана. Для оценки этих мнений было использовано множество индивидуальных и групповых методологий, включая фокус-группы, структурные схемы принятия решений, структурные интервью с информантами и упрощенные Н-формы.

(Translated by Elena Kan)

ABSTRACT (UZBEK)

Асосий илмий ращбар: Профессор Джон Овертон
Иккинчи илмий ращбар: Профессор Марилин Варинг
Былим: Ривожланишни тад=и=от =илиш

ЫзбекистоН =ишло= щыжалигидаги технологик ытиш жараёни комплекс ызаро бо\ли= тыс=инликлар билан чегараланган. Маз=ур тыс=инликлар Рус Совет щукумати давридаги пайдо былган и=тисодий, сиёсий ва ижтимоий бо\ли=ликларни ыз ичига олади. Бу яратилган бо\ли=ликлар пост-совет режимининг репрессив характери билан бо\лаш учун кырсатилган. Мазкур диссертация ЫзбекистоН, Хоразмдаги махсус ривожланишлар буйича фаолият олиб бораётган лойища доирасида технологик ытиш жараёнида мавжуд булган кыпгина тыс=инликлар характерини кыриб чи=ади. +ора феминизм билан бирга Бо\ли=лик назариясининг келажагини =абул =илган щолда, технологик ытишнинг учта ызаро бо\ланган томонлари мущокама =илинади. Хоразм =ишло= щыжалигини бош=аришда фермерлар афзалликлари ноёб асос тари=асида тащлил =илинган. Бундай афзалликлар фермерларнинг Хоразмдаги долзарб муаммолар ща=идаги фикрлари билан та==осланади. Ва, ощир о=ибатда, фермерларнинг =арор =абул =илиш автономияси, салбий ра\батлантириш тизими ва и=тисодий тизимнинг ызи кыриб чи=илади. Кейин бу технологик ытишдаги кыпгина тыси=лар модел ичига жойлаштирилади, ва шу тари=а Бо\ли=лик назарияси ва +ора феминизмни мылжалланган щолатдан ю=орида «саёщат =илиш» имконини текширади.

Бу мавзуга йыналтирилган дала тад=и=отлари махаллий фермерлар ну=таи назарига алощида эътиборни =аратган щолда этнографик ёндашув быйича олиб борилди. Фермерларнинг ЫзбекистоН =ишло= щыжалигининг ызгаришига таъсир =илувчи турли муаммоларни жуда яхши англиши тащмин =илинганди. Бу фикрларни бощалаш учун кыпгина индивидуал ва гурущ методологиялари щамда йуналтирилган гурущ, =арорлар =абул =илиш схемалари, информант структурали сухбатлар ва одиийлаштирилган Н – формалари =ылланилди.

(Translated by Dilfuza Jumayeva)

ABSTRAKT (GERMAN)

Der Technologietransfer im ländlichen Usbekistan wird durch einen Komplex zusammenhängender Barrieren behindert. Sie beinhalten wirtschaftliche, politische und gesellschaftliche Abhängigkeiten, die während der Herrschaft des russischen Sowjetregimes entstanden sind. Es zeigt sich, dass diese erzeugten Abhängigkeiten in die repressive Natur des post-sowjetischen Regierungssystems übergingen (verschmelzen).

Die vorliegende Arbeit untersucht die Art der vielschichtigen Beschränkungen des Technologietransfers, die für ein besonderes Entwicklungsprojekt in der Khorezmregion in Usbekistan bestehen. Durch die Übernahme der Perspektive der „*Dependency theory*" (Abhängigkeitstheorie), ergänzt durch „*Black Feminism*" (Schwarzen Feminismus), werden drei miteinander verbundene Facetten des Technologietransfers diskutiert. Die Prioritäten und Präferenzen der Bauern werden im Licht des einzigartigen „*regulatory framework*" der Landwirtschaft in Usbekistan analysiert. Die Präferenzen werden mit den Ansichten der Bauern über die akuten Probleme in Khorezm verglichen. Abschließend werden die Schnittpunkte der „*farm decision making autonomy*", des „*negative incentive systems*" (negativen Anreizsystems) sowie dem Wirtschaftssystem in Betracht gezogen. Die gewonnenen Ergebnisse werden dann in ein Modell multipler Barrieren des Technologietransfers eingebracht, welches analysiert, inwieweit die „*Dependency and Black feminist*" Theorien über ihr eigentliches Gebiet hinaus Erkenntnisse liefern.

Die Feldforschung, die für diese Arbeit durchgeführt wurde, übernahm einen ethnographischen Ansatz, bei dem die Ansichten der ansässigen Bauern in Khorezm den Vorrang erhielten. Es wurde angenommen, dass die Bauern am besten die vielfältigen Herausforderungen einschätzen können, die einen Einfluss auf Veränderungen im Agarsystem im Usbekistan haben würden. Um Zugriff auf diese Ansichten zu erhalten, wurden eine Vielzahl von individuellen und gruppenbasierten Methoden verwendet, unter Einbeziehung von „*Focus Groups*", „*decision trees*", „*informant-structured interviews*„ und vereinfachten „*h-forms*".

(Translated by Inga Haller)

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Finally, and most importantly, I owe great thanks to all the farmers in Khorezm who took time to answer my strange questions and to explain simple issues to an obviously ignorant foreigner.

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GLOSSARY OF TERMS

Aliy Majlis	Parliament of Uzbekistan
Amu-Darya	One of the two great rivers of Central Asia, formerly known as the Oxus River
Basmachis	Muslim "bandits" who opposed Sovietisation and collectivisation from 1917 until their defeat in 1930. Often compared to the Mujahedeen of Afghanistan
Dekhan	Smallholder
Desiccation	Drying up, leading to desertification
Hokim	Governor of a province
Hokimiyat	Governorate
Intersectionality	The analysis of multiple forms of oppression as inter-related and inseparable.
Khanate	City state under the authority of a 'khan' or ruler (historical)
Khiva	Ancient city in Khorezm
Khorezm	Administrative District in which this research is conducted
Kolkhoz	Collective farm (Russian), often also used to identify rural towns.
Mahalla	Neighbourhood
Neo-Marxist	New Marxism, here Latin American neo-Marxism.
Nomenklatura	Soviet ruling elites
Oblast	Province (Russian), viloyat in Uzbek
Raskreposhchenie Zhenshchin	The 'Liberation of Women Campaign' (Russian)
Rayon	Province governed by Hakim
Shirkat	Joint-Stock farm (former collective farm)
Sum	Uzbek currency –approximately 1000 sum = US$ 1 at 01/11/2003 (black market rate)
Syr-Darya	Northern most of the two great rivers of Central Asia, formerly knows as the Jaxartes River.
Tashkent	Capital city of Uzbekistan (population circa 4 million)
Urgench	State capital of Khorezm, region of research in this thesis

ACRONYMS

CIS	Commonwealth of Independent States
CPUz	Communist Party of Uzbekistan
ECLA	United Nations Economic Commission for Latin America (CEPAL in Portuguese)
GWL	Ground Water Level
I&D	Irrigation and Drainage
IMF	International Monetary Fund
MTP	Machine Tractor Park
MUHEC	Massey University Human Ethics Committee
SSRU	Soviet Socialist Republic of Uzbekistan
UNESCO	United Nations Educational, Scientific and Cultural Organisation.
USSR	Union of Soviet Socialist Republics
WUA	Water Users Associations
ZEF	Centre for Development Research, University of Bonn (German: Zentrum für Entwicklungsforschung).

CHAPTER ONE: INTRODUCTION

This thesis discusses two periods of field research undertaken during 2003 in the Khorezm region of Uzbekistan. The objective of this research was to identify what barriers existed to technology change in Khorezm, Uzbekistan. By adopting a range of participatory techniques, both male and female opinions were solicited and positioned within the two theoretical frameworks of Dependency and Black Feminist theories.

Aware of the need for this research to contribute to development outcomes and policy options, this research was situated under the aegis of a specific development project in Khorezm. Specifically, the Bonn University Centre for Development Research (ZEF) and United Nations Educational, Scientific and Cultural Organisation (UNESCO) project (hereafter ZEF/UNESCO). This practical application of the research was balanced against the need to identify farmer needs and priorities from the perspective of farmers, not from the techno-centric view of a Western development project. It is hoped that this balance ensured the research was of benefit both to academia as well as to the participants in the research process. The practical application of these findings is an important justification for conducting the research, and goes some way to validating the requests for participant's time and knowledge. It is hoped that the potential for long term benefits both from improved technological adoption as well as increased academic understanding, justified the conduct of this research.

Research Purpose

The specific research problem addressed was the low rate of technology uptake by farmers. Whilst the technical and environmental problems that exist Khorezm are well documented, appropriate social research into methods to mitigate these problems remain sparse. Whilst a number of development projects on agrarian reform exist, there is little evidence of the effective transfer of technologies from research to practical application

and dissemination. Part of this problem is the unique regulatory and economic structure of Uzbekistan, which provides negative incentives for innovation and investment. The Soviet history of forced collectivisation, mechanisation and cotton production also militates against the ready uptake of new technologies by farmers. It is the intersection of these manifold barriers to technology change that form the basis of the research in this thesis.

This research hoped to elucidate a development studies perspective of agrarian reform in Khorezm, Uzbekistan. Special attention was paid to the challenges to technology transfer that exist in Uzbekistan. The challenges examined are less technical in nature, but concern the social, political and economic complex. It was hypothesised from the benefit of past work in the area that the barriers to technology change and agrarian reform are numerous, and interconnected. For this reason dependency theory was used to analyse the impact of created dependencies in restricting farm level autonomy. This was complemented by Black feminist theory, which is instructive in analysing the interaction of several forms of oppression and dependence.

In order to assess the barriers to technology change, and to test the application of the two theoretical perspectives, a sequence of three lines of enquiry was adopted. In the first stage of the research, discussed in Chapter Five, participatory research was conducted to document the articulated priorities of both men and women farmers, and to assess the areas of conflicting and complementary interests. Farmer opinions were then sought on the causes and solutions to acute problems in rural Khorezm. This second phase, reported in Chapter Six, drew both upon the rapport and relationships established in the first phase, as well as contributing significantly to the findings of phase three. The third phase then attempted to define the practical challenges to agrarian reform in Khorezm, Uzbekistan. These practical constraints are discussed in Chapter Seven, and represent the policy implications of the development aspect of this thesis. Finally the conclusions reached in Chapter Eight hope to provide specific policy and ZEF/UNESCO project focused recommendations, as a practical outcome of the research.

Summary of Findings

The specific findings of the research should be read collectively. Perhaps the greatest finding of the research was the interconnectedness of various challenges to technology adoption. It would be mistaken to assess only one section of this research without purview to the complementary sections. For example farmer opinions on soil salinisation cannot be read independently of the specific policy problems of land tenure and water management. It is possible, however, to examine the three phases of the research as a process, beginning with an ethnographic focus and concluding with broader policy implications and practical findings. Likewise these three phases contribute collectively to an analysis of the wider social, political and economic complex. This complex is shown to be based on perpetuated dependencies, reinforced by multiple forms of oppression. To enable the reader to better understand this socio-economic-political complex, Chapter Two gives a brief historical introduction to Uzbekistan. Outlined briefly below is a précis of the main findings. For greater detail and full discussion it is necessary to refer to the relevant chapter, however this summary is provided in the hope of making the inter-connectedness of the problems more apparent to the reader.

Farmer Priority Setting

The Priority Ladder methodology elicited a number of interesting results. Amongst these was the fact that the lowest farmer priority was given as the market price of vegetables. Also very interesting was the low priority farmers accorded to the quality of both cotton and wheat. Further ethnographic research exposed that the economic system of Khorezm created the perverse situation of farmers having little concern for the quality of produce. The excessive focus on production to targets based solely on weight is an unfortunate legacy of Soviet rule, yet a legacy that is being perpetuated and strengthened by the current government.

Of considerable importance for policy was the primacy that farmers afforded to soil quality. Soil quality ranked highest in the priority ladder methodology. Almost as high a concern was water quality and timing, demonstrating that the priorities of farmers were in many cases complementary to those of technology transfer and agrarian reform. There was also evidence of a high degree of farmer concern about a lack of financial resources.

In the most part this is a function of the settlement accounting system, a key barrier to development that is discussed at length in Chapter Seven.

Farmer Opinions on Acute Problems in Khorezm

In many cases the priorities of farmers from phase one were complimentary to their opinions on acute problems. Specific problems discussed with farmers included the lack of access to technology, poor maintenance of infrastructure, a shortage of spares parts and the low level of post-harvest processing. Poor water use efficiency was also discussed with specific mention of the impact of soil salinisation and drainage, deteriorating infrastructure, land levelling and poor governance.

Farmers indicated that the lack of access to technology was a key constraint in the farming system. This finding spurred further research into the settlement account system, which was examined at length in the third phase. The lack of access to technology was also found to be a function of poor competition policy and insufficient incentive systems as established by the central government. Low water use efficiency was not always seen by farmers as a direct problem, despite the high priority attached to water quality and irrigation timing.

Barriers to Technological Adoption

This phase involved using the findings of the earlier stages to identify serious barriers to technology adoption. Primary amongst these problems was a lack of farm decision making autonomy incorporating a lack of land tenure, politicised cropping decision making and centralised farm management. It is argued that because cropping decisions remained a political, rather than a practical decision, that farm management and cropping decisions were distinct areas for analysis. Similarly, this research suggested that there is a need for reform of the cropping decision system and a move away from state production planning.

Secondly the negative incentive systems for efficient water management and the disincentives for innovation also posed constraints to technology change and agrarian reform. Specific interviews identified numerous preconceptions held by farmers and decision makers. These preconceptions are made worse by an economic system that

restricted farmer options, especially because of continued economic dependence, the settlement account system and because of a limited margin for experimentation.

Importance of the Research

Uzbekistan, especially the Khorezm region, faces severe economic and environmental challenges due to the effects of excessive irrigation and unsustainable land use practices. Excessive irrigation has resulted in a drastic rise in the saline levels of soils and ground water supplies, a raising of the water table (which subsequently worsens salinity), as well as the desiccation of the Aral Sea. There is a clear need for international assistance in providing sustainable livelihoods for the people of the Aral Sea basin. This assistance will require the development of appropriate technologies and farming practices, which can provide for ecologically and economically sustainable livelihoods. However, for these changes to be effective, farmers must be involved as "agents of change" and be empowered to act with ownership and control of their own development "rather than as passive recipients of development assistance" (Rathgeber, 1990, p494). Furthermore, this research must recognise the "critical, if unacknowledged contribution to economic growth" of women in the farming sector (Moser, 1989, p1810). This will require involving farmer's opinions, needs and priorities into the research process to avoid a "top heavy and top-down" approach to technology development, creating technologies that are inappropriate or unacceptable to the community they aim to help (Swanson et al., 1997, p9). As such, there is a need to work in partnership between researchers and farmers. This thesis contributes to this partnership by identifying and assessing local needs, priorities and constraints to technological adoption, in order to ensure the technologies developed are cognisant of the social environment in which they must work. In this respect this research endeavoured to work with both local farmers as well as project scientists. Whilst much of the field research was conducted independent of the ZEF/UNESCO project, it certainly benefited from the knowledge and advice of project staff in Khorezm.

Hypothesis and Key Concepts

At the beginning of the research process, the central hypothesis was that household needs and priorities were focused on ecological and economic considerations, and would in many cases be similar between genders. However it was expected that in terms of vegetable production and off-farm income men and women exhibit different, and at times conflictive, priorities. It was assumed that in some instances the ZEF/UNESCO project was equipped to meet these priorities, but that in other cases some technologies may need to be refocused. Central to this thesis is the concept that Khorezm faces numerous barriers to technological adoption, especially based around the economic system of negative incentives for experimentation and the high presence of corruption. Integral to this is the idea that a Western development project can, and indeed should, contribute to the solution to these problems.

From a theoretical perspective it was suggested that the dependency of Uzbekistan, an ex-Soviet country, could be compared to the dependency of Latin American countries, which evolved from capitalist modes of exploitation. This theoretical tenet held that this dependency created multiple forms of oppression which militated against economic and environmental improvement in Khorezm and Uzbekistan. In order to better understand the interaction between these manifold dependencies, Black feminist theory was drawn on, with focus on the intersectionality of multiple forms of oppression. This required an analysis of whether Black feminism was able to travel both spatially and conceptually. That is to say whether Black feminism could be applied to Khorezm in a pure theoretical sense, as well as examining the ability to intersectionality as a model to be applied to multiple forms of oppression, distinct from gender or sex based analysis.

Assumptions and Limitations

Several assumptions were made in the conduct of this research. A methodological assumption was an ethnographic assumption, which favoured the knowledge of local farmers and the resource poor over technocratic approaches. The main limitation of this research is that it was focused solely on the Khorezm region, very much at the periphery and riparian downstream of Uzbekistan and the Central Asian region. Thus care must be taken in applying the findings of the research beyond Khorezm.

Ethnographic Assumptions

It was assumed in this research that the priorities and opinions of local farmers was the most important and valid information. This ethnographic approach sought to elicit responses from individuals who were very much at the periphery themselves. The choice of dependency theory, as a view of exploitation from the periphery was intentional for this reason. Likewise, the use of Black feminist theory reflects an attempt to access views from oppressed groups in society. The methodologies chosen favoured the knowledge of the insider for this explicit reason. This research deliberately avoided accessing the views of governmental decision makers and the technocratic elites. This may be a severe limitation of the research, however it was considered necessary given the scope and time span of the research. Thus this research should be considered with a view to further enquiry into the opinions of stakeholders beyond the scope of this thesis.

Limitations of Khorezm

The fact that this research was conducted in only the Khorezm region of Uzbekistan is a key constraint. Khorezm is very much a peripheral district within the republic, and the ecological problems are atypical for the Amu-Darya and Syr-Darya basin. Thus care needs to be exercised in extrapolating the results of this study to other districts of Uzbekistan. Also, because the political system plays such a role in the rural economy, it would be mistaken to apply findings of this research to ecologically similar regions in other Central Asian republics. The range of socio-political differences between these seemingly similar republics makes application of research findings across borders somewhat perilous.

CHAPTER TWO: KHOREZM, UZBEKISTAN AND THE ZEF/UNESCO PROJECT

An introduction to the social, economic and political context of Uzbekistan is provided in this chapter, to inform the two theoretical approaches outlined in the literature review (Chapter Three) and to ensure that research findings can be positioned and understood in the light of the nature of Uzbek society. This introductory précis includes a far from exhaustive contemporary history of Uzbekistan and a discussion of what research is documented and available. The convergence of ancient culture, Soviet history, and the flux of recent independence makes analysis of the rural economy and society difficult.

Several aspects of regional history and culture are pertinent to understanding the nature of household decision making and priority setting in Uzbekistan. The first is the Soviet heritage and the impact of this (and earlier) history on the body politic. The second aspect is the economic system of Uzbekistan today, especially in the rural economy, and how this influences agrarian decisions. Thirdly it is vital to understand the role of human rights and repression in Uzbekistan and how this informs individual opinions amongst farmers and decision makers. To assist the reader in situating Uzbekistan and the Central Asian region, a political map of Uzbekistan is provided in Figure 2 (p.9), along with a regional map (indicating populations) in Figure 1 (p.9). The Khorezm region where the research was focused is in the environs of Urgench (Urganch in Figure 2, the alternate spelling).

Figure 1: Central Asia Regional Map, National Populations

(Source: The Economist, 26 July, 2003).

Figure 2: Political Map of Uzbekistan and Neighbours

(Source: University of Texas Library, www.lib.utexas.edu/maps/uzbekistan.html)

The Uzbek Affair: From the Great Game to Rashidov

Uzbekistan, and Central Asia, have long been at the meeting place of multiple cultures. From its history as a main path of the 'Silk Road' between China and Europe, to the dominance of Russian Soviet rule, Uzbekistan has moved from a 'Central' region, to one very much at the periphery of the Soviet empire and indeed the world. During Europe's Middle Ages the region was considered the centre of the world, forming the transport link between the cultures and economies of China and Europe, gleaning wealth from the camel caravans that crossed it (Frank, 1992, p11). The wealthy city states such as Khiva (in the Khorezm region) received not only tribute money, but also "new technologies – such as papermaking, gunpowder, and silk weaving [as well as] new ideas, new religions" (Rashid, 2002, p15). This also began the region's bi-lingual tradition (of Persian and Turkic scripts), which remains today.

With the advent of maritime navigation the region's geographical strength became its weakness, the landlocked steppe was soon superfluous to world trade and became an economically and socially peripheral region. With the expansion of the Russian and British colonial empires, Central Asia became the scene of what Rudyard Kipling named the "great game" of these two military powers facing off in pursuit of the wealth of India (Davis, 1926). Historical marks of this "tournament of shadows" remain evident. For example, the border between Tajikistan and Pakistan is broken by a 300km long narrow finger of Afghan territory, to ensure that the two empires remained incontiguous (Meyer & Brysac, 1999).

Imperial Russia expanded its influence in the region through both annexation and conquest, establishing control through vassal states and khanates[1]. The 1917 Bolshevik revolution had a profound impact on the region, as it quickly became the battle ground for the war between the 'White' (Royalist) and 'Red' (Communist) forces (Rashid, 1994, p21). Central Asian tribes fought fiercely against Sovietisation "with the Muslim Basmachis ... leading the struggle" (Rashid, 2002, p26). This developed a culture of resistance, often likened to the Mujahedeen who opposed Soviet rule in Afghanistan in the 1980s. The 74 years of Soviet rule had a profound effect on the society and culture of

[1] City states under local royal control, subject to Imperial authority

Central Asia. For the first time over one hundred clans and tribes were united as nation states, drawn along political rather than ethnic boundaries. The five new nations of Uzbekistan, Kazakhstan, Turkmenistan, Kyrgyzstan and Tajikistan, were demarcated by Stalin to suit a 'divide and rule' strategy, rather than to reflect the cultural and political realities of the region[2] (Rashid, 1994, p31-2). These 'independent' soviet states were always subject to authority from Moscow, and their economies made inter-dependent, as well as heavily dependent on Moscow-controlled commodities, transport and finance (*The Economist*, July 26, 2003, p7).

Concomitant with the political changes, Uzbekistan's economy was transformed from subsistence agriculture into "a source of cotton and importer of manufactured products (including textiles woven from local material)", fuelled by the construction of an extensive irrigation network and widespread mechanisation of agriculture (Fierman, 1997, p365). Whilst Uzbekistan's cotton growing potential was recognised by Imperial Russia, the period of Soviet rule saw a drastic increase in production.

> "Between 1940 and 1980 cotton production in Uzbekistan rose from 2.24 to 9.10 million tons ... made possible by bringing more and more land under cultivation; quality hardly increased, and the yield per acre in many areas actually decreased because of over cultivation. The rotation of cotton with other crops was abandoned, so soil erosion became worse, thereby increasing pests which led to greater use of pesticides ... Meanwhile the Uzbek peasant never got to wear a cotton shirt. Such a shirt sold in Tashkent for thirty times more than the amount Uzbekistan received for raw cotton" (Rashid, 1994, p91).

The intensification of a cotton monoculture and a reliance on commodities was a clear example of the creation of a 'dependent' or 'peripheral' client state as discussed in the dependency theory section (below).

The ecological and environmental impacts of this monoculture and excessive irrigation have been severe, including declining living standards, high morbidity rates and severe gynaecological ailments in the Karakalpak and Khorezm regions, which are nearest to the Aral Sea (Pomfret and Anderson, 2002, p190). The Aral Sea, once the

[2] Haugen (2003) presented an opposing view, that "in the view of Soviet authorities, national identity emerged as a solution to a variety of problems and challenges regarding Soviet state building" (p.1)

fourth biggest lake in the world, is now one third its pre-1980 size and has a salt content twice that of the world's oceans (Small and Bunce, 2003, p60). The desiccation of the Aral Sea is directly attributable to cotton-monoculture and the extension of irrigation networks from the Amu-Darya and Syr-Darya Rivers (Small and Bunce, 2003, p59).

The central Soviet government placed high, perhaps unreasonable, expectations on Uzbekistan to consistently increase cotton production. The constant pressure to increase production every year caused resentment and a degree of confusion within the ruling elites. This precipitated the 'Uzbek Affair' in which the Soviet State between 1978 and 1983 paid over 1 billion roubles for cotton that was never actually produced (Rashid, 1994, p92). Comrade Sharif Rashidov, the serving premier at the time of the fraud, was removed from his prominent grave in Tashkent in 1986. This was a controversial move by Soviet authorities as many Uzbeks considered the fraud as a legitimate snub to Moscow's insistence on increased production[3] (Rashid, 1994, p92). The Uzbek affair, with the disgracing of Rashidov and 2,600 nomenklatura, possibly had a large impact on popular perceptions of Soviet rule, and warrants further research.

Cottoning On[4]

Uzbekistan and its neighbours became independent states in 1991, with the dissolution of the Soviet Union. None of the leaders of Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan or Kyrgyzstan were consulted about the creation of the Commonwealth of Independent States (CIS). Had they been, they would have opposed it (Rashid, 1994, 3). "Central Asia's communist elite was horrified ... their privileges and promotions depended on Moscow ... their economies were entirely dependent on exporting raw materials to the Soviet Union [which] kept their under-funded schools and medical services functioning" (Rashid, 2001, p37). This Soviet history, perpetuated by

[3] Indeed, Islam Karimov (Uzbekistan's President) pardoned most of those convicted in the "cotton scandal" soon after independence (Fierman, 1997, p375). See also Gleason, 1990 for a discussion of 'Nationalism or Organised Crime – The Case of the Cotton Scandal in the USSR'.

[4] Title taken from *The Economist,* 26 July, 2003.

old communist elites, ensured that Uzbekistan's reforms since independence have been gradual, and often only at the insistence or duress of outside actors.

Uzbekistan's "development strategy and economic reforms were primarily determined by Moscow until 1992" as one of the few states that explicitly did not experiment with reforms during Glasnost and Perestroika (Pomfret and Anderson, 2002, p187). Domestic inflationary pressures in the early post-independence period were not responded to in a proactive manner, rather ignored until Moscow adopted an approach which was then emulated (Pomfret and Anderson, 2002, p188). Whilst the leadership acknowledged that a transition from cotton-monoculture was essential, the reforms to ensure this process lacked imagination or thinking beyond the Soviet mentality (Spechler, 2002, p64). National self sufficiency in wheat was promoted to complement cotton production, and a broadly structural approach to economic development was adopted (Kandiyoti, 2002a, p5). This included opening a Korean joint venture auto plant (Daewoo Uzbekistan) to make cars[5], expanding oil production to self-sufficient levels, as well as perpetuating some Soviet-era industries. These industries were "geared towards supplying other parts of the Soviet Union ... shielded from international competition" (*The Economist*, 2003, p12). An example of these industries is a sugar processing plant in Khorezm, designed to process sugar cane imported from Cuba. Importing raw product from the Caribbean to a double landlocked country[6] is economically infeasible, yet the plant continues to process unrefined sugar, purchased on the international market and sold in the protected Uzbek market.

Despite these attempts at reform, the economy continues to rely heavily upon agriculture and, in particular, cotton production. "Agriculture accounts for 30 per cent of GDP, 60 per cent of foreign exchange receipts and about 40 per cent of employment" (Kandiyoti, 2002a, p8). Cotton continues to constitute a large proportion of government revenue through the compulsory acquisition of the 'strategic crop' from farms at sub-market rates. Agrarian reform remains on the agenda, especially promoted by multilateral donor agencies, and includes land reform, as well as ending the monopolies held on

[5] The output of this plant is classified a national secret, and cannot be disclosed.

[6] Every one of Uzbekistan's neighbours are themselves landlocked (Gleason, 2003, p118).

almost all agricultural inputs and outputs (Kandiyoti, 2002a, p6-7). Almost all farms are either shirkat farms (former collectives, now joint stock companies) with a small but increasing number of dekhan farms (leaseholders). These farms remain subject to uncertainty of land tenure, a lack of predictable (and market based) exchange and interest rates, and limited access to freely traded inputs. Important for their modernisation is "the removal of barriers to farmers incentives by eliminating the massive price distortions for cotton and wheat, and instituting mechanisms that could stimulate efficient and environmentally sound methods of irrigation" (Kandiyoti, 2002a, p6). The negative incentives for sensible agricultural practices and efficient use of irrigation are a serious challenge to agrarian reform. The role that these negative incentives play in creating barriers to technological adoption, as well as in skewing household priorities, is addressed in Chapter Seven.

Repression

> "It is necessary to straighten out the brains of one hundred people in order to preserve the lives of thousands"
> "The subordination to such [Muslim] authority may result in personal tragedy"
> – Islam Karimov, President of Uzbekistan (Fierman, 1997, p385).

Uzbekistan does not have a functioning democracy, free media, enshrined protection of freedom of speech or an apolitical judiciary. Rather, a regime that has changed little in the past twelve years of independence continues to exercise extra-judicial power over citizens, remaining "one of the world's most repressive states, with thousands of political prisoners and little sign of improvement" (*The Economist*, 2002, p39). The likelihood of this situation changing is restricted by the fact that "Citizens cannot exercise the right to change their government peacefully; the government does not permit the existence of opposition parties. The government severely restricts freedom of speech and the press, and an atmosphere of repression stifles public criticism of the government" (State Department, 2002, p1-2). This approach manifests itself in the common and persistent use of torture as a means of obtaining confessions, using such methods as "suffocation, electric shock, rape and other sexual abuse" (State Department, 2002, p3). Indeed, it is estimated that some 7,500 intellectuals, Islamic

"fundamentalists"[7], and other individuals were incarcerated without charge during 2003. Human Rights Watch (2001) notes that "Police and local authorities also organized 'hate rallies' reminiscent of the Stalin era, in which hundreds of neighbours and officials gathered to denounce publicly relatives of pious Muslims as traitors and 'enemies of the state' and to demand a vow of contrition" (p.5).

Islam Karimov, President during the Soviet period and recently confirmed for his third term, retains control of all levels of state apparatus. The Aliy Majlis (Parliament) declared "the enthusiastic approval and support of the entire population of the country" from a referendum on extending Karimov's term, a declaration given, interestingly, "more than a week in *advance of* the referendum" (Fierman, 1997, p396).

The role of repression, the need for agrarian reform and the Soviet legacy all conspire to make Uzbekistan a difficult setting for change. From a research perspective, each of these factors has the potential to distort results, given a fear of reprisal and insecurity in speaking openly.

The ZEF/UNESCO Project

In light of the environmental and economic conditions Bonn University began a project in development research in Khorezm in 2001. This project "Economic and Ecological Restructuring of Land and Water Use in the Khorezm Region" was conducted by the Bonn University Centre for Development Research (German: Zentrum für Entwicklungsforschung) and the United Nations Educational, Scientific and Cultural Organisation. The research that this thesis discusses was conducted under the aegis of the ZEF/UNESCO project. This ten-year, multidisciplinary research project draws on researchers from within Uzbekistan, as well as PhD students from Germany and around the rich world. The project specifies three key objectives to be fulfilled over the ten year project period.

[7] In Uzbekistan; attending mosques, growing one's beard, and holding more than a cursory faith in Islam are considered 'fundamentalist' values.

Project objectives[8]:

The first phase of the project is the 'inventory phase'. This is focused on appraising the ex-post situation of agriculture in Khorezm, and beginning to develop the concepts of how the project can proceed. The research for this thesis took part entirely in the first phase, which ran from 2001 to 2004. The second phase is a pilot project of ecological and economic restructuring. This builds upon the scientific, economic and social analysis undertaken in Phase One. In this regard this thesis attempts to present some suggestions and strategies for Phase Two. The final stage is downstream implementation of the technologies and policy shifts developed from the previous phases.

This phased approach is very much one of action research, whereby lessons learned in undertaking the project are integrated into the design of subsequent phases. For example suggestions gleaned from this research (as part of Phase One) can constitute part of the planning for the pilot model in Phase Two. Successful methods can then be adapted and used in the extension phase. Thus any comments that are made in this thesis about the activities of ZEF/UNESCO represent this author's opinion of how best to conduct action research in the subsequent phases. It should not be interpreted as a criticism of ZEF/UNESCO.

This précis is only a brief introduction to the project. Appendix I includes a brief of the project proposal and readers are encouraged to consult the ZEF/UNESCO website[9] for more current updates of project progress.

Summary

This chapter presents the reader with a cursory background to the Khorezm region and the ZEF/UNESCO project. It is important that the Soviet history of Uzbekistan, especially the politicicised nature of cotton production, be remembered throughout this thesis. The history and post-Soviet legacy of repression and human rights abuses inform many of the methodologies adopted and discussed in Chapter Four. It is also vital to

[8] Adapted from ZEF/UNESCO project proposals, available at http://www.zef.de/research_activities/uzbekistan_project.htm

[9] www.zef.de

recognise the flux inherent in historical transition. This, combined with the complicated nature of Uzbek society necessitates a theoretical approach capable of analysing multiple, and interlocking challenges. For these reasons two distinct theoretical frameworks are adopted in this thesis. The role of state repression, as well as a system of perpetuated Soviet dependencies, plays a large role in the analysis of dependency theory in thesis. Likewise, the role that this research plays in the ZEF/UNESCO project means that it has been focused specifically on agricultural problems and the rural population. However the larger body politic should also be considered, especially in terms of the history of Tashkent as the 'centre' of Soviet Central Asia.

The first framework of dependency theory applies and contrasts Latin American and Indian experiences of created agricultural dependency. This includes the economic challenges faced in a post-Independence setting. Equally important is the political and social dependencies inherent in a period of rapid decolonisation, such as that experienced in Uzbekistan in 1991. This dependency analysis is also applied to Khorezm, as a marginal region both within Soviet Russia as well as within independent Uzbekistan.

To complement dependency theory, as well as to add a useful analysis of the intersection of multiple dependencies and challenges, Black feminist theory is used. The connections between historical events and present problems mean that these cannot be dealt with individually. Rather an integrated approach is required, examining the intersection of manifold challenges in present day Khorezm. In this regard Black feminism is instructive in discussing the nature of multiple forms of oppression, and how this connects with structural dependency.

CHAPTER THREE: DEPENDENCY AND BLACK FEMINIST APPROACHES

Introduction

There is a paucity of theoretical work relating to Central Asia. The recently independent, ex-Soviet republics were not subject to consideration in either the capitalist or Marxist paradigms of development theory. Nor is there a significant literature *a propos* household priority setting and technology adoption in central state socialist nations such as Uzbekistan. Because of the insufficiency of the literature, two distinct theoretical frameworks are adopted here for consideration, and evaluated against the research findings.

Dependency theory is adopted to explain the technology adoption aspects of the study. Uzbekistan was very much a peripheral part of Soviet Russia, the Khorezm region was, and is, the satellite of the metropolitan capital Tashkent. The dependency paradigm is particularly instructive in analysing the periphery from the view of the peripheral, in this case the rural poor of Khorezm.

To complement dependency theory, Black feminist theory is utilised in the hope of explaining the role of multiple forms of oppression that exist in Uzbekistan, both in terms of men and women, their role in society and in explaining the manifold forms of dependence in the marginalised Khorezm region.

For both Black feminism and dependency theory this chapter presents an assessment of how well the theories 'travel' to unintended locations, and from this their appropriateness to Central Asia and Uzbekistan. In the case of Black feminism this focuses more on its ability to travel conceptually as well as spatially.

Dependency Theory

Dependency theory is considered in this thesis to provide an apposite theoretical framework in which to position Uzbekistan's economic, social and political situation. It is also expected that it will be well complemented by Black feminist theory in elucidating the nature of oppression and subjugation at manifold levels. By adopting a neo-Marxist framework, such as dependency, there is the possibility for nexus between Marxist influenced 'Soviet development', Latin American structuralist approaches, and Uzbekistan's 'gradual reform process'. To examine the nature and causes of household decision making, dependency theory helps to explain the economic and social structure in which these decisions operate. The examination of dependency theory given here includes an introduction to the theoretical framework, a discussion of the role of various actors within the world system, an analysis of Uzbekistan's place in the Soviet and global systems, as well as an assessment of the appropriateness of dependency theory to Central Asia.

ECLA and Latin American Dependency

Dependency theory is derived from neo-Marxist theory and the experience of Latin American countries in the post World War Two period. Early dependency theorists such as Cardoso and Faletto (1979, p11-12) established dependency as a critique of classical economic and modernisation theories, as well as a new form of Marxism which was appropriate to Latin America. Classical theorists such as Adam Smith, David Ricardo and Thomas Malthus, writing in the late 18^{th} and early 19^{th} centuries, posited that comparative advantage and the gains from trade could benefit both developed and developing countries, which would result in greater utility as well as ensured equity, through the 'invisible hand' of the market (Gleason, 1991, 339). In the view of Cardoso and other dependency writers "the principle of comparative advantage was a damaging myth that covered up and justified the inherently exploitative nature of international (and intranational) capitalist economic relations" (Packenham, 1992, p15). While the classical school held that a comparative advantage in agricultural production was appropriate to Latin America (given resource and natural endowments), dependency theorists

considered the non-industrialisation of Latin America as unjustifiable and the result of a system of oppression born of dependence (Gleason, 1991, p340).

The post World War Two adherents of Smith and Ricardo were the modernisation theorists. Modernisation theory was enunciated by the publication of Rostow's (1960) 'The Stages of Economic Growth – A Non-Communist Manifesto'. The stages of economic growth, as identified by Rostow, came from a common origin of the 'traditional society', which progressed through the metaphors of 'preconditions for take-off', 'the take off', 'the drive to maturity', 'the age of high-mass consumption' and to an eventual point 'beyond consumption' (Rostow, 1961, p vii). This teleological process was presented as an absolute factor of economic growth, purporting to be both a descriptive analysis of American, European, Russian and Japanese economic development, as well as a normative model for those countries not yet 'beyond consumption' (Hagopian, 2000, p881). Modernisation theorists suggested that Latin American countries could adopt European and North American models of economic growth, to ensure their take off into modernity. The dependency paradigm opposed this view, noting the problems of distorted development and discussing how domestic underdevelopment was a result of foreign development and the colonial period (Frank 1967, 1984; Keelan and Moon, 1998, p14). Frank accused the modernisation theorists of considering the problems of under-developed countries as existing in isolation, rather than acknowledging the role of the world system and colonial powers in creating those 'internal' problems (So, 1990, p97). In this regard the work of Rodney (1983) is very useful, in his analysis of '*How Europe Underdeveloped Africa*'. This systematic analysis of the role of colonialism in creating underdevelopment, recognises the process of development and underdevelopment, and distinguishes it from the teleological and universalistic assumptions of modernisation.

Whilst dependency theorists drew heavily on Marxist theories and analysis, it would be a mistake to believe that their approach was entirely Marxist. Rather, what developed was Latin American neo-Marxism, to manage the absurdity of applying "Marx's descriptions and conclusions about 19th Century European capitalism to the so-called problems of the underdeveloped countries of today" (Blomstrom and Hettne, 1984, p28). Marx's writings were focused on imperialism as viewed from the 'centre', whereas "Dependency writers wanted to look at imperialism from the periphery" (Packenham,

1992, p18). Whilst Marx's analysis of the rapacious nature of global capital, and the tendency for central accumulation, were considered instructive, other comments were not[10]. In addition, Marx's suggestion that a bourgeois class needed to exist in order for a proletarian revolution, was rejected by Latin Americans, citing the success of the Cuban revolution in 'by-passing' that particular historical phase (Blomstrom and Hettne, 1984, p32). Neo-Marxism was also manifest in the move away from the United Nations Economic Commission for Latin America (ECLA, or CEPAL the Portuguese equivalent). Some authors attribute the ascendancy of dependency theory to the bankruptcy of ECLA, and the initial failings of modernisation influenced development in Latin America (So, 1990, p91; Blomstrom and Hettne, 1984, p27). The role of ECLA in promoting a broadly 'structuralist' approach to economic development, geared around import substitution and national self-sufficiency, was anathema to mainstream (modernist) thought at the time. This accepted wisdom of free trade and comparative advantage is prevalent even more so today. In light of this it is interesting to note the structuralist approach evident in the present development strategy of Uzbekistan, which represents the drive for national self sufficiency and import substitution[11].

The Centre and the Periphery within Dependency

Dependency theory establishes an international model of the world system, in which 'peripheral' nations are made economically, socially and politically dependent upon 'central' nations. Within these nations there are metropoles and satellites, representing the intranational process of dependence. Working from Latin American experiences of colonisation and colonial rule, Dependency theorists posited that European colonialists created 'dependent' protectorates. These colonies became an important source of raw materials and agricultural products for the rapidly developing

[10] Some Latin American scholars took umbrage at Marx's comment "All the vices of the Spaniards – boastfulness, grandiloquence and quixoticism – are found in the Mexicans" (Aguilar, 1968, p66-7 In Blomstom and Hettne, 1984, p29).

[11] This contrasts with the Export Led Industrialisation of Taiwan, South Korea and Singapore, which dependency theorists attacked widely, deeming it to be another form of dependence (So, 1990, p124-129).

central countries. The expansion of industries based on the processing of these raw products fuelled economic growth in the central countries, whilst contributing little to the development of the peripheral nations (Frank, 1981, p230). These processed goods were then sold to the peripheral nations, as a protected market, and at a significant level of added value. This process of economic dependence occurred concomitant with the creation of social and political dependencies, that make the peripheral nations reliant upon the centre for their survival, thus making a state of 'independence' difficult to attain (Wallerstein, 1979).

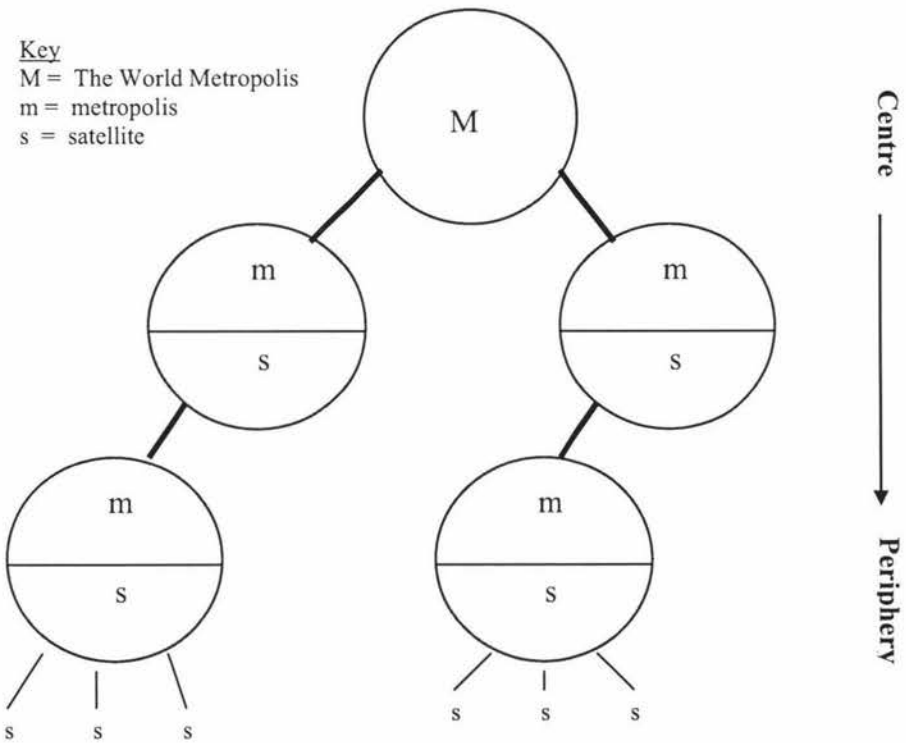
It is this *process* of dependency that enables the phenomena of development and under-development to occur. Central countries are able to access cheap labour and raw materials, which they can then apply superior technology to, enabling a profit and economic development (Ghosh, 2001, p1). This development of the central countries ('The West') facilitates the under-development of peripheral countries ('The Third World') by ensuring that peripheral development is conditioned by the Western power, and retains central ownership (Ghosh, 2001, p3). It is this process that caused Frank (1967, p9) to conclude that "Development and underdevelopment are opposite faces of the same coin". Frank (1967, p43) explained this process by crystallising dependency theory into a model of dependency, in which the role of intra-national (metropolis and satellite) as well as international (centre and periphery) actors was acknowledged to form a 'chain' of dependency.

Illustrated in Figure 3 (p.23) is a synthesis of Latin American dependency, which incorporates both intra and inter-national aspects of dependency. This model encompasses the 'chain' of dependency as explained by Frank (1967), when commenting on the Chilean economy both historically and in the 1970s;

> "it is this exploitative relation which in chain-like fashion extends the capitalist link between the capitalist world and the national metropoles to the regional centres (part of whose surplus they appropriate), and from these to local centres, and so on to large landowners or merchants who expropriate surplus from small peasants ... to landless labourers exploited by them in turn. At each step along the way, the relatively few capitalists above exercise monopoly power over the many below ... Thus at each point, the international, national and local capitalist system generates economic development for the few and underdevelopment for the many" (Frank, 1967, p7-8).

This is illustrated in Figure 3 (below), with the 'World Metropolis' or centre holding a dominant position over peripheral nations and local capitalistic systems. Each of these in turn has an internal structure, resembling the greater model, which feeds profits upwards toward the centre, whilst receiving subsequently less reward for their labour, materials or other factors of production.

Figure 3: Frank's Metropolis-Satellite Model



(Blomstrom and Hettne, 1984, p69)

Khorezm and Uzbekistan in the Soviet and Global Systems

With the annexation of Central Asia under Russian Imperial authority in the late 19th and early 20th centuries, the region now know as Uzbekistan became a colony of

Russia. This formal colonisation continued until 1991, with the granting of independence for Uzbekistan and its four neighbouring Soviet states. However, the end of formal colonial rule did not end economic, social and political dependencies in the region. Nor did the rapid decolonisation prepare Uzbekistan for an independent role in the global economy.

In many respects Central Asia's experience of colonial rule is very similar to that of Latin America and Africa. Specific comparison between Imperial India during the Raj and Uzbekistan during Soviet rule is made later in this section. The cotton and wheat growing potential of modern-day Uzbekistan and Kazakhstan was identified during the brief period of Imperial Russian rule in the late 19th and early 20th centuries. As a strategy to emulate English industrialisation, Moscow attempted to increase the production of cotton and wheat in the Central Asian region, largely through improved technologies and irrigation development. This saw the appropriation of communally held tribal land, which was then provided to settlers to develop into large cotton plantations, "in 1891 alone more than a million Russian and Cossack farmers were settled on Kazakh lands adjoining Siberia" (Rashid, 2002, p25). The unprocessed[12] cotton was then sent to textile mills in Russia, from where it was processed and used to substitute imports from the more advanced cotton industries of Western Europe. During Imperial rule, there were also limited attempts to access the considerable natural resource potential of the region, especially lucrative gold mines in northern Uzbekistan (now the largest open cast mine in the world) and iron ore deposits. This approach to colonial development can be compared to the experiences of Latin America, where European colonial rulers operated formalised mechanisms of appropriation (Ghosh, 2001, p7). These were both direct, through profit repatriation, as well as indirect methods involving unequal exchange and the protection of markets from outside access (Ghosh, 2001, p7).

Following the 1917 revolution in Moscow and the establishment of the Soviet government, attempts were made to harness the natural and human resources of Central Asia for the development of the USSR. Central Asia became the final battleground for the war between the 'White' (Imperial) and 'Red' (Socialist) forces, a conflict that

[12] Cotton is discussed here as 'unprocessed' if it is un-woven, ginning (the removal of seeds) is considered to add little value and thus ginned, but otherwise unrefined cotton is labelled 'unprocessed'.

endured until October 1924 with the dissolution of the khanates of Bukhara and Khiva, and the creation of the Soviet Socialist Republic of Uzbekistan (SSRU) (Rashid, 1994, p89). This coincided with Stalin's drive for economic development in Russia, as well as the promotion of Communism throughout the newly formed Soviet Union. From this point onwards the political, social, and economic spheres of existence in Central Asia were turned towards Moscow as the centre.

Political Dependence

Central Asia's response to the 'liberation' of Communism was far from enthusiastic. Many cultural and political elites anticipated a new era of independence and cultural renaissance following the October 1917 revolution, and looked forward to an end of Tsarist rule. This was founded on expectations of self-determination, based on early Marxist and Leninist writings. Stalin, however, had no intention of allowing independence for the region, and fought against the Basmachis until 1929 to ensure total control of the region and its resources (Rashid, 2002, p26).

With the creation of the SSRU in 1924, the Communist Party of Uzbekistan (CPUz) was purged, at Stalin's orders, of almost all if its 16,000 members – "leaving only 1000 Uzbek cadres" (Rashid, 1994, p90). This left the CPUz "devoid of Uzbek cadres who could counter the overwhelming influence of Moscow in shaping the economy and social structure" (Rashid, 1994, p90). Those Uzbeks who remained, such as President Kohjaev and First Premier Ikramov, were placed in nominal positions of authority in Uzbekistan. However, when they opposed rule from Moscow, under the slogan 'you cannot eat cotton', they were tried and executed on absurd charges (Rashid, 1994, p90-91).

Within Central Asia, Tashkent was developed as a 'Russian' city following a severe earthquake in 1966. The complete reconstruction of this city of three million people gave the Soviet government an excellent opportunity to cement its position as the 'metropolis' of Central Asia. The centrality of Tashkent, and indeed Uzbekistan, is recognised in the post-Independence literature and is anticipated to continue in the future (Karpat, 1997, p172).

The political organs of Soviet authority in the region were centred in Tashkent, and a large expatriate population of Russians were relocated there to ensure Soviet rule (Spechler, 2002, p63). Russian became the *lingua franca* of Central Asia, and many of the leaders in the post-Stalin era were said to be unable to speak their native tongue. President Karimov of Uzbekistan is an example of such a leader, raised in a Russian orphanage[13] and said to be unable to speak conversational Uzbek (Rashid, 1994, p93). Such leaders served at the pleasure of the Moscow leadership, and enjoyed privileges owing to their allegiance to Russia. Whilst some leniency was allowed for in governing local concerns, Moscow's response to the 'Uzbek Affair' of cotton fraud reinforced the supremacy of Moscow (Kandiyoti, 2002c, p241). The restoration of Rashidov to 'hero' status soon after Independence was a signal of the new autonomy of Tashkent. However the dependent nature of Uzbekistan in the global political world remains an issue. Indeed, no country in Central Asia has had a change in President since before independence (Rashid, 2001, p33). Uzbekistan has taken a self reliant approach to development in the post-Independence era, refusing to undergo IMF and World Bank reforms and spurning United Nations injunctions for increased human rights (Spechler, 2000, p295). However, long term international political dependency remains unresolved. Thus far President Karimov has been successful in capitalising on the Afghan crisis, and rent seeking for the use of airbases, to secure American political patronage (The Economist, 2003).

Social Dependence

Central Asia, as with all of the USSR, came under pressure to conform to expectations of the 'new Soviet man and woman', in reality, the 'modern' Russian man and woman. To legitimise the 'modernisation' of Central Asia, Soviet writers constructed a "stagnant, backward and immobile society, forced to 'awaken'" to explain Central Asian peoples prior to their 'liberation' (Kandiyoti, 2002b, p287). The construction of this identity was somewhat questionable, as was the reverse teleology of attributing all social ills to ancient, outdated, or Muslim cultural norms (Keller, 1998, p21). So strong was the Soviet dogma of characterising Central Asian tribes as backward, that it is

[13] As was President Saparmurat Niyazov of Turkmenistan.

difficult to find literature that celebrates 19th century Eurasian culture and traditions. Most authors accept the construction of pre-Soviet identity as backward and oppressive, and condone the 'modernising' influence of Soviet culture. A phenomenon that Kandiyoti (2002b) describes as the "numerous ideologically inspired celebrations of the achievements of Soviet-style modernisation, pointing, among other things, to the emancipation of women, universal literacy and the triumph of Soviet forms of expression over 'traditional' cultures..." (p.287). These advancements no doubt brought significant benefits, however at significant cultural and personal costs. For example Keller (1998) questions the positive impacts of the *raskreposhchenie zhenshchin* (liberation of women) campaign on women's lives, and cites examples of increased instances of violence against those women who obeyed Soviet directives to not wear a veil. Shahrani (1993, p125) makes a direct connection between this 'modernisation' of Central Asian culture and the creation of social dependency, working explicitly from colonial mechanisms of the centre and the periphery. In this work, Shahrani (1993) posits that the Soviet legacy of colonialism has created real obstacles to development and self-sufficient political and cultural practices.

The process of 'modernisation' and 'Sovietisation' in Central Asia represented a sustained attack on traditional modes of production and social relations, a "systematic onslaught on existing patterns of social institutions, identities and loyalties" (Kandiyoti, 2002b, p288). Uzbekistan was made explicitly dependent on Moscow for this culture and creation of social norms, through actions such as the forced acceptance of Russian language and a modified Cyrillic alphabet for written Uzbek. This creation of social dependency ran concomitant with the political and economic dependencies created by the Soviet regime (Matveeva, 1999, p28). Indeed, social dependency cannot be separated from the change in modes of production and the shift from nomadic (in the case of the Kyrgyz and Kazakh clans) and subsistence (in the case of Uzbek clans) farming to mechanised cotton monoculture.

Economic Dependence

The economic dependence of Uzbekistan on Russia was the most profound and enduring legacy of Soviet rule. In accordance with the Marxist doctrine of the division of

labour, expanded to the inter-regional level, Uzbekistan was tasked with providing cotton to the expanding Soviet economy (Khazanov, 1995, p115). To facilitate the transition from subsistence farming to mechanised monoculture, the entire economy of Uzbekistan was focused on cotton production. Massive irrigation and civil works projects were commissioned to expand the acreage under cultivation, along with the forced collectivisation of nomadic tribes and subsistence farmers onto state farms (Pomfret and Anderson, 2002, p190; Rashid, 2002). The social cost of this collectivisation was immense, with over one quarter of all Kyrgyz nomads dying as a direct result of these policies (Rashid, 1994, p143).

The Tashkent exchequer was paid a token sum for the cotton exported, and was then sold manufactured goods and means of production (e.g. tractors) against these payments. There was some compensation from Moscow for this 'unequal exchange' between centre and periphery, which subsidised the immense health and education budget of Uzbekistan (Kandiyoti, 2002c, p241). During the Soviet period this allowed Uzbekistan to have a higher standard of living than other countries of a similar income level (Pomfret and Anderson, 2002, p190). This also made Uzbekistan wholly reliant upon Moscow for continued transfers and for the supply of agricultural inputs, such as mechanical traction and fertilisers. This dependence "was accentuated in the last decades of socialism by low per capita investment compared to Union-wide rates [levels of capital investment compared across the entire Soviet Union] and a substantial reduction in capital investment" (Kandiyoti, 2002c, p241). The only dedicated period of industrialisation in Central Asia was during World War Two, when Stalin famously ordered Russian factories to be moved "brick by brick" to Central Asia to place them and their workforces out of reach of German bombardments. Indeed, Zhukov (2002) posits that Uzbekistan underwent de-industrialisation during the first years of political independence (p343).

The cotton-derived economic dependence of Uzbekistan is very similar to classical dependency analyses of India during the British Imperial period. Baran (1957) dedicated much of his analysis of 'The Political Economy of Growth' to India, and the creation of underdevelopment by Imperial England. Baran's thesis was that India was a relatively advanced economy at the beginning of the 18th Century, but that a process of de-

industrialisation coupled with increases in cotton exports to England, conspired to enrich the central capitalists, whilst benefiting the Indian peasant little if at all (Baran, 1957, p147; So, 1990, 112-3). Most interestingly Baran (1957) found that "economic development in underdeveloped countries [was] profoundly inimical to the dominant interests in the advanced capitalist countries" (p28). If we replace the phrase 'advanced capitalist countries' with 'Russia', the analysis remains pertinent to Uzbekistan. The social impact of dependency was also noted in India, when Baran (1957) conjectured that "the British administration of India systematically destroyed all the fibres and foundations of Indian society" (Baran, cited in Blomstrom and Hettne, 1984, p122). Whilst there are clearly some differences between India and Uzbekistan, the role of cotton in both economies became dominant during their periods of colonial rule. In the case of India "agriculture was virtually the only remaining source of national wealth ... in the nineteenth century" (So, 1990, 112), a state of economic dependency echoed in Uzbekistan today (Gurgen, et.al., 1999, p39).

Can Dependency Theory Travel to Central Asia?

Dependency theory was never designed to explain the specific nature of Soviet development in Central Asia. Moreover, much of the paradigm evolved in ideological opposition to modernisation theory and global capitalist development. This presents some difficulties in assessing whether dependency theory can 'travel' to the unintended situation of Uzbekistan. In order to establish this, Said (1984) is utilised, and the contention that "it is when a theory enters into a territory for which concepts are not already available and it is called upon to improvise, that it can be said to be travelling well" (Said, 1984, p229). To evaluate the mobility of dependency theory, it is necessary to examine the connections between capitalist driven colonisation and Soviet development and to evaluate whether the process is substantively similar as to warrant the application of dependency theory to Uzbekistan.

Prima facie dependency theory is inappropriate to Uzbekistan, as the theory was developed in order to describe the nature of capitalist exploitation at an inter-national level. However, there would appear to be some similarities in the mechanisms of exploitation used in Soviet development and that capitalist dependency discussed in

theory. Kandiyoti (2002b, 2002c) discusses the contest between the post-coloniality and dependency theorisations of Central Asia. In support of the dependency perspective is the evidence of how the inter-regional division of labour "clearly contradicted the interests of Central Asia ... because it condemned the region to the role of a supplier of raw materials which left the region for other parts of the country, mainly in unprocessed form" (Khazanov, 1995, p115 in Kandiyoti, 2002c, p241). This division of labour is characteristic of the unequal exchange that Baran (1957, p28) criticised as inimical to the needs of India. In a specific analysis of Central Asia, Gleason (1991) drew comparisons between the dependency paradigm and the nature of unequal exchange between Russia (the centre) and 'the Asian republics' (the periphery). Whilst dependency theory was focused on capitalist modes of production, the inter-regional mode of the USSR was considered by Gleason (1991) to resemble the Latin American experience in both mechanism and result. Shahrani (1993) reinforces this analysis with a discussion of the economic, as well as ideological, dependencies that Moscow created in the region.

There were, however, differences between the Central Asian and Latin American experiences of dependency. First amongst these is the role of Socialist ideology, which promoted certain 'modernising' influences on Uzbekistan. These included industrialisation projects of an ideological rather than pragmatic (economic) purpose (Kandiyoti, 2002c, p240). Also important was the role of the more positive aspects of 'Russification', such as universal education, improved health care and the enfranchisement of women. Whilst these forms of progress were not without their extreme personal and social costs, the Central Asian republics did enjoy a standard of living during Socialism that was much higher than that of other developing nations of similar *per capita* income levels (Pomfret and Anderson, 2002, p190).

Despite these differences, it is clear that dependency theory is a useful framework of explaining the nature of Uzbek society, politics and economy. The dependency created during Imperial times and expanded during the Soviet period, has conspired to create "another Third World region with unsolved structural problems and minimal potential for rapid economic and socio-political development" (Khazanov, 1995, p241). Dependency theory can travel to Central Asia, and it is expected that it can be instructive in addressing the manifold problems in Uzbekistan.

Black Feminist Theory

> "Feminism in the United States has never emerged from the women who are most victimised by sexist oppression; women who are daily beaten down, mentally, physically and spiritually – women who are powerless to change their condition in life. They are a silent majority." (hooks[14], 2000, p131).

As with any paradigm, it can be at times difficult to distinguish what constitutes Black feminist theory[15]. A liberal definition is adopted here, accepting the range of 'Afro-Centric' literature. Black feminist thought is essentially a critique of traditional feminism, which failed to recognise the multiple forms of oppression that Black women suffer living in a patriarchal and white-dominated society (Collins, 1990, p22). These multiple forms of oppression include economic disadvantage, explicit race and class prejudices, implicit and explicit gender and sexual discrimination. Brewer (1993) posits that "this polyvocality [of oppression] is historically missing from analyses of oppression and exploitation in traditional feminism". Black feminism seeks to expand the franchise of female liberation ideology towards a wider group of women. Indeed, much of the 'Third Wave' of Black feminist theory of the 1990s discusses the usefulness of Black feminism to African women (as opposed to African American women). Discussed in this review is the challenge of defining Black feminist theory, the multiple forms of oppression that Black feminism describes along with the applicability of these concepts to Khorezm, as well as an assessment of Black feminism's ability to 'travel' as a theory, to unintended regions.

Defining Black feminist Theory

The genesis of Black feminist theory is from freed female slaves in the United States of America. This 'First Wave' of Black feminism is identified as a 19th Century

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[14] The author writing under the pseudonym of bell hooks always requests to be referenced in lower case, a convention adopted in this thesis.

[15] I capitalise 'Black' to reflect standard practice in the literature, in order to "denote the 1970s political history of Black empowerment from which Black feminist theorising and activism emerged" (Springer, 2002, pp1).

movement of Black women articulating their oppression as distinct from that of Black men, and as unique from the white women's suffrage movement. Most visible in the literature amongst the 'First Wave' was Sojourner Truth, an illiterate ex-slave, who responded to a white male suggesting that women should not enjoy the same rights as men, due to their physical inability to perform their share of manual labour. In what became a foundation statement for the movement, Truth stated at the second annual convention of the women's rights movement in Akron, Ohio, in 1852:

> "Dat man ober dar say dat women needs to be helped into carriages, and lifted ober ditches, and to have de best places...and ain't I a woman? Look at me! Look at my arm! ... I have plowed, and planted, and gathered into barns, and no man could head me – and ain't I a woman? ... I have borne five children and I seen 'em mos all sold off into slavery, and when I cried out with a mothers grief, none but Jesus hear – and ain't I a woman?" (Cited in hooks, 1981, p160).

The First Wave occurred largely outside of mainstream academia, yet some authors have identified the academic merit of the First Wave. For example hooks (1989) credits Sojourner Truth with the academic aptitude to conceptualise her status as a woman as *socially* rather than *genetically* defined, a concept not well established in the Western Feminist academic tradition until Simone de Beauvoir stated that "One is not born but becomes a woman" (de Beauvoir, 1974, p16). Indeed some authors assert that Black women superseded the suffrage movement, as they "have always embodied ... an adversary state to white male rule and have actively resisted its inroads upon them and their communities in both dramatic and subtle ways" (Combahee River Collective, 1986, p2).

The academic definition of Black feminism, and indeed the title of 'Black feminism' came with the second wave of theorists. This developed from the post-World War Two American woman's movement, which saw the expansion of strong 'liberation' ideologies amongst university educated women. In an early statement of the second wave, the 'Combahee River Collective', a group of black women united after a series of urban murders, produced 'The Combahee River Collective Statement'. Here it was stated that "Black, other Third World and working women have been involved in the feminist movement from the start, but both outside reactionary forces and elitism within the

movement itself have served to obscure our participation" (Combahee River Collective, 1986, p2). Many writers from this epoch discuss their involvement in feminist and civil rights (as well as Black Nationalist groups such as the Black Panthers) as at times contradictory. There was also an emerging perception of the racism and elitism (especially class-based) of the mainstream feminist movement. For example, bell hooks posits that the 1970s feminist movement "actually referred to a select group of college-educated, middle- and upper-class, married white women – housewives bored with leisure, with the home, with children, with buying products, who wanted more out of life" (hooks, 2000, p132).

This 'liberation' ideology of white feminism came under attack from Black scholars, claiming that taking paid work, if not met with concomitant increases in rights and respect, would perpetuate Black women's subjugation. Indeed Black women's economic activity was often dictated by economic necessity rather than by a liberation ideology (Taylor, 2001, p20-21). In this respect, Black feminism sought to broaden the franchise of the 1970s feminist movement to all women, especially those who suffered multiple forms of oppression. A common feature of Black feminism is the belief that these manifold forms of domination are inseparable, and must be dealt with collectively and communally. Despite the commonalities within the paradigm "there is not a unifying Black feminist theory ... [like] white feminists, Black feminist perspectives are also varied" (Hamer and Neville, 2001, p22) and this literature review presents only a selective account of the corpus of literature and theory. As with the Feminist movement, there is significant debate about who can be involved in the Black feminist movement[16]. For the sake of perspicacity in this research, biological and social definitions are accepted as equally valid.

[16] This debate is interesting, but outside the purview of this literature review. For additional information see Collins (2001).

Multiple forms of Oppression in Black feminist Theory

The concept of multiple oppressions is a binding force within Black feminist and Womanist theory. Foundation theorists of the second wave such as the Combahee River Collective noted that it was the interdependence of oppression structures, and empowerment strategies, which informed Black feminism. The Collective committed to "struggling against racial, sexual, heterosexual, and class oppression and see as our task the development of integrated analysis and practice based on the fact that the major systems of oppression are interlocking" (Combahee River Collective, 1986, p1). Of the multiple oppressions discussed in the literature, a select number will receive closer analysis in this section. These will be: class, race, gender, and sex. The convergence of these multiple forms of oppression is termed 'intersectionality' in the literature, which refers to the interconnectedness of all forms of oppression. By merging Black feminist critiques of power with dependency theory (below), it is possible to analyse oppression and dependence as mutually reinforcing processes.

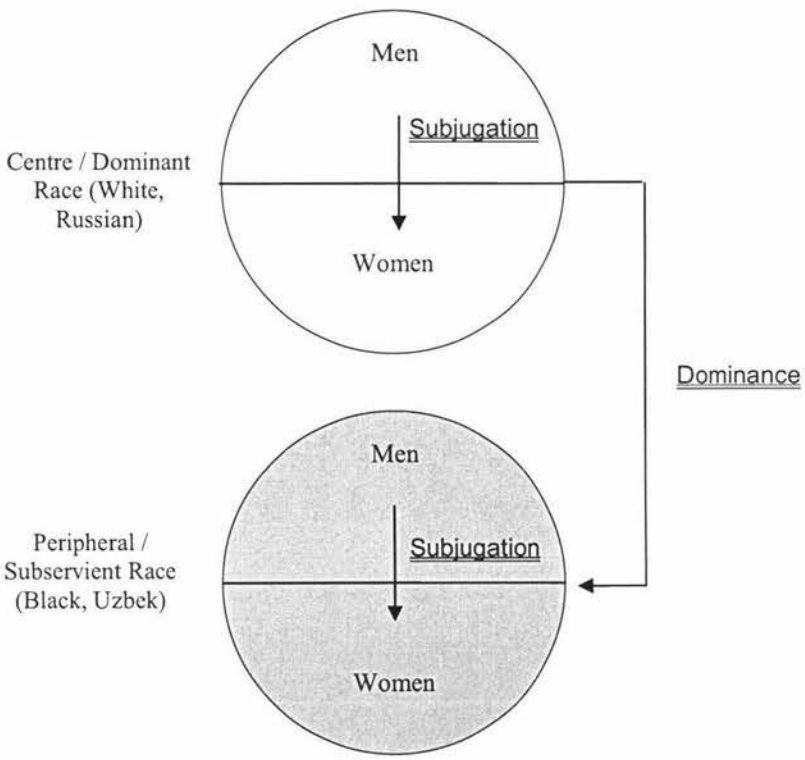
> "Systems of oppression (capitalism, imperialism, and patriarchy) rely on each other in complex ways. This 'interlocking' effect means that the systems of oppression come into existence in and through each other so that class exploitation could not be accomplished without gender and racial hierarchies, imperialism could not function without class exploitation, sexism and heterosexism, and so on. Because the systems rely on each other in these complex ways it is ultimately futile to attempt to disrupt one system without simultaneously disrupting others." (Fellows and Razack, 1998, p1)

This intersectionality of oppressions requires that race, gender, sexual and economic forms of oppression, are considered collectively (Crenshaw, 2000b, p2). This analysis must also expand to encompass others forms of oppression and subjugation, such as the dependent relations discussed later in this chapter.

Each of these main forms of oppression (racial, sexual, class and gender) can be related to Galtung's model of Structural Imperialism, provided in Figure 4 (p.35). Galtung's model has been adapted to reflect its influence in neo-dependency theory, as well as to demonstrate its applicability to Black feminism. The model demonstrates the

ability of the centre to oppress the periphery, as well as elucidating how central actors (men) within each sphere can subjugate peripheral actors (women) within that sphere.

Figure 4: Black Women's Oppression in terms of Galtung's Theory of Structural Imperialism



(Adapted from Blomstrom and Hettne, 1984, p178)

Economic Oppression

Class dominance and economic subjugation was a factor in the lives of many first and second wave Black feminists. For example hooks (1989) discusses attending university as a lived experience of class oppression, which informed her lived reality of poverty. Similar experiences of other authors had a large influence on the paradigm, and have led to the relative primacy of class analysis. Collins (2001) writes "First and

foremost, the economic status of women and issues associated with women's global poverty, such as educational opportunities, industrial development, environmental racism, employment policies, prostitution and inheritance laws concerning property, constitute a global women's issue" (p12). Whilst second wave white feminists were advocating economic empowerment, other forms of oppression coalesced to ensure that "because the Black woman worked, it did not make her 'independent' [like] the white woman. Rather she became more subject to the brutal exploitations of capitalism – as Black, as worker, as woman" (Williams, 1972, p43-44). What is interesting to note is that economic empowerment, when viewed through the prism of other forms of oppression, such as educational under-attainment and societal expectations of the type of work suitable for Black women (such as housework), in many ways militated against Black women's empowerment. Because economic and class oppression holds such primacy in Black feminist analysis it is often appropriate to the developing world. It is worthwhile contrasting this with the Soviet equality ideology that suggests men and women were equal in communist societies. Keller (1998, p32) refutes this suggestion, stating that in Uzbekistan "(male) chairmen or brigade leaders assigned women to such backbreaking manual labour [as cotton picking by hand] while allowing men to drive the few machines available". Similarly, the 'liberation' of women to work in textile and garment factories has been questioned as being libratory or simply another form of oppression (Keller, 1998, p29).

Racial Oppression

Racial oppression, demonstrated in the model as dominance, is an integral part of Black feminism. This is both in terms of the tacit racism of the 'White' feminist movement, as well as in the "historical reality of Afro-American women's continuous life-and-death struggle for survival and liberation... [and their] extremely negative relationship to the American political system" (Combahee River Collective, 1986, p1). On the first point, many Black women writers of the second and third wave discuss how their involvement in the 'White' feminist movement was met with implicit racism, and a feeling that they were 'invited guests' rather than 'owners' of the process (hooks, 1981; Combahee River Collective 1986; Collins 1990). Mazrui (1993, p8) discusses the need to

progress from the notion of "liberating the Black woman" towards 'centreing' and then "empowering the Black woman". A cautionary note is sounded to Afro-Centric feminists seeking to 'liberate' women in the Third World, and by doing so making the same mistake of the early White feminist movement (Mazrui, 1993; Moser, 1989, p1815).

Gender Oppression

Gender oppression and socialisation is a strong force in both Uzbek and American culture (Keller, 1998, p21; Davenport and Yurich, 1991, p64). This includes the subjugation of women by men, which occurs in The United States of America within both White and Black cultures. We see in the model of Structural Imperialism given in Figure 4 (p.35), that this has a two-fold effect on Black women, who suffer subjugation from within their race, as well as dominance from men and women within White society. Subjugation takes effect through the creation of the "mammy, matriarch, sapphire" image, a gender stereotype (Combahee River Collective, 1986, p4). Within Black society women are socialised to care for children, as well as take responsibility for domestic chores. More insidiously, Black women are socialised to not speak against their Black male 'leaders' and 'family' (Williams, 1972, p46). When Black women challenge their male 'leaders', they often suffer condemnation from the entire Black community as well as white society. A vivid example of this was in Professor Anita Hill's (an African American woman) chastisement and alienation from sections of Black America for speaking about being sexual harassed by Supreme Court judge nominee Clarence Thomas (African American Women in Defence of Ourselves, 1991, p1). The socialised role of the quiescent and obedient Black mother was captured by White male and female society. This manifested itself during slavery with Black women caring for white children, a situation still prevalent during the formative period of second wave Black feminism (Williams, 1972, p42-44). During this time "20 percent of Black women [worked as] private household workers... [having the] double exploitation of first doing drudgery in someone else's home and then having to take care of their own households" (Williams, 1972, p44). Gender socialisation is a lucid example of how both dominance and subjugation operate in the mechanism of oppression.

Sexual Oppression

Sexual oppression, as with gender oppression, involves both subjugation and dominance. The role that domestic violence and rape within Black neighbourhoods plays in Black women's experiences of oppression is discussed extensively in the literature. Collins (1990) discusses how the rape and sexual violence of urban Black communities reinforced the oppression of women, as well as contributing to a "legacy of struggle" that Black women endure. The interdependence of sexual and economic oppression is reinforced by Hamer and Neville (2001, p24) when they posit that "poor Black women are more likely to be sexually harassed, beaten and raped than women of greater economic means". Similarly, Crenshaw (2000a, p226) posits that Black's women's sexual subordination due to domestic violence is a key inhibitor to the development of Black female consciousness. Lesbian Black women also discuss how strong 'Christian values' amongst the Black community are often homophobic and militate against the establishment of Black female identity and womanhood (Clark, 1993, p214). Sexual domination is also a form of oppression, dating back to the use of white male rape in slave colonies as a form of social control and as a politically divisive measure (Williams, 1972, p42). This is also the case within Islamic societies, whereby the requirement for a virgin bride is a powerful tool of oppression (Mernissi, 1987, p27). It was argued in the second wave that domestic labour also made Black women vulnerable to sexual advances from white men, when they were in a subservient economic and social position, which made refusal difficult or impossible (hooks, 1981, 1989). This suppression of Black women's sexuality was often in favour of socially defined and degrading gender roles of "a black woman as weighing 200 pounds, holding a child to her breast, and/or scrubbing floors with a rag around her head" (Williams, 1972, p42).

Multiple Oppressions

In summary we can see how multiple forms of oppression are a key component in understanding the Black feminist approach. In conceptualising these oppressions it is useful to use the framework of structural imperialism proffered by Galtung to explain certain dependency relations, and how these forms of subjugation and oppression are mutually reinforcing and interdependent. What the model does not allow for is the full

range of class, sexual, gender and power oppressions, which together create a strong force of domination and repression. Galtung's model (Figure 4, p.35) is instructive in demonstrating the mechanism of dominance and subjugation both between and within racial and gender groups. What intersectionality suggests is that the manifold forms of oppression exist interdependent on each other, and that they should be analysed in this manner. At each stage of the dependency model, and within each metropolis and satellite, a system of gender oppression and dependency also exists. It is possible, according to Black feminist theorists, to incorporate the model given in Figure 3 (p.23) into each aspect of Frank's metropolis-satellite model. This would see women experiencing multiple forms of dependency, which would exacerbate their peripheral position within the world system. The same could possibly be said of ethnic minorities, and other groups in society who experience multiple forms of oppression. Such an analysis is particularly instructive in the ecologically and politically dependent Khorezm region where this research is conducted. It is the interconnections between these forms of oppression that contribute to our understanding of the process of repression and subjugation in Uzbekistan.

Is Black Feminism Transmutable?

In seeking to apply Black feminist theory to Uzbekistan it is important to critically assess the applicability of the approach both conceptually and across spatio-temporal locations. To examine this, the literature on Feminist Geography and Post-Colonialism, focused on ex-British empire colonies, is considered instructive. John (1996) in 'Discrepant Dislocations' advocates a "reverse anthropology", which involves questioning some of the universal assumptions of feminism (Raja, 2000, p281). The thesis is that traditional anthropology is based in comparisons of cultures, founded in value systems developed in one particular place and time, invariably colonial England (Johnson et.al., 2000, p151-2).

This creation of a perceived reality viewed through the prism of a 'superior' society was termed 'Orientalism' by Edward Said (1978), in his analysis of the 'other' in the social sciences. This "reverse anthropology" is an ethnographic approach (see Chapter Four), which focuses on the perspective of the subject, not on the view of the researcher.

In the same manner as anthropology, which fails to take account of place and time, it is argued that feminism must become cognisant of the spatio-temporal, as well as cultural and religious differences that exist across the world (Raja, 2000, p281).

Spatial Travel

The application of Black feminism to Maori nationalism and feminism in Aotearoa/New Zealand tests how well Black feminism 'travels'. Mohanram (1999) examined the importance of 'place'. This is the importance of land as an expression of self rather than as a purely economic asset. For Maori women being landless is not only economically oppressive, but it also removes an aspect of cultural and personal identity. The introduction of 'landlessness' as a new form of oppression, distinct yet connected with economic oppression, can be seen to fit within the Black feminist paradigm. Whilst academic theorems may tend towards homogeneity and essentialism, Mohanram (1999, p103) demonstrated how theory can be adapted to suit a colonial subject, for whom the theory was never intended.

To adopt the 'travelling theory' principle of Said (1984), "like people and schools of criticism, ideas and theories travel – from person to person, from situation, from one period to another" (p.226). Pattel-Gray (1999) comes to a similar conclusion when discussing the experiences of Black Aboriginal women in Australia. Whilst "Aboriginal women have been confined to the sidelines of the feminist movement in Australia" the Black feminist paradigm, especially in terms of discussing multiple forms of oppression, including sexual repression and dominance, is found to 'travel well' to the lived experiences of Pattel-Gray (1999, p259, 260). Lucashenko (1994) concurred with these findings when discussing the causes for Aboriginal women's non-involvement in Australian (white) feminism. It was argued that mainstream feminism, and analyses of patriarchy do not prompt "a reassessment of your [white women's] own standing on Aboriginal land" (Lucashenko, 1994, p22).

This is not to say that Black feminism is necessarily transmutable, applicable to all women in all situations, but it does reinforce its capacity to 'travel' to destinations unintended by the African American women who developed the first and second waves.

Conceptual Travel

It is also possible for theories to travel conceptually. Whilst there is little literature *a propos* Black feminism travelling conceptually, this is not to say it cannot occur. It is contested here that it is possible to apply the model of multiple forms of oppression (Figure 4) beyond gender based analysis and in this case to apply the model of manifold forms of oppression to the rural poor in Khorezm. There is some evidence that this is possible within the Black feminist theory. For example Black feminist discourses are constructive in assessing oppression by law enforcement and a negative relationship with the power structure and political system. Cooper and Traugott (2003, p59) suggested that feminism is a useful tool for appraising women's rights and security within Uzbekistan, particularly given the paucity of human rights. It is notable that the use of sexual oppression, as utilised in Black feminist theory, is instructive in this discussion.

The application of Black feminism in a conceptually modified form, is enlarged upon in Chapter Eight. It is important to note when read alongside dependency theory, that Black feminist theory in this thesis represents both a spatially and conceptually different *corpus* of theory than was envisaged by its progenitors.

Summary

Whilst there is a shortage of theoretical work relating to Central Asia and Uzbekistan, it is shown in the following chapters that Black feminism and dependency theories can indeed 'travel' to Khorezm. Black feminism is a useful paradigm in which to position multiple forms of dependency as inter-related and inter-dependent. These multiple oppressions can apply not only to sexual and gender oppression, but also to other systems of repression and subjugation. Whilst these forms of oppression may appear to exist separately from each other, Black feminism presents the injunction that these must be considered collectively. Dependency theory is in many respects similar to Black feminism. As a model of power systems, it identifies the role of central actors in expropriating surpluses from the periphery. Whilst Dependency theory was never intended for Central Asia with its Marxist history of development, it is an interesting test case of how well Dependency theory can travel. The utility of dependency is in the conception of viewing centre-periphery relationships from the unique position of the

periphery. Given the ethnographic focus on the rural poor of this research, the dependency approach was very useful. Dependency theory is particularly useful in addressing the question of how Soviet-era modes of economic, political and social dependence – perpetuated in Khorezm – create barriers to technology transfer. Black feminism contributes to this analysis by considering the role of multiple barriers to technology transfer. This goes beyond an analysis of the gender situation, also including the interaction of socially, economically and politically defined modes of oppression. It is this theoretical approach, combined with the history of Uzbekistan that influences the methodological approach.

This thesis combines aspects of both Black feminist and dependency theories, in Figure 11: Model of Multiple Barriers to Technology Adoption within Khorezm. This model (provided on p.110) demonstrates how the model of dependency in Khorezm is improved by including the multiple forms of oppression inherent in the social and political system. These multiple barriers, which are often complementary to the modes of dependence, exist economically, politically and socially. For instance the state system of compulsory acquisition is an act of created economic dependence – yet the enforcement of this order coalesces with various forms of political control. Likewise these mechanisms of political dependence rely upon the structural dependence (social as well as economic) of the Khorezm region on Tashkent. This model of Multiple forms dependence reflects a system engineered during the Soviet period, as shown in Chapter Two.

The following chapter discusses the choice of methods and philosophical approach to this research. Neither of these theories provides a definitive epistemological approach. Rather they establish, along with the ethnographic approach, an ontological framework in which to consider the research findings. It would be mistaken to apply these two, somewhat disparate, theories to Uzbekistan without purview to the cultural and historical context. Likewise, the methodologies chosen designate the overall theoretical context. Rather these aspects need to be considered in their totality, and it is hoped the Figure 11 provides a useful synthesis of these disparate theories and concepts.

CHAPTER FOUR: METHODOLOGY

> "It is customary ... to say something about what is somewhat pretentiously called 'methodology'. My field method could be summed up as meeting people." (Willis, 1981, xx; cited in Brockington and Sullivan, 2003, p57).

Introduction

Conducting research in a developing country, especially with a political culture so antithetical to one's own, raises a number of ethical, philosophical and practical questions. This chapter seeks to address the underlying ontological and epistemological questions faced in this research, as well as detailing the methods of inquiry adopted. By choosing an ethnographic approach, it is hoped that the knowledge of the 'insider' was recognised, and that this research reflects Khorezm culture from the point of view of actors within Khorezm. In attempting to access this knowledge and culture, there is the problem of *vide et impera*, an 'outsider' (the researcher) making an object of the 'other'. This raises risks of objectification, as well as serious ethical issues. Not least amongst the ethical issues is the potential for harm to participants, as well as the difficulties in gaining informed consent. These problems are discussed in light of the disconnection between the formulaic ethical standards of the Massey University Human Ethics Committee (MUHEC) and the practicalities of work in poor countries. The actual methods utilised in 'the field' are reflected against these philosophical and pragmatic issues identified prior to the research.

Ontology and Epistemology

This research is approached from a world view that rejects positivist[17] theories, and which favours inductive over deductive reasoning, a fact reflected in the preference for qualitative methods. Whilst "Positivism describes social reality as objectively constructed and believes there is one true 'real' reality", this thesis is based on an ontology that "argues that we should locate individual experience in society and history, embedded within a set of social relations which produce both the possibilities and limitations of that experience" (Bhopal, 1995, p155).

Theory plays a vital role in research. However this should be approached from a perspective of generating theory rather than simply testing it (Brockington and Sullivan, 2003, p57). The goal of this research is to adapt existing theories to suit the ethnography of Khorezm, not to adapt the conception of Khorezm to suit existing theories. The author is influenced by the authors such as Popper and Kuhn on the history and philosophy of science, regarding how scientists have and should conduct their inquiries.

The first point to note is the need for 'falsifiability', established by Popper (1992) in 'Conjectures and Refutations' (1963), as the contention that science tests hypothesises that could conceivable be proved false. It is important to note that this research can be considered 'successful' regardless of whether the theories are found instructive or not, as the academic nature of the research is founded not on the answer *per sae*, but on the question itself.

It is here that Kuhn's (1996) 'Structure of Scientific Revolutions' (1962) is of use. Kuhn (1996) established the paradigm test as a method of 'normal science' that allows an analyst to determine the degree to which a collection of unordered theories can be grouped into a singular paradigm (as the rubrics 'Black feminism' and 'dependency theory'). There are two criteria in establishing a paradigm, the first is for the new field to be "sufficiently unprecedented to attract an enduring group of adherents away from competing modes" and secondly the establishment of "shared rules and standards of

[17] I use Popper's conception of positivism, as those approaches that apply the methods of Physics to the Social Sciences (2nd Edition, 1976). It is however useful to note that Popper was commenting on a paradigm of physics that existed prior to the emergence of chaos theory and the discussion of the 'participant observer' (c.f. Heidigger 1982, Bohr, 1958)

scientific practise" (Kuhn, 1996, p10-11). In assessing how well Black feminist and dependency theory 'travel' this research will be examining the application of paradigms to different situations from which they were intended (c.f. Said, 1984). Should the "shared rules and standards of scientific practise" prove instructive in Uzbekistan, then it suggests that the paradigms remain valid (Kuhn, 1996, p11)

In utilising the paradigm approach, it is necessary to avoid what Popper (1976) describes as 'The Poverty of Historicism' (1957). Popper (1976) cautions against accepting "inexorable laws of historical destiny" (p iii) in conducting research, and instead favours 'objectivity and valuation' (p14). This cautionary note is very pertinent to the hydra of development studies, and the tendency for a teleological view of development. In terms of this research it is important to avoid making judgements, based on supposition, that reflect experiences or theory from outside Khorezm. To do this negates the ethnographic approach taken, and tends towards *Vide et Impera,* 'The Other as Object' (Fabian, 1983, p118) a topic discussed in the following section.

Within this ontology it is imperative the researcher adopts an approach of 'reflexivity', which "challenges the ... value of neutrality, which is part of the natural science definition of neutrality" (Gergen et.al., 1999, p433). It is impossible in cross-cultural research for the researcher to conduct 'independent' research without disrupting or influencing that which they observe (Reinharz, 1992, p46). Nor, it is suggested, is it possible for such 'independent' analysis in the physical sciences, given the tendency for observed phenomena to be altered by the act of observation (c.f. Einstein, 1956). The effect of the researcher and their involvement in the research process is a key issue in ethnography, discussed below.

Ethnography

Ethnography, in the broadest sense, is the use of anthropological and sociological methods to examine specific cultures and peoples. Brockington and Sullivan (2002) note that "ethnography implies both a particular suite of methods used to produce a range of qualitative data, and the end product or ethnographic text constructed from such interactions" (p65). Initially a paradigm within anthropology, ethnology and ethnocentric research has expanded to encompass inter-disciplinary investigations of various cultures.

Ethnography rejects the notion of impartiality, disabusing the research from the tenuous myth of 'objectivity', often cited in positivist literature. Instead, the active role of the researcher is acknowledged, which encourages critical reflection on the part of the researcher. This assists in avoiding the creation of *Vide et Impera,* 'The Other as Object' (Fabian, 1983, p118), or 'Orientalism' (Said, 1978).

The ethnographic approach is considered apposite to this research for several reasons. Firstly, ethnography was used, and is continued to be used in situations similar to those which this research will be conducted in. Foley (2002) claims that ethnographers "in the 1960s ... studied the so-called undeveloped 'periphery' countries' relations with the developed 'core' capitalist societies ... and the impact of colonialism on agricultural economies" (p469-70). This connection between dependency theory, Uzbekistan's history, and ethnography is reinforced by the growth of 'feminist ethnography', "multi-method research" which enables cross-cultural research to "aim for inter-subjective understanding between researchers and the person(s) studied" (Reinharz, 1992, p46). Specific to Uzbekistan, Kandiyoti (1999, p499-500, 508) notes that practical difficulties such as the contradictions between employment and livelihood[18], and the elusiveness of 'household' definitions within Uzbekistan necessitate an ethnographic approach, *contra* the "statistical and planning apparatuses inherited from the Soviet period" (p499).

By accepting the active role of the researcher in the research process, ethnography allows for research to act as an agent of social change (Schratz and Walker, 1995, p8-9, 11). The ability of research to be of benefit to participants, and of theory to be "not just theoretical" (Schratz and Walker, 1995, p104), is an important part of the ethical justification of this research (see 'Ethical Considerations' below). The potential of this research to benefit the participants is part of the justification for adopting the ethnographic approach. The research problem is at the most basic level, low rates of technology uptake by farmers. If we accept the assumption that new technologies can be of long term economic and ecological benefit to participants, then there is the possibility for benefits to participants. This prospective is reinforced by the fact that these

[18] For the purpose of pensions and health entitlements, it is important for Uzbeks to have their employment record lodged with an employer, even if they are receiving no wage for the work they are undertaking, or indeed are not actively employed at their 'workplace'.

technologies are currently being developed (under the aegis of ZEF/UNESCO), albeit with limited farmer input. If this research is effective in identifying farmer priorities and the barriers to technological adoption, then these technologies can be adapted to suit the needs of the local community. This will, *ceteris paribus*, produce benefits to participants and the wider community. Such a supposition is not without its dangers, especially given the inherent subjectivity and partiality of ethnography (Macdonald, 2002, p88). There is also the methodological problem that "extreme reflexivity ... can also render the production of ethnography as something more akin to individual psycho-analysis than as a means of enabling alternative perspectives on the 'real world' to gain public space" (Brockington and Sullivan, 2002, p66-7).

Ethical Considerations

Conducting research in Uzbekistan raises a number of serious ethical issues that warrant discussion in this section. The issues are grouped into principles of self-determinism, nonmalfeasance, justice and beneficence. These are the foundation principles articulated in the Code of Nuremburg in 1947 (Antle and Regehr, 2003, p136), and form the basis of the "evolving understanding of the rights and duties of human beings" (MUHEC, 2003, p8). This evolving understanding dates back to Hippocrates, and has continued to progress with the Helsinki Declaration [1964] and the International Ethical Guidelines For Biomedical Research Involving Human Subjects [1993] (Bhutta, 2002, p114). In the case of self-determinism and nonmalfeasance there is a *prima facie* case that this research faces ethical problems. Cognisant of these risks, it is the considered opinion of the researcher that the potential for justice and beneficence justify the potential for harm. This said, every effort to reduce the real and potential risks of the research has been taken.

Self-Determinism

The principle for self-determinism is that individuals have the right to choose whether to participate in research, and that this decision should be based on 'informed consent' (Macklin, 1999, p26). This determinism to participate must be "voluntary and based on understanding of adequate and appropriate information about what such

participation will involve" (MUHEC, 2003, p14). This ethical principle recognises that participants are persons worthy of respect and rights, not simply objects at the use of others (Macklin, 1999, p26). Whilst self-determinism is a vital principle, it is important for researchers to recognise the limitations of self-determination in research. As a philosophical concept 'freedom of will' and 'self-determinism' are contested terms (McDermott, 1975, ch.5-9). All human beings are influenced by their upbringing, their education and their cultural background amongst other factors. These influences inform decisions made by people, removing the possibility for 'pure' self determination. For example, a western educated individual has been socially conditioned to accept the need for research, making it unlikely they will not participate in University-sanctioned research. Their decision is in this case determined by their education (as well as privileged socio-economic position etc.), removing the idea that they are making an un-feted or free decision. There are merely degrees of self determination.

The, philosophically dubious, concept of 'free-will' is a largely Western value with a history in the European academic tradition (Antle and Regehr, 2003, p137). The majority of the world does not share this tradition of individualistic rights (Richards, 2002, 796). For example Macklin (1999) suggests that "informed consent is a concept understandable and applicable in the West but ... irrelevant to social and cultural norms in Africa and Asia" (p26). In such situations Orentlicher (2002, p404) suggests that oral consent, from tribal leaders or traditional authorities is more appropriate, a suggestion that the Massey University Human Ethics Committee guidelines do not easily allow for, and moreover the guidelines stipulate that consent must be recorded[19] (MUHEC, 2003, p24). In a society where one's word is considered sacrosanct, to request a recording or signature is considered insulting (c.f. Bedouin Culture discussed by Al-Krenawi, 1995 cited in; Antle and Regehr, 2003, p137). Likewise, tape recorders are inappropriate in a society where political repression and a 'Gulag' culture remain persistent.

In this research all participants were advised that the research was voluntary, and that they were under no obligation to participate. This conflicts with Islam's injunction to provide hospitality to all guests, and that the researcher as a foreigner was considered a

[19] However the Code of Best Practice does make provision for more appropriate mechanisms of gaining informed consent.

guest to be provided with whatever they requested. This placed potential participants in a difficult situation. However the fact that over ten individuals declined to participate suggests that self determinism was respected.

Nonmalfeasance

The notion that research participants should not endure unreasonable harm is sacrosanct amongst ethical principles (Bhutta, 2002, p114). Nonmalfeasance requires an anticipation and articulation of the conceivable risks of participation, which "include[s] not only physical risks ... but also potential symbolic or personal discomforts, such as embarrassment, fear of loss of reputation (for example, research that addresses a socially stigmatised issue)" (Antle and Regehr, 2003, p138). Inextricably linked with nonmalfeasance is the requirement for confidentiality. The rule of confidentiality is an important tool in ensuring harm minimisation, and like self-determinism is subject to attack as a Eurocentric concept (Mackiln, 1999, p32). In the case of this research it is argued that confidentiality was to be strived for, both to reduce potential harm, as well as to improve the efficacy of the research (an issue discussed below in 'Justice and Beneficence).

The paucity of human rights in Uzbekistan, combined with the politicised nature of the rural economy (importance of cotton to the exchequer etc.) coalesce to make confidentiality vital in this research. However, prior research in the region (Wall, 2003) has identified some problems with ensuring confidentiality from interpreters as well as focus group participants. The simple solution to this problem would be to adopt a *pro forma* approach, whereby interpreters and focus group participants were required to sign confidentiality clauses. It is the opinion of the author that such agreements would not be honoured, given the oral tradition of the region. This creates an ethical dilemma, whereby it would be unethical to follow the formulaic guidelines of MUHEC (2003), which state "Researchers must obtain a signed confidentiality agreement from anyone, such as transcribers and research assistants who will process any data which contains personal information ... [including an] agreement to not disclose, retain or copy information" (p30). As a solution to this problem, it was resolved to undertake extensive training of interpreters, as well as including comments on confidentiality in the briefing to focus

group participants (concomitant with disclaimers on informed consent). To ensure this the two interpreters were chosen for their discretion as well as translation skills. Zulmira Djabbarova had previously worked for Médecins Sans Frontières and was used to the need for privacy considerations, especially around socially stigmatised issues such as reproductive and sexual health. Durdona Igamberganova had worked previously with the author, and had ensured confidentiality at all times. This solution was not ideal, however it is considered better to be explicit about the ethical problems rather than adopt a, less ethical, pro forma solution[20].

Justice and Beneficence

The principle that researchers and academics must act in a just manner dates back to Socrates, who suggested that very few academics upheld justice. However, he posited "those who believe this and those who do not, have no common ground for discussion" (Plato, Crito; cited in; Koehn, 1998, 117). The principle of justice in this research implies that the benefits and burdens of the research should distributed evenly, ensuring that disadvantaged groups gain from the research and are not exploited by it (Antle and Regehr, 2003, p138). The concept of justice is inseparable from the principle of beneficence, the injunction that research must be of potential benefit to the participants. It is this beneficence (the 'benefit') that must be weighed against the potential for malfeasance and harm (the 'cost'), to determine whether research should be conducted (Orentlicher, 2002, p407). This judgement cannot be made in aggregate, but must also consider the just distribution of the costs and benefits, amongst at-risk groups and minorities. It must also recognise that different people and cultures attribute different value to certain costs and benefits, and that it is unethical to impose Western value systems in this regard.

This research hopes to be of long term benefit by assisting in developing sustainable farming technologies that reflect farmer needs and priorities. The ecological, economic and environmental disaster of the Khorezm and Aral Sea region, justifies the need for such research. This need has been reinforced by local desire for these

[20] For a similar discussion with a different decision see Scheyvens et.al, 2003, p145.

technologies, evidenced in prior research (Wall, 2003, p1, 16). The issue of justice is addressed in two ways. Firstly, those individuals who constitute the 'target group' for the downstream benefits are the same target group of the research, ensuring equitable distribution of burden and benefit. Secondly, women are identified as an at-risk group, and extra effort is made to undertake empowerment activities with women, to the extent possible in the research period. This includes focus group activities that promote equity, as well as specific gender analysis in the research.

Sampling[21]

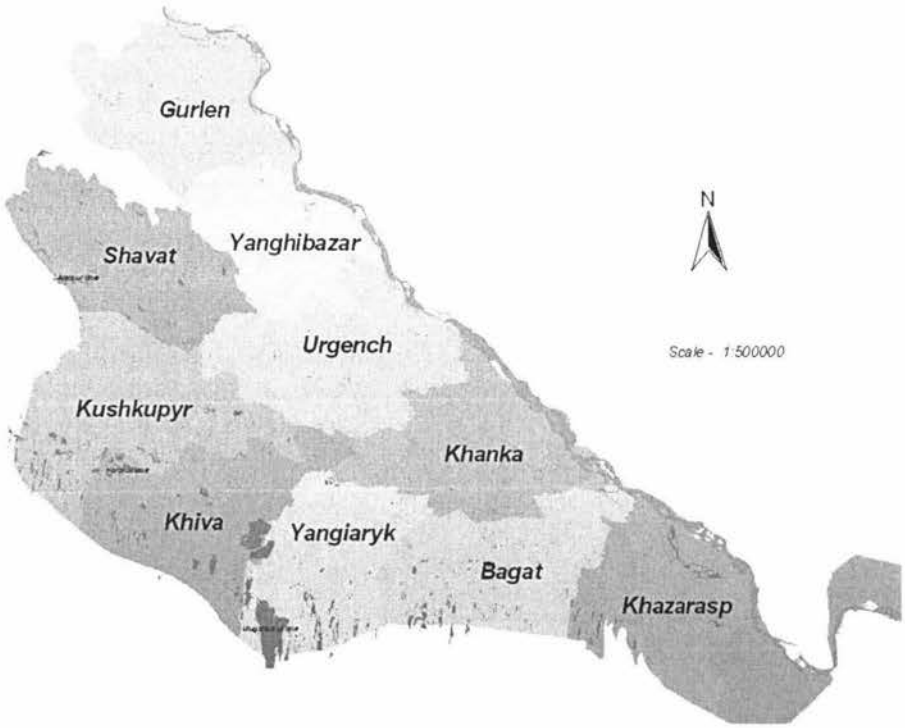
Several considerations were made in taking a sample of the population, which included the operational type of the farm, position of the farm relative to irrigation (up or downstream), gender aspects and pragmatic factors. Provided in Figure 5 is a map of Khorezm, indicating the Rayons (administrative districts) in which the research was conducted. The Amu-Darya river flows from the South-East towards the North-West, making Gurlen the most downstream Rayon within Khorezm.

Farm types vary in Khorezm. Whilst no private farming exists, there are degrees of operational autonomy. This ranges from devolved state farms which retain central state ownership (kolkhoz), joint-stock farms with collective ownership (shirkat) and smallholder leased farms (dekhan). Efforts were made to include a representative sample of each farm type, which is detailed in Tables1 and 2 (p.54). The typology of upstream and downstream is based on access to irrigation water, assumed to be a key determinate of economic and agricultural affluence. The assumption is that 'upstream' farms that are early in the water distribution cycle have an advantage over 'downstream' farms (which are later in the distribution cycle). Upstream farms have greater security of irrigation supply, as water will flow past them before it arrives at downstream farms. This also has an effect on the salinity of the water available for irrigation, with upstream farms entering saline and other pollutants into the irrigation canals, which is then used by downstream farms. This effect is most profound during the leaching cycle (whereby surface salt is 'leached' away through surface flooding). This report adopts a more sociological

[21] Aspects of this section have been adapted from Wall (2003).

definition of up/down stream access. Access to water is typified as having greater control over, ready supply of, and preferable timing for, irrigation water. This can take a variety of forms, but in each instance it describes a "social relationship and expression of power" defining not only "access to a resource, but also a relationship of inclusion and exclusion, and control over decision-making" (Boelens and Hoogendam, 2002, p ix). This may or may not relate directly to the 'geographical' definition of up/down stream farms. Rather, the social definition of upstream is of farms that have ready access to and availability of irrigation, whereas downstream farms are those which experience poor access to, and availability of, irrigation water. In Khorezm, Gurlen is a downstream region, compared to Kazarasp and Bagat which are upstream.

Figure 5: Map of Khorezm region: Administrative Districts



Gender sampling faces serious challenges in the culturally conservative Khorezm region. The revival of Islam in Uzbekistan has seen the growth of traditional notions of women's segregation from certain aspects of society. Husbands and fathers might wish to

restrict women's contact with a white, western young male as a researcher. However, working with two female interpreters, and by building rapport through group work, it was possible to access 68 women, 33% of the sample. In the first research period, where mainly group activities were used, women's participation reached 39%. However this was pulled down to 21% representation in the second research period. It would have been preferable to have increased the participation of women. However, the challenge of conducting one on one interviews with women made this very difficult. Where it was possible, there were usually follow-up interviews and longer length discussions, to ensure more equitable representation of opinions.

The two research periods of March 2003 and September to October 2003 constituted slightly different sample groups, and are analysed separately for this reason. The first period (March 2003) is given in Table 1 (p.54) and the second research period (September to October 2003) is provided in Table 2 (p.54). Most of the group-based activities were conducted in Phase One (March 2003) which explains the higher number of individuals involved in each farm visit. However there were a greater number of total contacts in the second phase of the research (September – October 2003). The gender disparity was actually worse in the second phase of research, associated with the difficulties of a white male researcher accessing women in a Muslim society.

Table 1: Sample Size, Gender and Farm Typology: March 2003

Rayon	Farm Type	Up/Down Stream	Men	Women	TOTAL
Khiva	Research Farm	Down	13	6	19
Khiva	Research Farm	Down	0	8	8
Khiva	Research Farm	Up	9	12	21
Yanghibazar	Dekhan	Up	7	2	9
Yanghibazar	Dekhan	Up	4	7	11
Yanghibazar	Dekhan	Up	8	2	10
Yanghibazar	Dekhan	Down	3	5	8
Yanghibazar	Dekhan	Down	8	2	10
Khanka	Shirkat	Up	15	0	15
Khanka	Shirkat	Up	5	3	8
Khanka	Kolkhoz	Up	3	2	5
Khanka	Kolkhoz	Up	4	0	4
Khanka	Kolkhoz	Up	4	4	8
Total – March 2003		**70% Upstream 30% Downstream**	**83 (61%)**	**53 (39%)**	**136**

Table 2: Sample Size, Gender and Farm Typology: September - October 2003

Rayon	Farm Type	Up/Down Stream	Men	Women	TOTAL
Khiva	Dekhan	Down	2	1	3
Yangiaryk	Cattle	n/a	1	1	2
Yangiaryk	Dekhan	Down	1	1	2
Yangiaryk	Dekhan	Down	1	0	1
Yangiaryk	Dekhan	Up	1	0	1
Yangiaryk	Dekhan	Down	1	1	2
Khanka	Fruit Grower	Up	3	0	3
Khanka	Fruit Grower	Down	2	2	4
Yangiaryk	Shirkat	Mixed	14	1	15
Yangiaryk	Dekhan	Up	7	1	8
Yangiaryk	Shirkat	Down	4	0	4
Yanghibazar	Dekhan	Up	3	1	4
Yanghibazar	Dekhan	Down	5	0	5
Yanghibazar	Dekhan	Down	1	0	1
Gurlen	Cattle	n/a	0	1	1
Yanghibazar	Dekhan	Up	3	0	3
Yanghibazar	Dekhan	Up	2	2	4
Yanghibazar	Dekhan	Down	1	0	1
Yanghibazar	Dekhan	Unknown	1	1	2
Khiva	Research Farm	Down	1	1	2
Khiva	Research Farm	Down	1	0	1
Gurlen	Kolkhoz	Up	0	1	1
Gurlen	Kolkhoz	Up	1	0	1
Total Sept. – Oct. 2003		**40% Upstream 60% Downstream**	**56 (79%)**	**15 (21%)**	**71**

Qualitative Methods[22]

A range of interview techniques were used, and adapted as conditions required. These interviews included key informant interviews, group interviews and informal farmer level discussions. In each case the respective Hakim and/or Shirkat Farm Manager was approached and interviewed, and permission sought for the conduct of farm level meetings. In most cases this permission was forthcoming. However there were limited instances of xenophobia or miscommunication, that led to Hakims and Shirkat Farm managers declining to allow farm meetings to occur. In each instance of farm meetings and informal farmer discussions, a brief introduction was provided by the facilitator (Caleb Wall) by way of an interpreter. This introduction covered privacy provisions, the rationale for the research and began by relating some of the facilitator's knowledge of the New Zealand farming systems. This served to introduce the facilitator, and to begin the rapport building process.

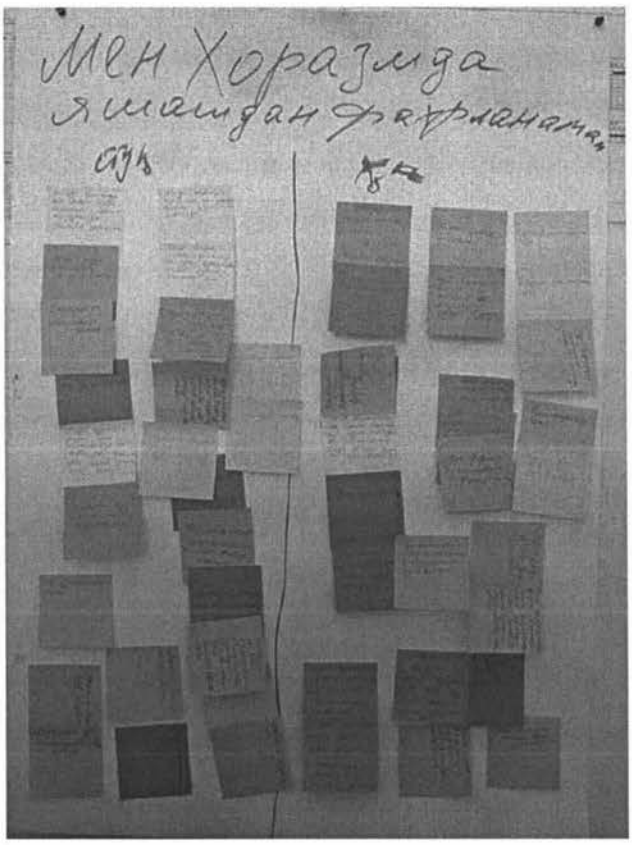
Simplified H-Forms

Simplified H-Forms are an adaptation of a commonly used tool in guiding participatory discussions. What they require is for a large group of participants to be separated into groups of 6-8 people, and for each person to be given a pad of Post-It notes. Usually five different colours are given to men, and a slightly different five colours to women, however this aspect is not shared with the participants. Each group is then given a large (A1) sheet of paper, with a capital H drawn on it. At the top is a question, written in Uzbek, and a 0 is marked on the left hand intersection and a 10 is marked on the right hand intersection. Participants then write reasons why the status quo is NOT a 0 and NOT a 10, which is done individually. The group then discusses the findings, and collects together common answers on each side, which are ranked vertically (top most important). These grouped Post-Its can be used as a starter for group discussion, as well as taken away for further gender disaggregated analysis. From this a clear idea of local priorities, views on project activities and wider opinions can be gained. It is also useful

[22] Aspects of this section have been adapted from Wall (2003), or represent work undertaken in prior study (Wall, 2002, 2003).

from a gender standpoint because men's and women's answers can be disaggregated using the colour-coding system. As an ice-breaker activity this process is useful as it gets groups working together, as well as allowing the facilitator time to stand back and observe how groups interact and which individuals hold traditional or existing power over others. These individuals can then be targeted, and their influence can be dissipated through the careful use of 'sabotage management' techniques by the facilitator (see below). In total nine H-Forms analyses were undertaken, often with larger groups of individuals. In six cases the groups were divided at random, and in three cases the groups were gender segregated. It was the belief of the researcher that conducting mixed gender groups using the subtle colour coding system was the most useful mechanism for disaggregating responses by gender.

Figure 6: Photograph of a Simplified H-Form



Semi-Structured Interviews

Otherwise named 'Informant Structured Interviews' are an inductive method of research, which begin with a range of information desired, without tying the researcher down to particular question sets or ways of accessing information (Reinharz, 1992, p18). The advantage of this is that discussions lead towards issues of importance for the participants, which is the key aim of priority setting. In this manner the researcher can access information from different perspectives and the participant feels less like the 'subject' of research and more like a partner in the research process. In this way, rapport is built more easily and the bias of the 'expected' or 'desired' answers by the researcher is less of a distortion to the research. Semi-structured interviews served as one of the most commonly used interview techniques in the second phase of the research. In total sixty seven informant structured interviews were conducted.

Focus Groups

This method was used to separate men and women, and to focus on issues of particular importance to each group. The main aim of using smaller focus groups is to encourage more equitable participation. Large groups tend to be dominated by the more eloquent speakers, or those who hold traditional power and authority. In such situations many people, especially the disenfranchised, tend to stay silent rather than risk the rebuke of making a comment. This is especially the case in societies where men speak 'on behalf' of women (in reality, instead of). Whilst this is not absolutely the case in Uzbekistan, in more traditional rural areas there is certainly a tendency for it. As such, smaller focus groups were established where peers could confidently discuss specific issues with the facilitator. Focus groups were utilised on fourteen occasions.

Household Meetings

This method involved the researcher visiting (by appointment) a series of households in order to observe the family and discuss household decision-making processes with them. These meetings ideally included the children, as well as the husband, wife and any other members (i.e. a widowed mother of either spouse). The

conduct of these discussions often followed that of a semi/un-structured interview, and the timing occurred after the initial focus group discussion. In this manner a degree of rapport was already established, and there were always a number of issues arising from prior meetings that benefited from clarification at a household level. Such an example was discussions over vegetable planting decisions, typically a female domain but one many men would claim as their own in front of their male counterparts. The aim of using the household as a unit of analysis is not simply one of convenience, rather it is considered a good method to encourage a synergy of "insights and solutions that would not come about" without the household meeting (Brown et.al, 1989, p40; cited in; Patton, 2002, p16). Household meetings were utilised twelve times during the second phase of the research.

Problem Trees

These followed on from the priority ladder exercise (see below 'Quantitative Methods'), taking the top three or four priorities established by the farmers in that activity. The group was then broken up into three to four sub-groups, and each sub-group was given a priority to make into a problem tree. These priorities formed the 'trunk' of the tree. The causes of the problems were listed by participants, and linked to the trunk like roots, indicating how they led to the specific problem. The effects of the problem were then classified as the branches, the visible impacts of the problem. These problem trees were then used as discussion pieces, and were later taken for interpretation and analysis. Problem trees were found instructive in cases where there was a high level of literacy and where participants had a large amount of spare time. In many respects more ethnographic approaches (such as semi-structured interviews) were found more helpful. In total five problem trees were developed by mixed gender groups, all in the first phase of the research.

Sabotage Management

This involved eliminating the influence of overly vocal group members, initially by using body language and directing questions to other group members. In the extreme situation the saboteur manager, one of the interpreters nominated prior to the meeting,

complemented the individual on the degree of their knowledge and requested a one-on-one interview in a separate room, thus eliminating the saboteur. The use of sabotage management was only necessary on two occasions, and in each instance it was possible to continue with the group activity by removing the saboteur. It is necessary to exercise caution in using sabotage management techniques, as it remains a matter of judgement as to what constitutes a saboteur. Excessive use of sabotage management can hinder, and possibly contradict, an ethnographic approach. In spite of this it remains a useful tool to use in extreme situations.

Quantitative Methods

In keeping with the ethnographic approach, quantitative methods are not used extensively in this research. Priorities ladders were used, and analysed using non-parametric tools.

Priority Ladders

This is a simplification of Q-sort methodology, devised for psychology and adapted for self-referent social research by Celia Kitzinger (1987), in 'The Social Construction of Lesbianism'. The Q-sort methodology is not externally referenced, so the numbers produced bear no resemblance to factors outside the study, rather it "is fundamentally a means of eliciting subjectivities" (Kitzinger, 1987, p78). The adaptation used in this research involved developing fifteen factors of life in Khorezm, gleaned from the semi-structured interviews and household meetings. A focus group was then presented with each of the factors written on a large piece of card. Each of these was then arranged at random, and the group was asked to rank them in order from highest to lowest priority. Each group member was allowed to move two cards, moving each only one place up or down the 'ladder'. This ensured equitable participation and input by all participants. The ranking of the priorities was then recorded, and analysed. The priority ladder was used initially for staff training (Figure 7) and at six farms, during the March 2003 research period. These farms were; Khorezm (1), Khorezm (2), Mustakil, Khamid, Mashrab, Khudaibergam.

The priorities used were:

- Fertiliser availability
- Price of vegetables at Bazaar
- Quality of Wheat produced
- Quality of Cotton produced
- Availability of herbicides/pesticides
- Water/Irrigation Timing
- Water Quality
- Agricultural Engineering
- Seed Quality
- Supply of Machinery and Technology
- Availability of Diesel for Tractors
- Financial Resources
- Soil Quality

Figure 7: Photograph of Staff Training in the Priority Ladder

Summary

This chapter has provided a summary of the methodological approach taken in the research, as well as discussing the epistemological and ethical issues considered relevant. Naturally for research of this kind the methods utilised went through a developmental process, where more successful approaches were gradually gleaned from less effective methods. The following three chapters of results discuss the findings of the research from the various methods provided in this chapter. However these chapters also signify the process that this research went through. As a learning experience for the researcher, and research staff, each phase of the research contributed to future work and methodological understanding. For instance the farmer priority setting phase (Chapter Five) contributed greatly to the researcher's understanding of the farming systems of Khorezm. This enhanced understanding had a considerable bearing on the choice of methodologies employed in the subsequent two phases. It is notable that qualitative tools, employed only to a limited extent in the first phase, were not used employed at all in the third phase.

When considering the pursuant three chapters, it is instructive to refer back to this chapter on methodologies. Firstly the ethical and epistemological approaches outlined here do inform the research and findings given below. Similarly, the use of an ethnographic approach is reflected in the research findings. This includes both how the findings are reported upon, as well as what these research findings actually tell us.

Finally it is worth noting that these methods were chosen for a variety of reasons. Some had to do with simple practicality of work in Uzbekistan. Other reasons reflect the ontological approach of the researchers. Thus it would be mistaken to employ this exact set of methods to similar research in a different socio-political-cultural environment. Whilst some or many of the methods may be appropriate, they are not transmutable, nor an exhaustive list of methods available for this manner of research.

CHAPTER FIVE: FARMER PRIORITY SETTING

Introduction

In an effort to better understand the barriers to technological change that exist in Khorezm, a 'farmer first' approach was adopted (c.f. Chambers, 1997, ch10). Thus the first phase of the research sought to identify research needs from the view of the rural populations. The priority setting exercise enabled this thesis to proceed in a manner cognisant of the needs and desires of the rural poor. This approach of positioning farmers at the primacy of the research process was of benefit for three key reasons.

Firstly, the farmer first approach enabled the research to take cognisance of the priorities of the rural poor. These priorities, or a conflict between farmer priorities and the economic reality, have the potential to be a major barrier to technology transfer (c.f. Richards, 1985, p117-121). Thus the first period of research undertaken placed a great emphasis on farmer priority setting. This priority setting contributed to the thesis by positioning further research in light of farmer priorities. This identified aspects of rural life that are often assumed to be important by external development projects, yet which this exercise showed to be of marginal or limited importance to farmers.

Secondly the ethnographic approach of eliciting farmer priorities, made it possible to build the empathy of the researcher towards the participants. In many cases farmers were very honest about their lack of money and their concerns about future harvests. From the outset of this research this enabled the researcher and translation staff to understand the most serious problems facing farmers, as well as being aware of factors that farmers did not consider to be of real concern. A concomitant advantage of priority setting is in improving the efficacy and efficiency of research and technology transfer. Any efforts towards technology transfer must be acceptable to the socio-political context in which they will operate. Most importantly this means that for farmers to adopt new technologies, these technologies must respond to needs that have been identified by

farmers themselves. It is not sufficient for external researchers to identify perceived needs and to solve these. Technologies must be appropriate to the needs of the rural community for them to be used.

The third aspect is that of empowerment. By working with farmers to identify their own needs, and then by assisting them in solving these needs, a process of empowerment occurred. Farmers became aware of their needs as legitimate, and ultimately as solvable. Communities and families were encouraged to work collectively towards solving common problems, sharing the strategies for meeting their needs and priorities (Pretty, 2003, p.9-10). It is hoped that the priority setting exercises, as well as subsequent interviews and group discussions met the three aims of empathy, efficacy and empowerment. Whilst limited in its scope, this research hopefully provides a useful insight into farmer level priorities and a guide for further technology development.

Priority Ladder Results

Farmer priority setting was informed partially through the use of the 'priority ladder' discussed in the methodology section (Chapter Four). Each priority was initially developed from the earlier discussions held on farms, and was vetted by two trials of the method, before the final list was produced. The results of the priority ladder are given below in Table 3 (p.64), which provides the final priority from each farm meeting. A1 indicated primary priority, whilst a 14 indicated lowest priority. Of greater use is the analysis of these results, which is provided in Table 4 (p64). There are a number of interesting results that emerge from this analysis, specifically the low importance of 'Price of vegetables at Bazaar', 'Quality of Wheat produced', and 'Quality of Cotton produced'. Equally interesting, and encouraging for the ZEF/UNESCO project, is the primacy given to 'Soil Quality', 'Water Quality', 'Financial Resources' and 'Water/Irrigation Timing'. Each of these findings is discussed in the following section and compared to the legal and economic framework analysed in subsequent chapters.

Table 3: Priority Ladder Results: By Farm

Priority	Khorezm (1)	Khorezm (2)	Mustakil	Khamid	Mashrab	Khudaiberg
Fertiliser availability	7	9	9	9	2	9
Price of vegetables at Bazaar	11	13	14	14	9	14
Quality of Wheat produced	10	12	12	11	12	11
Quality of Cotton produced	9	11	11	12	13	13
Availability of herbicides/pesticides		10	10	10	6	10
Agricultural Engineering	6	8	7	5	5	8
Seed Quality		7	1	3	11	7
Supply of Machinery and Technology	4	6	5	2	7	2
Availability of Diesel for Tractors	8	5	6	7	10	3
Financial Resources	1	4	4	6	8	1
Soil Quality	2	1	3	1	1	6
Water Quality	3	3	2	8	4	5
Water/Irrigation Timing	5	2	8	4	3	4

Table 4: Priority Ladder Results: Analysis

Rank[23]	Priority	Median	Mode	Minimum	Maximum
1	Soil Quality	1.5	1	1	6
2	Financial Resources	4	1	1	8
3=	Water Quality	3.5	3	2	8
3=	Supply of Machinery and Technology	4.5	2	2	7
5	Water/Irrigation Timing	4	4	2	8
6	Availability of Diesel for Tractors	6.5	-	3	10
7	Seed Quality	7	7	1	11
8	Agricultural Engineering	6.5	8	5	8
9	Fertiliser availability	9	9	2	9
10	Availability of herbicides/pesticides	10	10	6	10
11	Quality of Cotton produced	11.5	11	9	13
12	Quality of Wheat produced	11.5	12	10	12
13	Price of vegetables at Bazaar	13.5	14	9	14

[23] The Rank is gained by taking the sum of the median and mode, and then ordering the priorities according to their relative score. The lowest score indicates highest priority.

Market Price of Vegetables

The fact that 'Price of vegetables at Bazaar' was most commonly the lowest farmer priority is of interest. This could be due to an error in sampling, which may have favoured farmers with allotments that were not focused on vegetable production for sale. However, pursuant research suggested that a sampling error was not to blame. What emerged was that most farmers were self-sufficient in basic foodstuffs and vegetables. Thus they were not influenced greatly by the market price of crops, as they produced sufficient vegetables for domestic consumption and only infrequently bought vegetables at the bazaar. Vegetables at the bazaar constituted a small part of household expenditure, only increasing during preparations for life cycle ceremonies, especially for weddings which require the host to cater for large numbers of people. In this case there is a significant expenditure on rice, carrots, mutton and cotton seed oil for making *plov*, the national dish, traditionally served at weddings and other life cycle ceremonies. The reverse is true for urban and peri-urban families, who were informally interviewed at various bazaars. These families ranked the cost of staple foodstuffs as amongst their highest household expenditure, and complained about the incessant inflation of prices since Independence. In the case of farmers who are producing marketable surpluses what emerged from follow-up interviews and focus group discussions was that farmers saw market prices as relatively inflexible.

> II09(f)[24]: "The price at the bazaar doesn't change that much"
> CW: "Does the price change from year to year?"
> II09(f): "Yes, it goes up all the time – but things are the same compared to other things ... meat always costs more than carrots"

Whilst price inflation was noted by most farmers and consumers alike, farmers stressed that this increase in market price did not even keep pace with increases in the cost of agricultural inputs and new forms of expenditure since Independence. For example, schools now charge fees and require students to purchase their own textbooks, whereas all education was basically free during the Soviet period. Despite these

[24] Informant Interviewee number nine, female. For an explanation of the coding system used, please see Appendix II (p.VIII)

complaints, those farmers who do produce marketable surplus saw themselves as price takers, who had little ability to influence the price which they were paid for their goods.

Notably women farmers were observed to place greater emphasis on the market price of vegetables than their male counterparts. During the priority ladder exercise research staff noted that women would often move this item further up the ladder, whilst men left it relatively static or moved it down the ladder. Pursuant interviews suggested that the relatively low income gleaned from the sale of excess vegetables at market is a 'women's activity'. Not only is vegetable production largely in the female domain, but the sale of surpluses at market is usually conducted by the leading woman in the family, usually the mother or grandmother. These women are then able to retain the profits from this sale, often spending it on children's clothing and other large, irregular, expenditures. The fact that the market price of vegetables was considered such a low farmer priority, despite the importance of it to women farmers, possibly suggests a lot about the state of gender equality in rural Khorezm.

This finding does not remove the importance of vegetables and marketable surplus in the rural economy. What it does highlight is the high degree of self-sufficiency in vegetables for most of the rural farming population. This self-sufficiency, combined with the statements about price elasticity, actually confirm the importance of vegetables to rural Uzbekistan. However, the price is an inappropriate measure in determining this priority, and identifies a need for greater clarity in translation between English and Uzbek.

Wheat Quality

The quality of wheat produced, with a median of 11.5, indicates the degree to which the governmental and farm management systems described in Chapter Six distort the agricultural market. In a competitive environment, quality of produce is usually of primary importance to farmers. In this instance it would appear that state strategic plans, which emphasise only the 'quantity' (i.e. weight) produced, do so at the expense of quality control. Wheat became a "strategic crop" under central government planning soon after Independence in 1991. The Uzbek government continues to aim for national self

sufficiency in grain, not wanting to rely on imports from Kazakhstan and elsewhere in the world.

> II27(m): "We process the wheat, but the quality is not as good as Kazakhstan – if people could afford to they would buy their wheat from Kazakhstan...it is much better to eat and cheaper"

At present approximately 50% of farmer yields are subject to purchase at the 'plan' price, with the remaining 50% theoretically available for sale outside the state system. This is somewhat illusory as the majority of flour mills are state owned, and operate a protected market. Farmers complain that whilst they only receive 150 sum per kilogram of wheat, they then buy back the milled flour at 300 sum per kilogram. The privatisation of grain processing facilities was underway during this research, and there was evidence of private milling of grain for either a percentage of produce or a set monetary charge.

One family of farmers proudly displayed a home made flour mill - capable of processing several hundred kilograms of wheat per day. The fact that this mill was very small made it difficult for the family to sell their flour at any marketable quantity. However the family reported a ready market of neighbours who were prepared to pay a portion of their harvest to use the mill.

> HM31(m): "Our neighbours come and get us to put some of their wheat through...we take about a tenth part, depending on how close they are to us"
> CW: "What do you mean by how close?"
> HM31(m):: "Well, if they are family or good friends then we take less and it all depends on the arrangement"
> CW: "What if the Mahalla came to check"
> HM31(f):: "Feed him well enough to keep his mouth full – so he can't speak" (laughter). CW: "Is the grain you process better quality than the state mill?
> HM31(m):: "Yes, but only because farmers bring their best wheat to us – the tool is the same quality"

Various women interviewed in household interviews in the environs of the private mill noted a preference for privately milled flour. I was told that the flour from private mills is much easier to make good bread from, and is thought to have improved nutritional qualities. The fact that women think this suggests that the private use of technology is a possible solution to technology change. This demonstrates that it will be important to monitor the impact that privatisation has on the priority accorded to the quality of wheat. Equally significant, one businessman discussed his ownership of wheat

and rice processing equipment, of Russian origin. Purchased using private finances (of unknown origin) this equipment employed several staff, and charged 5 sum per kilogram for rice and 6 sum per kilogram of wheat. Farmers in the locale who availed themselves of this service demonstrated a much higher concern for the quality of their wheat, not just the quantity produced. It would however be wrong to state that the Uzbek government is solely responsible for the excessive emphasis on weight as the sole indicator of production. Soviet central planning, and the education system that served it, placed undue emphasis on quantification of weight. Whilst this may have aided the analysis of aggregated statistics, it created adverse affects in terms of proper incentives for farmers and indeed other industries. Regrettably the Soviet legacy has been perpetuated by the Uzbek government, which continues to focus, almost exclusively, on the weight produced. Indeed, the Yangiarik Hakimyat observed in 2003 had a propaganda billboard, boasting of the tonnes of each commodity produced in the past harvest (Figure 8).

Figure 8: Photograph showing Tonnes of Production: Yangiarik, September 2003

From my own observations, this problem is exacerbated in the education system that trains agronomists and other agricultural specialists in almost purely quantitative techniques at the expense of qualitative techniques. Many agronomists were visited during the course of the research. Often when the research was explained to them, they eagerly ran off a litany of previous years (probably spurious) production figures. Many would also boast to what extent their region had fulfilled or exceeded the state plan.

The low farmer priority of wheat quality emphasises the impact of negative incentives for constructive farmer behaviour. If the central government continues to measure output using inappropriate, and solely quantitative, tools then farmers will continue to place a low priority on quality factors.

Cotton Quality

The state plan for cotton calls for 100% of the production to be procured at sub-market rates by the government, which is then ginned and sold on the international market. This internal monopoly provides a significant, yet un-quantified, part of the national accounts. Farmers are paid for their cotton according to three or five grades of quality, averaging a price of 250 sum per kilogram.

These quality grades are deceptive for two reasons. The first is that farmers are not actually paid according to a verifiable quality scheme, rather paid on a calculated figure depending on several factors. These include which picking the cotton is from (the first picking is generally of a superior quality), the variety, and whether it is hand or machine harvested. There is also, apparently, laboratory testing of the quality. However, no information on how this is verified or tested is available. Farmers have little ability to increase the grading of their cotton (except through bribery and inducements) through improved agricultural techniques. Also important to note is that the preference for weight over quality can lead to irrational farming behaviour, such as that observed in September 2003, prior to the cotton harvest. In this instance farmers were seen irrigating their cotton crop during cotton boll development, which would appear unnecessary.

CW: Why are you irrigating now?
HM50(m): "We make the cotton wet, because we just get paid by weight ... it is an old trick"

CW: "Does it do anything to the quality of cotton?"
HM50(m): "I don't really care ... the pay is the same – too low"

The second factor influencing the low priority placed on cotton quality is the limited price differentials along the quality gradient. Farmers are not aware of what price they will receive for their cotton ahead of time, and act as passive price recipients. This system discourages farmers from making future production decisions based on economic logic. Rather, farmers tend to plant crops that have delivered high profits in previous years rather than choosing future production based on anticipated future prices. This retrospective decision making process saw the over-production of rice in 2003, as farmers all strove to produce this (usually high value) crop.

Soil Quality

Farmers interviewed attributed clear importance to soil quality, with a mode of '1' and median of '1.5'. The fact that those interviewed recognised the importance of soil quality means that further research and extension can emphasise the direct relationship between sustainable land use and soil quality. This rates it as the most important priority for local farmers and was thus considered to warrant further research.

In order to provide a more in-depth analysis of farmer priorities for soil quality, a decision tree was completed for five of the interviews. These trees exposed a lack of understanding of the causes of poor soil quality, with farmers focusing on the need for more fertilisers and other inputs. These problem trees also identified the causes of soil salinity and chemical toxicity as being from either the Soviet past, or from a lack of irrigation water. The fact that farmers correlated water shortages with soil quality is of some note, as it is often the excessive application of low quality (rather than low quantity water) that degrades soil quality.

However, those interviewed demonstrated a good understanding of the effects of good and bad soil quality. The fact that fertility, yield and quality of harvest consistently appeared confirmed the importance of soil quality to farmers. There was a significant correlation between priorities identified by farmers in interviews and the effects of bad soil quality noted in the problem trees. For example fertility and yield were frequently cited in both formal and informal farmer meetings, and the connection was often made

with soil quality. This reinforced the importance of soil quality, as well as illustrating how degrading soil quality is and will continue to be a key constraint to technology transfer. What it also identifies is that greater levels of education are required, especially in terms of the causes of soil quality, for the ZEF/UNESCO project to successfully transfer technologies.

The primacy of soil quality to farmer priorities was confirmed in the H-Form exercise. In each H-Form completed, the most popular grouping of negative responses to "I like Farming in Khorezm" was that of 'ecology'. Within this grouping, popular responses included land salinity, poor soil structure and decreasing yields attributed to generally poor soil quality. Follow-up discussions from the H-Form exercises identified that many farmers not only saw land quality as poor, but that they perceived it to be declining at a rapid rate.

> FG07(m): "Our land is getting harder to grow crops on ... we used to be able to grow fruit trees but not any more"
> FG07(f): "It is very bad for the health of the old and the young – and us working age people get less and less from the land"

The high instance of marginal lands in Khorezm was also a key priority for farmers. Many farmers when asked about their saline soils which were no longer productive actively sought advice on what to grow on them. This active interest suggests that high saline levels pose a present constraint to technology change in Khorezm.

Water Quality

Water quality ranked third equal in terms of priorities, with a median of 3.5 on the priority ladder. This identified it as an important, though not vital component for those interviewed. When questioned, some farmers identified a decline in water quality over the past ten years, whilst older farmers talked of a high level of water quality in their youth. Notwithstanding the statements made in 'Soil Quality' (above), there seems to be a disconnection between the high priority attached to soil quality, and the relatively low priority attached to water quality. The accepted scientific research on Khorezm indicates poor water quality as the primary cause of degrading soil quality. The high presence of salinity, and persistence of agricultural chemicals, is generally considered by the academic community to be a primary cause of declining soil fertility and quality.

Interestingly, many farmers did not make a significant association between salinity of water and soil salinity. This is surprising, given the logical connection between saline application and saline residue. Whilst most farmers seemed concerned with a decline in the *quantity* of water available, there was limited concern with the existence of salt or other pollutants. This may reflect concerns of water scarcity during the drought in 2000-2002. It also reflects the conventional wisdom that salt can be "leached" away. The twice annual application of water to leach surface salt may be effective in the short term. The long term effects of raising the water table, and increasing the levels of salinity in this water table, are not well acknowledged by farmers. The effects of the saline water table are evident, and include not being able to plant fruit trees on land with a high water table. This finding would tend to suggest that there is a need for farmer education about water quality to enable technology change.

The issue of poor water quality illustrates the dependent nature of Khorezm. As a downstream user of the Amu-Darya, the Khorezm region is subject to the water use of up-stream riparian regions and countries. The water usage of Kyrgyzstan, Tajikistan, Afghanistan, Turkmenistan, as well as significant regions of Uzbekistan, has a profound impact on Khorezm. To a large extent the farmers of Khorezm are unable to control the water use, or polluting, of upstream users. Khorezm is very dependent upon central state, and interstate planning bodies for their water allocation.

> II18(f): "We have no say over the water – it just comes to us and we use what we can when we can ... it is not very good – but what can we do, we are just farmers"

The despondence of many farmers reflects the fact that many are resigned to accepting whatever water arrives, and see no mechanism for ensuring that quality and quantity concerns are met.

Water/Irrigation Timing

This variable ranked much lower than was expected, however is still significant at a median and mode of four. This was possibly due to the fact that whilst water supply had been a problem in the past two drought years, it had not been and farmers did not anticipate it to be a problem in 2003.

FG15(f): "We have no problems with water this year ... in past years yes we did – but this year there are no problems"

This may also reflect the formulaic approach to irrigation, which is dictated more by calendar date and rostering, than the actual crop needs. All farmers discussed some short-term lack of supply, but claimed that this was always remedied within an acceptable time span.

II05(m): "we all need water, so we take turns ... it always works out".

In most cases a "responsible person" (sic) monitors water use and makes ad hoc rulings on irrigation timing and manages water allocation. Given the paucity of metering or other adequate control mechanisms this would appear to be an effective solution. However, personal interviews identified a high incidence of corruption, and water theft.

II12(f): "How it works is that if you have money, or are friends with the right people you have water. We are poor. We have no water. Some people take the water when we are not allowed, what else can we do if the crops need water? Everything needs the same amount of water – plants don't know how rich their owner is"

On a macro scale the irrigation of cotton in particular is too infrequent, with many cotton crops being irrigated from one to four times throughout the entire growing cycle. The system of taking turns favours upstream users who will over-irrigate their fields, unsure of their next opportunity to access irrigation water. This produces problems of saline runoff, which is then gathered in collector canals (many of which are old and poorly maintained). Downstream users receive both limited and untimely water access, as well as increased levels of salt in their water.

Of considerable concern is the use of 'emergency' ground water supplies for general crop irrigation. Many farmers discussed using electric or tractor driven pumps to access shallow well water for irrigation, during times when no canal water was available. In doing this farmers are using high saline ground water, which contributes to the already problematic soil salinity.

HM56(m): "We all use wells and drainage canals if we can – it is water, but it is very sour [salty]"
HM56(f): "It is not very good for humans or animals but it is good for the crops, except for fruits and trees that don't like sour water"
HM56(m):: "You have to know what the plants need – I am a farmer and I know

what plants need – cotton can have sour water so long as it is old enough, if it is too young it will die"

The use of ground water for irrigation highlights both the relatively low priority farmers attach to water quality as well as the high importance to the project of improving irrigation timing.

Financial Resources

Financial resources are, unsurprisingly, a key concern with a mode of one and a median of four. The reasons for this are two-fold. Firstly the settlement accounts system of Uzbekistan is a significant barrier to accessing financial resources, as well as an inhibitor to rural development. This system of accounts is discussed fully in Chapter Six. In brief the majority of transactions must occur through the 'settlement account' of an individual. This includes receiving payment for official crops (cotton, wheat and rice) as well as paying production costs such as for fertilisers and seeds. In most cases men are the legal 'leaseholders' of land and it is their settlement account into which monies are paid. Whilst women are legally entitled to lease land, and some do, this remains a rarity. Similarly, there is no reason why a woman's banking account could not be nominated for receipt of payments and for expenses. However informal interviews showed that in almost all cases men are both the legal leaseholder and the bank account is in their name. The only common exception is where a widow annexes her husband's lease and bank accounts following his death.

The second reason for the importance of financial resources is the generally high level of poverty in Khorezm, especially in the rural regions. Many families subsist on or below what is colloquially termed 'the poverty line'. Extensive use is made of informal cash income mechanisms, with the black market dominating the rural (and urban) economies. Family focus group discussions exposed that there was an acute lack of cash resources. For example on family noted that they did not have enough cash to bribe their two children into university.

FG66(f): "I have not been paid as a teacher for the past three months, I should get 30,000 sum [$30 US] but I get much less than that, if I am lucky enough to get anything at all".

One of the coping mechanisms employed by this family was for the father and eldest son to travel to Karakalpakstan where some extended family lease a farm. The men then worked harvesting rice by hand, in return for a portion of the rice they harvested. During the summer months the mother also bought ice-cream in bulk, and sold it from her front door for a small profit.

What is clear from this research is that farmers are motivated towards gaining cash income, especially if it is outside of the official settlement accounts system. This enables them perfect access to their cash, rather than access only to buy certain inputs from government firms. This preference was evidenced quite clearly in 2003 by farmers stating a preference for rice over cotton, even though the profit was not so great. The advantage of rice was that all the profit was in cash rather than in an inaccessible back account.

Farmer Priorities and Barriers to Technological Change

What these farmers articulated as priorities demonstrated that there exists a real impetus for change within rural Khorezm. Whilst the Soviet legacy continues to stifle the development of new agricultural technologies, farmers are interested in improving their land and improving their crop profit. This is useful in understanding the following two chapters that make direct reference to barriers to technological change. What the farmer priority setting research enables is for this thesis to compare and contrast articulated farmer desires with the opinions of farmers and decision makers on technological change. From a development perspective this is very useful in enabling technological intervention to be properly targeted to meet the needs of the rural poor. Moreover, the farmer priority setting research serves as a useful introduction to the problems of technology transfer in Khorezm.

The first finding from this chapter is that there is a lack of access to cash resources and that this poses a serious constraint to the adoption of new technologies. This constraint identifies the need for cash generating technologies to ensure successful technology transfer. It is important to note that financial resources kept in banks are not always accessible, and that new technologies that are promoted through the private sector may be inaccessible to the very poor. This is because the private sector requires cash

payment whereas the government managed Machine Tractor Parks accept transfers from the settlement accounting system.

The second issue to note is the level of motivation by farmers for improving both water quality and irrigation timing. Whilst farmers attribute high levels of priority to these factors, they are not as high as would be optimal for technology transfer. A general lack of impetus for change, at the farmer level, can be seen as a serious constraint to technology change. This barrier intersects with the lack of access to cash resources noted above. This is especially true if a lack of cash is shown to be having an adverse effect on farmer level education, as indicated by one family interview. It is the intersection of these two barriers that needs to be analysed jointly, as part of the complex of barriers to technology change.

It is likely that the continued privatisation of agricultural production and post-harvest processing will see a move away from quality focused production, towards quality and quantity focused production. This transition towards the private sector, including the move towards quality focused production, has the potential to exacerbate the problems identified by farmers in this chapter. This privatisation is likely to reinforce problems in the rural community if it does not occur concomitant with a rationalisation of the banking system and improvement in the state of family financial resources. This once again shows the intersection of barriers to technology transfer, in line with the model of multiple dependencies in Black feminist theory.

In summary, the priorities of farmers in Khorezm are understandable given the socio-legal context in which they are formed. This thesis attempts to adopt a farmer first approach, working from the perspective of meeting the articulated needs and priorities of the rural poor. This chapter represents the first step in this process, seeking out the priorities of households in rural Khorezm. These findings then inform the results of the next chapter, which discusses the opinions of farmers on acute problems in Khorezm. Equally, the practical barriers to technology change, as discussed in Chapter Seven relate directly to the priorities identified in the priority setting exercise.

CHAPTER SIX: FARMER OPINIONS OF ACUTE PROBLEMS IN KHOREZM

Introduction

In an attempt to better understand the barriers to technological adoption, farmer opinions were solicited on a range of problems. This focused especially on a series of environmental and practical challenges often perceived by the development community in Uzbekistan, the hope was that farmer opinions on specific problems may serve to reinforce, or prompt the critique of, some of the tacit assumptions made in technology transfer. Specific problems discussed with farmers were a lack of access to technology, including poor maintenance, a paucity of spare parts and a lack of post-harvest processing. The low water use efficiency was also discussed with specific mention of; soil salinisation and drainage, deteriorating infrastructure, land levelling and poor governance. The perceptions of these problems from the perspective of farmers is given in this chapter, and compared to the priorities established in Chapter Five.

Lack of Access to Technology

This research found that there was a shortage of agricultural technologies in Khorezm and much of rural Uzbekistan. Both from my own observations, as well as from focus group and key informant interviews it became apparent that basic agricultural technologies are in short supply. Periodic shortages of mechanical traction, planting and ploughing equipment appear to be part of the cycle of rural life in Khorezm. The lack of access to technology is especially prevalent for poor dekhan farmers who do not have the cash required to pay private machinery providers. Many kolkhozes also experience shortages of equipment, and certainly make use of substandard equipment on a regular basis.

Maintenance and Repairs

During the Soviet period almost all agriculture was heavily mechanised, with much of the equipment being imported from other, industrialised, parts of the Soviet Union. Whilst some machinery assembly plants were established towards the end of the Soviet era, Uzbekistan inherited in 1991 an agricultural system heavily dependent upon externally provided machinery. This problem manifests itself in the absence of spare parts for old machinery, much of which is in varying states of disrepair (see Figure 9). This causes a lack of technology when required, and often results in poor quality land preparation.

Figure 9: Photograph of a typical Tractor: Khorezm 2003

One dekhan farmer with twelve acres of land mainly under cotton and wheat with two acres of rice, owned his own tractor. However this individual complained that it was a full time job to keep his own tractor operating.

II42(m): "I can't get the parts I need to repair the tractor. If I go to the market only used parts that are no good are for sale – we would have to go to Russia to get new parts … this never used to be a problem"
CW: "Are you able to rent out the tractor to neighbours – to help pay for the repairs?
II42(m): "If only the tractor worked that well! I am happy if it can plough just my twelve acres"

In practice older tractors are pillaged for parts to fix more modern tractors, or home made replacement parts are engineered (to a low standard) in workshops with limited facilities and quality control systems. A visit to three local MTPs showed how scrap metal was used to cast and machine new parts, the quality of which could be said to be dubious. This *ad hoc* approach to maintenance is also unsustainable, as the availability of even scrap metal continues to decline. One MTP manager commented that the paucity of basic materials and spare parts was crippling his ability to meet farmer technology needs.

II47(m): "We always have people coming looking for parts – some parts we can make ourselves – we have the tools to make good parts … but the metal is difficult, we cannot get good steel anymore – here we are using that big piece of gas pipe [pointing] it is not perfect, but what can we do?"

No system of maintenance or supply of spare parts seems to operate in a meaningful sense. Basic consumables such as batteries are neither available nor affordable, necessitating the 'jump starting' of all tractors on either hills or by towing. Whilst new parts are available at local bazaars, the lack of access to cash (c.f. Chapter Seven) prevents many farmers and MTPs purchasing these parts. The government has encouraged investment by Case Corporation, a large transnational machinery manufacturer. Case has established a tractor assembly plant in Tashkent, and sells a range of agricultural technologies to Machine Tractor Parks (MTPs) and Kolkhozes. The cost of a new Case tractor remains prohibitive for private farmers or most private machinery providers.

CW: "What about Case tractors?"
PL16(m): "That would be nice … to own a Case tractor, but we can't even afford a Russian one"
PL16(m): "If we had a Case, then we could afford to come and visit you [CW] in your country" *laughing by group members*

The priority setting exercise identified a lack of access to technology as the most serious problem faced in the farming system. A majority of dekhan farmers with smaller

land holdings, interviewed informally, complained that they could not access technologies in a timely manner from public providers (kolkhozes, MTPs), and that the charges for private equipment are either too high or cannot be paid due to the settlement accounts system (c.f. Chapter Seven, Settlement Accounting).

> II67(m): "Money and technology is the same thing. If you have money, you have technology, but if you don't have money – you have nothing".

The shortage of supply of technology, reinforced by the financial difficulties faced in the rural economy has seen a decline in the mechanisation of agriculture. For example I observed that rice is now harvested by hand and then fed by hand through combine harvesters parked on roadsides. While a combine harvester is capable of harvesting and threshing the entire crop in the field, key informants noted that there are insufficient numbers of harvesters for this to work. Were there sufficient harvesters it is in my opinion likely that the majority of farmers, especially dekhan farmers, would be unable to pay for this service.

Farmers interviewed through focus groups and informant interviews in Yanghibazar noted that the privatisation of land has exacerbated the shortage of technology supply. MTPs are not considered to be providing an effective service, and there is a lot of suggestion that corruption and social networks influence access to technology.

> II70(m): "We have to wait for the tractors to come – sometimes the fields are ready but the people who own the tractors will till their own land first. Sometimes you have to 'arrange things' with a friend at the MTP, even then sometimes you have to wait"
> CW: "Who owns the technologies now?"
> II70(m): "The rich people of course, people who had money when the changes started happening, us, we had no money – we were only farmers not high up people in government"

What privately owned technology does exist tends to be very old, only partially operable and requiring constant maintenance. In many cases these problems could be fixed by having an available supply of spare parts, however import restrictions and a 100% tax on foreign goods restrict the supply of new parts from Russia. The difficulties in accessing technology, especially for dekhan farmers, contributes to the increasing level of manual labour in Khorezm. Increasingly amounts of cotton picking is reverting to all

being hand picked, which improves quality but which places a huge burden on the rural and urban populations. To quote a local phrase "cotton comes before college" and most university students are still sent to the rural areas to pick cotton every year.

Post-Harvest Processing

There was evidence of persistent shortages of post-harvest processing facilities in 2003, as Khorezm continued to remain a dependent agricultural region producing largely unprocessed cotton and wheat. Farmers and factory managers interviewed noted that they would be interested in greater involvement in the supply chain, potentially using ginned cotton to make blankets or other value added goods.

> II55(f): "I would like to make my own blankets and sell them – the older women still know how to, but it is illegal, we can't keep the cotton because the government needs it all"

This account was reinforced by the experiences of a PhD student working with the ZEF/UNESCO project. In this case the student wanted to hand gin the cotton from his research plot in order to analyse it. It eventuated that the ownership of such a gin was illegal, and the project had to purchase one from Karakalpakstan.

Likewise, state owned cotton processing plants continue to export bales of ginned cotton and report a lack of capital as a key constraint in developing their post-harvest facilities. Even in Yanghibazar, where the privatisation has been most rapid, the local cotton gin remains state owned and operates a firm monopoly. A senior manager of the gin commented:

> II61(m): "All the cotton bales we make are sent to Tashkent, we cannot sell any to people. Sometimes people come wanting to buy cotton to make blankets [a typical wedding gift] we cannot sell them any – it is controlled"
> CW: "What about this factory making blankets?"
> II61(m): "We have tried, but we cannot buy the machines. Anyway, we still have to fulfil our plans for Tashkent, so we would not be able to do much – who would buy them anyway"

These same challenges also apply to other agricultural products such as milk. Private milk processing plants do exist, but have a difficulty in gaining a steady supply of milk from farmers. This problem is apparently not caused by a lack of milk production, but rather by an edict that all milk must be paid for using the settlement account system,

and that this payment should be made annually. An in-depth interview was conducted with the female manager of a milk processing plant in Khorezm. This interview identified a high level of dissatisfaction with the barriers faced and a degree of resignation, stating that:

> II73(f): "Really, what do you do? We can't pay the farmers so they just sell their milk themselves, which means they can't make cheese because that takes technology. We had the technology to make cheese, but because we had no cash we could not fix it when the heater [pasteurisation plant] broke"

Thus many farmers complain that there is no profit in selling milk given that cash in settlement accounts often cannot be accessed, whilst the dairy factories do not have the cash to maintain and repair equipment. In this case the factory stopped making cheese, their highest value product, despite an apparent demand for cheese and a definite supply of unprocessed milk.

The lack of access to technology remains a primary concern for farmers in Khorezm. The paucity of financial resources, and the necessity of corruption and connection to access state equipment, exacerbates the need for manual labour and inefficient farming practices. This lack of technology also serves to reinforce economic inequality, as well as impacting on other acute problems such as low water use efficiency, soil salinisation and poor drainage.

Low Water Use Efficiency

The efficiency of water use in Khorezm is incredibly low, often cited as being well below 30% (World Bank, 2003, p2; Wegerich, 2002, p9). There are a number of causes for the low efficiency of water use, most notably:

- A lack of incentives for irrigation savings (as noted in Chapter Seven)
- Inadequate drainage, water logging and high soil salinity which then requires large water applications for leaching. Creating a downward cycle to keep soil salinity under control (see Soil Salinisation and Drainage' below).
- Deteriorating Irrigation and Drainage infrastructure (see 'Deteriorating Infrastructure' below).

- Poor irrigation practices due to poorly levelled fields, long furrows, long intervals between irrigations and reliance on shallow groundwater levels for meeting crop water requirements (see 'Land Levelling' below)
- Inadequate institutional capacity for proper management and maintenance (see 'Poor Governance' below)

Soil Salinisation and Drainage

Farmers attach a high priority to soil salinity, evidenced in Chapter Five where soil quality ranked as the highest farmer priority. The issue of soil salinisation and poor drainage is acute in Khorezm. I observed that saline levels in many fields have reached the point of toxicity, with a thin layer of salt on the surface of the soil. This prevents plant growth and causes acute health problems for the local population. All farmers interviewed considered the solution to soil salinisation to be the process of leaching, whereby large quantities of irrigation water are applied to the soil, in order to leach the salt away.

> FG24(f): "When the salt gets bad we have to wash the salt away. So we build up the fields and flood them with water. We do this two times a year, if there is enough water, if not then we do what we can. The only way to get rid of salt is to wash it away."

According to PhD students and research staff at ZEF/UNESCO, the leaching process places a considerable strain on the irrigation system, removing significant quantities of water from the system during the two main leaching periods of the year (prior to cotton/rice and wheat sowing). This lowers the overall efficiency of the irrigation system, using large amounts of water for purposes outside of direct crop requirements. It also contributes to long term soil toxicity, given the downstream position of Khorezm on the Amu Darya river. Large amounts of surplus salt and agricultural chemicals, and increasingly human wastes from upstream regions, are now part of the irrigation water that is applied. This creates the cycle of increased soil toxicity, requiring further leaching, which ultimately uses more irrigation water. The success of leaching is premised on effective drainage systems that can remove the salt-laden leaching water from the soil and groundwater. What drainage systems do exist were said by focus groups to have been constructed over 50 years ago, during the period of mass Soviet investment

in expanded cotton production. Many of these drainage canals suffer from poor maintenance (see 'Deteriorating Infrastructure' below) and almost all are not operating to full effect.

> HM58(m): "Our collectors [drainage canals] are good, but they need to be cleaned once a year. We do not have the diggers, the state ministry has them. We have not seen the ministry for a couple of years."

A combination of poor maintenance by the government department responsible and the need for significant investment in modernisation contrive to provide poor levels of drainage. The net result of this is that much of the leaching water remains in the soil, contributing to the problem of high ground water levels (GWL) with high saline content. An excessively high GWL makes growing certain crops such as fruit trees and cotton impossible. Most farmers interviewed, both in informant structured and focus group interviews, expressed the view that the solution to this problem is to plant rice. Rice, with a shallow root system and medium levels of saline tolerance is preferred as it can be grown on land with high GWL. Sadly rice is also a high user of water, and the paddy cultivation system introduces high levels of water into the field, exacerbating the GWL problems. The high GWL then aggravates the soil salinity problem, as ground water is picked up by crop roots or through capillary action.

Farmers remained focused on a technological fix to the problems of soil salinisation and drainage. Instead of being interested in improving irrigation efficiency, the opinion of almost all farmers interviewed was that leaching was the only way to cure soil salinity. Most farmers seemed unaware of the long term impact of leaching, its ultimate un-sustainability, or the impact on GWL. Similarly, many family groups who were interviewed stated a collective belief that improving drainage collectors was the responsibility of the government, and were not wont to take any initiative in cleaning their own collectors. Whilst these farmer perceptions of a need for technological fixes, rather than preventive measures, were strong there was evidence they were changing. In Yanghibazar a number of leading dekhan farmers indicated an enhanced interest in soil preservation and in improving drainage conditions. Whilst few opportunities are available to farmers to improve their soil salinity levels, the interest of dekhan farmers in particular is worthy of note.

Deteriorating Infrastructure

The irrigation and drainage (I&D) infrastructure of Khorezm appeared to be deteriorating unchecked. I saw little evidence of investment to maintain the current or potential system capacity of either the irrigation or drainage systems. Whilst some repairs and maintenance could be seen to be undertaken, these were simply a case of fixing problems as they appeared, as opposed to a proactive approach to ensure the longevity of the infrastructure.

> II26(m): (a State Engineer) "We don't have so much money any more, so we fix problems when they happen. Nothing new is built, except for big projects, but we don't do those types of projects [referring to the 'Olympic Stadium' built in Urgench in honour of President Karimov]. There is no fuel or money for the equipment, so we do what is possible."

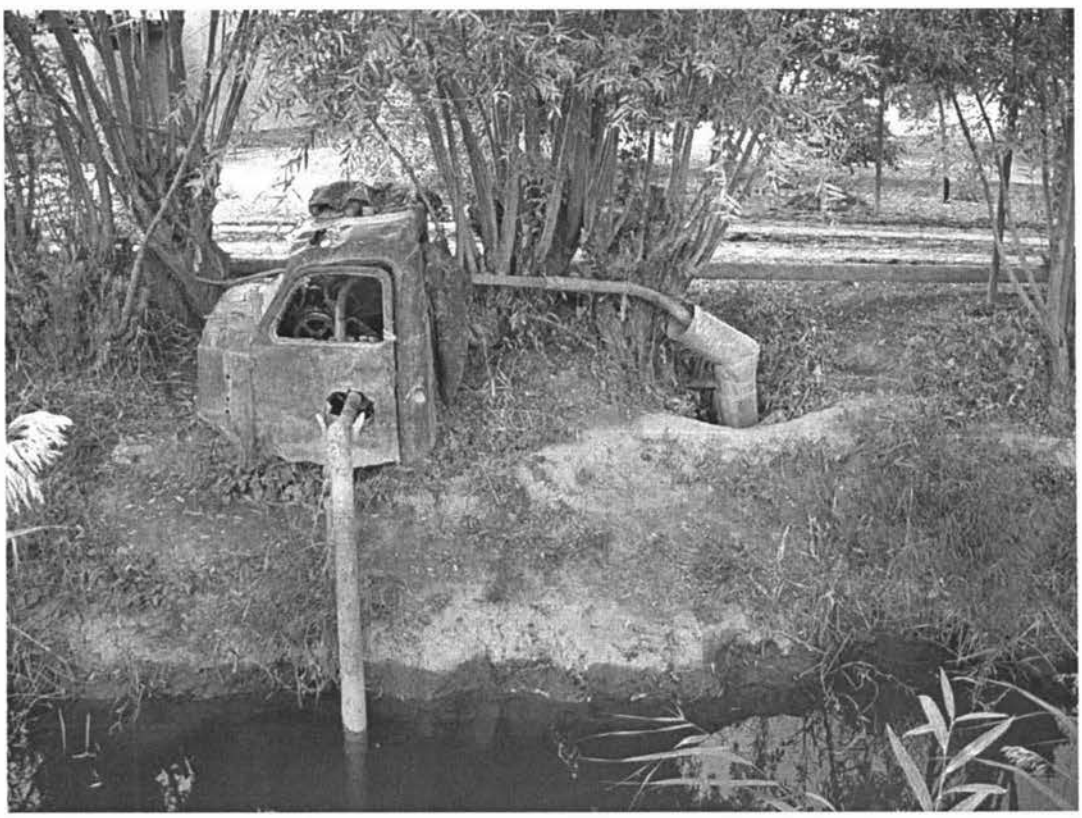
The deterioration of the irrigation and drainage infrastructure was manifest in a reduction in the amount of irrigation water available, and was characterised by high levels of systems losses through broken pipes and canals, as well as from increasing levels of irrigation water being used for domestic and sanitary purposes. The deterioration of drainage canals was in my opinion leading to increasingly high GWLs, and was perhaps a primary cause of the increasing levels of soil salinity. Whilst periodic cleaning of drainage collectors was said by informant interviewees to occur, this maintenance would appear to be insufficient for the increased loads on the collectors. There was no evidence of new collectors being constructed, or of a plan to replace many of the aging collectors installed fifty years prior during the Soviet financed expansion of the I&D infrastructure. The vast majority of farmers interviewed were aware of the problems of deteriorating irrigation infrastructure. Especially in terms of water availability, farmers noted that in the drought years of 2001-2002 there was insufficient water to meet crop needs. Many also noted that the pumping mechanisms were dated and rely upon *ad hoc* repairs and maintenance (see Figure 10). Many simply no longer operate.

> HM33(m): "Sometimes there is not enough water, in the last two years this was the case. People in the Samarkand [upstream] had water, but we did not. This was very hard."

The lack of systems maintenance has led to the profusion of private ownership of electric pumps, making the management of irrigation turns more difficult. These electric pumps are also used as a mechanism of tapping 'emergency' ground water supplies. Numerous farmers reported using their electric pumps to access ground water from wells when they were unable to get canal water. The salinity of this ground water is such that it can severely stunt crop growth, as well as contributing to the high levels of soil salinity. Yet the belief of these farmers was that they had to irrigate, even if this was at the expense of crop and soil quality.

> II04(f): "In the last two years there was not enough water, so we used what we could. Sometimes we used our neighbours pump to get water from the well, sometimes we got water from the collector – but that water is very sour [saline]."

Figure 10: Photograph of canal pumping equipment: Khorezm 2003



The opinion of most farmers interviewed was that the responsibility for irrigation infrastructure maintenance was firmly with the government. No farmers interviewed expressed an interest in contributing to the preservation of irrigation canals or in taking a more active role in water management. The Water Users Associations of Yanghibazar appear to have had little to no effect at the time of research on farmer perceptions towards irrigation infrastructure maintenance.

The opinion of most farmers towards drainage infrastructure was that it was sufficient for their needs in the most part. However some farmers – especially those with fruit trees – noted that the infrastructure was not working as well as required. Also interesting was the high importance family group interviewees placed on drainage collectors as the solution to high GWL and soil salinity. It was the belief of many interviewees that the significant ecological problems of the region could be mitigated by improving the drainage infrastructure. Perversely, very few farmers were prepared to make the requisite investment in improving their drainage infrastructure to ensure environmental benefits. Rather, most informants considered drainage maintenance to be the domain of the government, and they accepted with resignation the poor quality of service provided to them.

The lack of impetus for irrigation and drainage infrastructure maintenance is noteworthy, given the high priority of soil quality afforded in the priority setting exercise. A recurrent theme is an attitude that it is the government, not farmers, who are responsible for the maintenance of the I&D infrastructure. Whilst most farmers agreed that the *status quo* was ineffectual, there was a lack of impetus for change or motivation for action. This approach, whilst understandable in light of the political and historical context of a paternalistic state, is unfortunate. In my opinion there is a dire need for improved irrigation and drainage infrastructural maintenance, and it would appear that the government is either unwilling or unable to provide this. From this research it would also appear that the majority of farmers are not prepared to adopt the burden either. This presents a serious challenge for technology transfer, as any new technologies will ultimately be premised to some extent upon a functioning I&D infrastructure. Such an infrastructure could not be said to exist at the time of research. Moreover, this situation is likely to worsen if the current deterioration of infrastructure continues unabated.

Land Levelling

The levelling of land prior to irrigation is established in scientific literature as one of the most fundamental mechanisms for saving irrigation water, reducing salinisation and mitigating the environmental impact of agriculture. Land levelling appeared to be practiced infrequently in Khorezm, and what levelling was conducted was often of a poor quality and of limited effect. Because of this paradox, in-depth interviews were conducted with farmers to determine the reasons for not levelling the land. Primary amongst the reasons given were the cost and associated with this lack of access to technology. The issue of quality is also found to be a function of outdated equipment combined with a reliance on the skill of tractor drivers.

All farmers who were questioned about land levelling considered that it was very important to level the land prior to sowing and irrigating. The matter was raised in three focus groups on irrigation savings, as well as in over forty semi-structured interviews. In every instance those farmers interviewed stated unequivocally that land levelling is important. The fact that the majority of tilled land goes unlevelled is not because farmers attach a low priority to it. Rather, there is an acute lack of access to both the finance required to level land and a lack of access to the technologies required. The settlement account system (c.f. Chapter Seven) makes withdrawing cash at the times required for levelling almost impossible. Thus farmers, especially dekhan farmers, noted that they were solely reliant upon MTPs for their land levelling. In many cases MTPs did not have sufficient tractors and levelling tools for the kolkhoz farms. If they did, then they were also likely to be constrained by the cost and availability of tractor fuel, as well as competing demands on the tractors for sowing and other land preparation activities. The lack of land levelling can be attributed in part to the problems of the settlement account system and with the associated lack of access to technology, as discussed earlier in this chapter.

The second issue militating against land levelling is the lack of modern equipment and an excessive reliance upon driver skill and care. Much of the levelling equipment that is available is of a very simple design, which requires several passes with a tractor to remove large irregularities in land level (interview with MTP manager, Case Uzbekistan

ex patriate staff, informal farmer interviews). This equipment was, as with much of the machinery, poorly maintained and was often becoming ineffectual with age. In addition the equipment used relied upon the tractor driver's skills in judging the levelling required rather than working from a more modern laser levelling system. The result was that much of the levelling that was performed tended to be of a poor standard, further discouraging farmers from investing precious financial resources.

Notably the access of farmers to land levelling technology was seen to be often worse in Yanghibazar. Four separate informant interviews commented that poor dekhan farmers had less access to land levelling technologies than they did under the Kolkhoz system. It appeared from an in-depth interview with an MTP manager that providing tractors for levelling comes low on the priorities of the MTPs, due to the fixed cost structure at which they charge for their services.

These factors, combined with the lack of incentives for water savings, coalesced to make land levelling both difficult to access and ultimately less desirable than alternative uses for technology. This suggests that significant structural changes are required to ensure land levelling does occur, however there were few signs that these changes were likely to occur in the foreseeable future.

Poor Governance

Broad issues of poor governance plague Uzbekistan. The high incidence of corruption, systemic abuses of power, and a lack of democratic institutions and bureaucratic values conspire against agrarian reform and efficient use of water, and other, resources. This is certainly the case within Khorezm, where many of the causes of low water use efficiency can be attributed to poor governance. This includes the disincentives for efficient water use, the limited oversight of the water allocation system and the poor level of maintenance of irrigation and drainage infrastructure. Each of these issues is addressed elsewhere in this chapter, however the contribution that poor governance makes to low water use efficiency is worthy of note. There is no evidence of a concerted effort by the government of Uzbekistan to prevent the ecological and economic decline of the Khorezm region. The nomenklature continue to promote an extractive method of cotton and wheat production, with little or no regard for the environmental consequences.

Nor was there any evidence of policies to ameliorate the adverse health effects of the desertification of the Aral Sea.

Whilst farmers in focus groups and family interviews were understandably nervous about criticising the government, some key informants were less careful about commenting on politicised issues such as cotton production. Despite these reservations, most farmers were prepared to discuss their dissatisfaction with the current local government. This dissatisfaction extended to a resentment of the continued emphasis on cotton production and on the apathy of government leaders to the human cost of salinisation in Khorezm. However these concerns were situated within an aversion to questioning authority, and it is in my opinion unlikely that farmers will give public voice to their concerns. Given this submission, the prospects for improved governance remain slight.

Summary

What this chapter reinforces is the critical role of farmers in the technology transfer process. The opinions of farmers on these acute problems must inform the analysis of barriers to technology transfer. In some cases the opinions of farmers are themselves a barrier to technology transfer. For example the fact that those farmers interviewed divorced salinisation and excessive irrigation is of some concern. This contrasts with a sound understanding of the need for land levelling. What is important is that the reasons why farmers were not levelling their fields are considered. This chapter has shown that the convergence of a lack of access to technology and financial constraints militate against effective land levelling. Moreover early indications from Yanghibazar suggested that the process of privatisation will, if anything, increase this as a severe constraint on technology transfer.

The constraint to land levelling should be considered in conjunction with the problems discussed in the following chapter, especially the role of the settlement accounting system in stifling innovation and restraining farmer choices. These barriers also intersect with the paucity of spare parts and difficulties in ensuring adequate repair and maintenance of machinery. On a macro scale these same problems exist in the management of water and irrigation resources. As discussed above there appears to have

been little effort in the post-Independence era, to adequately maintain or expand irrigation capacity. A worrying adjunct to this is the fact that most farmers interviewed in this research believed that responsibility for irrigation and drainage infrastructure remained with the government. If we accept that little or no work was being performed in 2003 by the government, then this highlights a key risk for future technology transfer. The importance of irrigation and drainage infrastructure for the sustainability of Khorezm contrasts with the limited attention borne to it. Thus this deterioration poses a gathering danger for both technology transfer, and for the survival of the Khorezm region.

The shortage of post-harvest facilities ties in with the concerns about poor access to financial resources discussed in Chapter Seven. If the government retains a monopoly on strategic crops, disallowing farm level 'value added' then it is difficult to envisage how the lack of financial resources will be ameliorated. Similarly, this chapter has shown the interdependence of technology access and post-harvest processing, combined with an overall paucity of access to cash. Once again this demonstrates the intersectionality of the multiple barriers to technology access in Khorezm.

Finally issues of poor governance can be argued as a vital cause of, and potential solution to, many of these afore mentioned challenges. Sadly the nature of repression in Uzbekistan does not invite research on this specific facet of rural life. Thus many of the conclusions drawn reflect my opinions and observations gleaned from several months in the field. Whilst my opinion is shaped from an on-going involvement in the region, it should not be seen to supplant the opinions of the rural poor.

The next chapter addresses the practical challenges to technology transfer in Khorezm. This links directly with both the problems faced by farmers in Khorezm, as recorded here, as well as reflecting the priorities of the rural poor, as discussed in the previous chapter.

CHAPTER SEVEN: PRACTICAL CHALLENGES TO TECHNOLOGICAL ADOPTION

> "There was a wave for 'harvest losses' (losses in comparison with the arbitrary figures announced the preceding spring by the 'Commission for the Determination of the Harvest')
> There was a wave "for failure to fulfil obligations undertaken for delivery to the state of bread grains" ...
> There was a wave for *snipping ears,* the night time snipping of individual ears of grain in the field – a totally new type of agricultural activity, a new type of harvesting!" (Solzhenitsyn, 1974, p57-58).

Introduction

Farmer interviews and personal observations identifed a number of serious challenges to technological adoption in Khorezm and Uzbekistan. Each of these challenges must be acknowledged, and mitigation strategies devised, in order for sustainable development strategies to be implemented. In many cases the barriers were the result of governmental policies that stifle innovation and risk taking. There were also problems with farmer and decision maker preconceptions, prejudices that could be overcome through dedicated education programmes and by working in partnership with leading farmers and institutional actors. The constraints on farm decision making autonomy present a number of barriers to technology transfer, and it is likely that large scale adoption of new technologies will be premised upon continuing reforms in land tenure, cropping decisions and farm management. Each of these challenges is situated in the economic situation in Uzbekistan, which poses significant difficulties in terms of the banking system and in providing a limited margin for experimentation.

Whilst the current political climate does not allow for radical changes to ameliorate these barriers, there are positive indications of change. The gradual reform process away from the central Agro-Industrial complex, and the reform of state farms into leasehold

units hold real potential, and indicate a commitment to change that will become increasingly vital for sustained economic and social development.

Farm Decision Making Autonomy

Farm decision making autonomy was observed to be severely restricted in Uzbekistan. This lack of autonomy posed real constraints on the implementation of new agricultural technologies. Farmers were unable, for a variety of reasons, to make informed decisions about technology use and farming methods. This was especially pertinent in terms of land tenure, cropping decisions, and farm management.

Land Tenure

All land at the time of research was officially owned by the state. However land could be leased for negotiable periods by farmers for a set fee or land tax. Whilst this period could be as long as fifty years, every ten years the farmer's performance was set for review by the Hakim's (regional governor's) office. The fixed level of land tax was inflated by the necessity for bribery to ensure a lease. However the exact amount required is difficult to quantify and probably varies across farms. In interviews farmers were very un-easy about specifying the extent of corruption, or of 'going on the record' to say how much they paid for their lease. In light of the political sensitivity and potential for harm, questions relating to corruption were discussed in the hypothetical. This made it difficult to ascertain concrete figures, a fact that exemplifies the uncertainly of land tenure.

Whilst the encouraging move towards so called 'privatisation' is occurring, there is concern that the broadening of land tenure is too limited in scope or time span to be effective. Farmers still retain a limited right to land and a low degree of certainty that their leases will be renewed. I also observed an aversion to investing significant amounts of money in land where farmers may not retain ownership. On at least ten occasions individual farmers expressed concern that their investments would be collectivised, as the land of their forebears was. Mobile technologies such as tractors and electric pumps are considered good investments by farmers interviewed. However non-mobile investments such as improving water courses are seen as a poor decision, as improved land is more likely to be appropriated and the investment lost. This issue also relates to the focus

group and household meeting findings discussed in Chapter Six, especially in terms of farmer opinions on water management.

The H-Form analysis identified that the farmers who enjoyed only limited land tenure had little incentive to implement sustainable land use practices. This is because they do not have a sense of 'ownership' of the land, and an 'ownership' of the environmental problems faced. With short-term land tenure the rational decision for farmers is to conduct extractive farm practices that emphasise short-term profit gains over long-term ecological sustainability. This is evident in the over-irrigation and excessive fertiliser use in cotton, wheat and rice crops. This practice has lead to widespread salinisation as well as the degradation of soil quality and organic matter content. It is my opinion that as long as farmers enjoy only limited land rights they will continue to exercise only limited responsibility for the land and its ecological system.

This view was reinforced by differences in opinions between farmers interviewed at Yanghibazar and Khonka Hakimyats. Yanghibazar has led the way in Khorezm by 'privatising' all Shirkat farms, whereas Khonka has been slow to liberalise. In each instance (across a total of 58 direct interviews and five focus groups) farmers from Yanghibazar indicated greater concern than their colleagues from Khonka about soil degradation, salinisation and organic matter loss. This is surprising given that the devolution from shirkats to private farms is not yet finished. It is possible that this concern is due to privatisation, or that the salinisation and hence, the decline in profitability of shirkats was the reason for the privatisation. Similar differences of opinion were evidenced within the Yangiarik Hakimyat, where some farms have been privatised whilst others remain shirkats or kolkhozes. It was interesting to note that within this hakimyat there was a marked difference of views on sustainability and investment between dekhan (leasehold) farmers and shirkat workers. In most instances those farmers who had a degree of land tenure indicated an increased willingness to implement sustainable land use practices, and many were making greater use of natural fertilisers such as cow manure.

The introduction of water conservation technologies and improvements in technology use will increasingly rely on a high degree of farm decision-making autonomy. This in turn will be premised on the ability of farmers to 'invest' in long-term

sustainability through short-term production losses. For example a decision to dedicate a proportion of marginal land to tree fallow is necessarily an investment in future productivity much greater than ten years. If land tenure is restricted to a short time span, or if farmers have little belief in their ability to retain land which has been improved, then the likelihood of such an investment is low. Whilst the land tenure situation in Uzbekistan remains limited in scope and time-span this will restrict the ability of the development community and the government of Uzbekistan to implement technological situations. This significant barrier must be recognised in the development of technologies for extension, and the need for land tenure must be emphasised as a necessary policy at the national level.

Cropping Decisions

Cropping decisions in Khorezm remain heavily centralised. Farmers are given very little decision power over crop choices in a system of State plans for the production of mandated quantities of cotton, wheat and rice. The Government of Uzbekistan retains an official policy of encouraging cotton and wheat production on a large scale, classifying them as 'strategic crops'. In practice every rayon and in turn every kolkhoz, shirkat and leaseholder must produce certain amounts of cotton, wheat and rice. This produce is then compulsorily acquired by the government. One hundred percent of the cotton crop was purchased at well below world market value and then sold abroad for foreign exchange revenue in 2003. Approximately fifty percent of the wheat crop is also purchased below market rates, ostensibly to ensure domestic food security. In 2003 rice was also placed under the provisions of the State Plan in Khorezm, with farmers required to supply varying quantities of this staple crop to government mills at a sub-market price. In approximately 80% of respondent's farms, cotton and wheat rotations continue without any fallow or alternate crops being utilised, with vegetables being cropped on separate land. In some regions of Uzbekistan, especially in Khorezm, local varieties of rice are favoured by farmers both for their usefulness in the staple food plov, as well as because of historically high market prices.

Because the ZEF/UNESCO project, or any development project, will have to work within the national framework of strategic cropping, the importance of ecologically

sustainable methods of cotton/wheat and rice/wheat rotation is of vast importance. Such technologies are vital in terms of poverty prevention and in the amelioration of environmental problems. However, certain technical solutions such as cover cropping and crop residue management will face significant barriers, as they are perceived to challenge strategic crops. The short-term view taken by the government will ultimately be at the expense of the strategic crops, as cotton yields continue to decline. The State Plan system will also pose a serious constraint to the introduction of small-scale aquaculture or other alternative land use methods, as government bodies may perceive this use of marginalized land to be diverting resources away from cotton/wheat cultivation. There was little evidence in 2003 of a move away from mandated production under the State plan and compulsory acquisition system, a fact that presents a substantive challenge to technology transfer and adoption.

Farm Management

In terms of farm management it is clear from all sources that shirkat managers and dekhan farmers did not have autonomy over cropping and machinery use decisions in Khorezm. Rather a complex set of social and political networks and rules exist, influencing farm management decisions.

Primary amongst these was the State plan system of strategic crops. This issue is discussed at length above. It is worthy of comment here in reinforcing the paucity of autonomous farm management in Khorezm. State strategic crops dominate the agricultural system, accounting for over 60-80% of typical farm land use and a similar, if not higher, proportion of water and fertiliser use. Farmers have little ability to adopt fallow strategies or to opt for more sustainable systems of crop rotation. This is because the state plan system also promulgates farming methods. For example, the 'plough police' can punish a farmer for not tilling the soil to a requisite depth (Semi-Structured Interviewee). In terms of transferring technologies this leaves a very limited margin for the implementation of research.

Concomitant with this is the shortage of agricultural inputs, especially mechanical traction and consumables. Farmers rely on the state monopolies for fertilisers and seeds and have only a limited selection of private machinery providers. Farmers must apply

agricultural inputs as and when they are available, for the fear that they may not be available at another time (Focus group interview). In practice farmers apply their inputs and use machinery at a time that is largely outside of their direct control, according to most dekhan and shirkat farmers. So, whilst a degree of autonomy may exist in theory and legislation, this is curtailed by practical constraints. Fertilisers can only be applied when they have arrived, leaving tacit decision making authority in the hands of the agro-industrial complex.

Important farming decisions, such as when to plant wheat and when to begin harvesting cotton, remain centralised decisions. There is an official period during which strategic crops must be planted and subsequently harvested. It is difficult to ascertain the legal implications of not following such rules. From my observations they are almost universally obeyed or at least broken discretely. There appears to be a significant amount of legislation in this regard, but I was unable to find a definitive guide to such regulations. What appeared to happen is that directives were issued in the form of decrees by the Hakim for Khorezm, which were then promulgated on a regional basis and implemented, by Regional Hakims and state farm managers. The execution of decrees was said by many agronomists to be open to interpretation and various Hakims appeared to implement these decrees in varying manners. From my observations both shirkats and dekhan farmers were equally subject to the imposed regulations from the central political infrastructure.

Dekhan farmers in theory had a greater degree of autonomy in terms of planting outside of the state plan system. Once a farmer had met their state quota, they were able to exercise a higher degree of autonomy over their remaining land. This ranged in the interview sample from as little as 10% for farmers on 'virgin' lands[25], who grow only wheat. Some farms, especially those with established fruit groves or land only suitable for rice production, may have had a much higher percentage of discretional land (Virgin land farmer in informal and follow-up interview). This discretion is somewhat illusory, as it is often the case that no other crop can be grown on the land. The discretionary land is

[25] In a policy reminiscent of the 'virgin lands' plan of Brezhnev, a number of dekhan farmers were granted previously un-used land on which they are mandated to plant wheat in the hope of making Uzbekistan self-sufficient in grains.

used firstly for producing domestic consumption needs, followed by market influenced cropping decisions.

At Yanghibazar, which has fully devolved all shirkat farms to leasehold farms, I observed a high level of farmer initiative. This included growing grapes, tomatoes, and evidence of small investment in post-harvest processing facilities. One dekhan family commented how having more land outside of the state plan had encouraged them to diversify production.

> HM41(f): "Now we can grow more vegetables, especially tomatoes. I can grow them and sell them at the Bazaar in [name of home rayon] or Urgench, where we get a higher price"
> HM41(m): "There is more money in tomatoes, and they take less work than wheat and cotton. We get a better price, but we do need more water – which is not always there.

Negative Incentives

There are a range of negative incentives at work in the rural economy of Khorezm. That is to say that farmers are rewarded for actions that are disadvantageous to either their own interests, or to larger environmental and economic considerations. There are negative incentives to adopting appropriate water management techniques, disincentives for innovation, and a tendency towards dishonesty in production of strategic crops.

Water Management

On-farm water management in Uzbekistan is characterised by corruption in a system where water remains a largely free public good, with no incentives for reductions in water use. The distribution of irrigation water is conducted at various levels of national and regional government, down to leasehold farmers and kolkhozes. At every level of this process there is evidence of corruption and water theft, with allocations affected by personal ties and by the payment of various inducements to those allocating water.

For example five farmers in separate informant interviews complained in March 2003 that they had been unable to access water for leaching. These farmers did note that there was sufficient water in the canals, but that this water had been 'reserved' for use by

the Hakim's brother. This individual, whilst having a farm downstream of several other riparian farms, enjoyed unfettered access to water for leaching.

Similarly, during the autumn irrigation of winter wheat in October 2003, two family group interviews exposed that it was apparently necessary to bribe officials within the hakimyat to ensure that pumping equipment was available. Whilst these farming families claimed to have paid the official charge, they complained that without a 'gift' the pumping equipment would not be supplied with electricity.

This political interference is limited by the fact that irrigation turns are generally allocated according to one's place in the queue. The problem with this system of turns is that once it is a user's turn, they can irrigate until they are satisfied they have used sufficient water. This provides if anything, a negative incentive to effective water management. Any individual user can never be certain when their next allocation will arrive. Thus there is a strong tendency to over irrigate once one's turn comes, at the expense of both downstream users and the farmer's own fields. This policy results in large gaps between water allocations. For example cotton is often only irrigated four times during the growing cycle (Key informant interviews with dekhan and shirkat farmers, as well as State agronomists and ZEF/UNESCO staff). From my observations this large time span between irrigations reinforced the tendency towards over-irrigation, and perpetuated the irregularity of water turns. There is also a wider ecological impact of excessive irrigation, which is the raising of the water table and associated increases in water and soil salinity. These negative impacts will continue while a system of negative incentives for sustainable water management continues to exist. In Yanghibazar there was in 2003 an experiment with the use of Water Users Associations to better control irrigation timing, and the implementation of effective water meters. Early indications after only one year of operation showed small but encouraging changes in farmer behaviour. The effects of this policy change warrant further research, which is sadly outside the scope of this thesis.

Disincentives for Innovation

Innovation at the farm level is a requisite part of effective technology transfer. However, there are a range of disincentives, especially for shirkat managers, for the innovation of agricultural methods. For example, seeds for strategic crops are provided cheaply or free of charge by the government, even though they have a high fungible value[26]. Improved sowing methods and the use of better quality seed germination techniques could reduce seed inputs significantly, but there is no real incentive to do so. Conversely adopting a farming method not promulgated by higher authorities invites rebuke and punishment for shirkat and kolkhoz managers.

> II44(m): (a Kolkhoz manager) "If we use the new techniques we could get in trouble, it is safer to do what we always do ... to do what we are told"

This risk is not balanced by the possibility of reward if the innovation is successful. Such a situation favours risk aversion and provides a disincentive to innovation and a real barrier to technology transfer. This has created the mentality within shirkat and kolkhoz management whereby officials would have to take significant risks were they to adopt new technologies, without any hope of tangible gain if the innovation works. Thus, they have no incentive to deviate from accepted central wisdom, and face a punitive bureaucracy that favours dismissal for failing to meet central plans. There is some evidence that this mentality is not held by dekhan farmers, who exhibit enhanced levels of interest in new technologies and innovations. The high level of ZEF/UNESCO project activity within Yanghibazar is testament to the interest in innovation amongst dekhan farmers. This was reinforced in interviews with farmers in Yanghibazar, who exhibited keen interest in participating in the project (author's observation).

It is for this reason that the uptake of new technologies in Uzbekistan will be premised on the creation of effective incentive systems. It is possible that further devolution of agriculture will allow greater incentives for dekhan farmers. However it is clear this devolution must occur concomitant with the liberalisation of fertiliser and tractor supplies, as well as a move away from centrally promulgated farming methods.

[26] Wheat for flour, cotton for edible oil

Farmer and Decision Maker Preconceptions

Farmer and decision maker preconceptions were seen to be very strong in Khorezm. A poor quality of agricultural education for decision makers, and historically low levels of farm decision making autonomy had coalesced to form strong preconceptions, especially in terms of tillage practices and water use management.

It was evident from a range of discussions with Hakims, Mahallahs, Shirkat managers and farm workers, that there is a strong belief in periodic tillage of the soil. Over twenty farm managers and agronomists were interviewed, and every one of them expressed a belief in tillage practices, as well as being somewhat scornful of no-tillage. Whenever it was suggested that ploughing could be replaced with permanent or semi-permanent bed planting, almost all of the forty five farmers interviewed dismissed this idea as ridiculous. Similarly, suggestions that water could be conserved through the use of alternative irrigation methods (such as night irrigation to reduce evaporation), was met by strong opposition

FG63(m): "You cannot use less water and get the same yield ... it is impossible".

These preconceptions are only two of a litany of many traditionally-held opinions about farming best practice. In my opinion these preconceptions are systematic of "poor economic, social and environmental performance" of agriculture in the economy, as a result of the bureaucratised structure effect of the command economy (Adams et. al., 1997, p707).

Thus, farmer education must precede any attempts at technology transfer and extension. This will be made more difficult given the legacy of formulaic and centralised educational methods introduced in Soviet times and continued to the present. It should be possible to reverse these preconceptions through the use of participatory education, which could also assist in the technology transfer process. In the ZEF/UNESCO project, farmer preconceptions can and have constrained the effective trial of some technologies, as farmers proceed with their 'old' methods, in spite of directions to farm in accordance with the design of the research. This highlights an immediate need for greater participation of farmers in the design and implementation of research. In my opinion it is not sufficient to simply tell a farmer what to do, rather they must be made aware of the reasons why the research is conducted a particular way.

Economic System

The economic system of Khorezm, and indeed Uzbekistan, was slow to evolve post-Independence. Whilst some progress away from central-state socialism had occurred at the time of research, this progress has been slow and at times fraught with high levels of corruption. In terms of technology transfer in the context of development projects, the lack of access to agricultural inputs poses a serious constraint. Farmers reported frequent difficulties in accessing fertilisers and tractors in a timely manner. Whilst all these inputs are theoretically made available by the government, many farmers describe supply through legal means as being insufficient to requirements. This led to a significant black-market for state farmers to sell excess fertiliser and other inputs, either through cross-border trade into Turkmenistan or to private farmers.

Settlement Accounting

The system of banking and national accounts is based on 'settlement accounting'. This system uses government owned banks as intermediaries for almost all legitimate, financial transactions between farmers and inputs suppliers, as well as regulating taxation on profit and assets. At the time of research all official transactions had to occur through one of several government banks, with the individual seldom seeing their physical money. For example farmers were paid for their cotton harvest direct to their bank account, from which they could transfer money to fertiliser or technology suppliers. The balance remaining in their settlement account was then deemed to be their profit for the year, which is taxed accordingly. It was almost impossible for individuals to access their cash deposits, which created a substantial black market for both goods and financial services. The settlement accounting system had an adverse impact on private technology providers, fertiliser supplies and on cropping decisions.

Private contractors of tractors and other mechanical technologies had to be paid in cash, as they were not eligible to receive deposits to their settlement account. Only Machine Tractor Parks (state run) and Kolkhozes could rent out equipment and receive a settlement account transfer (sources: focus groups with dekhan farmers, informal

interviews and author's observations). This stifled private enterprise, and created periodic shortages of technology for dekhan farmers, who in many cases did not have the cash required to hire a private contractor.

> II79(m): (a Dekhan farmer) "If we do not have the money we cannot get the tractors. We have money from the cotton, but that is in the account. Money in the account is no good to us – we go to get it out the bank is closed and has no money to give"
> Interpreter: "What if you gave a gift to the bank manager?"
> II79(m): "Then is might be possible, but I don't think they have any money in the bank"

Kolkhozes and Machine Tractor Parks have been reported as inefficient and tend to favour government farms over dekhan farmers. Interviews with various leaseholders identified that the settlement account system is a much greater hindrance to poor farmers. Only seven of the thirty poor dekhan farmers interviewed were able to afford private machinery rental. In contrast none of the twelve rich dekhan farmers noted any problems with technology access.

Fertiliser and seed supplies remained a state monopoly and it is probable any privatisation will be ineffectual without a prior reform of the settlement account system. It is difficult to envisage private investment in the agricultural input industry, without any real possibility of a contestable market. The lack of access to technology despite privatisation suggests that the settlement account system will pose a real constraint to technology transfer.

Cropping decisions were also influenced by the settlement account system. Farmers voiced a preference for growing rice, as the surplus could be sold for cash at the market. This was seen as more profitable than, possibly higher earning, strategic crops – as access to cash was guaranteed whereas bank deposits are not. This creates a distortion to cropping decisions, which must be remembered in the technology transfer phase of any development orientated project.

Limited Margin for Experimentation

A limited margin for experimentation was seen by me to exist in agriculture in Khorezm. This is to say that most farmers are relatively poor, and cannot risk the possibility of a bad crop in the pursuit of higher yields. Likewise, many farmers are so

close to the poverty level that they cannot afford to undergo short-term reductions in profitability in order to achieve long-term economic benefits and sustainability. This limited margin for experimentation is exacerbated by a regulatory regime that provides negative incentives for risk-taking, and positive incentives for the formulaic fulfilment of centrally devised plans. In such a situation it is difficult to access and target leading farmers to act as agents of technological trials and extension. This will pose a real barrier to the downstream implementation and transfer of agricultural technologies. Thus there is an immediate need for the ZEF/UNESCO project, and other development projects working in the region, to address the paucity of contact with leading farmers or other suitable agents of technology transfer. Given that technology transfer must work within the narrow confines of the regulatory framework and within a very small margin for experimentation, farmer participation is vital. The end users of technologies are acutely aware of the manifold constraints imposed by the perverse political and economic system of Khorezm. Equally, farmers are cognisant of the demands that end users will place on new technologies, and their priorities must be integrated into the evaluation and transfer of technologies.

Potential for Change

The political structure of Khorezm and Uzbekistan has demonstrated that there is a potential for positive change in the rural political economy. These changes have however been beset by corruption and vested interests, militating against their effective implementation. The privatisation of land in Yanghibazar and the commitment to privatise all kolkhozes in Khorezm by 2008 are encouraging signs. This is balanced against the high incidence of corruption that has characterised land reform thus far. From my observations and interviews, privileged elites have capitalised upon the privatisation scheme, amassing significant land holdings. These large land holdings do little to encourage the transition to positive incentive systems for farmers and certainly marginalise many already poor farmers. Whilst urban elites claim to espouse reform, most are obdurate in their efforts at maintaining the status quo.

The nomenclature of Khorezm continues to rely upon the rural economy as a source of funds and power in my opinion. The vested interest of many high placed political

officials in the agro-industrial complex suggests that any reforms may not deliver real benefits. For example, if the privatisation of the fertiliser industry leaves factories in the control of the nomenklature, then a move away from monopoly supply is unlikely. Likewise the central government has strongly resisted any reform of the financial sector, if anything strengthening the rural banks and the settlement accounting system.

If these numerous challenges of farm decision making autonomy, negative incentives, preconceptions and a perverse economic system are to be addressed, then the systemic issues of corruption and political patronage must also be addressed. It is less clear, in my opinion, if there is the political will or if flexibility exists within the system to allow these changes to occur. Without the reform of the political complex it is possible that reforms in the rural economy, and indeed technology transfer activities, will run contrary to their aims. It remains to be seen if there is the potential within the political and economic system for the reforms required in order to allow effective technology transfer.

CHAPTER EIGHT: CONCLUSION

Summary of Findings

The findings of the research can be grouped into three interrelated areas. Firstly the locally articulated priorities and desires of farmers which were reported on in Chapter Five. Secondly, Chapter Six analysed the opinions of farmers towards acute problems in the Khorezm region. Finally the barriers to technological transfer and adoption were examined in Chapter Seven. These three chapters should not be treated as distinct findings, rather as interrelated and interdependent aspects of the wider social, political and economic system. For this reason it is vital that the practical findings are situated in the historical context of Uzbekistan and Khorezm, to which a brief introduction was given in Chapter Two.

Farmer Priority Setting

The Priority Ladder methodology elicited a number of interesting results. The lowest farmer priority was given as the market price of vegetables. This finding reinforced both the lack of price elasticity in the bazaars as well as the high degree of self-sufficiency in basic food for most rural communities. This finding also identified a case of conflicting gender interests, which must be considered in the search for policy solutions and development interventions. Also very interesting was the low priority farmers placed on the quality of both cotton and wheat. Further research exposed that the economic system of Khorezm created this perverse situation of farmers having little concern for the quality of produce. The excessive focus on production to targets based solely on weight is an unfortunate legacy of Soviet rule, yet a legacy that was being perpetuated and strengthened by the current government.

More encouraging for the ZEF/UNESCO project and the development community was the primacy that farmers accorded to soil quality. Soil quality ranked highest in the priority ladder methodology. However the problem tree methodology exposed a lack of understanding about the causes of deteriorating soil quality, with an excessive focus on technical solutions rather than prevention. This showed a need for greater farmer participation and involvement, as discussed below (Practical and Policy Implications). Similarly, the concern accorded to water quality and timing demonstrates that the priorities of farmers are focused on the same problems that the ZEF/UNESCO project is working on. There is also a high degree of concern about a lack of financial resources. In the most part this is a function of the settlement accounting system, a key barrier to development that is discussed at length in Chapter Seven.

Farmer Opinions on Acute Problems in Khorezm

There are a number of acute problems in rural Khorezm that have been identified by the ZEF/UNESCO project and the wider development community. The aim of this research was to compare the opinions of farmers on these acute problems to the opinions of the development community. In almost all cases the concerns of farmers were complimentary to the concerns of the ZEF/UNESCO project and the development community. Specific problems discussed with farmers were a lack of access to technology, including poor maintenance, a paucity of spare parts and a lack of post-harvest processing. The low water use efficiency was also discussed with specific mention of soil salinisation and drainage, deteriorating infrastructure, land levelling and poor governance.

Farmers indicated a real concern about the lack of access to technology, blaming the financial and settlement account system for many of the problems. The lack of access to technology is also a function of poor competition policy and insufficient incentive systems. Low water use efficiency was not seen by farmers as a direct problem, despite the high priority attached to water quality and irrigation timing. The disconnect between these opinions suggests a lack of communal water control systems, and the development of Water Users Associations in Yanghibazar certainly warrants further research in this regard. The deterioration of infrastructure and the low standard of governance were both

seen as significant problems for farmers. However these problems appeared to be accepted with resignation, with the rural community expressing pessimism that they could change the political system or improve infrastructure at the community level.

Barriers to Technological Adoption

This research focused on the perceptions of farmers towards technology change. A range of opinions were elicited in an attempt to understand the barriers that exist to technological adoption from the ethnographic view of the farming community. Primary amongst these problems was a lack of farm decision making autonomy. This facet incorporated a lack of land tenure, politicised cropping decision making and centralised farm management. It is argued that because cropping decisions are a political, rather than a practical decision, that farm management and cropping decisions are distinct areas for analysis. Similarly, this research suggests that there is a need for reform of the cropping decision system, this refers to the process through which cropping decisions are made, rather than the actual cropping decisions made.

Secondly the negative incentive systems for efficient water management and the disincentives for innovation also pose constraints to technology change and agrarian reform. This research also exposed a high degree of preconceptions held by farmers and decision makers. These preconceptions are made worse by an economic system that restricts farmer options, especially because of continued economic dependence, the settlement account system and because of a limited margin for experimentation.

Finally, the potential for removing numerous barriers to technology change and agrarian reform are restricted by the political and economic system. This finding points to the interconnectedness of the problems faced by farmers. The settlement accounting system has a symbiotic relationship with the lack of access to technology. Similarly, cropping decisions are a function of limited farm autonomy, poor governance and possibly reinforce farmer preconceptions.

Application of the Theory to the Findings

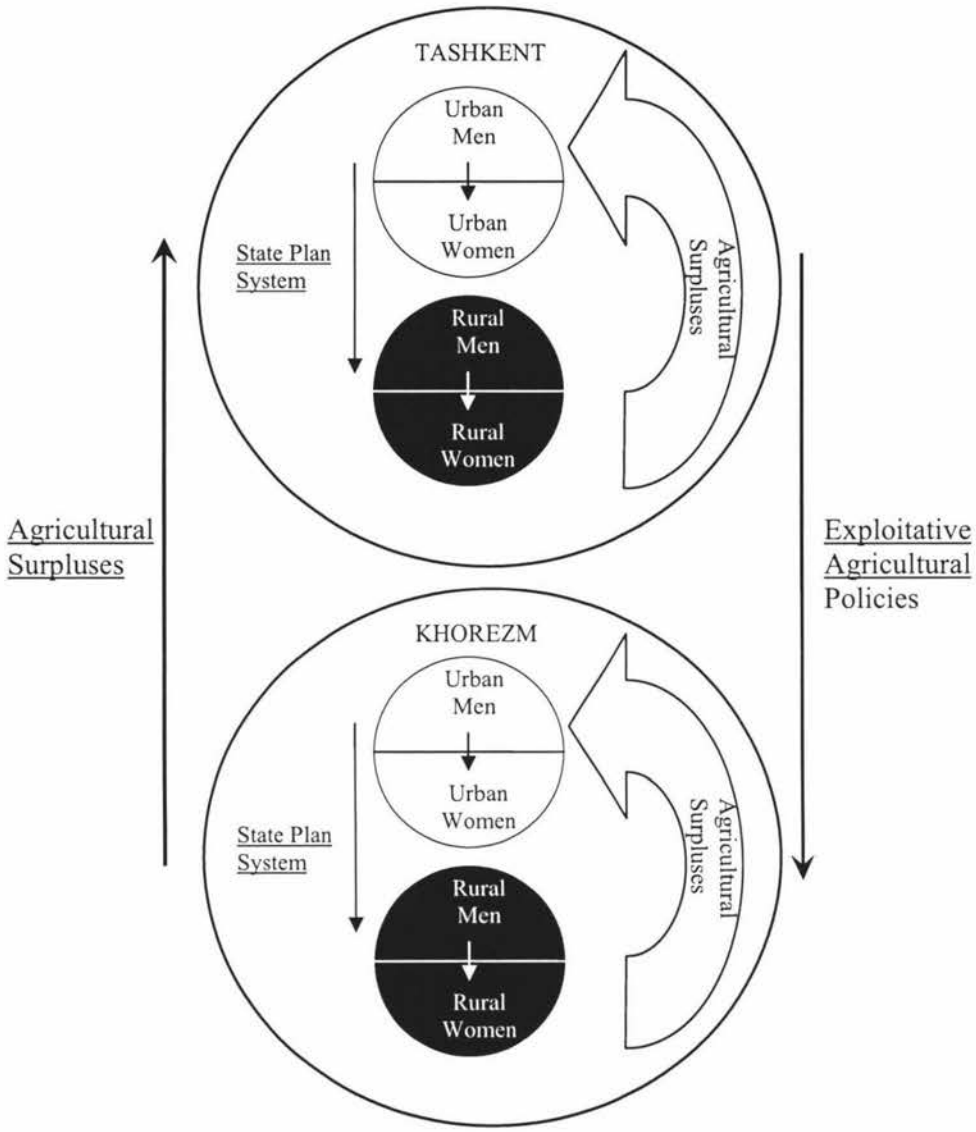
There are inevitable challenges in applying meta-theories to specific research findings. Dependency and Black feminist theories are meta-theories, designed to describe how power and other social functions exist within a framework. Thus analysis of the research findings requires a high degree of interpretation and innovation. I posit that both Black feminist and Dependency theories are a useful framework in which to analyse social relationships in Khorezm and Uzbekistan. To apply these two theories to the research findings, a model of 'multiple dependencies' is provided. This represents the junction of the two theories in praxis with the research results. Figure 11 (p.110) illustrates how the multiple forms of dependency and oppression operate within Khorezm and Uzbekistan. This model is simplified, only showing the effects of agricultural policies. Political oppression could equally be applied using this same model.

Black feminism and Dependency theories are discussed below, to analyse their relative strengths and weaknesses in application to the findings. This then informs much of the subsequent section, 'Wider Theoretical Implications'.

Applying Black feminism

The analysis of multiple forms of oppression and the intersection of these oppressions is of great use in assessing the research findings. The barriers to technological adoption are clearly interlinked, mutually reinforcing. It is not possible to analyse the lack of access to machinery without examining the settlement accounting system. Similarly, the continuation of the state production system can be seen as a function of the poor governance in Uzbekistan. Where Black feminism is instructive is in describing these problems from the perspective of the oppressed.

Figure 11: Model of Multiple Barriers to Technology Adoption within Khorezm



The similarity between the perceptions of farmers with acute problems and the complaints of the second wave of Black feminists is of great interest. For example the priorities of resource poor farmers reflect the fact that the state production system is inimical to their interests. Whilst no direct action is possible, they can be seen to be resisting these policies through non-participation. This includes producing large yields to meet state plans, at the clear expense of crop quality. This is comparable to the refusal of

Black feminists to participate in structures that perpetuated their oppression. The development of Black feminism, as separate from white feminist 'liberation' ideology, can find parallels with farmer's preference for illegal activities, outside of the state acquisition and settlement accounting system. Equally it could be argued to be a purely pragmatic decision, responding to the incentive system that operates.

The most useful aspect of Black feminist theory remains the analysis of manifold forms of oppression. This analysis constitutes a significant part of Figure 11. We see here how urban and rural dependences coalesce with centre and periphery dependencies (between Tashkent and Khorezm). Whilst Black feminist Theory was never intended for Uzbekistan, it proves itself most useful in the analysis of the multiplicity of oppressions, both of women and of resource poor farmers.

Dependency Theory and Khorezm

Dependency theory has proved very applicable to Uzbekistan. The analysis of colonial cotton production as a form of created dependence can be applied to Khorezm and Uzbekistan, during both the Soviet and post-Independence eras. Of particular interest is the process of co-option of the urban and rural elites by the central elites, or metropolis. In Dependency theory, the elites within the satellite state were always a complicit part of the process of dependence and oppression. Whilst these intermediaries remained dependent upon the central metropolis, they exercised considerable influence and gained real privileges over the majority of, especially rural, people in the satellite country.

Baran's (1957) analysis of the cotton industry in India is also a very accurate analysis of manufactured dependence in Khorezm and Uzbekistan. The urban elites of Tashkent became dependent upon Moscow for the promotions and privileges. In exchange, they were complicit in the extraction of surplus from the rural economy of Uzbekistan. In the post-Independence era, this dependence has been internalised within Uzbekistan. Khorezm now has urban elites who owe their allegiance and position to Tashkent, and who continue to produce cotton and wheat for the centre – in a manner inimical to the interests of Khorezm. The mechanisms of this dependence are reflected in the priorities of resource poor farmers. A lack of access to technology serves to restrict crop choices to state plan crops. The shortage of supply and lack of competition for

fertilisers and seed supply ensures that the agro-industrial complex can supply these inputs at a time best suited to cotton and wheat production.

The model of multiple dependences given in Figure 11 (p.110) demonstrates the application of dependency theory to post-Independence Uzbekistan. This simplified model shows how elite actors, both within and between centre and periphery, exercise influence to ensure the exploitation of surplus. This unequal exchange is partially compensated by a social welfare system; however this is much weaker than during the Soviet era. Increasingly the central government relies upon more overt forms of oppression, such as human rights violations and through the use of conscription for the cotton harvest, to ensure continued dominance.

Wider Theoretical Implications

This research contributes to the literatures of Black feminism and Dependency theories be examining whether the model of multiple barriers to technology adoption within Khorezm, provided in Figure 11 (p.110) is indeed appropriate. This discussion is centred on whether Black feminism and Dependency theories are competing or complementary discourses. There is also a secondary contribution, which suggests that Dependency theory does have a place for analysis *within* Soviet Russian rather than just a Marxist form of analysis

Complementary or Competing?

Black feminist and Dependency theories can be seen as convergent theories, that draw closer to each other and under certain circumstances appear very similar. This does not however mean that the two paradigms are competing. Rather these two meta-theories complement each other, and can be integrated into a general model. The Model of Multiple Barriers to Technology Adoption within Khorezm, given in Figure 11 (p.110) demonstrates how both theories can be incorporated into one model. Dependency theory is useful in providing a framework for how power is distributed *between* the centre and periphery. Illustrating the creation of satellite and peripheral regions within an economic or political system. This system of dependence is shown to occur both *within* and *between* the various actors within the system. For example modes of dependence are

evident within Khorezm, most notably between men and women, as well as with practical aspects such as restricted access to technology. The fact that Dekhan farmers experience serious challenges to autonomous action is the result of dependencies internal to Khorezm as well as imposed from Tashkent. Likewise the state system of compulsory acquisition, itself inherited from a Soviet system of dependence, remains the dominate form of created dependence relationships. This economic, political and social relationship transfers wealth from the periphery (Khorezm) towards the centre (Tashkent).

Whereas Black feminist theory is instructive in showing how power is distributed *within* the centre and *within* the periphery. This creates a more complex, but ultimately more useful model of analysis. Moreover Black feminism allows an analysis of the intersection of the manifold forms of oppression within each system. For example the use of political power (both overt and covert) to ensure the fulfilment of central production targets. Here we can observe how the inducement of providing private land is a, perhaps illusory, incentive to produce more cotton and wheat. However the lack of access to technology, substantive challenges to farming autonomy, and the state plan system conspire to decrease dekhan farmer power and wealth.

This research shows that not only can both theories 'travel' to Central Asia but that they can be integrated into a third model, based on research experience. The ability of these discourses to travel and evolve evidences both their usefulness and their adaptability. Likewise the development of the integrated model, appropriate to Khorezm and Uzbekistan evidences the utility of both theories.

Dependency within Marxism

Dependency theory was initially developed to describe the mechanisms of capitalist modes of appropriating surplus. Much of the literature was neo-Marxist in nature, and focused on the ex-colonies of capitalist world powers. The fact that the Dependency paradigm so accurately describes Marxist modes of regional divisions of labour within the Soviet Union has significant implications for Dependency theory. Further research is required, yet it is possible that dependency described a system of central control and management which tends to situate power and profit in a central location. It is arguable that this process of centralisation within a colonial structure may exist independent of the

economic system. Thus dependency may not in fact be a function of capitalist colonialism, but rather a more generic function of central colonial control. Given the ideological influences of many Dependency theorists this is very interesting indeed.

It can certainly be said that in the case of pre and post-Independence Uzbekistan and Khorezm that Dependency theory does accurately describe the political and economic systems. Further research into the nature of Soviet era industrial and agricultural development is necessary to draw further conclusions on the application of dependency to Central Asia. Likewise, it may well be necessary for proponents of the dependency paradigm to re-examine the nature and causes of dependence. Uzbekistan and Central Asia provide at least one example of dependence, which was explicitly borne not from capitalist modes of production. The direct implication of this research is that dependency can no longer be seen as a unique product of capitalist colonisation, but rather as a more general process of oppression and the extraction of surplus.

Towards a Theory of Multiple Dependencies

The key contribution of this research to theoretical study is in progressing towards a model of Multiple Dependencies. Figure 11 (p.110) provides a simplified model for use in the Khorezm region. The mechanisms shown concern specific facets of rural life in Khorezm, for example the settlement accounting system, compulsory state acquisition of cotton and wheat, as well as less overt methods of state control. It is posited that this model can be applied more generally, as a representation of how multiple forms of dependence occur. The mechanisms of action may well be different in divergent locations; however this does not mean that the model of multiple dependencies in Figure 11 cannot be applied to different locations. Rather what has been demonstrated in this thesis is the ability of both dependency theory and Black feminist theory to 'travel' well beyond their intended locations. Likewise it should be possible for a theory of multiple dependencies to travel beyond Khorezm.

Significant research is still required to develop and improve a theory of multiple dependencies. This can, indeed should, draw extensively upon other theories that examine dependence from the perspective of the oppressed. It could be suggested that Third World feminism, a *corpus* of theory not examined here, could be well applied to a

model of multiple forms of dependence. Likewise this thesis has drawn on the classical dependency theorists in an attempt to ensure conceptual purity and perspicacity. However it is be instructive to draw on later critiques of dependency theory to better understand the mechanisms of multiple dependence.

What has been established in this thesis is a conceptual model of multiple forms of dependence. This shows how manifold forms of oppression are interconnected and interdependent. It is this critical 'intersectionality' to oppressions that classical dependency theory is not capable of considering. However to examine one form of oppression, say the settlement accounting system, independent on other forms of oppression renders the analysis inadequate. In Khorezm the settlement account system relies largely upon the system of state compulsory acquisition, which in turn would be ineffective without the state plan system as a guarantor of agrarian and economic policy. Correspondingly, the political and social dependence of Khorezm is a structure that remains largely unchanged since the Soviet period. The diverse forms of social and state oppression are largely beyond the scope of this research. The forms of control that have been examined in this thesis have identified the interconnectedness of social and economic control. For example the 'privatisation' of land in Yanghibazar, which purportedly seeks to increase farming autonomy, is in fact a reinforcement of social control. By placing increased emphasis on the importance of meeting the state plan, thereby strengthening the institutions of compulsory acquisition and settlement accounting, land 'privatisation' can be seen as a way on enhancing not ameliorating oppression. It is vital to note here that were the other institutions of state oppression not analysed, that land privatisation would be seen as a genuine move towards reducing modes of dependence. What the model of multiple forms of dependence shows, however, is that land privatisation in fact increases the dependence of the periphery on the centre.

Thus there is a need for a model that deals genuinely with the manifold forms of oppression. Likewise this model must be capable of observing dependence both within and between various actors. It is for these critical reasons that further research into multiple forms of dependence is necessary. It is hoped that this thesis makes a contribution to this emerging literature.

Limitations of this Study and Areas for Further Study

This study is limited by several key constraints, which reduce the applicability of the results. These shortcomings also elucidate the need for further study in certain other key areas. The main constraints in this study is the restriction to Khorezm, the insufficient participation of women, the lack of consideration of Water Users Associations and the paucity of research with institutional and other stakeholders. Each of these limits the application of the research findings beyond a narrow ambit. Conversely, each of these limitations identifies and defines areas for further study, and suggests how supplementary research can complement this thesis.

Restriction to Khorezm

This research was restricted to the Khorezm region of Uzbekistan. The ecological problems of Khorezm, whilst not unique for the region are not typical of Uzbekistan or the Amu-Darya and Syr-Darya basin. The position of Khorezm at the downstream of most other riparian regions places it at the extreme end of the ecological problems of Central Asia. In addition, the peripheral nature of Khorezm places it at manifold political and economic disadvantage to more central regions such as Tashkent, and to a lesser extent Samarkand, Bukhara, and the Ferghana Valley.

In terms of application to the ZEF/UNESCO project the focus on Khorezm was entirely appropriate. The restriction to only one region was also necessary from a pragmatic perspective, given the lack of time and research finding. This does however limit the extent to which the findings can necessarily be applied to other regions of Uzbekistan. It is likely that the Karakalpak region, which faces similar ecological and economic constraints, could have much of this research applied to it. Similarly, the neighbouring regions in Turkmenistan could possibly have similar ecological problems. However the legal, economic and political constraints will be vastly different.

Allegorical evidence suggests that upstream regions of Uzbekistan face similar economic and political constraints, however, the relatively better ecology of these regions suggests that not all findings can be transferred. There is a need for further research into both farmer priorities and barriers to technology adoption, before deciding if findings

from this research are applicable to other parts of Uzbekistan and the Amu-Darya and Syr-Darya basin.

Lack of Women's Participation

A conscious effort was made to include women as equal participants in this research. Women play an integral, if often unacknowledged role in the agricultural system of Uzbekistan. Moreover women are much more likely to suffer from severe poverty and to be adversely affected by ecological and economic problems. In the first research period, when group based methodologies were used, women constituted 39% of the sample. This figure fell to a disappointing 21% in the second research period, where it was difficult for a Western male to access women for one-one-one interviews. Overall, women comprised 33% of the total sample. This is a pleasing, yet still insufficient level of participation.

However, the mere inclusion of women in the sample does not guarantee equal levels of participation. The fact that women tended to have less input into group based activities, despite being almost 40% of the number of participants, suggests that women were not fully integrated into this research. It may be necessary to have women only groups, with a trained female facilitator in any further research. What is clear is that subsequent research must continue to work towards equitable participation of women in this research, as well as in the ZEF/UNESCO project.

Water Users Associations

The development of WUA came very late in this research period, and is an immense research area. The transition from central control of water towards devolved management and responsibility will have a great impact on the rural economy and society. Water remains the key resource in Khorezm, and the effective management and regulation of water distribution is of considerable research interest. On a wider scale the use of democratically managed WUA to allocate water suggests that a transition to more participatory forms of governance is possible. Indeed, some spectators have suggested that participatory management of water may encourage farmers to take a more active role

in the administration of other key resources and may empower them for increased political involvement (Terry Naughtin, 2003, personal communication).

It is encouraging that several researchers are conducting work in Khorezm on WUA, under the aegis of ZEF/UNESCO as well as through other organisations such as German Agro-Action. This research should be careful to include the opinions of farmers, especially resource poor farmers who have the potential to be marginalised from the WUA. The reform of water management may be seen as a microcosm of the necessary reform in the entire rural economy, and as such should be closely studied and evaluated.

Other Stakeholders

This research focused almost exclusively on the opinions and perceptions of farmers, especially resource poor and female farmers. However the findings showed the importance of other stakeholders in the decision making, priority setting and technology transfer complex. For example the critical, if unacknowledged, role of the political structure in the rural economy warrants further research. Any agrarian reform will have to include the interests of all stakeholders, which in Khorezm may include a variety of competing and conflicting interests. There is a need for further research into the opinions and priorities of state farm managers, Hakims, and representatives of the agro-industrial complex. This will include MTP managers, as well as private machinery providers, and the full range of state industries such as cotton ginning and fertiliser supply. Concomitant with this the political system, both within Khorezm and for greater Uzbekistan, needs to be studied in greater depth. This should include the vested interests of the elites, as well as suggestions on how these interests can be reconciled with the acute ecological and economic problems of Khorezm and Uzbekistan. These desires must also be reconciled with the needs and priorities of farmers as identified in this research.

Practical implications for the ZEF/UNESCO project

This research has identified a number of practical implications for the ZEF/UNESCO project in Khorezm. First amongst these is the need for greater farmer participation and education in every aspect of the research and project. Concomitant with

this there must be a consideration of the low priority attached to crop quality aspects, and how this impacts the research being undertaken by the physical scientists in the project. Finally the numerous barriers to technological adoption must be considered in the next phase of the project, with the establishment of a model farm.

Enhanced Farmer Participation

Those farmers who were involved in the ZEF/UNESCO project exhibited a keen interest in the research being conducted. However in most cases these same farmers had only cursory awareness of the research being undertaken by the project, and were often unaware of the wider aims of the project. Specific instances arose where farmers were conducting certain tasks for the project, yet remained unaware of the rationale behind these activities. A number of farmers complained that they were interested in the project, and wished to learn more about the research they were part of, yet had not had the research explained to them in an understandable and meaningful manner.

Attendant with this high degree of farmer interest was the occasional frustration of research staff with farmers. Complaints that farmers were acting irrationally and disturbing scientific research were common. In many cases these frustrations and setbacks could have been prevented had proper farmer education had been undertaken. This situation of high farmer interest and problems with research implementation is a representative case for participatory, farmer focused, research. By involving farmers as key agents of the scientific research two gains can be made. Firstly the efficacy of the research can be enhanced, with better education allowing farmers to perform as more effective research assistants. Secondly, the downstream implementation of the research – the technology transfer – is enhanced by working with a well trained farmer who understands the research.

The level of farmer participation in the ZEF/UNESCO project is good however there is a clear need for continually enhanced participation of farmers. This need will become heightened through the project process, as there is a move away from basic research towards action research and extension.

Crop Quality and Research Aims

The farmer priority setting exercise identified cotton and wheat quality as very low farmer priorities. This is antithetical to most scientific practice, which emphasises crop quality and yield as both important. The Soviet legacy of quantitative measurement conspires against quality aspects, and the farmer priorities reflect the agricultural incentive system that favours pro forma fulfilment of state plans, at the expense of quality factors. It is important that this fact is remembered in the design of crop research in the project. Whilst crop quality must be considered in all research, this should be framed within the incentive system that continues to exist in Khorezm. Should the research conducted ignore the primacy of yield over quality, then it is likely that the extension of this research will fail – due to inappropriateness to the local situation and farmer's articulated priorities.

Establishing a Model Farm: Barriers and Prospects

The barriers to technological adoption presented in the research suggest that the establishment of a model farm as part of the ZEF/UNESCO project could be beset by challenges. However it is argued here that the establishment of a trial, or model, research farm is an excellent opportunity for action research. By working within the system of barriers and constraints faced by other farmers, this project is in a unique position to evaluate the barriers to technology transfer. It is of course necessary for the barriers identified in this research to be considered, and for the project to proceed in a manner cognisant of manifold challenges to innovative farming practice.

This will require research staff to consider how their technologies and experiments will work within the socio-legal complex of Khorezm. This will necessarily include a consideration of farmer and decision maker preconceptions, as well as accounting for the disincentives for innovation. In part this exposes a need for policy change (see: 'Policy implications for Khorezm and Uzbekistan', below). However the project must respond to the local situation, and ensure that technologies are appropriate to both the technical and socio-legal context.

Policy implications for Khorezm and Uzbekistan

It is apparent that the agricultural management policies of Khorezm and Uzbekistan are in urgent need of reform. Given the shortcomings of this research in accessing the opinions of decision makers and political elites, it would be improper to suggest an exhaustive list of reforms required. What is appropriate is to draw attention to the most blatant of the policy failures, and to discuss some criteria on which future policy should be based. The predominance of cotton in rural Uzbekistan must be weakened, as should the system of central state planning of production. Agricultural inputs, including water, seeds, fertilisers and machinery, must be deregulated. Similarly, the settlement account system must be removed as a key barrier to innovation and agricultural development.

Cotton – No longer White Gold

It is tempting for the government of Uzbekistan to appraise the foreign exchange revenues from cotton, and to deem it an essential crop. This analysis ignores the severe ecological and economic costs of cotton production, as well as disregarding the social costs of forced cotton production and conscripted labour. Whilst Uzbekistan will continue to produce cotton in the medium term, there needs to be a move towards market-based production. This will enable a greater focus on the quality produced, rather than the present focus on yield maximisation.

It is suggested that given the rapidly increasing population of Uzbekistan, especially in urban and peri-urban areas, that post-harvest processing needs to be promoted. The development of a cotton processing industry will enable Uzbekistan to gain more wealth from the production of cotton. If this policy is effectively implemented, then more economic profit can be gained from a decreased use of water and land for cotton production. This policy would also promote productive employment, and mark a shift away from Soviet era dependencies.

Central Production Planning

The system of central production planning is a serious constraint to the development of Uzbekistan's rural economy. Central planning tacitly promotes poor

quality produce through an excessive emphasis on the formulaic fulfilment of state plans. Similarly, the negative incentives for innovation and the development of alternative agricultural methods that central planning produces, remain a key barrier to technology transfer and adoption. The production of cotton and wheat without sufficient fallow periods or crop rotation is inimical to best farming practice, and is actively not in the interests of most farmers. The central state must develop alternative sources of revenue and work to broaden its tax base, rather than continuing to rely upon the rural economy to pay for state functions.

The failure to move beyond central state planning and compulsory acquisition is a sad indictment on the government of Uzbekistan. Whilst the government refuses to exhibit an ability or willingness to reform the rural economy, the ecological decline continues unabated. State production policy remains, as in the Soviet period, a dominant constraint to economic development.

Agricultural Inputs

The modes of regulation of agricultural inputs are excessively centralised, inefficient and ineffective. The regulation of water remains based on shirkat and kolkhoz managed distribution, however, recent trials of WUA suggest that there is the potential for reform. The findings of research of WUA should be closely analysed, and policy implications should reflect the experiences of the early trials.

Fertilisers and seeds remain state monopolies, and exhibit endemic corruption and ineffectiveness. The supply of these vital inputs is unpredictable and unreliable, a fact that no doubt contributes to the relatively low crop yields of most farms. It is necessary that these industries be open to genuine competition. However, this deregulation should not follow the model set by the deregulation of the machinery industry. MTPs remain dominant due to a lack of access to capital for private providers, and because of the settlement account system.

Settlement Accounting

This system of banking must be transformed if the rural economy is to develop. Whilst a fully private model may not be appropriate to Uzbekistan, the government must

disabuse itself of the corruption and administrative difficulties of the settlement accounting system. The case of settlement accounting is a eloquent example of why any agrarian reforms must be holistic in order to be effective. For example, the deregulation of the machinery industry has been stifled by the lack of access to cash deposits that settlement accounting creates. In the same fashion there needs to be a shift away from the settlement account system to ensure that fertiliser and seed supply can become a fully competitive industry.

Final Conclusions

What this research provides is a hybrid framework in which the multiple challenges to technology transfer can be positioned. This model draws both upon Dependency and Black feminist theories, showing their respective abilities to travel both spatially and conceptually. In many respects Khorezm resembles an agriculturally dependent region, similar to those described in the dependency paradigm. There is insufficient evidence that Black feminism can travel directly to Khorezm in a spatial context. What does emerge however is the utility of applying Black feminism conceptually. The analysis of manifold forms of oppression as intersecting is particularly pertinent to Khorezm. When merged with dependency theory this produces a useful framework in which to analyse the challenges to agricultural reform and technology adoption. Figure 11 (p.110) provides a synthesis of both these theories, and applies it to real-world problems in Khorezm. This model identifies the interconnectedness of the multiple barriers to technology change. These barriers can be situated both theoretically, as well as practically, in the Model of Multiple Barriers to Technology Adoption within Khorezm, introduced in Figure 11.

Specific findings from this research suggest that rural reform is possible. However this reform will be premised upon the creation of positive incentives, key policy shifts in the agricultural economy and a reform of governance systems. There remains a vital role for development projects in this process and it is hoped that this thesis provides a useful framework in which to design development interventions.

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APPENDIX I: ZEF/UNESCO PROJECT OUTLINE

Zentrum für Entwicklungsforschung
Center for Development Research
ZEF Bonn

GERMAN-UZBEK
KHOREZM PROJECT

Economic and Ecological Restructuring of Land- and Water Use in the Region Khorezm (Uzbekistan)

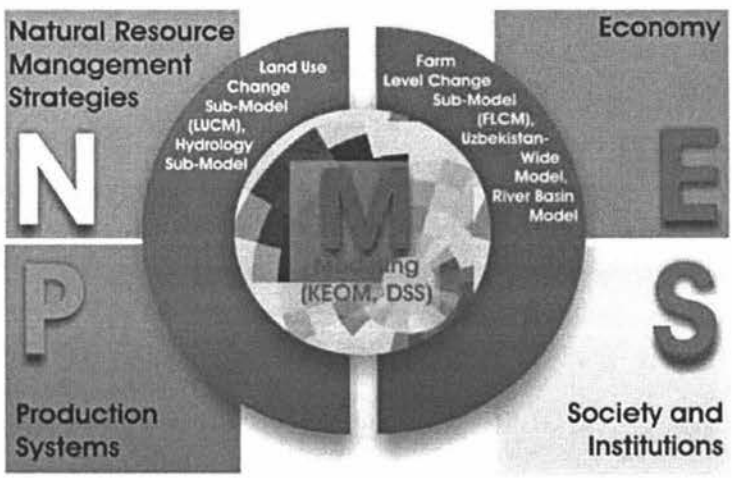
A Pilot Project in Development Research

Project Phase II:

Field Research

and Development of a Restructuring Concept

(2004-2006)



Bonn, August 2003

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ZEF/UNESCO Executive Summary

During Soviet times, over 7 million ha of artificially irrigated agricultural land have been created in the Aral Sea Basin (Aral), basically in order to produce cotton. Large amounts of river water have been withdrawn from the main tributaries of the Aral Sea. Following independence in 1992, Uzbekistan has chosen a gradual approach to economic reforms from plan to market economy; however, today's agricultural production systems are in fact still reminiscent of those inherited from the Soviet era. They are characterized by extensive monocultures under heavy inputs of fertilizers, pesticides, and water, the latter being delivered in extensive irrigation systems that are expensive to maintain and in which up to 70% of the water is lost. The so-called "state order" on crops such as cotton, wheat and in part rice, is a system of obligatory allocation of land to the production of these crops, which is imposed via strongly hierarchical and centralized government structures inherited from the former Soviet system. It insures the predominance of cotton production and impedes the transition to a market economy. As it is, the agricultural production is ecologically unsustainable; soil degradation is rampant, water quality is very low, and water losses, in comparison to other arid countries, are extremely high. The system is also economically unstable, as, for example, the wages paid in agriculture are among the lowest in the region. The inhabitants of Karakalpakstan and Khorezm, two districts on the lower reaches of the Amu Darya River, the largest of the Aral Sea's tributaries, suffer most from the accumulated effects of low water use efficiency, soil degradation and salinization, as well as from the economic and administrative legacies inherited from the Soviet era that are leading to poverty and poor health. The critical economic and ecological situation in the Aral region is thus the result of ill-conceived economic policy and weak institutions and administrative measures.

Furthermore, the mixture of Soviet, tribal ("clans"), and ethnic cultures adds to the complexity of the problem. Structural solutions will need to be multi-facetted and can only be developed by a truly interdisciplinary approach. ZEF has therefore designed, in consultation with its partners (UNESCO, DLR, University of Urgench and TIIAME in Uzbekistan and many others), an interdisciplinary, application-oriented research program with the aim to provide appropriate regional development concepts based on sustainable and efficient land and water use. The program started in 2001 and is based on an integration of natural resource management, economic studies and studies of institutions. The philosophy is that of a long-term, participatory commitment to deliver de-centralized development options based on a system where markets function and sound ecological principles are adhered to. The program includes a strong human capacity building component, particularly the training of young Uzbek scientists from the Aral who will be the potential future decision-makers in the region. Recognizing that most of the Aral Sea is lost, the ZEF program assumes that a sustainable restructuring of land and water use in the Aral (1) will have to improve the livelihood of the local population through private farming based on (ecologically, economically and socially) sustainable land use options; (2) must be based on an efficient use of the existing resources while gradually refurbishing the dilapidated irrigation system. This requires a reduction in cropped land, which we expect to achieve through diversification of land use, utilization of the "service potential" of ecologically sound land-use systems, efficient use of production factors, liberalization of the input and output markets, increase in rural income and careful modification of existing legislation and decision-making systems to enable this process.

In this document we present the proposal for extending ZEF's project on "Economic and Ecological Restructuring of Land- and Water Use in the Region Khorezm (Uzbekistan) - A Pilot Project in Development Research" into its next phase. This project phase, to last from 2004 to 2006, is the second of a total of four phases covering the 10-year program (Phase I: Establishment of central databases and infrastructure; Phase II: Field trials for process understanding, development of a simulation model (KEOM, see below); Phase III: Testing the concept for restructuring land use on pilot farms and developing a Decision Support System (DSS); Phase IV: Adaptation of the concept and its implementation in Khorezm; cf. Table 1).

In Phase I (18 months) the project concentrated its efforts on assessing the state-of-the-art, based on secondary data acquisition, surveys of land use, ecological conditions and current economic, institutional and social/health conditions of the Khorezm region. The project has been firmly established with excellent institutional arrangements, infrastructure and national and local support. Moreover, there is a clear tendency in the country to shift to privatization and liberalization of markets, so that the BMBF project is drawing increasing attention from various levels of government. It therefore becomes even more important to facilitate this process with sound restructuring concepts.

Therefore, in Phase II, the main aims of the project are (1) to gain the necessary understanding of natural, economic, and social processes that allow the proposition of a alternative restructuring concepts; (2) to develop an Ecological-Economic Optimization Model (KEOM) that will help assess the impact of various restructuring concepts on economic and ecological developments; (3) to develop together with the local land users and with the help of KEOM, a pilot scheme for large-scale privatization of Shirkats (communal farms); and (4) to initiate the development of a Decision Support System (DSS) to aid decision makers in the privatization process and reallocation of land and water resources. Thus, the model developed in Phase II will provide the concepts to be tested on the pilot farms in Phase III, when also the DSS will be fully developed.

For this purpose, the project in Phase II comprises research in four thematic areas that will provide the basic data input for the integrative, interdisciplinary KEOM and the pilot farm scheme design (cf. Figure 1). These areas cover: (1) Natural Resource Management Strategies (N) targeted at decision makers, in which i) optimal land-use patterns (including the introduction of trees and ponds as alternative land uses with ecological functions) will be determined, ii) ways for an efficient, sustainable management of the two most important resources, water and land, will be elaborated, and iii) indicator functions for a sustainable resource use related to water quantity and quality (salinity in irrigation and drinking water), and soil quality will be established allowing assessment of the success of the restructuring measures to be adopted; (2) Production Systems (P) in which i) possibilities for a diversification of crops through the introduction of alternative crops, cropping systems, and rotations will be exploited, ii) possibilities for an improvement of fertilizer efficiency will be studied, and iii) irrigation efficiency on the field level will be addressed to develop recommendations targeted at farmers as the main land users; (3) Economy (E) aiming at i)

establishing development pathways for transforming the local economy from a centrally-based to a market-oriented system, ii) the acquisition of primary research data on farm management, market conditions, profitability of diversified crop production systems, expenditures of regulating the economy as well as costs of intergenerational distribution, and iii) a socio-economic assessment of losers and winners of possible reforms, all related to the question of how the land and water use can be improved; and (4) Society and Institutions (S) aimed at i) understanding the formal (legal) ways of resource distribution in the state institutions and the newly formed Water User Associations, ii) increasing our understanding of the the informal ways of by-passing these institutions in decision-making, iii) assessing environmental legislation and the legal aspects of land tenancy and land use with the aim of identifying the possibilities for legal, institutional and administrative modifications needed for a land reform, market liberalization and an effective increase in land/resource use efficiency and sustainability.

In area S, the project also addresses the question of international competition for water in Central Asia and thus provides the link between the development of water distribution on regional and supranational scales. The sub-models (representing the thematic components) developed during Phase I and II of the project will be integrated in the central model (KEOM). The model's main purposes are research, planning and teaching; however, it will also provide the basis for a concept to implement changes in land and water use, free of the Uzbek state order, in experimental pilot farms (Phase III). Parallel to this large-scale experiment, Phase III will be dedicated to the participatory development of the Decision Support System.

In short, an improved resource management, the success of which is gauged through monitoring the adequate indicators in area N, is supported by a restructuring of the production systems (P), the economic (E) and the legal/institutional/administrative systems (S), and integrated in the KEOM model and DSS (area M) through which a thorough scenario analysis will lead to restructuring concepts. In the following, we shortly give justifications for and describe the main content of the single work packages and their interrelationships (for an overview cf. Table 1. The link between research from Phase I and Phase II is shown in Table 8).

Area N (Natural Resource Management Strategies):

Resource utilization begins with the allocation of land to various land uses. One alternative land use is the establishment of tree plantations and shelterbelts for biodrainage, organic matter input, improvement of the microclimate through shadow, and tree products such as wood, fruit or fodder. The other alternative explored in this program is the installation of ponds for fish farming in the region. A status quo of land use over the region has been established in a DLR study through Remote Sensing of the Leaf Area Index (LAI), through which, in combination with biophysical parameters, optimum watering will be forecasted for short periods. Given the obvious need to set aside land for ecosystem services necessary for making the environment more viable, the GIS project will be expanded to include a dynamic land-use model that will allow the identification of the regions to be set aside for forests, shelterbelts, and fish ponds. This will be viewed in close connection with the alternative suite of cropping systems. Detailed hydrological and soil quality studies are

necessary for achieving vertical drainage efficiency, water-use efficiency and improved ecosystem functioning that will allow assessment of the success of the measures to be implemented through this program. As no reliable information is available in Uzbekistan on the in- and outflows of water in the irrigation systems of the lower Amu Darya River (district of Khorezm), first a sound database for a hydrological budget for Khorezm will be created based on own measurements. Furthermore, the ongoing measurements of a field water budget for cotton will be extended to additional crops and regional up-scaling will be undertaken based on studies of water fluxes on different scales. This will allow the optimization of water allocation strategies. Research on the establishment of tree plantations will be continued. A long-term experimental plantation of tree species under different irrigation regimes will be continued to study growth parameters and gauge the expected ecological effects on soils and water. Mapping of existing tree stands and of indicators showing suitable sites will allow later implementation of the plantation schemes on a larger scale. Another alternative land use that also will contribute to income generation is the transformation of marginal land into fish ponds, making use of drainage water. Again, this requires mapping of site suitability. The spatial distribution of health-related aspects of drinking water quality, specifically the incidence of those heart diseases related to high water salinity, will continued to be monitored and documented in the GIS-database. This data set will serve as a base-line from which to assess the impact of restructuring in the pilot scheme at a later date. A soil-ecological monitoring program will be established to evaluate the impact of the newly introduced land-use and cropping systems. This is coupled to an intensive investigation of carbon and nitrogen budgets in these systems under different irrigation regimes. A central task in Area N will be the development of the Land Use Change Model (LUCM) that will integrate the different aspects of land use and resource use, and feed into the overall Model (KEOM, see below).

Area P (Production Systems):

Agriculture consumes about 70% of all water resources in Uzbekistan, and the agricultural water-use efficiency in Khorezm is notoriously low. Research will therefore be dedicated to establish alternative cropping and crop management systems that have been successful elsewhere. These include the introduction of a permanent bed-and-furrow system and improved irrigation techniques in combination with optimized fertilizer management via a judicious combination of organic and mineral materials. We will also test the introduction of alternative crops like potatoes, sorghum, sunflowers, or crops with a high value density such as flowers or spices, and work on crop rotation – all this as a means to both improving resource-use efficiency and assessing new market opportunities. The proper production functions of the four main crops to date (cotton, wheat, rice and fodder maize) under these modified conditions will have to be established. The same will be needed for promising alternative crops. Studies initiated in 2002 will continue to establish the production functions for different fish species using cheap locally available plants and crop residues for feed. Economic feasibility of bed-and-furrow (B&F), tree plantations (TP) and aquaculture will be studied (link to Area E), and the ecological effects of B&F and TP will be assessed through groundwater and soil studies described above for area N.

Area E (Economy):

The key to the success of restructuring will be functioning markets and privatization of agriculture. It will be necessary to study up to which point privatization and land set aside policies may diminish the employment opportunities in the farm sector, and how far market restructuring might be able to compensate for these losses. An in-depth analysis of the institutions necessary to create functioning markets, of constraints prevailing in input markets as well as in those affecting output at various stages (processing, storage, and marketing) will be undertaken in order to assess the various options for privatization of these sectors as a viable alternative to the procurement system of the government. In addition, a socio-economic evaluation of possible winners and losers of agricultural reform will provide the necessary background information to minimize or avoid social disruptions. Judgment on the economic effects of re-allocating land and water use will be mainly based on analyses of individual farms started in 2002 and carried out with Linear Programming Models (LPM) that will represent the three major farm types at each district level. These investigations not only will provide a reliable insight into the status quo, but will also provide the levers with information for economic re-organization into more market-orientated agriculture. Furthermore, the computable general equilibrium model will be extended in several respects in order to properly quantify the economy-wide effects of agricultural reforms (e.g., through an up-scaling from a static to a dynamic version). Analyzing the costs of regulations will provide a clear assessment of the hidden expenditures in the current system and visualize the possible financial improvements through privatization. Also in Area E, the modeling studies initiated in 2002 will be continued with the emphasis on integration of the farm data into the Farm Level Change Model (FLCM) to support the overall model, KEOM.

Area S (Society and Institutions):

Any implementation of modifications of resource use will involve regulatory, organizational and social issues. The analysis will determine where improvements of the institutional system are needed with regard to the restructuring of the use of land, water and ecosystems, and will assess the political feasibility of reform proposals. Furthermore, the possible legal forms of small and medium enterprises (SME's) that could seize the new chances in marketing and processing provided by privatization will be elaborated in close cooperation with Area E. The applicability of successful property concepts and models of land use reform from other countries with socialist tradition (e.g., China, Kyrgyzstan, Kazakhstan) to the Uzbek situation will be studied. Privatizing farms and liberalizing markets calls for alternative institutional arrangements in water delivery as well as in monitoring markets. Research will be intensified on appropriately anchoring the new institutional settings in the formal and traditional societal structures in Khorezm. On the supraregional level, a study of water distribution and allocation in countries upstream (Tadjikistan, Turkmenistan and Afghanistan) will address the political dimension of water availability, help to assess arbitration options for future conflicts over water, and allow adjustment of water management in the downstream area of Khorezm according to upstream competition.

Area M (Modeling):

A central goal in this project phase will be the modeling of economic and ecological processes in order to understand their dynamics and to allow, through simulations, to develop scenarios for optimization of land and water use. This will be obtained through simulations in a spatially distributed, agent-based computer model consisting of subunits for resource utilization, natural constraints, economics and human driving forces (the Ecological-Economic Optimization Model (KEOM). The KEOM will allow assessment of the impact of possible scenarios (climatic changes, policy changes, introduction of different land management, etc.) on the long-term sustainability of ecological and economic conditions of Khorezm and Uzbekistan. The model will be based on appropriate linear as well as non-linear programming tools; the scientific challenge will be internalization of the ecological externalities such as ecosystem services. This model will be an education- and research-oriented open-source platform for integrating the various databases and identifying the relevant key processes. It will also serve as the basis for developing a comprehensive decision support system at a later stage. The KEOM will assemble the different parallel multidisciplinary approaches into a truly integrated interdisciplinary research tool. The management and administration of the project's central GIS facilities in Urgench through the DLR will provide the platform for this task.

APPENDIX II: CODING SYSTEM FOR INFORMANT INTERVIEWEES

To ensure confidentiality a coding system was utilised for referencing respondent interviews. In all cases in the text a two letter code is given showing the type of interview, followed by the interview number and a bracketed letter to denote gender. For example II07(m) means that the interview was the ninth Informant Interview, and that the respondent was male. Provided below is a key to the coding system:

II	=	Informant Interview
FG	=	Focus Group
HH	=	H-Form analysis
HM	=	Household Meeting
PT	=	Problem Tree Group
PL	=	Priority Ladder

The numbering system relates to the order in which the interview was recorded. In order to ensure confidentiality this number is not provided in this thesis. However non-specific dates are provided in Table 5 (below). In all cases the initial CW refers to Caleb Wall, the researcher.

Table 5: Interview Numbers and Month recorded

Research Phase (indicative)	**Interview Number**	**Date Range**
Phase One	01 – 13	March 17- 25
	14 - 21	March 26 - 31
	21 - 25	April 1 - 5
Phase Two	26 - 33	September 1 -7
	24 -42	September 8 - 15
	43 – 50	September 16 -22
Phase Three	51 - 57	September 23 - 30
	58 - 65	October 1 - 6
	66 - 72	October 7 - 15