

Inland fisheries livelihoods in Central Asia

Policy interventions and opportunities



Cover photographs:

Left: Harvesting of trout at the Forel Farm, Tajikistan, 2008; Courtesy of R. van Anrooy

Right: Local fisher, fishing from the World Bank funded SYNAS dam in Kazakhstan (North Aral Sea), 2008; Courtesy of A. Thorpe.

Inland fisheries livelihoods in Central Asia

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Policy interventions and opportunities

by

Andy Thorpe

University of Portsmouth

Portsmouth, United Kingdom of Great Britain and Northern Ireland

Raymon van Anrooy

Fishery Officer

FAO Subregional Office for Central Asia

Ankara, Turkey

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Preparation of this document

The Central Asian region, including the Republic of Kazakhstan, the Republic of Tajikistan, the Kyrgyz Republic, the Republic of Uzbekistan and Turkmenistan, has experienced three profound events that have had notable reverberations within the fisheries sector over the last few decades.

- 1) The ecological crisis precipitated by the *shrinking of the Aral Sea* has devastated the local ecosystem, destroyed a vibrant fishery¹ – with the loss of 24 indigenous species of fish, and undermined the health and livelihoods of more than three million people.
- 2) Commercial *overfishing of sturgeon from the Caspian Sea* (bordering Kazakhstan and Turkmenistan) saw landings collapse and led the Convention on International Trade in Endangered Species (CITES) to prohibit sturgeon exports from the region in 2006.
- 3) *The demise of the former Union of the Soviet Socialist Republics (USSR)* saw the fragmentation of the previously “effective” centralized system of managing the region’s 55 reservoirs, with the consequent uncontrolled expansion of fishing activity resulting in fish “becoming less available to the broader communities” (Petr *et al.*, 2004).

Somewhat surprisingly, the impact of these changes on the structure of fishing and fish farming communities and the role of fish in household livelihood strategies has largely gone unrecognized. To date, there exists only minimal recognition of the nature of fisher livelihoods in the inland fisheries of Central Asia and the coping strategies employed at the household and community level to deal with systemic shocks such as the Aral and Caspian stock collapses and the fisheries decentralization alluded to above. The human dimensions of fisheries in Central Asia are largely overlooked in literature about fisheries of the region.

This document is the result of a synergetic effort in 2008 of the Food and Agriculture Organization of the United Nations (FAO) and the University of Portsmouth, United Kingdom of Great Britain and Northern Ireland, in collaboration with some key fisheries-sector stakeholders in Central Asia, from both research and management fields. It intends to increase understanding of, and contribute to, reducing the gap in information on effective livelihood-supporting policy interventions in the inland fisheries of Central Asia.

¹ The Aral Sea fishery regularly produced over 50 000 tonnes of fish during its heyday in the 1960s, providing employment for 60 000 workers.

Abstract

This technical paper presents the findings of a study on inland fisheries livelihoods in Central Asia. It discusses current policies and potential livelihood-enhancing policy interventions. The study was conducted in 2008 under a partnership between Portsmouth University, the United Kingdom of Great Britain and Northern Ireland, and the Food and Agriculture Organization of the United Nations (FAO). The paper examines the evolution of the Central Asian fisheries sector, showing how it was one of – if not the most – acutely affected sectors by the deterioration in the economic environment after the collapse of the former Union of the Soviet Socialist Republics in 1991. Examples are given of livelihood or coping strategies that have evolved for those persons who currently derive an income from the sector. Three distinct groupings are highlighted in the examples presented: the Kazakh “fisher brigades” based on the North Aral Sea, the “community” fishers of Kyrgyz Republic and the pond culturalists of the Republic of Tajikistan. The livelihood strategies of each group and the particular constraints each group faces are documented. A concluding chapter identifies the pre-requisites for more effective livelihood-supporting policy interventions within the fisheries sphere across the Central Asian republics.

Contents

Preparation of this document	iii
Abstract	iv
Acknowledgements	vii
Acronyms and abbreviations	viii
1. Introduction	1
2. Poverty, well-being and poverty reduction strategy papers (PRSPs) in the Central Asian republics	3
Kazakhstan	5
Kyrgyzstan	7
Tajikistan	7
Turkmenistan	9
Uzbekistan	9
3. The evolution of Central Asia's inland fisheries	11
Fisheries in Kazakhstan	12
Fisheries in Kyrgyzstan	15
Fisheries in Tajikistan	17
Fisheries in Turkmenistan	20
Fisheries in Uzbekistan	22
Commonalities among fisheries of the Central Asian Region	25
Reactivation of the fisheries sector	25
4. Fisher livelihoods and well-being in Central Asia	27
The "fisher brigades" of the north (little) Aral sea	32
The "community" fishers of Kyrgyzstan	38
The "Dekhan pond fishers" of Tajikistan	41
5. Conclusions	47
Increasing government attention to the fisheries sector	47
A holistic approach to determining livelihood-supporting policy interventions	48
Actions needed at the regional level	49
Actions needed at the national level	49
References	53
Tables	
1. Central Asia: poverty and well-being at independence	4
2. Central Asia: trends in poverty and well-being	4
3. Poverty in Uzbekistan by oblast, 2005	10
4. Fish production in the Commonwealth of Independent States (in tonnes)	11
5. The livelihoods approach framework	29
6. Number and location of brigades on the North Aral Sea (NAS)	36
7. Fish prices and margins on the North Aral Sea (NAS), 2004	37

8. Stocking and capture data at reservoirs managed by the Hunters and Fishers Association in Chui-Bishkek, 1999–2007	40
9. The emergence of dekhans farms, 2002–2006	42

Figures

1. Economic performance of the Central Asian economies, 1992–2007	5
3. Fish production in Kazakhstan, 1989–2006	13
2. Recreational fishing near Almaty, Kazakhstan, 2008	13
5. Fisheries production in Kyrgyzstan 1989–2006	16
4. A fish retailer at the Osh market in Bishkek, Kyrgyzstan, 2008	16
6. Harvest from an extensively used fish pond in Tajikistan	18
7. Fish production in Tajikistan, 1989–2006	19
8. The remains of one of the largest Soviet-era hatcheries in Central Asia, located in Tajikistan	19
9. Fish production in Turkmenistan, 1989–2006	21
10. Fish retailers with love for their product at one of the markets in Ashgabat, Turkmenistan	22
11. Fish sales at Chinaz wholesale market in Uzbekistan	23
12. Fish production in Uzbekistan, 1989–2006	24
13. Soviet-era incubators at the largest fish hatchery in Uzbekistan	25
14. Nurek reservoir in Tajikistan where aquaculture development is being planned	30
15. The Central Asian livelihoods pentagon	31
16. Fingerling culture ponds near Almaty for restocking in various lakes and reservoirs in Kazakhstan	34
17. A newly established agricultural training centre with demonstration fish ponds in Tajikistan	44
18. Participants at the regional intergovernmental meeting to initiate the establishment of a Central Asian fisheries organization, Dushanbe, Tajikistan, November 2008	48

Boxes

1. The Millennium Development Goals (MDGs) and the Central Asian republics	6
2. Livelihood analysis of the social, economic, institutional and environmental domains	28
3. The local NGO Aral Tenizi	35
4. The hatchery and feeding ponds in Kuybyshev	45

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Acronyms and abbreviations

CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species
DFID	Department for International Development
DRD	Direct Rule Districts (Republic of Tajikistan)
DSLS	Danish Society for a Living Sea
EIFAC	European Inland Fisheries Advisory Commission
FAO	Food and Agriculture Organization of the United Nations
FSS	Former Soviet States
GDP	gross domestic product
GEF	Global Environment Facility
HDI	human development index
HFA	Hunters and Fishers Association (Kyrgyz Republic)
ICWC	Interstate Coordination Water Commission
IMF	International Monetary Fund
IUU	illegal, unreported and unregulated
KR	Kyrgyz Republic
MCS	monitoring, control and surveillance
MDG	Millennium Development Goal
NAS	North Aral Sea (Republic of Kazakhstan part)
NGO	Non-governmental Organization
PRSP	Poverty Reduction Strategy Paper
RoK	Republic of Kazakhstan
RoT	Republic of Tajikistan
RoU	Republic of Uzbekistan
SAS	South Aral Sea (Republic of Uzbekistan part)
SEC	Subregional Office for Central Asia (FAO)
TAC	total allowable catch
UNDAF	United Nations Development Assistance Frameworks
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
The former USSR	the former Union of the Soviet Socialist Republics
WIS	Welfare Improvement Strategy of Uzbekistan 2008–2010
WFP	World Food Programme

1. Introduction

The collapse of the former Union of the Soviet Socialist Republics (the former USSR) and the consequent disintegration of the command economy that had bound the individual Soviet republics to Moscow caused severe economic dislocation for both the Russian Federation and the newly independent transition economies. Svejnar (2002:8), for example, suggests that while post-1989 growth performance was “mildly to significantly disappointing in Central Europe”, in Eastern Europe and the Commonwealth of Independent States (CIS), the results ranged from “poor to disastrous”. By 1998, average cumulative output across the 25 countries in transition had declined by 42 percent, a reduction that dwarfed the 34 percent reduction in the United States gross domestic product (GDP) during the Great Depression (Fidrmuc, 2001:8). Differences in initial conditions, external factors, reform strategies pursued and the inflows of foreign direct investment into the Soviet Union successor states caused large variations in economic performance among the countries in transition (Fischer and Sahay, 2000; Dolinskaya, 2002; Meyer and Pind, 1999), variations that have been substantiated by a number of country specific studies.¹

There was also a marked variation in sectoral economic performance over the period. While industrial output dropped by 47 percent, even sharper contractions were recorded in light industry, construction and wood processing (Oldfield, 2000:81; Vodianov, 2000). Bessonov (2002:49) attributes this to the domestic market orientation of these sectors, with the most acute contractions experienced in those industries producing end products for the final consumer. In contrast, aggregate agricultural production (down 33 percent over the same period) proved slightly more resilient, notwithstanding the widespread elimination of agrarian subsidies² and the worsening of the agricultural terms of trade (Lerman *et al.*, 2003:1000).

Equally problematic was the *generalized institutional failure*³ that accompanied the collapse of the Soviet Union. As Przeworski (1996:22) acknowledges, while “institutional failure at the centre provides a context in which regionally-based nationalists can effectively mobilize to promote an autonomy movement”, the ensuing autonomy that resulted was also accompanied by the removal of a myriad of institutional supports that had helped underpin the economic and social stability of the Soviet regime. Stark (1992:301), for example, has suggested that, in general, institutionalization was “undoubtedly low and uncertainty was extraordinarily high” following the 1989 regime changes as weak states faced weak societies bereft of independent political organizations or strong civil societies. In the case of the Russian Federation, Djankov *et al.* (2003:608) have emphasized the extreme economic disorganization that occurred after 1989, with the briefs of the emerging public institutions addled by crime, corruption and political influence (Shleifer, 1997; Sonin, 2003), and localism/regionalism subverting financial accountability and the rule of law and order (Zhuravskaya, 2000). In the Republic of Tajikistan, Lynch (2001:51) notes how the severe institutional weakness of the new

¹ See Pomfret (2000) on Uzbekistan, Blackmon (2005) on Kazakhstan, Repkine (2004) on Turkmenistan, Van Zon (2001) on the Ukraine, Khaduri (2005) on Georgia, and the Special Issue of *Problems of Economic Transition* (2005) on Moldova.

² Johnson (1996) suggests that prior to dissolution, the former USSR was directing 20 percent of the government budget – 10 percent of national income – to food subsidies.

³ The authors follow Douglas North (1990) in viewing institutions as encompassing all the formal and informal “rules” that determine the conduct of individuals and groups within a society. Institutional failure can then be either specific (collapse of a bilateral fishing agreement, for example) or generalized (demise of the Soviet Union).

Tajik state was a major contributory factor to the 1992–1997 civil war, while Snyder (1998:8) talks of the “Hobbesian struggle for economic survival” following the abrupt removal of subsidies in the early 1990s. Sokolsky and Charlick-Paley (1999:10) go as far to assert that the absence of “institutionalized mechanisms” for resolving economic, ethnic or political grievances or ambitions is the most critical factor threatening the security and stability of Central Asia and the south Caucasus.

While (re-)building institutional capacity is clearly imperative, the task is hampered by the *lack of social capital*⁴ present in the former Soviet economies (Paldam and Svendsen, 2001). Murrell (2002:13ff.) corroborates this, citing sources which show that participation in clubs and associations was low (and fell further between 1990 and 1995), as was membership in professional or work-related groupings. Circles of friends were also relatively circumscribed within the countries in economic transition, and such countries were “not very well endowed with personal trust (page 9)”. Consequently, as the command economy fragmented, the Hobbesian struggle for economic survival was exacerbated by the absence of such capital, not only making the likelihood of impoverishment greater but also militating against the construction of effective livelihood-supporting escape ladders.

The intention of this technical paper then is four-fold. First, to delineate how economic collapse was reflected in increased levels of impoverishment across the Central Asian region and how current macroeconomic development strategies seek to address such deprivation. Second, to examine the evolution of the Central Asian fisheries sector and to show how it was one of – if not the most – acutely affected sectors by the deterioration in the economic environment (and yet has been largely neglected in the national poverty alleviation strategies now being deployed across the region). Third, to examine the way livelihood or “coping strategies” have evolved for those people who currently derive an income and subsistence from the sector. For illustrative reasons, three distinct groupings, the Kazakh “fisher brigades” based on the North Aral Sea, the “community” fishers of the Kyrgyz Republic (Kyrgyzstan) and the pond culturalists of Tajikistan, were chosen and the livelihood strategies of each were documented as were the particular constraints each group faced. Finally, a concluding chapter identifies the pre-requisites for more effective livelihood-supporting policy interventions within the fisheries sphere across the Central Asian republics.

⁴ The authors use Putnam’s conceptualization of social capital as referring to “connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them” (2000:19).

2. Poverty, well-being and poverty reduction strategy papers (PRSPs) in the Central Asian republics

Historically, the economic and geographic isolation of the Central Asian region was mitigated by (often significant) transfers – as much as 40 percent of GDP in the case of Tajikistan – from the central Soviet budget (Falkingham, 1999:3; Cukrowski, 2006), thus guaranteeing a standard of living that, while lower than in other parts of the Soviet bloc, surpassed that of some of its neighbours (Table 1).

Income per capita was highest in the resource-rich Republic of Kazakhstan and Turkmenistan and, while Tajikistan's income per capita was the lowest of the newly independent former Soviet States (FSS), it comfortably exceeded the per capita incomes of its southern neighbours (Afghanistan and Pakistan). Differences were even more pronounced with regard to adult literacy and life expectancy in Turkmenistan, the lowest among the FSS at 66.4 years and even eclipsed that of Turkey (65.1 years). The incidence of poverty was, nevertheless, considerably higher in the FSS of Central Asia than in the Caucasus, ensnaring between one-third and one-half of the population (Kazakhstan excepted). Inequality was also slightly more acute in the Central Asian region, as measured by the Gini coefficient, but was still markedly less acute than in the neighbouring states of Pakistan, Iran or Turkey.

However, while the region inherited high levels of human capital, overdependence upon Soviet supply and trade networks and budgetary support caused profound problems for the region in the decade following independence. As support was withdrawn and trade relations were ruptured, the Central Asian economies contracted sharply. Hyperinflation emerged, reaching levels of 7 344 percent and 9 750 percent in Tajikistan and Turkmenistan, respectively, by 1993, social expenditures fell precipitously (education and health expenditures fell between two-thirds and three-quarters except in the Republic of Uzbekistan between 1991 and 1996), and real wages collapsed to a fraction of their immediate post-independence value⁵ (Falkingham, 1999:3ff.). The social unrest resulting was most acute in Tajikistan, which was consumed by a civil war costing between 50 000 and 100 000 lives over the period 1992–1997 (Kolstø, 2000). Inequality rose sharply too. In Kyrgyzstan, the Gini coefficient leapt to 0.353 by 1993, increasing over the period 1989–1993 at a rate two and one half times as fast as that registered during the 1980s within the fastest inequality-increasing Western countries (Falkingham, 1999:10). The descent into poverty was equally swift. Milanovic (1998: Table 5.2; Grootaert and Braithwaite, 1998) estimated that by 1994 Kyrgyzstan had the highest levels of poverty of any FSS (84 percent of the population), Falkingham (2000) suggests that 95 percent of the Tajik population was unable to access the minimum consumption basket by 1999, and Milanovic (1998) reported poverty levels of 47–57 percent in the other three Central Asian republics. Child malnutrition also increased, with Babu and Reidhead (2000:655) reporting that 15.8 percent of all Kazakh pre-school children in 1995 were “stunted” (below the expected height for their age), with rates exceeding 50 percent in parts of Tajikistan.

⁵ Falkingham (1999: Table 2) suggests that by 1996, real wages had fallen to just 44.5 percent of their 1991 value in Kyrgyzstan, 34.4 percent of their 1991 value in Kazakhstan and 5.0 percent of their 1991 value in Tajikistan.

TABLE 1
Central Asia: poverty and well-being at independence

	Population (millions) 1990	GDP per capita (US\$) 1990	Poverty (% pop'n.) 1989	Gini coeff. 1989	Life expectancy (years) 1990	Adult literacy (%) 1990	HDI ranking 1990
Former Union of the Soviet Socialist Republics	289.3	N/A	11.1	0.289	N/A	N/A	N/A
Armenia	3.4	4 741	14.3	0.259	71.8	93.0	47
Azerbaijan	7.1	3 977	33.6	0.328	71.0	93.0	62
Belarus	10.3	5 727	3.3	0.238	71.3	95.0	38
Georgia	5.5	4 572	14.3	0.292	72.8	93.0	49
Moldova	4.4	3 896	11.8	0.258	68.7	95.0	64
Russian Fed.	148.7	7 968	5.0	0.278	69.3	94.0	37
Ukraine	52.0	5 433	6.0	0.235	70.5	95.0	45
Kazakhstan	16.8	4 716	15.5	0.289	68.8	93.0	54
Kyrgyzstan	4.5	3 114	32.9	0.287	68.8	93.0	83
Tajikistan	5.5	2 558	51.2	0.308	69.6	93.0	88
Turkmenistan	3.8	4 230	35.0	0.307	66.4	93.0	66
Uzbekistan	20.9	3 115	43.6	0.304	69.5	93.0	80
Afghanistan	N/A	714	6.1	N/A	42.5	29.4	171
Pakistan	115.8	1 862	36.0	0.36	57.7	33.8	132
Iran	57.7	3 253	N/A	0.46	66.2	54.0	103
Turkey	57.3	4 652	N/A	0.51	65.1	80.7	73

Note: The names of Central Asian countries appear in bold. The names of neighbouring non-transition countries are in italics. Population data is from the 1992 World Development Report (World Bank, 1992:Table 1). Data for GDP per capita is in real PPP terms. Data for GDP, poverty levels (neighbouring countries only), Gini co-efficients, life expectancy, adult literacy and HDI ranking are taken from the Human Development Report (UNDP, 1992:Tables 1 and 18). Poverty and Gini data for the transition economies is taken from Pomfret and Anderson (2001).

TABLE 2
Central Asia: trends in poverty and well-being

Country	GDP per capita (US\$)		Poverty (% population)		Gini coefficient		Life expectancy (years)		HDI ranking	
	1990	2005	1989	2003	1989	2003	1990	2005	1990	2005
Kazakhstan	4 716	7 857	15.5	21	0.289	0.32	68.8	65.9	54	73
Kyrgyzstan	3 114	1 927	32.9	40.6*	0.287	0.28*	68.8	65.6	83	116
Tajikistan	2 558	1 356	51.2	64*	0.308	0.33*	69.6	66.3	88	122
Turkmenistan	4 230	3 838	35.0	44	0.307	N/A	66.4	62.6	66	109
Uzbekistan	3 115	2 063	43.6	25.8**	0.304	0.35**	69.5	66.8	80	113

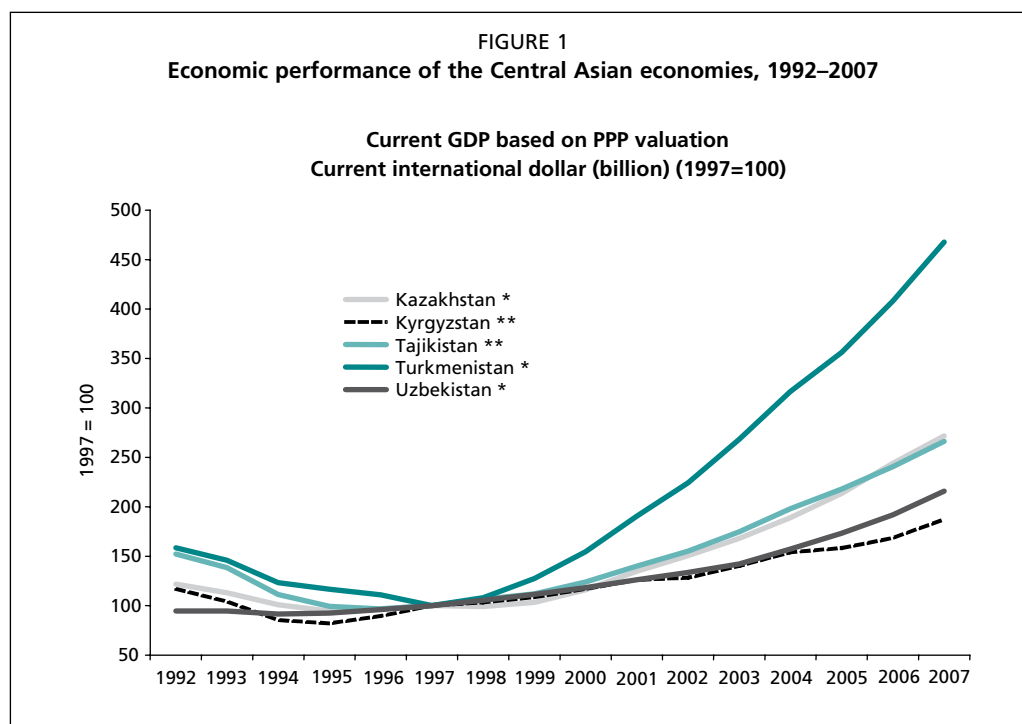
* Data for 2006 from PRSP.

** Data for 2005 from PRSP.

Note: 1989 and 1990 data are repeated from Table 1 above. Data for 2005 GDP per capita are in real PPP terms. Data for GDP, life expectancy and HDI ranking are taken from the Human Development Report (UNDP, 2008:Table 1). Slippage in regional HDI rankings between 1990 and 2005 is explained by a combination of poor socio-economic performance, principally, and increased country coverage. The 2008 report covers 177 countries compared with the 160 countries covered by the original 1990 survey. Poverty and Gini data are the most recent available and were taken from Cukrowski (2006), except in the case of Uzbekistan, Kyrgyzstan and Tajikistan, where figures cited are those that appear in the respective PRSPs.

Fortunately, in the latter half of the decade, a partial economic recovery (Figure 1) helped reverse these trends. Economic growth has continued unabated since the millennium and, in the last decade, national income has more than doubled in Uzbekistan, Kazakhstan and Tajikistan, and more than quadrupled in Turkmenistan, checking the “rollercoaster ride” that the people of the region had endured since independence (Falkingham, 2005). Only Kazakhstan posted a higher per capita income in 2005 compared with 1990 and socio-economic indicators now disclose a more impoverished and vulnerable contemporary population (Table 2)

Although adult literacy levels remain exceptionally high (more than 95 percent), life expectancy across the region is down by three years, and the Central Asian republics



* Estimated data for 2006 and 2007.

** Estimated data for 2007.

Source: International Monetary Fund (IMF), 2008.

have slipped around 20 places (30 places in the case of Turkmenistan) down the HDI rankings. Poverty too, while declining from the mid-1990s high points, remains unacceptably high. In response, governments have devised national development and poverty alleviation strategies, which are also coincident with the Millennium Development Goals (see Box 1).

KAZAKHSTAN

In Kazakhstan, poverty was most acute in the 50 to 60 “sick towns” such as Termirtau, which had depended upon a sole enterprise – since closed – during the Soviet-era (Pomfret and Anderson, 2001:194). Recognition of the sick towns consequently fed through into the *Strategic Plan of Development of the Republic of Kazakhstan up to 2010* (RoK, 2001) that targeted the retraining of the unemployed, the formation of a new entrepreneurial class, the provision of incentives to encourage employers to both preserve old jobs and create new jobs, and interventions targeted at socially vulnerable populations, such as women, orphans and adolescents (2001:Section 4.3–4). The latter group were specifically targeted by the 2002 Law on State Targeted Social Assistance that provided for a programme of social assistance. This programme grew rapidly to provide support to 90.4 percent of the population subsisting below the poverty line in 2003.

A subsequent State Program for Poverty Reduction in the Republic of Kazakhstan, 2003–2005⁶ (RoK, 2003) provided further insights into national poverty. It noted that poverty was both more extensive and severe in rural areas compared with the “non-sick” urban areas, with average cash incomes barely half the level recorded in the cities. Territorially, poverty was concentrated in Mangistau (46.2 percent of the people in poverty and reaching 95.5 percent in the more remote areas) and Atyrau oblasts, which border the Caspian Sea.

⁶ To the best of the authors’ knowledge, no subsequent poverty reduction strategy document has been produced to date.

BOX 1

The Millennium Development Goals (MDGs) and the Central Asian republics

The MDGs were agreed by world leaders at the United Nations Millennium Summit in September 2000, and re-endorsed at a high-level event held in New York on 25 September 2008. Eight goals were identified:

1. Eradicate extreme hunger and poverty
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

These goals were then quantified (e.g. to halve the number of people exposed to extreme poverty and hunger, to reduce under-five mortality by two-thirds, to reduce maternal mortality by three-quarters, etc.) and a target date of 2015 was set by which time these goals were to be achieved. While the United Nations and other international organizations tailor their support to such endeavours, national governments are expected to introduce domestic strategies to ensure that these goals are met at the national level and to report upon the progress towards meeting these goals. The table below details progress in the Central Asian region towards these goals.

Progress towards the MDGs in Central Asia (2007 data)

	Goal							
	1	2	3	4	5	6	7	8
Kazakhstan	☺	☺	☺	◇	◆	◆	◇	◆
Kyrgyzstan	☀	☀	◇	◆	◆	◇	◇	◆
Tajikistan	☀	☀	◇	◆	◆	◇	◆	◆
Turkmenistan	☺	☺	◇	◇	☀	◇	◇	◆
Uzbekistan	◇	☀	☀	◇	◇	◆	◆	◆

Key:

- ☺ – Achieved
- ☀ – On track
- ◇ – Possible, with policy changes
- ◆ – Insufficient information
- ♣ – Off track

Source: www.un.org/millenniumgoals/ and National MDG profiles.

The 2003–2005 programme, which pledged to reduce poverty by 48.8 percent and the number of persons with incomes below the minimum subsistence level by one-quarter between 2002 and 2005, largely re-iterated the policies espoused in the 2010 strategic plan, i.e. to create conditions for employment and entrepreneurship to flourish, to promote vocational training and to target assistance, and added a commitment to improve the effectiveness of, and accessibility to, health, education and infrastructural services. However, despite recognizing the plight of the rural poor, the document proposed no specific initiatives directed towards the fisheries sector, while governmental support to agriculture was focused upon improving the

competitiveness and integrated nature of markets rather than on any explicit pro-poor agro-development strategy.

KYRGYZSTAN

Kyrgyzstan has the most extensive data on poverty available in the Central Asian region, thanks to its participation in the World Bank's Living Standards Measurement Study, which conducted household surveys in 1993, 1996 and annually thereafter (Anderson and Pomfret, 2000; Babu and Reidhead, 2000). These surveys show that the sharp economic contraction after independence, when GDP fell 45 percent between 1991 and 1995, pushed over four-fifths of the population below the poverty line. However, the redistribution of state lands and a series of agrarian trade and pricing policy reforms undertaken over the same period (Livinets, 2007:34) provided the basis for agrarian-led economic growth after 1996 and with it, poverty levels fell. Alam *et al.* (2005:53) note that poverty declined seven percentage points alone (from 63 to 56 percent) between 2000 and 2001, and out of every 100 poor people in 1998, 23 of them escaped from poverty by 2001. Poverty has continued to decline, dropping to 40.6 percent in 2006 (KR, 2007a:8). Although Kyrgyzstan retains an extensive social protection scheme that provides 37 types of benefits to around 11 percent of the population and consumes over one-quarter of the state budget, "the size of these payments is small and its impact on improving of life standard (sic) is insignificant". The 2007 PRSP promises to overhaul the scheme so as to make it more effective (KR, 2007a:66). Poverty, too, is largely a rural phenomenon, except in Talas and Djalal-Abad oblasts where urban poverty levels are higher than rural poverty levels. While regional poverty levels are higher in the western oblasts of Batken (59.1 percent in 2005), Djalal-Abad and Osh (55.4 percent), the highest indices of village poverty are to be found in the Issyk Kul (62.9 percent), Osh (59.7 percent) and Batken (59.4 percent) oblasts.

The current governmental strategy to redress poverty, as espoused in the 2007 PRSP, identifies four priority tasks:

- to enhance economic potential (nine sectors are targeted, including agriculture and processing);
- to combat corruption
- to advance human and social development; and
- to deliver environmental sustainability.

In the case of agriculture, the emphasis is on:

- further land reform;
- cooperative formation;
- a deregulation of food markets; and
- improved financial and extension support.

Significantly, while the strategy promises to establish rural water-user associations, the underlying rationale is to develop irrigation systems. Recognition of the regional divide is reflected in the development of local oblast and rayon-level poverty reduction programmes, which in turn, are melded into the national PRSP. Yet, while "the unique Issyk Kul Lake" is given pride of place in the development strategy for the oblast of the same name, tourism, not fisheries, is the preferred policy tool (indeed, neither fisheries nor aquaculture are mentioned in the 163-page PRSP).

TAJIKISTAN

Although Tajikistan already experienced the highest poverty level of all the FSS at independence, the Tajik plight worsened markedly as the collapse of the Soviet Union saw domestic economic decline (GDP fell over 60 percent between 1989 and 1996), the cessation of budgetary transfers (equivalent to as much as 40 percent of GDP) and a reorientation of (the severely reduced) government expenditures towards the military and away from social services as a consequence of the civil war. Natural disasters, such as

floods, mudslides and avalanches, exacerbated the problem (Abdulai and Tietje, 2006:3). By 1999, more than 95 percent of the population had insufficient income to purchase the minimum consumption basket, and almost one in five people was designated as “extremely poor” and subsisted on an income of under US\$1 a day (Falkingham, 2000). In the cities, the problem was a lack of jobs and inadequate formal sector wage levels. In the countryside, the problem was low agricultural incomes and a lack of access to basic social services (RoT, 2007b:8). There is also a strong regional dimension to poverty, with more than one in three households living in the sparsely populated remote mountainous Gorno-Badakhshan Autonomous oblast bordering China and Pakistan and suffering from extreme poverty (and seven times more likely to be poor than their urban counterparts in Dushanbe). In numeric terms, however, the majority of the poor households are to be found in the two most populous oblasts: Khatlon with 76.1 percent of households in poverty in 2003 and Sogd with 62.3 percent of households in poverty in 2003 (Abdulai and Tietje, 2006:7). To counter such deprivation, households developed a series of coping mechanisms: selling assets, increasing food production for domestic consumption, expanding where possible participation in informal sector activities, accessing humanitarian aid, and borrowing from family and friends, yet it was clear that such strategies would not suffice in the long term.

Although the Tajik economy has been characterized as “extremely weak”, is devoid of mineral resources and suffers from endemic corruption (EU, 2007:50),⁷ high international cotton prices and remittance income⁸ helped underpin economic recovery and reduce poverty at the turn of the millennium, although the effect upon inequality was only marginal (Abdulai and Tietje, 2006:20). The 2002 PRSP was able to build upon this foundation, however, with a four-point strategy intent upon encouraging labour-intensive economic growth, efficient and equitable provision of basic social services, effective governance and targeted support to the most vulnerable (RoT, 2005:4). As economic growth rates hit 10 percent, the 2002 PRSP was superseded by the publication of a National Development Strategy for the Republic of Tajikistan to 2015 and a new 2007 PRSP (RoT, 2007a, 2007b), which sought to operationalize this plan. Three tasks were identified:

- creating the institutional conditions for development, i.e. carrying out public administration and macroeconomic reform, improving the investment climate and developing regional cooperation – termed the “functional” block;
- promoting sustainable economic growth (through developing the infrastructure, energy and industry, and agriculture sectors – termed the “production” block; and
- developing human potential, i.e. providing education, health, social welfare, water and sanitation, and promoting environmental sustainability and gender equality – termed the “social” block.

The agrarian strategy outlined to tackle poverty included: a more transparent procedure for registering land rights, measures to improve the effectiveness of agricultural and water management (drainage and irrigation) infrastructures, and the promotion of rural entrepreneurial activity, which included the attraction of funds from labour migrants for the establishment of fish farms, as well as dairy, sheep and poultry farms, apiculture, and yak and goat herding. Despite these efforts, poverty levels at 64 percent are the highest in the region and national food security was further compromised by the coldest winter in 44 years in 2007/2008 as night temperatures dropped to -25 °C. FAO (2008a:3) estimated losses in the agriculture sector alone

⁷ Tajikistan was ranked 150th (with Kazakhstan and Kyrgyzstan) out of 179 countries on the Corruption Perceptions Index of Transparency International (www.transparency.org). This ranking was still somewhat better than either Turkmenistan, which ranked 162nd, or Uzbekistan, which ranked 175th.

⁸ The IMF estimated remittances from family members, mainly working in the Russian Federation, were around US\$433 million to US\$1 billion (equivalent to 21–50 percent of GDP) in 2004 (IMF, 2005).

amounted to US\$260 million (livestock losses US\$95 million), with the “cold-affected poor and food-insecure households in Khaton and DRD” the most direct beneficiaries of a rapidly assembled FAO Emergency Assistance Programme (FAO, 2008a).

TURKMENISTAN

Turkmenistan’s current development strategy is outlined in the *Strategy of Economic and Political and Cultural Development of Turkmenistan up to 2020* (2006). The copious oil, gas and to a lesser extent cotton revenues, were expected to catapult Turkmenistan onto a par with Western states in terms of wealth generation and living standards. This was complemented by the launch of a National Programme on Improvement of the Social and Living Conditions in Rural Areas in late 2007, in which the focus appears to be the implementation of “hundreds of construction projects”, and a specific development plan for the region (the Balkan Velayat) bordering the Caspian Sea entitled the *Conception of Social and Economic Development of the Balkan Velayat, 2008–2012*. Few details are available regarding the actual contents of either the programme or the plan, let alone the specific fisheries components (if any). Further, while the government reports progress towards meeting a number of the Millennium Development Goals (MDGs), there is a lack of independent data available and external commentators are sceptical of the progress claimed, citing the closure of most local libraries and medical facilities, reductions in state benefits (including the cessation of state maternity and sick leave payments and a reduction in the number of pensions payable to senior citizens), and a lack of both drugs and qualified medical staff (UNDP, 2005b; Nichol, 2006).

UZBEKISTAN

Contemporary Uzbek policy to redress poverty and enhance well-being is encapsulated in the *Welfare Improvement Strategy of Uzbekistan, 2008–2010* (WIS) (RoU, 2007), which doubles as the country’s PRSP. While domestic income equality has increased, as income growth in Tashkent and Navoi oblast has outstripped income growth in the rest of the country, the poverty-stricken people are principally located in rural areas (Table 3), where employment opportunities shrank as “shirkats” (i.e. agricultural cooperatives) were transformed into large private farms (2007:43).

Poverty in Uzbekistan is most prevalent in rural areas, where almost three-quarters of the poor live. Regionally, poverty is highest in the oblasts of Karakalpakstan (which encompasses the Amu-Darya basin and borders the South Aral Sea), where maternal and infant mortality rates were also historically highest⁹ (2007:48), and Kashkadarya (which includes the Kashkadarya River basin in the southern Pamir mountains). McCauley (2004:294), for example, notes with regard to Karakalpakstan that “drought and desertification have combined with the dislocations associated with the Aral Sea’s desiccation to impoverish most of the population”. Urban poverty is linked to unemployment (3.8 percent in 2006) and invisible underemployment in both formal and informal sectors. Presently, poverty is partly ameliorated by a series of targeted social protection programmes (pension fund, employment fund and social assistance) that consume 7.9 percent of GDP, although this is expected to reduce over time as growth continues.

The long-term and medium-term objectives of the WIS (RoU, 2007:6–12) are to:

- maintain high and stable rates of economic growth. If the projected rates of 7–9 percent per annum are achieved, poverty is expected to fall to around 20 percent by 2010;

⁹ The implementation of a series of maternal and child health programmes in the oblast reduced mortality rates from 108.7 per 100 000 newborns in 1991 (national mortality rate = 65.3) to 15.3 per 100 000 newborns in 2005 (national average = 30.8), the lowest in the country.

TABLE 3
Poverty in Uzbekistan by oblast, 2005

Oblast	Poverty rate	Total population (percentage terms)	Percentage of poor
Karakalpakstan	44.0	5.1	8.7
Kashadarya	41.0	8.5	13.5
Surkhandarya	34.6	7.3	9.8
Namangan	33.4	7.9	10.2
Syrdarya	32.6	2.4	3.0
Khorezm	31.0	5.1	6.1
Jizzakh	29.6	3.7	4.3
Navoi	26.3	2.9	3.0
Samarkand	23.9	11.2	10.4
Andijan	23.1	9.5	8.5
Bukhara	20.8	6.4	5.1
Tashkent	20.4	10.1	8.0
Ferghana	15.8	11.6	7.1
Tashkent City	6.7	8.2	2.1
National	25.8	100	100
Rural	30.0	64.4	74.7
Urban	18.3	35.6	25.3

Source: Republic of Uzbekistan, 2007:Table 3.10.

- prioritize human development and welfare by strategic interventions in the health, education, water and sanitation, and environmental fields; and
- improve the effectiveness of governance and the civil service.

At the sectoral level, a 12-point programme for agriculture is outlined that will complete the transition to private farming, focusing upon cash crops, new seed varieties and “substantially increased” capital investment in irrigation water supplies (page 70). Yet, while the WIS introduces the *Concept of Integrated Sustainable Water Supply to the Regions of the Republic of Uzbekistan*, no mention is made of fisheries, an oversight that extends to the entire WIS document.

The Central Asian region has witnessed widespread change over the last 20 years. The collapse of the Soviet Union had an immediate impact upon economic growth and poverty within the region and, although economic recovery has gathered speed over the last few years (GDP growth rates are in the range of 7.3 percent in Uzbekistan to 11.1 percent in Turkmenistan for 2006–2007), poverty levels, with the exception of Uzbekistan, still surpass those of 1989. Poverty, moreover, is more accentuated in certain localities as has been noted: the Caspian Sea oblasts of Mangistau and Atyrau in Kazakhstan, Batken, Talas and Djalal-Abad in Kyrgyzstan (although village poverty is greatest in the lakeside oblast of Issyk Kul), the remote and mountainous oblast of Goron-Badakhstan in Tajikistan, and Karakalpakstan bordering the South Aral Sea in Uzbekistan. While the national development plans (and/or PRSPs) proposed in recent years often have a local/oblast dimension, fisheries or aquaculture as a livelihoods provider or contributor in Mangistau, Issyk Kul and Karakalpakstan is overlooked. This begs not only the question as to why the sector is disregarded thusly, but also the question as to how it too was affected by the economic events of the last 20 years, for posing these questions may provide an answer as to why fisheries is, rightly or wrongly, presently ignored in contemporary regional development strategies.

3. The evolution of Central Asia's inland fisheries

Statistics suggest that the fisheries sector suffered one of – if not the – greatest output declines of any productive sector over the period 1989–2006. Output across the CIS region tumbled more than 60 percent (Table 4).

By 2006, recorded output was down to 3.78 million tonnes (from 9.64 million tonnes in 1989), with the largest absolute declines recorded in the Russian Federation (down 4.8 million tonnes) and the Ukraine (down 740 000 tonnes). Somewhat surprisingly, this collapse in fish production has largely escaped comment to date. While Nilssen and Hønneland (2001) did note that the process of transition affected the Russian fishing industry, their field research was restricted to a study of institutional change in the northwestern fishing region. R. van Anrooy *et al.* (2004) were a little more forthcoming, attributing the decline to fleet contraction and obsolescence, the collapse of Pacific pilchard stocks and reduced distant water fishing (the case of the Russian Federation) and subsidy reduction, reduced investment and obsolescence (the case of the Ukraine), although the primordial thrust of their paper was to examine the extent to which the fisheries sector featured in national development plans across the region. Yet the average decline in fish production, determined as it is by the magnitude of landings made by the Russian Federation, masks an even more calamitous decline in the reported catches of many CIS states. Inland catches in the Central Asian republics of Kazakhstan, Turkmenistan and Uzbekistan fell 60–72 percent, Tajikistan's catches dropped 94 percent and Kyrgyzstan's catches plummeted 98 percent.

Significantly, in contrast to the general economic situation, there has been little evidence to date of (fisheries) output recovering in the Central Asian republics (as discussed in the following sections and documented in Figures 3, 5, 7, 9 and 12), which raises pertinent questions as to the impact such a collapse has had upon fishers' livelihoods across the region and the coping strategies that have been employed as a consequence.

TABLE 4
Fish production in the Commonwealth of Independent States (in tonnes)

Country	1989	2006	Current production as % of 1989 output level
Armenia	7 342	1 406	19.2
Azerbaijan	54 406	4 093	7.5
Belarus	21 457	5 050	23.5
Georgia	148 318	3 075	2.1
Kazakhstan	89 508	35 676	39.9
Kyrgyzstan	1 447	27	1.9
Moldova	8 621	5 082	58.9
Russian Federation	8 246 556	3 456 044	41.9
Tajikistan	3 547	210	5.9
Turkmenistan*	52 974	15 016	28.3
Ukraine	981 783	243 885	24.8
Uzbekistan	25 526	7 200	28.2
Total	9 641 485	3 776 764	39.2

* Associate member since 26 August 2005.

Source: FAO (FIGIS).

FISHERIES IN KAZAKHSTAN

Kazakhstan has the highest level of fish species diversity (151 species) in Central Asia, spread across a waterbody area (excluding the Caspian Sea) of around 5 million ha. Kazakh fish production is essentially sourced from four river basins (the Ural-Caspian, the Aral Syr-Darya, the Balkhash-Alakol and the Irtysh-Zaysan) and the 7 000 lakes encountered in the Steppes region. Intensive development of the fisheries sector commenced in the 1960s and production increased exponentially, to peak at just over 100 000 tonnes in 1975. Besides increased fish harvesting in the Aral Sea and Lake Balkhash, 13 state-run hatcheries were set up near the major reservoirs to facilitate the introduction of high-value species, most notably zander, bream and European cisco. The newly introduced species displaced indigenous stocks of low value, such as roach, rudd, perch and dace, and by the 1990s, the fisheries of Lake Balkhash, the North Aral Sea and the major reservoirs of Bukhtarma, Zaisan, Kapchagay and Shardara were based almost exclusively on introduced species (Ismukhanov and Mukhamedzhanov, 2003).¹⁰

In Kazakhstan, however, agriculture has historically taken precedence,¹¹ with over 70 percent of national water resources employed to irrigate 3.3 million ha of land, including 1 million ha in the deltaic region proximate to the Aral Sea, through a complex network of irrigation (96 400 km) and drainage (14 900 km) canals¹² (FAO, 2002:4). The consequence of such extensive levels of water abstraction was the desiccation and salinization of the Aral Sea (see Micklin [1988]; Aladin and Potts [1992]; Zholdasova [1997] and Spoor [1998]) and fisheries collapse. Lake Balkhash was similarly affected: the construction of the Kapchagay reservoir upstream on the Ili River in 1969 caused the lake's depth to drop 2 m and its surface area to reduce by 2 610 km² between 1970 and 1989, leading to wetlands degradation, increased salinity and reduced catches (Petr and Mitrofanov, 1998:145).

The World Bank (2004), in the most definitive study of Kazakh fisheries to date, suggests the sector was one of the most profitable and developed in the country in the pre-independence period. The 1991 harvest of 82 690 tonnes of fish, for example, was worth over roubles280.5 million (US\$14.4 million) and generated profits of around roubles79.3 million (US\$3.8 million). The scenario was not to last, and subsequent landings exhibited a steady decline, bottoming out at 21 000 tonnes in 2001, after which a partial recovery to 35 000 tonnes in 2006 took place (Figure 3). Sturgeon landings, in particular, tumbled sharply, falling nine-fold over the period 1989–2006 (Magzumovich, 2007).

A number of reasons are proffered for the decline in fish production. FAO (2002:4) and Ismukhanov and Mukhamedzhanov (2003) suggest poor water management is partly to blame. FAO cites the case of untimely water releases from reservoirs in the Syr-Darya River basin, which spilt both water and fish into depressions without an outflow. Ismukhanov and Mukhamedzhanov chastise the government for failing to install fish protection devices when constructing multipurpose or irrigation dams. Petr and Mitrofanov (1998:149), for example, note how the Takhiatash dam blocked the upstream migration of the Aral barbel. Magzumovich (2007) attributes the decline to a combination of reduced funding (which saw all state-run hatcheries cease operations

¹⁰ FAO FIGIS data suggest that in 1991, bream accounted for 27 percent of catch, Black Sea and Caspian Sea sprat landings accounted for 32 percent of catch and carp (principally common, crucian and silver carp) accounted for 23 percent of catch. In 2005, bream and carp accounted for 63 and 8 percent, respectively, of reported catch (no sprat landings were reported).

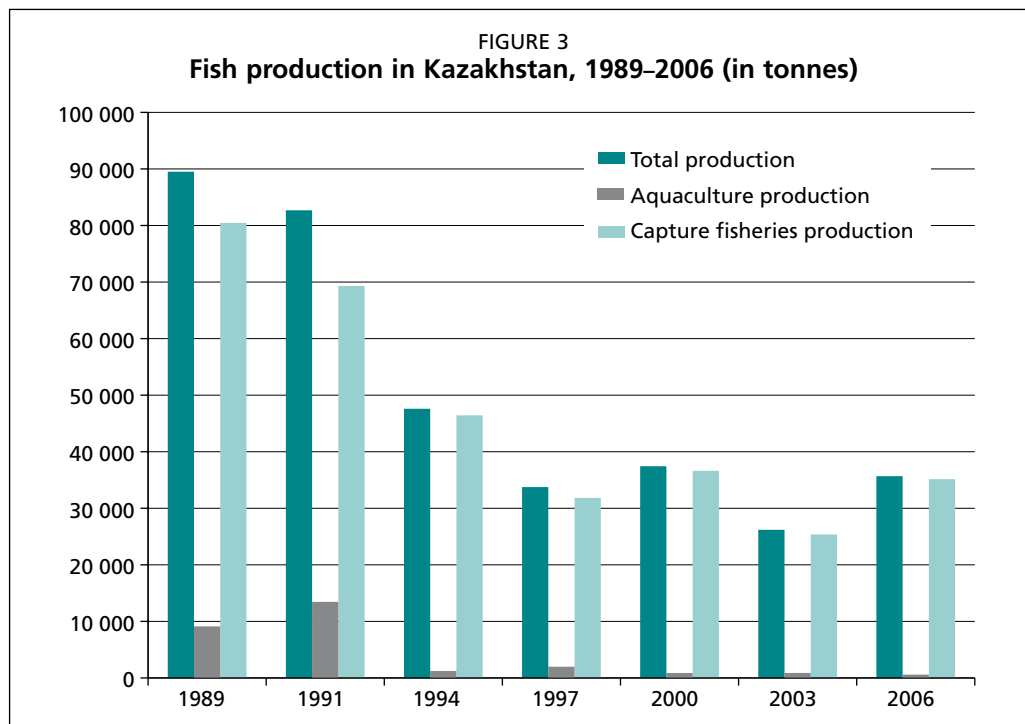
¹¹ The World Bank (2004:27) notes that until recently fisheries was only the *fifth* priority regarding reservoir water use in Kazakhstan.

¹² Since independence, there has been a 30 percent reduction in irrigated area and with it a reduction in organochloride pesticide runoff which, historically, had led to high fish mortality rates.



FIGURE 2
Recreational fishing
near Almaty,
Kazakhstan, 2008

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Source: Authors with data from FAO FishStat+, 2008.

for a period¹³) and the fragmentation of authority when, following independence, the Ministry of Fish Resources and its associated committees were abolished¹⁴ and responsibilities were then shared among the Committee of Forestry, Fishery and

¹³ There has been a substantive recovery in the new millennium. Magzumovich (2007) notes that the funds assigned to fish reproduction and release rose from tenge100.4 million to tenge363.1 million between 2001 and 2006, with the number of fish larvae/fingerlings released increasing from 63.47 million to 194.02 million. The same author also notes that a further tenge780 million has been allocated to developing industrial fish-breeding farms under the Programme of Fish Farm Development, 2006–2008, in the Mangistau region.

¹⁴ One consequence of this, as Makhambetova (2008) noted, is that there is now a lack of highly qualified staff in the Kazakh fisheries sector at all levels, including policy research, aquaculture production, administration and wholesale fish distribution. The other Central Asian republics also exhibit similar human capital shortcomings.

Hunt Farming (reproduction and regulation), the Ministry of Natural Resources and the Environment (conservation), and the Ministry of Economy and Trade (fish processing).¹⁵

The figures on national level fish production, as presented in this paper, are used by the authors also in a forthcoming special issue of *Fisheries Management and Ecology*, dedicated to the European Inland Fisheries Advisory Commission (EIFAC) Symposium on Interactions between Social, Economic and Ecological Objectives of Inland Commercial and Recreational Fisheries and Aquaculture, Antalya, Turkey, 21–24 May 2008.

The World Bank (2004) suggests the decline can be attributed to regime change, which involved the restructuring of collective fishing enterprises, the removal of subsidy and fishery support services, and the drastic reduction in public good provision. It also identifies further culprits: water pollution from oil and heavy chemicals, a culprit also identified by Petr and Mitrofanov (1998:148) in the specific case of Lake Balkhash, the introduction of exotic species and the large-scale environmental and hydrologic changes occasioned by the construction of dams and reservoirs. Pond aquaculture, which contributed around 12 000 tonnes of fish annually in the early 1990s, declined due to a combination of high feed and running costs, a lack of equipment replacement parts and the imposition of water and tax charges (World Bank, 2004:60). As the fishery has declined, so have the numbers of people formally employed within the sector. Aralrybprom, the state fishing enterprise operating at the Aral Sea, was liquidated and formal employment has plummeted since the early 1980s when 60 000 were employed in the sector (Fergus, 1999:40).

Nevertheless, the World Bank study also urges caution in jumping to hasty conclusions regarding the current status of Kazakh fisheries, as the abolition of the “Kazrybhoz” (fisheries committees) and the emasculation of state involvement in fisheries since independence precipitated endemic poaching not just in Kazakhstan but across all the Central Asian republics. With “most landings go[ing] unrecorded, the majority of activity in the fisheries sector takes place in the underground economy and does not register in official data (2004:iv)”, leading the World Bank to suggest that actual production levels could perhaps be three to four times the presently declared level of 31 589 tonnes, with a potential resource rent loss of between tenge220 million and tenge335 million (US\$1.5–2.3 million). Indeed, the same document further suggests that as many as 110 000 rural residents may still be informally active within the sector (as opposed to the 5 200 cited in the FAO Fishery Profile for the country [2004] and the 17 300 cited by the Fisheries Ministry in 2006 [Timirkhanov *et al.*, 2007:51]) and that more than 300 000 people nationwide may be dependent on fisheries for their livelihoods (2004:12).

The corner would appear to have been turned, however, as efforts are now underway to revitalize the sector following approval of Decree 72 (2006: *Approval of the Composition of Tender Commissions for Assigning Waterbodies of International and National Importance*), Decree 963 (2006: *About Fishery Sector Development Concept of the Republic of Kazakhstan for 2007–2015*) and Decree 57 (2007: *Approval of the Republican Scheme of Acclimatising and Stocking Fish Reservoirs*). These decrees are nested within the National Socio-Economic Development Plan, 2008–2010. Specific initiatives include:

- assignation of waterbodies to private leaseholders. Subsequent to the approval of Decree 72 (2006), the government granted ten-year leases over 1 466 waterbodies to 956 fish resource users. This formalization of access rights was expected to combat the relative impunity of poachers and poaching (due to stricter controls

¹⁵ This is one reason prompting the World Bank to note that improving the institutional framework for fisheries management is imperative (2004:vi).

- over access introduced by the new lessees) and increase reported landings (as lessees were now expected to formally record and report their landings);
- increased regulatory vigilance. Poaching (or at least being caught poaching) is also a more costly venture now. The number of poachers caught rose 21 percent from 8 449 to 10 203 between 2005 and 2006, and the fines levied increased by almost 300 percent from tenge10.4 million to tenge41.5 million (Magzumovich, 2007). These figures are likely to increase, following the appointment of 441 fisheries inspectors in 2007 (Timirkhanov *et al.*, 2007:45);
 - improved recording systems. The declared yield in the Aral-Syr-Darya basins has risen five-fold as a result (Timirkhanov *et al.*, 2007:25), with a presumed nationwide reduction in the incidence of unreported landings;
 - increased state funding of hatcheries and nursery pond facilities. Funding leapt from tenge246.5 million to tenge406.3 million (more than 65 percent) over the period 2004–2007, with a concomitant increase in the stocking material produced from 76 million pieces to 194.02 million pieces (Timirkhanov *et al.*, 2007:Tables 9 and 25); and
 - increased number of fish processing establishments. The number of fish processing enterprises has increased from 49 to 57 between 2005 and 2006, although five large plants (Ulkenbalyk Ltd, Rybprom Ltd, Karatalbalyk Ltd, Atyraubalyk JSC and Balkhashbalyk JSC) with hygiene standards acceptable to European importers dominate. New technology, principally for filleting pike-perch, has also been introduced into the sector (Timirkhanov *et al.*, 2007:31–34).

FISHERIES IN KYRGYZSTAN

The main waterbody in Kyrgyzstan is Lake Issyk Kul (6 826 km²). Although the country possesses an additional 1 922 lakes covering 600 km², the relative size of the lakes – allied to the altitude and inaccessibility of many of them for much of the year – precludes their playing any systemic role in national fish production. The same can be said of the country's river system. Although more than 3 500 rivers traverse Kyrgyzstan, fishing is largely restricted to only 33 rivers: the Chui, the Naryn, the Talas and the Kara-Darja Rivers and their tributaries. More important in fish production terms are the 13 large artificial reservoirs, which, although directed primarily towards satisfying the country's agricultural (irrigation) and energy (hydroelectricity) needs, also afford opportunities for aquaculture and commercial and recreational fishing.

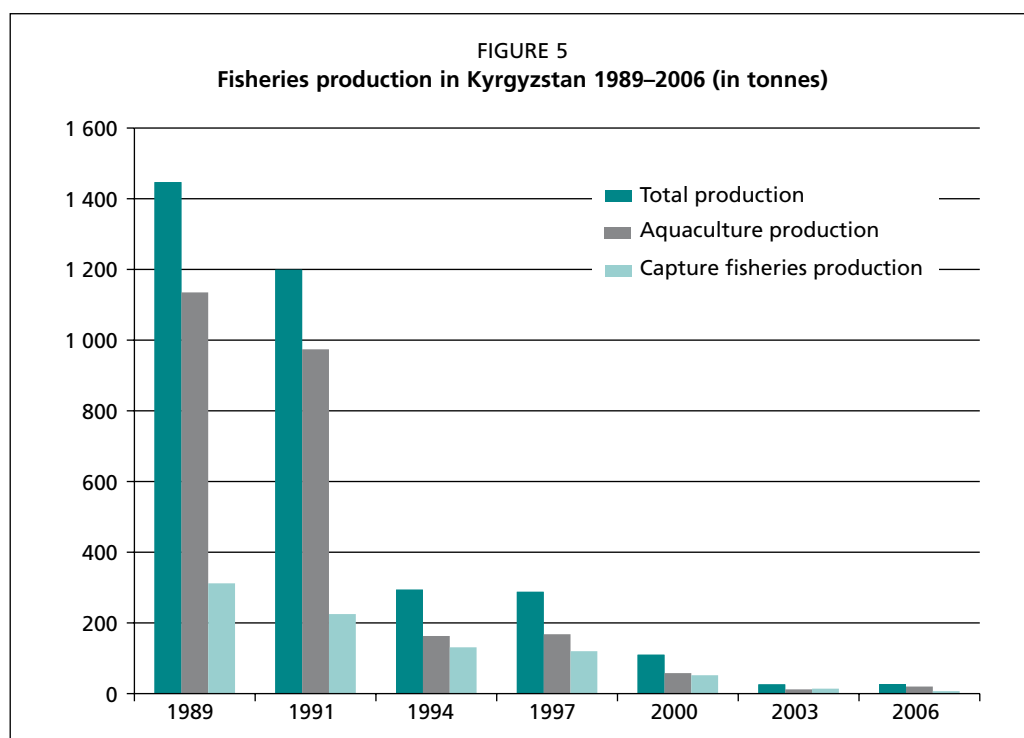
Nevertheless, historically, fish production was dominated by landings from Lake Issyk Kul, initially of dace, and then of newly introduced exotics, principally trout imported from Lake Sevan (1930 and 1936 and later supplemented with trout from two trout hatcheries established on the Ton and the Karakol Rivers), pike-perch (1958) and coregonids (the beginning of the 1970s). Landings from the lake peaked in 1965 at 1 350 tonnes (96 percent dace) and steadily declined thereafter. By 1989, a combination of overfishing and predation by the newly introduced species saw dace landings decline to 193 tonnes (Konurbaev, 2005:8; Savvaitova and Petr, 2003). In their stead, pond culture, principally of common carp and, to a lesser extent, silver carp, expanded following the opening of the Chui, the Ton, the Uzgen and the Talas fish farms between 1950 and 1975. By 1989, 78 percent of the total fisheries-sector production originated from aquaculture (Figure 5).

Post-independence, the fisheries sector has undergone an inexorable decline, culminating with a ban on fishing save for reproductive purposes on the country's two major lakes, Lake Issyk Kul since 2003 and Lake Son Kul since 2006. Paralleling this, the lack of investment due to governmental financial constraints and the withdrawal of state subsidies has ensured growing equipment obsolescence within the aquaculture

FIGURE 4
A fish retailer at
the Osh market in
Bishkek, Kyrgyzstan,
2008



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Source: Authors with data from FAO FishStat+, 2008.

sector,¹⁶ a scenario exacerbated by a present lack of clarity regarding access rights to waterbodies and the fish therein (FAO, 2008c:7). This prompted low productivity

¹⁶ A number of studies refer to this. FAO (2008c:3/6) laments the lack of studies on catch, conservation and reproduction of fish resources due to financial pressures and the absence of state involvement in fish breeding and stock augmentation over the last decade. Sarieva *et al.* (2008:21–22) note how high costs in the post-independence period caused farmers to rely upon increasingly outdated aquacultural equipment and techniques. FAO (2007b:17) notes that the Cholpon-Alta research station on Lake Issyk Kul has received no finding since 2003. These comments are somewhat contradicted, however, by the *Strategy for Fisheries and Aquaculture Sector Development and Management in the Kyrgyz Republic, 2008–2012*, which notes that state/private hatcheries produced 26 million whitefish eggs and 6.6 million syrok eggs in 2005, and stocked reservoirs with around 9.3 million syrok, carp, trout and whitefish fry the same year.

ponds to be taken out of production, filled in and used for agricultural purposes (Djancharov, 2003). By 2006, recorded fisheries output at 27 tonnes was less than 2 percent of the 1989 level. Employment too dropped from a peak of 1 000 workers in former Soviet times to 72 in the early years of the millennium before rebounding to 396 workers in 2007 (Sarieva *et al.*, 2008:42).

A number of caveats are in order. First, the collapse of the institutional Soviet structures has facilitated in Kyrgyzstan, as in a number of the other Central Asian states, poaching, much of it for subsistence purposes.¹⁷ Moreover, if estimates are correct, the phenomenon is not a negligible one. The Department of Fisheries, for example, estimates that the annual illicit catch could increase to as much as 250 tonnes from Lake Issyk Kul alone (Sarieva *et al.*, 2008), prompting renewed efforts to control such illegal fishing through regulation and the punishment of offenders.¹⁸

Second, official data on pond catches are restricted to the data provided by the two state facilities presently in operation, namely Talas and Uzgen. However, if fish production by the 20 or so currently licensed “private pond operators” as well as catches from the many more ponds, where informal aquacultural activity is probably taking place, were to be included, then the aggregate pond catch would almost certainly be higher. Furthermore, aquaculture prospects look decidedly bright. A private cage-culture enterprise (Ekos International) has commenced activities at Lake Issyk Kul and produced 53 tonnes of trout in 2007, with an annual projected output of 225 tonnes in the near future (FAO, 2007b). This swift success has prompted a number of new entrants such as New-Tek Ltd, Janysh and Co. Ltd, Aquada Ltd and Ladoga Ltd, among others (Sarieva *et al.*, 2008).

Fortunately too, the lack of administrative and legislative clarity regarding the functioning of the sector is presently being tackled. Recognition that the 1997 Law on Fish Industry of Kyrgyzstan was both dated and inadequate led the state to re-establish a Department of Fisheries. Under a new proactive director, the department swiftly promulgated the *Strategy for Fisheries and Aquaculture Sector Development and Management in the Kyrgyz Republic, 2008–2012*, approved by the government on 22 April 2008, and has subsequently managed to attract interest from donors (e.g. FAO, UNDP, the Government of Finland) to support the implementation of the strategy (FAO, 2008c, 2008b). Significantly, the second goal of the five-point development strategy pledges to: “augment the contribution of fisheries and aquaculture in generating socio-economic benefits and *improving the wellbeing of the rural population*” (page 13, the italics are the authors’).

FISHERIES IN TAJIKISTAN

The topography of Tajikistan is similar to that of Kyrgyzstan insofar as it is highly mountainous and has a glacial area (8 percent of the land area) that exceeds cropped area (6 percent). Its annual water production (13 000 m³ per caput) is among the highest in the world. The country is well-endowed with lakes (1 300 lakes, covering 705 km² with the biggest being Lake Karakul, accounting for over half this area), reservoirs (9) and rivers (3 000), and provides around 55 percent of the water flowing into the Aral Sea basin. Historically, as in the other Central Asian republics, the emphasis was on agriculture and Tajik waters were directed down to the cotton and rice fields of Kazakhstan, Turkmenistan and Uzbekistan. Despite this proliferation of water

¹⁷ Sarieva *et al.* (2008:20) estimate that catches by poachers undertaking the activity for subsistence purposes are around 50–70 (Lake Son Kul and national reservoirs), 70–80 (Lake Issyk Kul) and 80–90 percent (national rivers) of the total catch in these waterbodies.

¹⁸ Changes to the Criminal and Administrative Codes in this respect have been submitted to the authorities, while the implementation of Presidential Decree No. 7 of 10 January 2008 led to 53 indictments and fines totalling soms100 200 (around US\$3 000) in the first quarter of 2008 compared with 81 indictments and fines summing to soms14 600 (around US\$400) in the whole of 2007 (FAO, 2008c:12).

FIGURE 6
Harvest from
an extensively
used fish pond in
Tajikistan



COURTESY OF A. THORPE

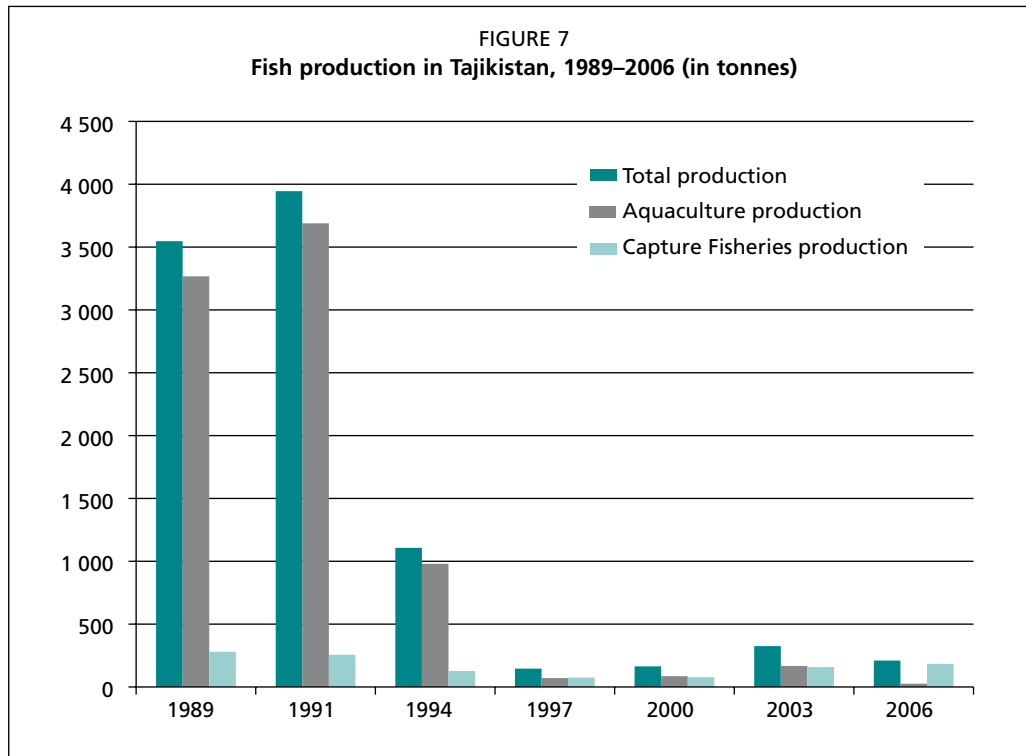
resources, however, there is little information in the public domain on Tajik fisheries. Tajikistan, for example, is one of the few countries for which FAO presently does not have a Fishery Country Profile, while a recent government publication on *Water Management Strategy* (MIWM, 2006) makes only an incidental reference to fisheries.

In Soviet times, fish production largely focused on pond culture. The first fish-breeding farm was established on the Luchobka River in 1936 and Kuybyshev, the first hatchery, was established at Vakhsh in Khatlon oblast in 1951 (Khaitov, 2008:7). Originally covering 72 ha, the farm expanded within the space of 20 years to cover more than 200 ha and to produce 14 million larva for domestic and export purposes. The favourable conditions for pond culture in Tajikistan saw a further ten fish-breeding installations open across the republic and, as fish production drawn from the newly constructed reservoirs in the north, principally at Farkhadskiy, Kayrakkum and Katasey, and in the south at Nurek, expanded too, production reached its zenith in 1991. In that year, pond culture, which contributed 3 298 tonnes or 84 percent of the total fish production, was largely focused on carp (silver and common carp comprised 94 percent of the catch) and smaller quantities of freshwater bream (130 tonnes). Commercial fishing was most in evidence at Kayrakkum, where catches peaked at 192 tonnes in 1993. Although not in evidence at Kayrakkum, fisher brigades (10–15 fishers, 2–5 boats, 10–20 nets) were very much a feature across the rest of the republic at the time, with Khaitov (2008) putting their number as high as 155.

Since 1991, however, there was a swift decline in production (Figure 7). This decline has been attributed to three factors:

- water pollution from industrial enterprises, agrochemical runoff and sewage;¹⁹

¹⁹ Khaitov (2008:36) notes that in 1997 almost 40 m³ of sewage were dumped untreated in the national river system. The most affected rivers were the Kafirnigan River (58 percent of total), the Syr-Darya River (22 percent of total) and the Vakhsh River (8 percent of total).



Source: Authors with data from FAO FishStat+, 2008.

- an increased incidence of illegal poaching; and
- institutional failure, specifically the inability of post-independence institutions to guarantee a regular feed supply, to control fish diseases, and to adequately disinfect and/or maintain production facilities and/or restock effectively, factors in part related to the financial impoverishment of such institutions.

Abduvali (2008) too stresses institutional failure. He attributes the sharp decrease in fisheries output to the deterioration of economic relations with the former USSR (especially Uzbekistan, Kazakhstan and the Russian Federation) – that led to sharp increases in the market price of fish feeds, petroleum, oil and lubricants and a lack of spare parts to repair fish culture equipment and hatcheries – and the civil war that damaged economic and social life in the country. The country's only trout cage-culture facility on the Nurek reservoir was destroyed during the troubles, for example. This decline in output was reflected in sectoral employment: the number of

FIGURE 8
The remains
of one of the largest
Soviet-era hatcheries in
Central Asia, located in
Tajikistan



COURTESY OF R. VAN ANROOY

workers employed dropped from more than 6 000 in the early 1990s to around 1 500 by 2008. Similarly, the number of governmental fisheries staff was reduced from 27 to 9 (Khaitov, 2008 and personal communications with the state enterprise Mohiparvar, September 2008).

By 2006, production had fallen to just 210 tonnes (silver and common carp accounting for 37 percent of the total) and renewed efforts were underway to rejuvenate production in the sector (Figure 7). The limited success of early ventures²⁰ now prompted the government to reformulate its fisheries staff to encourage both private and international investment within the sector. In March 2006, the government announced its investment programme for the period 2006–2008, allocating US\$100 000 to investments within the fisheries sector. In January 2007, the government approved the Fish Culture Law and was presented with the State Fishery Development Programme, 2009–2015, by the state unitary enterprise Mohiparvar of the Ministry of Agriculture. Later the same year, Mohiparvar piloted a new fisheries law through the legislature (October 2007).

These efforts were severely undermined by the extreme winter of 2007–2008, however. The extremely low temperatures not only caused rivers, reservoirs, lakes and ponds to freeze over, but the ice (up to 37 cm deep in places) wiped out a large part of the fish stock used for aquaculture production. A damage assessment report delivered to the Deputy Minister of Agriculture by the state enterprise Mohiparvar in March 2008, for example, suggested that as much as 60 percent of fingerlings were lost: eight farms alone lost 2.8 million fingerlings worth an estimated somoni 1.6 million (US\$470 000).²¹ While Mohiparvar swiftly designed a strategy to prevent bankruptcy and closure across the sector, underpinned by financial and technical support from FAO under a US\$393 000 Emergency Assistance Programme, 2008 output levels are likely to be more than 100 tonnes (FAO, 2008a).

Another clear sign that the Ministry of Agriculture of Tajikistan is aware of the potential of the fisheries sector for improvement of rural livelihoods and food security is also shown by the fact that in November 2008 Tajikistan hosted the regional intergovernmental meeting to initiate the establishment of a Central Asian fisheries organization (Dushanbe, Tajikistan, 10–12 November 2008) (FAO, 2009). In this meeting, Tajikistan, in close collaboration with FAO, brought together fishery sector policy-makers from nine Central Asian and Caucasus countries (as well as China and Turkey).

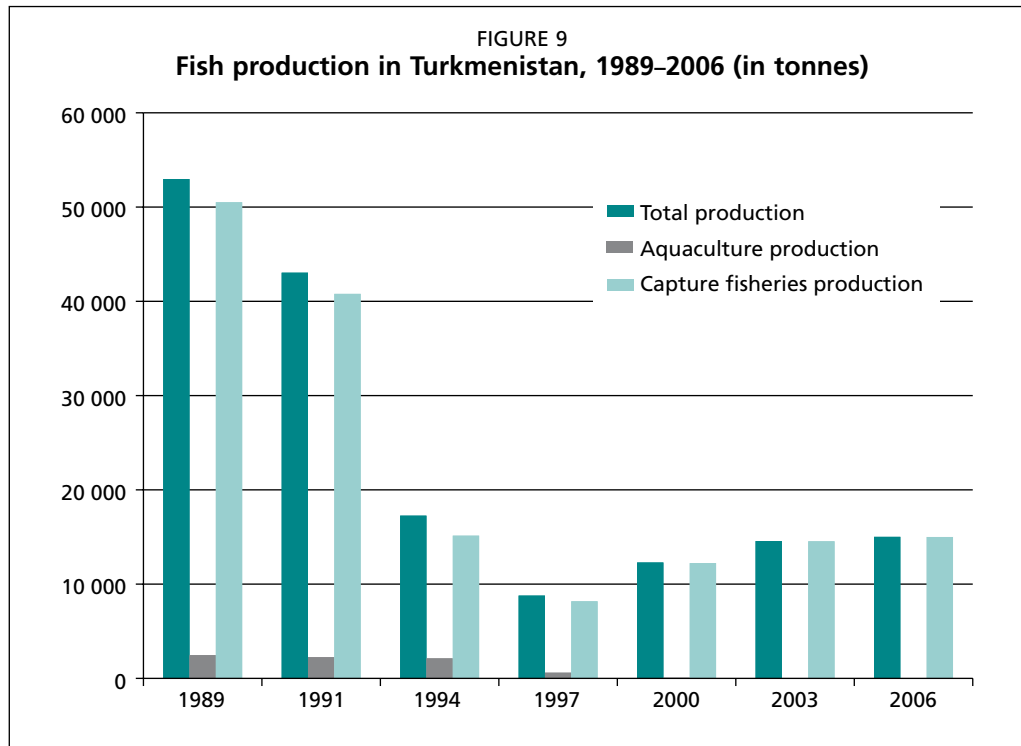
FISHERIES IN TURKMENISTAN

Although Turkmenistan is the fourth largest state of the former USSR by area after the Russian Federation, Kazakhstan and the Ukraine, it possesses one of the largest sand deserts in the world, the Karakum desert, and over 80 percent of the country's land area is bereft of surface runoff. The major water source is the Amu-Darya River (84 percent of total water available), although this river has largely been destined for crop irrigation, more so since the collapse of the Soviet Union²² (Stanchin and Lerman, 2007). Although Turkmenistan features regularly in the literature relating to sturgeon catches in the Caspian Sea, in reality the country is/was entitled to only a small share of the total permissible catch (6.3 percent) due to its short Caspian coastline and its lack of spawning rivers. Entitlement to sturgeon catches may increase following

²⁰ In 2003, the Ministry of Agriculture – without success – solicited funds to farm sturgeon in the Vakhsh valley. The privatization of various state facilities had not brought forth the hoped for private investment and consideration is now being given to increased state involvement in the sector.

²¹ At Forel Ltd, the country's only trout producer, 90 percent of the 2007 cohort perished [along with 60 percent of the 2006 cohort] (personal communication, September 2008).

²² In 1990, 1.33 million ha were irrigated. By 2003, this number had risen almost 40 percent to 1.84 million ha.



Source: Authors with data from FAO FishStat+, 2008.

the recent approval of two sturgeon-breeding projects (Shadrina, 2007; The New Anatolian, 2 October 2006) but production from the breeding projects is unlikely to make any substantive contribution to landing volumes. Historically, catches of Black Sea and Caspian Sea sprat made by the large Soviet fishing cooperatives dominated, with smaller contributions from the commercial fisheries of Lake Sarykamysh, Kahauskhan and Kopetdag reservoirs, and the Murgab basin (Durdyev *et al.*, 2007). However, while the preponderance of sprats in the catch has risen (to 98 percent by 2005), absolute Turkmen annual landings have fallen by over 70 percent to just 15 016 tonnes (Figure 9).²³

Although the sprat biomass, and hence landings, in the Caspian Sea has been significantly affected by ecological factors in the post-Soviet-era,²⁴ the United Nations Development Programme (UNDP) attributes the decline of Turkmen fisheries to the closure of the former Soviet fishing cooperatives (UNDP, 2005a:13). Although this institutional void was partly filled by new fishing companies, the number of workers employed is smaller (100 as compared with 300), and access to fishing equipment, finance, storage facilities and sales channels is sharply constrained. As in the other Central Asian economies, the current management structure is unable to prevent increased levels of poaching. UNDP attributes this to the current high cost of fishing permits (in relation to average catch values) so “as a result, the FIS [Fishery Inspection Service] misses out on a significant amount of revenue to support its management efforts and [this] leads to their insufficient enforcement capacity” (UNDP, 2005a:14). Poaching of the endangered beluga sturgeon is particularly endemic (IWPR, 2004), with Shadrina (2007:68) noting that poached sturgeon is “almost the sole source of subsistence for the local population”.

²³ Aquaculture has never been a significant sector in Turkmenistan. At present, the only active fish hatchery facility in the country is the production association Biotilsimat (formerly Biomelioratsiya), which provides fingerlings and fry to the state for restocking activities and to a couple of private small-scale fish farmers.

²⁴ Sievers (2002:375) attributes the reduction of sprat biomass to the growing preponderance of comb jellyfish (which devastate the plankton upon which the sprats feed) in the Caspian Sea, and a 2001 oil-spill, which killed up to 40 percent of the sprats in the sea.

FIGURE 10
Fish retailers with
love for their
product at one of the
markets in Ashgabat,
Turkmenistan



COURTESY OF R. VAN ANROOY

Aquaculture and inland (excluding the Caspian Sea) capture fisheries production is insignificant at present. Inland catches, mostly destined for household (subsistence) consumption, are estimated at around 500 tonnes annually, but official statistics are lacking (FAO, 2008e:5). Currently, neither inland capture fisheries nor aquaculture is considered to be a priority by the government.

FISHERIES IN UZBEKISTAN

Fisheries in Uzbekistan are concentrated primarily in two river basins, the Amu-Darya and the Syr-Darya (including the Aydar-Arnasay lake system), both of which enter the Aral Sea and whose catchment areas constitute a major part of the Aral Sea catchment. The crisis of the Aral Sea, whose surface area fell 70 percent from 67 499 km² in 1960 to just 17 382 km² in 2006 (the volume decreased by 90 percent and salinity rose ten-fold), was occasioned by the excessive abstraction of water, with a consequent deleterious impact upon fish stocks (Micklin, 2007). Uzbekistan, which accounts for more than 50 percent of the total irrigated area in Central Asia (4.3 million ha), was a major culprit (Umarov, 2003) and, even today, agricultural interests determine river-flow management regimes with “the interest of fisheries having little say” (Kamilov *et al.*, 2004). Pavlovskaya (1995) suggests that the failure to give consideration to the fisheries sector causes around 90 percent of juvenile fish to swim down the irrigation network and to “perish on irrigated fields”.

The decline in the surface area of the Aral Sea presaged the evolution of fisheries in Uzbekistan. Until 1960, Uzbek fisheries were centred on the Aral Sea. Catches largely of common carp, bream, barbel, roach and shemaya peaked at 50 000 tonnes in 1958. As water abstraction increased and the salinity of the Aral Sea rose, the sea shrank, catches declined and the fishing fleets were physically relocated to Lake Sarykamysh



FIGURE 11
Fish sales at Chinaz
wholesale market in
Uzbekistan

COURTESY OF R. VAN ANROOY

and the Aydar-Arnasay lake system in the 1970s.²⁵ Fishing in the Aral Sea ceased in 1983 (although it continued in the deltaic lakes surrounding the Area Sea) and the region was declared a zone of ecological crisis by the United Nations in 1991 (Wecker *et al.*, 2007:6). In livelihood terms, the diminution of the Aral Sea was catastrophic (Karimov *et al.*, 2005:87–90).

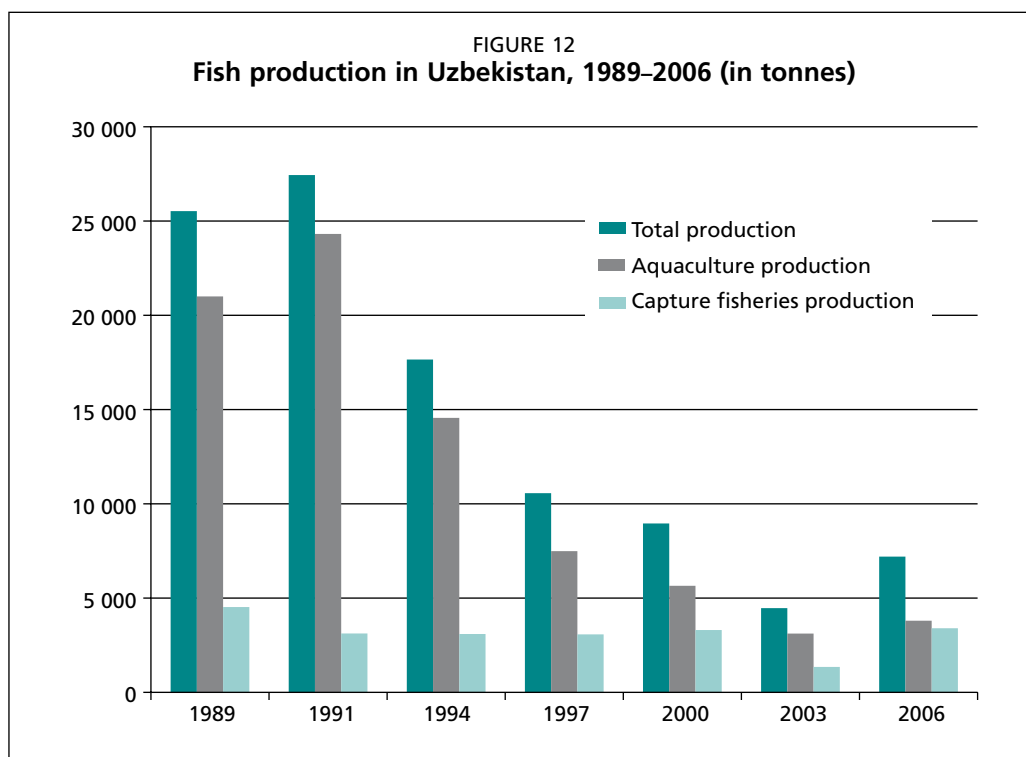
Attention was, therefore, directed towards building up the aquaculture sector. In the 1960s–1970s, the government had established a large-scale programme of pond culture covering some 20 000 ha (Karimov *et al.*, 2009). Twenty new fish farms were created (owned and financed by the state and run under the direction of the Soviet Ministry of Fisheries), state fishing companies were established at all large reservoirs and lakes, new technologies were introduced, research centres were set up and specialist training was provided. Up to 15 million fingerlings of carp were released annually into the country's lakes and reservoirs by the fish farms (Wecker *et al.*, 2007:14). At the time of independence, annual pond aquaculture output increased to 20 000–25 000 tonnes (Karimov *et al.*, 2009), providing the bulk of the country's catch, with silver and common carp accounting for 82 percent of the total (Figure 12). Output was largely destined for the domestic market.

The scenario worsened following independence, however. State fish farms were privatized and financial support withdrawn. Problems facing the sector were exacerbated as the curtailment of links with fishing input firms in the former USSR led to a gradual deterioration in equipment and shortages of formulated fish feed, and large-scale fishing in Charvak, Chimkurgan and other reservoirs virtually ceased (Kamilov, 2003:122; Umarov, 2003:136; Kamilov *et al.*, 2004; Karimov *et al.*, 2009). In 2003, the state ceased the funding of fish restocking activities, and since then there has been no state restocking programme in the republic. In the same year, production, in the absence of a national fisheries programme and a lack of international sectoral support, bottomed out at barely 4 500 tonnes of fish, some 17 percent of its pre-independence level.

This largely coincided with the final phase of the privatization programme,²⁶ which saw the liquidation of Uzbalyk and the complete privatization of all fish capture/

²⁵ In 1964, landings from the Aydar-Arnasay lake system were just 26 tonnes but increased to more than 500 tonnes at the start of the 1970s. Catches peaked at 4 200 tonnes in 1988 (Kamilov, 2003).

²⁶ In the first phase (Decree No. 427 of 1994), all fisheries-linked enterprises and organizations were consolidated within the state corporation Uzrbya. In the second phase (Decree No. 289 of 2001), Uzrbya converted into the slimmed-down joint-stock company Uzbalyk: 25 percent of the shares were owned by the state, 10 percent of the shares were owned by workers and the remainder of the shares were issued for general sale (Karimov *et al.*, 2009:18ff.).



Source: Authors with data from FAO FishStat+, 2008.

culture facilities. One unintended consequence of the programme saw the new owners of the Chinaz feed factory choose to focus their production activities outside the fisheries sector thus precipitating a shortage of fish feed, while a number of fishery extension enterprises that failed to attract bidders/investors were closed (Karimov *et al.*, 2009). Managerial responsibility for the sector was entrusted to the Ministry of Agriculture and Water Resources in 2003. Decree No. 350 of 2003 leased out natural waterbodies on ten-year leases. One beneficiary was the enterprise Akva Tudakul, leasing out Tudakul reservoir for a culture-based fisheries programme that has seen output rise from 150–170 tonnes to more than 1 000 tonnes in the span of four years (Karimov *et al.*, 2009:28).

Since the 2003 nadir, fish production has partially recovered to 7 200 tonnes in 2006. Furthermore, with (i) the government successfully requesting FAO support in identifying effective livelihood-supporting policy interventions in the aquaculture and inland fisheries sector and supporting development of the sector generally, and (ii) an influx of new private investors, such as Asia Agro Alliance, Tashinvest, NT Fish Farm (Tashkent) and Akva Tudakul, there is every chance the country could ultimately produce up to 26 000 tonnes or more of fish annually from its 10 237 ha of pond fish farms (Karimov *et al.*, 2009). Nevertheless, the same source also cautions that following privatization, employment opportunities in the pond-farm industry halved and conditions for fishers have grown difficult as “no measures have been taken to improve the living standards and health of the fishermen and their families”, a task recognized explicitly by the *Aquaculture and Capture Fisheries Development Policy and Strategy of Uzbekistan, 2008–2016*.²⁷

²⁷ Development Objective 2, the social goal, commits to alleviating poverty and assuring food security, increasing employment and generating higher incomes in rural areas while contributing to the health and nutrition of all Uzbeks.



FIGURE 13
Soviet-era incubators
at the largest fish
hatchery
in Uzbekistan

COMMONALITIES AMONG FISHERIES OF THE CENTRAL ASIAN REGION

Output peaked during the Soviet-era, and declined quite precipitously thereafter. These declines were accompanied by increased poaching as institutional structures fragmented and enforcement capabilities shrunk. Supply-chain dislocation saw the newly independent republics unable to access feed, equipment or knowledge (fieldwork disclosed that no practitioners in the field, including academics, state officials or producers, had been able to attend external training courses in contemporary production techniques since 1990) or find a replacement market of significance for their fish products.

Latent problems deriving from the Soviet-era also took on a greater significance in the post-independence period too. Introduced alien predatory species contributed to the decimation of indigenous stocks as was the case of Lake Issyk Kul in Kyrgyzstan and Lake Balkhash in Kazakhstan. Increased salinity and pollution, whether from agricultural runoff (most notably from cotton plantings) or inadequate waste water treatment in Tajikistan, or from oil and heavy chemical spillages in Kazakhstan, had detrimental consequences for the aquatic ecosystem. Moreover, fisheries ranked below irrigation and hydropower generation when setting the policy agenda in each of the republics and, with regard to reservoir waterbodies in Kazakhstan, the sector ranked fifth.

REACTIVATION OF THE FISHERIES SECTOR

Somewhat belatedly, attention is now being focused upon the reactivation of the fisheries sector with the emphasis very much on aquaculture as it is unlikely even in the Caspian Sea that capture fishery could ever again assume the same importance as in yesteryear. Led by private entrepreneurs, and with the active prompting of national fisheries departments and foreign donors, fisheries are being slowly restored to the developmental agenda. *This is no easy task*, given both the general failure to recognize the role the sector can play in national development and poverty alleviation strategies (see Chapter 2, *Poverty, well-being and poverty reduction strategy papers [PRSPs] in the Central Asian republics*) and the continued lack of legislative clarity, although the latter is gradually being rectified in a number of the countries. *However, it is opportune*, given the current surge in basic food commodity prices, a surge that helped tip 75 million more people into the ranks of the hungry in 2007 (Reuters, 17 September 2008a), and given the preoccupation that this may translate into growing food insecurity across the developing world.

Equally, fears have also been expressed that: “... *[fishers themselves]...were left out of the decision-making process, resulting in a loss of livelihoods for them and their families*” (the case of the Aral Sea fishers in Kazakhstan, FAO, 2008e:16); “...*no measures have been taken to improve the living standards and health of the [Uzbek] fishermen and their families*” (Karimov *et al.*, 2009); and that “*socio-economic considerations (for example, livelihood diversification for the local population) should be a governmental priority*” (World Bank, 2004:67). As a consequence, the next chapter of this technical paper examines how three diverse yet characteristic instances of regional “fisher livelihoods” have/are being affected in the post-Soviet-era. The final section builds upon this analysis and identifies the pre-requisites for new livelihood-supporting policy interventions in the inland fisheries of Central Asia.

4. Fisher livelihoods and well-being in Central Asia

The livelihoods approach derives from the recognition that households which coexist in close geographic proximity are not all equally exposed to poverty or are vulnerable to crises such as droughts, floods, plague and pestilence). Rather, faced with deprivation and environmental uncertainties, households develop idiosyncratic, often highly sophisticated, coping mechanisms designed to reduce their exposure to both poverty and uncertainty. Bebbington (1999:2028), for example, notes that the more viable rural livelihoods tend to be those livelihoods whereby a household (or members thereof) sustains or increases its access to different resources (credit, land, skills) and different opportunities (namely, accessing new labour and product markets), enhances the way in which said assets or opportunities are exploited (e.g. by hiring out draught animals or fishing gear), and/or engages with conducive livelihood-supporting institutions (these can encompass kin, ethnic networks, social organizations, state and non-government entities, market actors). By extension, sustainable livelihoods then are those that can “cope with and recover from stresses and shocks and maintain or enhance their capabilities and assets both now and in the future, while not undermining the natural resource base” (DFID, 1999). As such, the approach employed is holistic, extending beyond narrow disciplinary boundaries to provide a broad analytic framework that encompasses the social, economic, institutional and environmental domains (Box 2).

Central to the approach is the notion that “the crucial determinants of household’s ability to achieve increased wellbeing are their access to capital assets” (Radoki, 1999:322)²⁸, assets which form the household’s “livelihoods platform”. These assets in turn can be decomposed into capitals, namely:

- *natural capital*: the natural resource stocks, from which income and/or consumption opportunities are derived. In the case of Central Asian fisheries, the authors refer not only to the natural aquatic biomass of the lakes, reservoirs and rivers of the five republics, but also to the culture fisheries practiced in ponds, which over time had grown in importance;
- *human capital*: the skills and knowledge (not just acquired through formal education processes and training opportunities, but also acquired informally through social contacts) allied to the physical ability to labour productively;
- *financial capital*: the financial resources, including cash and credit opportunities, available to the household. An important component of financial capital in the Central Asian context is the inflow of remittances from expatriate workers that may account for as much as 21–50 percent of GDP in Tajikistan (footnote 8);
- *physical capital*: refers to the basic infrastructure and producers’ goods needed to support livelihoods. This may be publicly provided, as was invariably the case in the Soviet-era, or generated privately. The most obvious example in the Central Asian fisheries case are the fishing vessels themselves, but physical capital also

²⁸ Well-being is defined as “a state of being with others, where human needs are met, where one can act meaningfully to pursue one’s goals, and where one enjoys a satisfactory quality of life” (WED, 2008) and adherents focus on the extent to which well-being is attained and on the social conditions that either enable or frustrate this goal. While there are strong similarities between the two approaches, this paper chooses to work within the livelihoods framework due to the wider availability of literature examining fisher livelihoods as opposed to fisher well-being.

BOX 2

Livelihood analysis of the social, economic, institutional and environmental domains

Livelihood analysis investigates (with a view to understanding) the:

Social perspective

- important differences in access and power between social groups
- the values attributed to different livelihood assets and outcomes
- local social organization and its effect upon livelihoods
[so as to promote needs of/participation by the poorest and most vulnerable groups]

Economic perspective

- the economic environment in which people operate (e.g. incentives, local effects of economic policy, production and consumption decisions, household budgets)
- economic factors behind organizational and institutional behaviour

Institutional perspective

- the institutional context of livelihoods
- quality of governance systems
- the nature of the policy-making processes and the local impact of policy

Environmental perspective

- effect of livelihood strategies on the environment (degradation, pollution)
- impact of environmental factors on livelihoods and poverty

Source: DFID, 2000.

extends to the nets and gears deployed, the provision of water and electricity to aid post-harvest processing, and the presence of good roads and means of transportation to facilitate marketing; and

- *social capital*: the “social resources” households are able to call upon in pursuit of livelihood objectives. These resources range from kinship networks and informal connections, to membership in more formal organizations. It is this form of capital that Paldam and Svendsen (2001) categorize as weak in the Soviet schema of things.

Livelihood platforms will vary from household to household, community to community and country to country and access to these platforms is modified by social relations, institutions and organizations and is influenced by temporal trends, policy changes and shocks (Table 5). In the case of Kyrgyzstan, for example, post-independence rural livelihoods were profoundly affected by the land redistribution process (= natural capital). However, kinship factors led to claims by extended families on adjacent plots and this resulted in the emergence (= access modified or determined by social relations) of a variety of “clan-based reciprocal institutions” (cooperative alliances), despite such groupings being severely prejudiced by the Kyrgyz government policy of levying VAT on agricultural producers with a turnover of more than soms300 000 (around US\$8 800) (= macropolicy). While such livelihood strategies have ensured subsistence, Sabates-Wheeler (2007:1444) suggests that a lack of natural and physical capitals (and depletion of those few assets possessed), allied to a dearth of financial capital, has succeeded in locking such households into subsistence farming strategies and policy-makers need to

TABLE 5
The livelihoods approach framework

Livelihood platform	Access modified by:	In the context of:	Resulting in:
Assets	<i>I. Social relations</i>	<i>I. Demographic and technological change</i>	
Natural capital	Gender	Population growth	
Physical capital	Class	Migrational trends	
Human capital	Age	Technological change	
Financial capital	Ethnicity		
Social capital			
	<i>II. Institutions</i>	<i>II. Policy changes</i>	<i>Livelihood strategies</i>
	Rules and customs	Global protocols and conventions	
	Land tenure	Macropolicy	
	Markets	Micropolicy	
	<i>III. Organizations</i>	<i>III. Shocks</i>	
	State government	Storms	
	Local administration	Recruitment failures	
	NGOs	Diseases	
	Community associations	Civil wars	

Source: Thorpe *et al.*, 2007:5.

seek out new opportunities for effective livelihood-supporting strategies so as to allow households to break out of this subsistence cycle.

There is a burgeoning literature that has applied the above livelihoods framework within the fisheries context. The Sustainable Fisheries Livelihoods Programme, 1999–2006, was instrumental in applying livelihood techniques to better understand the nature of small-scale fishery systems and, as a consequence, how to better target development interventions and community-level poverty strategies across 25 West African countries (Thorpe *et al.*, 2007:5). Neiland and Béné's edited volume (2004) asked how livelihoods analysis could be modified, and then applied, in helping devise optimal poverty-reducing interventions across the same region. Smith *et al.* (2005) examine how inland fisheries make an important but often neglected contribution to livelihoods in the developing world, although no specific reference is made to the Central Asian context. The seminal article of Allison and Ellis (2001) on the theme is unequivocal in asserting that conventional fishery management can result in the introduction of inappropriate and/or unnecessary policies if the lessons of livelihood analysis are ignored. Further, they caution that community management is not “a panacea” when “the resource is not strongly defined territorially and where it fluctuates in volumes according to ... the effects of human activity” (page 386). Such an observation is particularly apposite in the Central Asian context, not merely because of the lack of clarity regarding access to or ownership of many waterbodies, but also because (as has been noted in Chapter 3) the interests of the fisheries sector have historically been subordinate to the dictates of the agriculture (irrigation) and power (hydroelectric generation) sectors across the region.

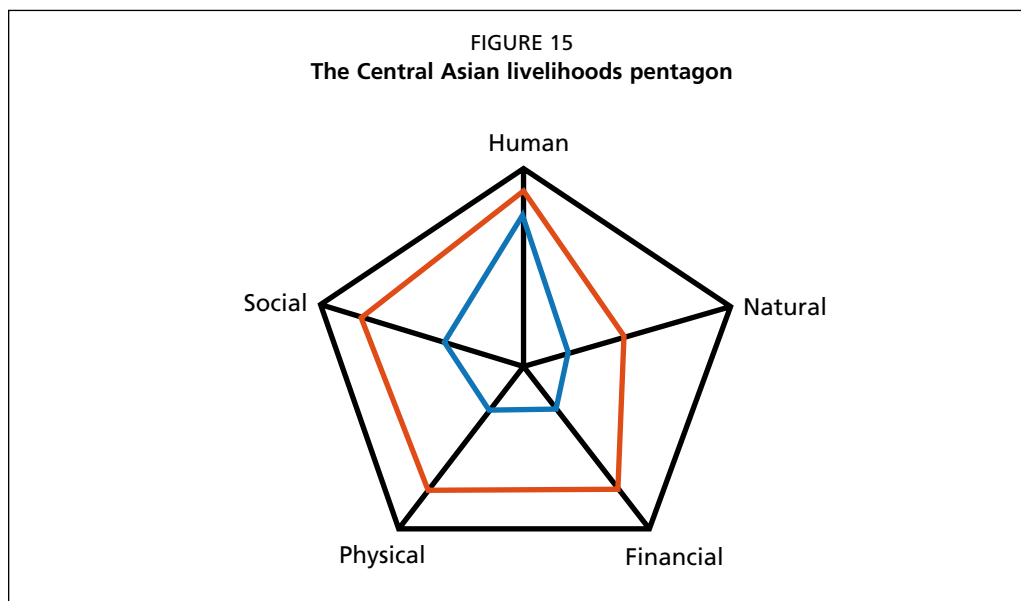
Research into the livelihoods of Asian fishers and farmer-fishers in order to assess how small-scale aquacultural development might be undertaken so as to contribute to poverty reduction through livelihood enhancement has been the focus of work by Friend and Funge-Smith (2002) and the Asian Development Bank (2004). Muir (2005) similarly examines how livelihood strategies employed by Asiatic floodplain and deltaic dwellers integrate pond aquaculture into small-scale farming systems, supplementing culture production with the capture of fish from rivers, irrigation and drainage canals, lakes and reservoirs. The Stream Initiative has also been proactive in developing training manuals to support livelihoods research and in undertaking local and regional reviews of livelihoods opportunities in the Asia-Pacific region (Gonzales *et al.*, 2008; STREAM, n/d).

Somewhat surprisingly, however, there is a dearth of livelihoods studies across the ex-Soviet republics of Central Asia. FAO, through the Livelihoods Support Programme, intended to apply livelihoods analysis to forestry-poverty linkages in the West and Central Asian region as part of a wider investigation to ascertain the trends and driving forces that would shape developments in the regional forestry sector over the following two decades. However, the “sparse literature available” resulted in the Central Asian part of the study being anchored solely on Kyrgyzstan, where an earlier research output on Collaborative Forest Management was available (Fisher *et al.*, 2004). Acknowledging that the transition to a market economy had resulted in increased pressure on forest resources, the research pinpointed problems relating to forest access and the absence of alternative income/subsistence generating activities as causal factors prompting forest degradation (Shimizu and Trudel, 2006:56ff.). Jones and Laverack (2003) comment upon the initial experiences of the 2002–2006 project to construct sustainable livelihoods for livestock-producing communities in upland Kyrgyzstan. This project was funded by the United Kingdom Department for International Development (DFID). Recognizing the complexity and importance of community capacity to the success of such projects, they propose a “domains approach”, identifying seven areas or domains in which activities can and need to be focused so as to strengthen community capacity. Shigaeva *et al.* (2007) also focus on Kyrgyzstan, employing a participatory wealth ranking to differentiate between household types on the northern slopes of the Sokuluk River basin. They express concern that households drawn from the two wealthier livelihood categories, for whom agriculture forms the main income source, are both expanding their herds and making increased use of remote rainfed pastures, pastures from which the poor are precluded

FIGURE 14
**Nurek reservoir in
Tajikistan where
aquaculture
development is being
planned**



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Source: DFID.

due to their lack of physical capital such as tents and lorries. This increased usage of pastures could unleash “a new danger of unsustainable overexploitation by investors without any emotional relationship to the area” (pages 404/405). While Ivaschenko and Mete (2008) employ an assets-based approach to interpreting poverty in Tajikistan, their study is based on a panel data survey rather than an analysis of livelihoods at the local and community level. Outside Kyrgyzstan, to the best of the knowledge of the authors of this paper, there has been no substantive research applying livelihoods analysis and certainly none on fisheries in the region.

As a consequence, this paper makes an exploratory foray into the livelihoods of households that fish either for subsistence or for income-generating purposes in the Central Asian region. This is certainly opportune. Table 4 shows how fish production (natural capital²⁹) declined across the region and the collapse of the command economy also had implications for the other “capitals” highlighted by livelihood analysts. One way of depicting such change is through recourse to the livelihoods pentagon developed by DFID in the late 1990s.

The pentagon symbolically represents the capital assets of the community or household,³⁰ whether it relates to the community fishers of Kyrgyzstan or the fisher brigades of the Aral or Caspian Seas.

While clearly, the pre-independence pentagon (shown in red) lies inside the “ideal” for the majority of the republics:

- Catches (*natural capital*) had declined since the heydays of the 1950s (Uzbekistan), 1960s (Kyrgyzstan) or 1970s (Kazakhstan).
- Infrastructure (*physical capital*), best exemplified by the fishing vessels stranded as the Aral Sea receded, had deteriorated.
- Levels of *social capital* were low (Paldam and Svendsen, 2001).

the era of independence saw a substantive shrinkage in the livelihoods pentagon (shown in blue) for households that fish in the region:

²⁹ Ideally, the authors would depict stock levels, as opposed to catch levels, on the natural capital axis, but because stock data is unavailable, they use catch data instead. While the authors recognize that high catch levels are likely to lead to stock depletion in the longer term, as their objective is simply to show schematically the natural capital contribution to livelihoods at a point in time and not show the sustainability of such a livelihood, the use of such a proxy is warranted in this particular instance.

³⁰ An equidistant “ideal” pentagon is used by livelihood analysts to suggest the “harmonious” interaction of the different five capitals in assuring livelihoods (Failler and Kane, 2004:129).

- Recorded catches (*natural capital*) fell by between 60 percent in Kazakhstan and 98 percent in Kyrgyzstan over the period 1989–2006.
- While formal education levels remained high, the sector suffered as specialist training for those employed in technical institutes and fisheries departments effectively ceased, preventing the sector from accessing information on the development of aquacultural techniques, for example (Mahmadullaev, 2007:5). In addition, Waltham and Sholji (2001) note that contaminated soil and water have led to a major health problem around the Aral Sea: two-thirds of the population suffer from ill-health, hepatitis is rampant in Khiva, anaemia and birth deformities are prevalent in Moynak and there is an epidemic of tuberculosis in Aralsk (*human capital*).
- Infrastructure (*physical capital*) continued to deteriorate. Hatcheries fell into disrepair due to an inability to purchase spare parts, civil war (in Tajikistan) and the unavailability of commercial fish feeds (this feeding through to affect natural capital levels), and there was little replacement of ageing vessels or gear.
- Financial support (*financial capital*) for the sector effectively ceased post-independence in the majority of the republics (see Karimov *et al.*, 2009, with regard to Uzbekistan, for example), compounding the problem of sourcing needed inputs.
- *Social capital* was further eroded, factory-based networks ceased to function as workplaces closed and social networks and cooperation mechanisms disintegrated (Kuehnast and Dudwick, 2004).

The task then is to devise effective livelihood-supporting policy interventions to counter this shrinkage. For this reason, the remainder of this chapter focuses upon three particular case studies³¹ drawn from across the region. First, the authors examine the livelihood changes wrought by independence and contemporary water management policies upon the fisher brigades of the North (Little) Aral Sea in Kazakhstan. Second, they consider how an independent non-state organization (the Hunter and Fishers' Association of Kyrgyzstan) has sought – and fought – to offer both members and non-members access to waterbodies and the fish stocks therein for subsistence-enhancing purposes. Finally, they review the constraints facing dekhkan cooperatives in Tajikistan *vis-à-vis* the development of pond-culture activities so as to underpin livelihoods. These three varied examples offer insights into how policy interventions might be structured to better support fishers across the region (Chapter 5).

THE “FISHER BRIGADES” OF THE NORTH (LITTLE) ARAL SEA³²

By independence, livelihoods of those people residing in the 19 fishing communities bordering the North Aral Sea (NAS) were already extremely precarious. This was in sharp contrast to the vibrant nature of the local economy during World War II, when the Aral Sea had provided copious quantities of fish (an estimated 50 000 tonnes) to the Red Army, and in the late 1950s when the state fishery enterprise Aralrybprom alone was processing more than 20 000 tonnes of sturgeon, carp, bream, roach and pike-perch annually. An estimated 3 000 people were employed in the NAS fishery, and the Aralsk shipyard regularly launched cargo and fishing vessels of between 50 tonnes and

³¹ While these three examples are location specific, each of the countries has similar groupings. There is a republican hunting and fishing association in Kazakhstan, fishing brigades are active in Tajikistan, and the ADB (2000:3) notes that there are 404 000 dekhkan farms in Uzbekistan and so the policy suggestions arising from these individual case studies may well be applicable across the region.

³² The authors are indebted to Messrs Prikeev, Batimova and Makhambetova (the NGO Aral Tenizi), Christensen and Bjerre (the Danish NGO Levende Hav) and the various fishers, fish processors, academic and institutional staff they met and interviewed during their time in Almaty and on the NAS for the information that follows. The authors alone are responsible for any errors herein.

500 tonnes (DSLS, 2004:5ff.).³³ The demise of the Aral Sea and its fisheries can be traced back to the Soviet decision to collectivize agriculture, assigning the steppes of Central Asia the task of delivering cotton self-sufficiency. The construction of the Karakum canal³⁴ in 1954 was the most visible expression of this policy and, by 1988, more than 700 000 km of irrigation canals (compared with just 40 000 km in 1960) were extracting water from the Amu-Darya and Syr-Darya Rivers, the sole tributaries feeding the Aral Sea. In 1960, the two rivers were emptying annually 55 km² of water into the sea and by 1982, the inflow to the sea had dropped to zero (Whish-Wilson, 2002:29).

Detrimental consequences of the “irrigation-first” policy

The “irrigation-first” policy had two disastrous consequences for the local fishing communities. First, it led to a swift and dramatic reduction in the size of the Aral Sea. The sea shrank 70 percent in area and, with the water level dropping 23 m, in 1987 the sea split into two distinct entities, the NAS and the South (Large) Aral Sea (SAS), the latter wholly located in Uzbekistan, linked by the Bering Strait. Crop losses due to shallow water tables and/or increased soil salinity in the basin have been estimated at US\$1 754 million per annum (GEF, 2002:111), fishing communities became stranded as the waters receded, and deltaic wetlands dried up. The seaport of Aralsk found itself almost 100 km from the sea, the local shipbuilding industry collapsed, and the “sovhov” (large-scale collective farm) Aralrybprom had to source fish from as far away as the Baltic Sea, Murmansk and even Vladivostok for processing before re-exporting to consumers in mainland Russia (Reuters, 24 June 2008b). Zhalangash became internationally (if unwelcomely) renowned as the “ships graveyard” as pictures of marooned ships were wired around the world. Even at Tastubek, where the waters retreated only a kilometre or so, marketing a catch now required an 80 km road trip to Aralsk rather than simply offloading the catch at the docks in Aralsk before returning home. Second, the Aral Sea became increasingly saline and partly toxic (Karimov et al. [2005:96–97] provide details on concentrations of lindane, DDT and other agricultural pesticides encountered in fish landed at a number of Aral Sea ports over the period 1989–2002) due to irrigation runoff. Micklin (2007:53) reports salinities of more than 100 g/litre in 2006 in the SAS. He reports 12 g/litre in the NAS, down from the 34–37 g/litre reported by Petr et al. (2004:207) in 1992. These salinities proved lethal to indigenous Aral fish species. Thus, not only could many Aral fishers not access the sea but those fishers who could found few (if any) fish to catch. Fishing on the sea effectively ceased in 1983.

The government response was forced relocation, with many fishers moving to the Balkhash, Kapchagay, Alakol and Zaysan Lakes (over 1 000 km to the east) or converting to farm work on the state collectives along the Syr-Darya River, and 17 settlements were abandoned completely (DSLS, 1998:7). Even attempts to restock the sea with saline species in 1979 appeared to founder and those Aral fishers who remained were largely reduced to surviving upon state handouts and petty commodity trading during the late 1980s. The situation deteriorated yet further following independence as, with Aralrybprom unable to source fish from abroad or to export fish, the few remaining Aral fisher brigades were directed to Lake Balkhash and the Syr-Darya River delta to harvest fish for processing at the plant. This proved to be only a temporary palliative, and in 1997, the enterprise was privatized. However, the new private owners (Alem Zholdyzy) proved incapable of arresting the decline and, within the space of three years, the enterprise was bankrupt, leaving many fisher brigades and employees in Aralsk, Bugun, Katareren, Amanotkel and Akespe out-of-pocket

³³ Fergus (1999:40) suggests that the whole Aral Sea fishery and related industries employed over 60 000 workers locally at its peak.

³⁴ The Karakum canal extends 1 370 km into the Turkmenistan desert and demands an (excessive) 12.9 km² of water (almost 25 percent of the annual 1960 flow into the Sea) to irrigate just 9 000 km² of cotton.

FIGURE 16
**Fingerling culture ponds near
 Almaty for restocking in various
 lakes and reservoirs in Kazakhstan**



COURTESY OF R. VAN ANROOY

as debts for fish received or wages due remained unpaid. In response, these creditors rifled the assets of the enterprise to offset the debts owing, further undermining future (fishing) livelihood possibilities. While the “kolkhofs” (collective farms) of Djambul (Zalangash) and Raim were less afflicted by managerial problems in the decade after independence, the collapse of the local fishing resource also had a material effect upon their well-being (DSLS, 2004:18).

Factors in support of the Aral fisher brigades

Nevertheless, while (centralized) institutions failed, local community structures, specifically the brigade system, survived. Fisher brigades, normally comprised of between three and ten fishers drawn from the same village and under the direction of a brigadier, had historically contracted out their labour (and vessels and gear in a number of instances) to the local sovhov and kolkhofs. However, with the collapse of the Aral fishery and Aralrybprom, the likelihood of the brigade system surviving in the long term was also bleak.

Rather fortuitously, two factors came to the aid of the Aral brigades. First, the 1979 insertion of alien species into the Aral Sea finally bore fruit. Studies suggested that the flounder had not only acclimatized to its new saline climate, but also prospered. The NGO the Danish Society for a Living Sea (DSLS) (2000:3) estimated that sustainable catch levels of the species could be as much as 1 500–3 000 tonnes, with the majority of the flounder (75 percent) located along the western parts of the NAS (Tastubek-Akesbe), where the brigades were also based. *Unfortunately, the novel nature of the species meant that local brigades had neither the equipment nor the knowledge to target the stock.* Second, *this shortcoming was resolved with the support of DSLS and Danish aid funds.* Following an initial site visit in 1994, the DSLS subsequently trained

BOX 3

The local NGO Aral Tenizi

Aral Tenizi was founded in December 1998 with the brief to work towards the restoration of the NAS as a freshwater lake and to support NAS fishers and their families. Its original members were drawn from participants (fishers and other local volunteers) in the 1996 trial fishery that established the commercial potential of the flounder. The first general assembly was held in September 1999 and saw Askerbek Karatupov, a former Director of Aralrybprom (Bugun branch), elected chair of a seven-person board (the majority were fishers) by the 500 fishers present. Subsequent meetings have been well attended, although membership had dropped to 296 by September 2007.

An office of Aral Tenizi was opened in Aralsk in 1999 and, in conjunction with the DSLS, it has taken charge of distributing donated nets and other fishing equipment and microcredits among the local fishing communities. Information on brigade catches and prices received, and NAS fishing activity is collated at the office. At the local level, 14 volunteer centres have been established and these centres provide a means of communicating details about the NAS fishery, ongoing projects and initiatives, and general information of interest. Aral Tenizi is also active in training fishers in teamwork and management and issues a community newspaper named *Seashore Light*, advises on fishery issues relating to the SYNAS I and II projects, which educate children of fisher families, sponsor environmental campaigns and raise environmental awareness, and organizes an Annual Celebration of the Fisherman Day in July.

More recently, the NGO has established its own fish processing company LLP Kambal-Balyk, has plans to open the first internet café in Aralsk, a city of 39 000 people, and is an integral participant in the 2008 US\$1.9 million Japanese Social Development Fund project to develop sustainable livelihoods around the NAS through improved management of the resources base.

Source: DSLS, 2004, and www.aralsea.net/en/index.htm.

Kazakh counterparts in catching techniques and provided vessels and 1 000 nets to help resuscitate the fishery.

It quickly became apparent, however, that post-harvest and organizational support in the wake of central institutional collapse was also imperative if local livelihoods were to be maintained and improved, and this heralded the start of a decade-long DSLS support programme. In 1997, DSLS helped set up 22 small independent cooperatives. In 1998, it was instrumental in the formation of the local NGO Aral Tenizi (see Box 3). In 2000, DSLS oversaw the delivery of freezing containers and helped set up four fish-receiving stations at Tastubek, Akbastay, Bugun and Karataren to resolve supply-chain problems and thereby promote cooperative independence (DSLS, 2000). More recently, DSLS aided Aral Tenizi in setting up the fish processing factory LLP Kambal-Balyk in Aralsk.

They have been helped in these endeavours by the US\$85.79 million SYNAS I (Syr-Darya Control and Northern Aral Sea) project (World Bank, 2001). Supplanting a 1994 local community project, which dammed the Bering Strait, ensuring Syr-Darya River waters only raised water levels in the NAS, but which succumbed to wave erosion in 1999, the World Bank funds aided the construction of the permanent 13 km Kok-Aral dyke. Water levels rose 3 m, the NAS expanded by 500 km² (up almost 30 percent), and its waters are now “only” 25 km from Aralsk (Kazinform, 2 April 2008; Reuters,

TABLE 6
Number and location of brigades on the North Aral Sea (NAS)

Akamotkel	9	Aralsk	14	Karashalan	1	Raim	1
Akbasty	6	Bugun	10	Karateren	10	Shomsishkol	1
Akespe	7	Djambul	17	Kosaman	2	Tastubek	6
Akshatau	3	Kambash	1	Kyzylzhar	3	Zhanakurilis	1

Source: DSLS, 2004:18.

24 June 2008). A second follow-up phase of the project (SYNAS II), announced in June 2008, will construct the 3 billion m³ Koksaray reservoir on the Syr-Darya River to mitigate flooding, “safeguarding the livelihoods of the Syr-Darya region’s inhabitants, [and] encouraging environmental revival by rationalizing water use in Kazakhstan’s agricultural and fishing industries” (Mott MacDonald, 2008).

While the Aral fishery is still only a pale shadow of what it once was, the initiation of the flounder fishery and the ensuing Danish developmental support have helped place the NAS fishing communities on a new, relatively more secure, if still low-income, footing. Fifty-one fish catching and processing enterprises were registered in the NAS fishery, comprising (i) independent fishery production cooperatives (up to 15 members); (ii) limited companies, such as the private fish processing plants Karasai-Kazi, Aknur, Akbidai-2, Atameken), which contract brigades to catch fish on their behalf; and (iii) small private companies (one or more fishers unite forces and form an enterprise). Yet, of the 51 enterprises registered, only 15 enterprises, directly employing just 84 people (brigade and brigade members are contracted on a “when needed” basis), were active in 2004.³⁵

Organizationally, however, the most important functioning unit (although without juridical recognition) in terms of stability³⁶ and underpinning local livelihoods is the brigade. The brigade, through its brigadier, agrees contracts and prices with the cooperatives, companies or Aral Tenizi, procures inputs such as credit and fishing gear on behalf of brigade members, disseminates information relevant to fishing activities (regulations and changes thereto, for example), and seeks to establish and foster working relationships (social capital) with the local authorities and fisheries inspectors. Brigade fishing is a collective enterprise, equipment is held in common and the income generated is divided equally. If illness strikes, the brigade covers the medical expenses of the ill party. It also participates in local community events and collaborates with other brigades as necessary. A Karateren brigade leader mentioned that 2–3 brigades from the village combined to share a truck in the winter so as to get the fish to market, although they preferred to use motorcycles in the summer. In 2002, 92 brigades, around 600 fishers, were active on the NAS during the fishing season from mid-June to mid-May, with the majority of the brigades concentrated in Djambul and Aralsk itself (Table 6).

Fishing is unable to guarantee anything more than a (below) subsistence livelihood, however, and is supplemented in a number of NAS communities by the rearing of livestock, principally goats and camels, although the harshness of the terrain and the limited availability of water preclude this from offering anything but a marginal contribution to livelihoods, and by small-scale vegetable production on household plots. Critically, for a large number of the families interviewed in Karateren, Tastubek, Akbasty and Zhanalash, government support made a real difference to household

³⁵ Aral Tenizi (personal communication, June 2008) attributes the low number of active enterprises to the profitability of illegal fishing, a statement corroborated by DSLS (2004:21), which suggested that after deducting taxes, such as social fund, cooperative tax, income tax and retirement fund amounting to around 51 percent of revenues, expenses for gasoline and victuals during the fishing trips, the fisher was left with just 10–15 percent of the value of the catch (about tenge3 or US\$0.02 per fish).

³⁶ While the number of active enterprises in the NAS fishery fell by almost 50 percent from 29 to 15 enterprises between 2002 and 2004, the number of identified brigades dropped by just 12 percent from 92 to 82 brigades (Aral Tenizi data and DSLS, 2004:18).

TABLE 7
Fish prices and margins on the North Aral Sea (NAS), 2004

Species	Period	Fisher tenge/kg average	Intermediary tenge/kg average	Factory price tenge/kg average	Fisher share of factory/ final price (%)
Carp		12.5	22.5	50	25
Pike-perch (large)	Winter	100	150	170	59
	Other	100	120	150	67
Pike-perch (small)		50	70	110	45
Pike	Winter	30	45	–	67
Snakehead	Winter/autumn	30	40	–	75
	Spring/summer	10	20	–	50
Flounder	Winter	30	40	90	33
	Spring	15	25	90	17
	Summer	15	20	90	17
	Autumn	25	35	90	28
Small fish		10	20	–	50

Source: Aral Tenizi.

income. An interviewee in Karateren mentioned that he was in receipt of tenge10 000 a month in the form of child and assorted state benefits, and fishing, his full-time occupation, contributed around double that amount or tenge20 000.

Impediments to improved fisher well-being

There appears to be two main impediments to improved fisher well-being, given the minimal alternative employment options available. First, the quantity of fish available in the NAS is limited. The 2008 total allowable catch (TAC) established by the local Fisheries Institute was just 1 600 tonnes, including 600 tonnes of flounder and 1 000 tonnes of six other species, a constraint that is likely to remain for the foreseeable future. Second, the prices received for the fish that is caught are low.³⁷ Research undertaken by Aral Tenizi indicated that fishers received between 17 percent of the final price for flounder in spring and summer and 75 percent of the final price in the case of snakehead sold to the female intermediaries, who then onsold the fish in Aralsk and other regional towns (Table 7).

The low percentage returns accruing to fishers from the flounder industry (presently the major NAS fishery in volume terms) was a pivotal factor in prompting Aral Tenizi to create its own processing company, the LLP Kambal-Balyk, with a view to establishing backward linkages with its receiving stations, and thereby ensuring that a greater share of the rewards from fishing are returned to the fishers themselves. This move proved opportune as the state's decision to introduce and auction ten-year fishing quotas in 2007 saw fisher cooperatives affiliated to Aral Tenizi capture eight of the ten quotas offered. *Not only is this venture likely to bring greater stability to the brigade fishers associated with the NGO, but there is every expectation that the returns to fishers will improve as a result of the Tenizi-owned enterprise acting in the social rather than private interest.*³⁸

³⁷ If indeed the fish can be sold. A brigade leader in Karashalu, where 38 households live, pointed out that the remoteness of the village and the small and irregular size of the catch (only 12 households presently fish and there are no local freezing or ice supply facilities available) dissuaded buyers from coming to the village and so the brigade had to transport its fish to the market along poor dirt tracks. The damage caused in the transporting further reduced the prices received.

³⁸ One caveat must be raised, however. The success of the SYNAS I project and an (unrelated) reduction in irrigation runoff along the Syr-Darya River is having a dramatic impact upon the Aral Sea's ecosystem. As salinity levels drop, flounders are migrating to the saltier extremes (necessary for species reproduction, although the fish itself can survive in less saline environments) and freshwater fish are beginning to recolonize the sea. How these changes might impact upon future fisher livelihoods remains unanswered to date, however.

THE “COMMUNITY” FISHERS OF KYRGYZSTAN³⁹

Somewhat unfortunately, the major piece of post-Soviet fishery legislation, the 1997 Law on Fish Industry (KR, 1997), not only neglected to legislate for aquaculture activities, but also failed to explicitly consider small-scale and subsistence fishers. Indeed, during exploratory field visits in the Issyk Kul and Chui oblasts with Department of Fishery officials in May and June 2007 a number of rod and line fishers were encountered and were rather dismissively referred to as “poachers” by fishery officials. The same philosophy permeated early drafts of the *Strategy for Fisheries and Aquaculture Sector Development and Management in the Kyrgyz Republic, 2008–2012* (KR, 2007b) for, while the strategy referred to a “sector which will deliversocial and economic benefits to communities (particularly alternative livelihood opportunities in rural and remote areas)” and pledged to “develop diversified and multi-purpose fisheries” (Objective 4), no reference was made once again to small-scale fishers.

Legislation in recognition of small-scale fishers

Neglect of small-scale fishers was remedied after extensive discussion at the Third Workshop on the Finalization of the Strategy for Fisheries and Aquaculture Sector Development and Management in November 2007 (FAO, 2007c) when the strategy, subsequently approved by the legislature on 22 April 2008, instructed the fishery authorities to:

- collect data and information on the social and economic relevance of small-scale fisheries (Strategy Objective 4.2); and
- allocate fishing rights to groups of private small-scale fish business units⁴⁰ through co-management arrangements and through their representation on the Scientific Fisheries Board (Objective 4.3).

One possible reason for the neglect of small-scale fishers could be attributed to the deterioration in social capital in the post-Soviet-era. Kuehnast and Dudwick (2004) note how the economic and social polarization that occurred post-1991 caused “once vibrant” social networks and cooperation mechanisms to disintegrate. The poverty and increased inequality that followed transformed “traditional social norms from a basis of solidarity to a basis for social differentiation” (Sabates-Wheeler, 2007:1425) and excluded the poor from both access to resources and decision-making processes.⁴¹ Small-scale fishers were thus ignored as the “social contract” between state and society shattered.

The Hunters and Fishers Association (HFA) in the interests of small-scale fishers

Nevertheless, this neglect of small-scale fishers overlooks the fact that they did have a ready-made representative organization, the Hunters and Fishers Association (HFA) (“Kyrgyzzohotrybolovsouz”) to advance their interests. Moreover, while the organization has suffered a decline in membership since 1991, it still unites a substantive proportion of the republic’s subsistence and recreational fishers.

³⁹ The authors are indebted to Messrs Kiryanov, Hunters and Fishers Association (HFA) Deputy-Director, Shmidt, HFA Chief Fish Culturist, the Chui-Bishkek HFA Chairperson and the various HFA stewards they met and interviewed during the Chui-Bishkek field visits for the information that follows. The authors alone are responsible for any errors herein.

⁴⁰ The terms “fish business units” and “private entrepreneurs” were preferred by workshop participants as it was felt that the term “small-scale fishers” had unwelcome connotations with poaching in the Kyrgyz context (FAO, 2007c:3).

⁴¹ Sanghera and Satybaldieva (2007), for example, note the current absence of any academic association in Kyrgyzstan, commenting that professional networks in higher education are *too small to have any critical influence* (the italics are the authors).

Established in 1963, HFA membership peaked in the late 1980s at 28 000 members, declining to 23 656 members in 2007 (just over 12 000 being fishers or hunter-fishers). Membership reduction has been attributed to a number of reasons:

- out-migration of Russian nationals following independence;
- privatization, which saw enterprises such as the Lenin (350 employees) and Frunze agrarian machinery factories in Bishkek subsequently perish, breaking the workplace ties that often played an integral role in sustaining work-based pockets of HFA membership; and
- poverty, as individuals allowed membership to elapse due to reduced cash incomes.

Despite this downsizing, the association currently employs around 300 people and has an office in each oblast, with the main base of operations being in Chui-Bishkek oblast where three local offices (Chui-Bishkek, Tokmuk and Kara-Balta) are also maintained. The economic and social importance of the HFA was formally recognized in Soviet times, the authorities granting the association hunting rights across 72 farms (principally for wild pigs) as well as exclusive rights to fish in just over 40 leased waterbodies across the republic. These waterbodies included four reservoirs: the Sokuluk, Chumysh, the Nizhnee Alai-Archa system and Manas, the latter currently was restocked and opened in 2008 to HFA-licensed fishers in the Chui-Bishkek region. These access rights were subsequently confirmed by a 1985 government resolution and thence verified legally when the HFA won a test case over fishing rights at Sokuluk in 2000.

The emphasis of HFA activities is related to hunting. Besides organizing hunting across the 72 farms, it is a major national retailer of guns at its ten shops, where rod and line tackle is also sold. However, it plays a critical – if largely unacknowledged role to date – in stocking, capture and control (monitoring-surveillance) within the fisheries domain.

In stocking terms, the association raised an estimated 12.6 tonnes of carp fingerlings in its culture ponds over the period 1999–2007 (Table 8), releasing these fingerlings into the nation's waterbodies before the start of the season (June). By far, the major part of this activity is concentrated in Chui-Bishkek oblast, where just over 11 tonnes of fingerlings were released into 11 waterbodies (principally the Ala-Archa reservoir system) between 1999 and 2006 (FAO, 2008c:11; Sarieva *et al.*, 2008:23).

The HFA also regulates fish capture by artisanal and recreational fishers in three ways. First, until 2008 the association issued licences that allowed the holders to catch a specified number (normally five) of trout (total quota allocated = 1 000 fish) and naked osman (6 500 fish) from the nation's rivers. However, from 2009, the Department of Fisheries has assumed responsibility for this particular task. Second, individuals can subscribe to the association. Initial membership registration presently costs soms700 (approximately US\$20.50) and thereafter soms300 (US\$8.80) annually, although this reduces to soms150 if the member only engages in fishing activity, with pensioners being entitled to a 50 percent reduction in the subscription. Members are thereby entitled to fish in all the nation's rivers, and publically owned or HFA-leased waterbodies.⁴² Third, non-members can buy a day ticket, costing soms40 (US\$1.20), to fish. Both members and day-ticket holders are entitled to use multiple rods but no more than ten hooks, and are limited to a daily catch bag of 5 kg. Membership and *esprit de corps* is encouraged by organizing regular fishing competitions at the HFA-leased sites, competitions such as the “fishing under ice” contest at Nizhnee Ala-Archa reservoir in the winter of 2007. Catches of these small-scale fishers are not insignificant, especially

⁴² There has been a sharp increase in the cost of membership and day tickets. The cost of a day ticket doubled from soms20 to soms40 between seasons 2007 and 2008, for example.

TABLE 8
Stocking and capture data at reservoirs managed by the Hunters and Fishers Association in Chui-Bishkek, 1999–2007

Year	Fingerlings stocked (in tonnes)	Fish catch (in tonnes)	No. of fishers (members and day ticket holders)	Average catch (kg)
1999	1 264	13 865	3 119	4.4
2000	1 423	13 868	4 851	2.9
2001	1 756	10 896	5 228	2.1
2002	1 410	6 586	3 787	1.7
2003	1 042	15 535	6 096	2.5
2004	1 555	16 237	5 269	3.1
2005	1 719	12 658	4 042	3.1
2006	0 856	23 630	4 726	5.0
2007	1 618	18 245	3 649	5.0
Total	12 643	131 520	40 767	–

Source: Sarieva et al., 2008:20–21.

when compared with the aggregate recorded national catch.⁴³ More than 40 000 visitors caught 131 520 tonnes of fish solely at the reservoirs open to HFA members over the 1999–2007 period (Table 8). Consequently, artisanal catches across the whole country will almost certainly be higher.

The scenario appears more bleak in the first quarter of the 2008–2009 season (June–August), however. HFA records suggest 586 visits by 166 members and 420 day visitors were paid to these waterbodies, with just 2.93 tonnes landed during the same period.

Control (monitoring and surveillance) is principally exercised by the HFA through its network of stewards, who account for the majority of the association’s employees. These stewards are housed close to the waterbodies. Besides renting out local cabins, organizing hunting parties and other hunt-related events, and engaging in environmental conservation work such as tree replanting, they are expected to monitor and undertake a number of activities *vis-à-vis* fisheries. These activities include:

- raising of fingerlings and their introduction into waterbodies;
- helping to test water quality;
- issuing day tickets and recording data on fishers and catch;
- enforcing regulations as laid down in the articles of the association (for example, with regard to closed seasons and the returning of undersized fish to the water) and preventing poaching; and
- confiscating nets and rods of those fishers who are in violation and reporting such violations to the State Agency on Environmental Protection and Forestry.

However, field research suggests that these stewardship activities are not as robust as one might desire. Two fishers encountered at Chumysh reservoir were neither HFA members nor holders of day tickets for the waterbody, and both these and fishers interviewed at the Nizhnee Ala-Archa reservoir were clearly retaining undersized fish as opposed to returning them to the water. Rather intriguingly, too, despite published evidence suggesting the disintegration of social networks and capital in the post-independence era, the same field research reported the case of a fisher with four children who regularly went to fish, not just to supplement his family’s diet but also to provide for local community members. He would spend 3–4 days fishing continuously and camping out, while his neighbours would share the licence costs and regularly visit to supply him with victuals and collect the fish he had caught on the community’s behalf. It appears that the notions of “ashar” (community participation) and “birimdik” (unity) are perhaps not wholly dead in Kyrgyzstan then.

⁴³ In 2006, national fish production totalled just 27 tonnes, though this figure excluded HFA catches of 23.63 tonnes.

Nevertheless, despite the HFA being an important institutional constant in the pre- and post-independence period, the current interest in reactivating the fisheries sector is, paradoxically, threatening to undermine its activities. Recognition of the value of aquatic resources has attracted private investors intent upon leasing out waterbodies for commercial purposes. Besides the 20 or so private pond enterprises (see section *Fisheries in Kyrgyzstan*) already in operation, the HFA is fearful that a private entrepreneur will shortly wrest control of part of the Nizhnee Alai-Archa reservoir system from its grasp and use price to restrict access.⁴⁴ While such a scenario may well maximize fisheries revenues and help reduce fishing pressures, it bodes ill for the livelihoods of the one in three Kyrgyz households that fall below the poverty line.

In a sense, if livelihoods are to be better protected and the present minimal level of organization of fisherfolk and occasional fishers is to be countered, there is a real need to both strengthen and more effectively integrate the HFA into decision-making processes. To quote an old Kyrgyz proverb “whoever separates, he will be eaten by wolves”. This is very much in line with current international donor support to the sector, which seeks to “reduce IUU [illegal, unreported and unregulated] fishing practices.....using participatory methodologies such as co-management and community-based resource management..... generating alternative employment and increasing the income in rural areas”⁴⁵ (FAO, 2008b:17–18). Accommodating the HFA as a representative of the interests of subsistence and recreational fishers can be accomplished in a number of ways. First, the HFA could be invited to participate in this role as a member of the Fisheries Board (also known as the Scientific Production Council), advising as to how the assignation of access rights and quotas and proposed policy in general may impact upon the artisanal and recreational fishing community. Second, there is an economic case for coordinating the activities of HFA stewards *vis-à-vis* their fisheries roles and fisheries inspectors appointed by the Department of Fisheries because both are tasked with monitoring catches and preventing IUU fishing so as to safeguard the underlying resource. Coordination, with perhaps joint training opportunities, could also form a prelude for the development of effective community-based management schemes. However, stewardship costs money and the HFA must recuperate such costs through its annual subscriptions and day-ticket rates. Unfortunately, recent government minimum wage legislation is likely to have a dramatic impact upon HFA finances⁴⁶ and, if these costs are passed on in full in the form of increased membership subscriptions, there is a real likelihood that membership will fall, IUU fishing and poaching will rise, and livelihoods will be compromised.⁴⁷

THE “DEKHAN POND FISHERS” OF TAJIKISTAN⁴⁸

Dekhan farms are a relatively recent phenomenon in the Tajik Republic.⁴⁹ Created from the ashes of the “kolhoz” (joint-stock company) and sovhov following independence,

⁴⁴ HFA officials substantiate their argument by pointing out that, while fishing at the HFA-leased Chumysh reservoir costs an individual soms40 a day, those persons who choose to fish at the nearby privately-owned Hydropower Station No. 5 reservoir are obliged to pay soms150 a day.

⁴⁵ Indeed, the same document explicitly recognizes the need to “assist the Kyrgyz Hunting and Fishing Union in its aims to improve the habitats for aquatic wildlife, to protect rights of leisure and recreational fishing and to develop codes of good practice for recreational fishing” (FAO, 2008b:18).

⁴⁶ Most stewards had been paid salaries of around soms1 000 per month. Wage legislation now establishes a minimum wage of soms3 000 a month, which legislation the HFA is in the process of implementing.

⁴⁷ Some form of state subsidy is thus perhaps justified in terms of the general conservation work that is and could be undertaken by HFA stewards.

⁴⁸ The authors are indebted to Messrs Gafurov and Hujiev (Chairman and Vice-Chairman of Mohiparvar, respectively), Balkhova (FAO National Correspondent in Tajikistan), Khaitov (Tajik Agrarian University), Kholov (A. Djami) and the various informants they met and interviewed during visits to the Nurek reservoir and the Forel, the A. Djami and the Kumsangir farms/installations for part of the information that follows. The authors alone are responsible for any errors herein.

⁴⁹ “Dekhan” is the Tajik word for peasant or worker.

TABLE 9
The emergence of dekhhan farms, 2002–2006

	2000	2002	2004	2005	2006
Collective dekhhan farms					
Number	10 395	6 897	6 455	7 916	8 740
Average arable land per farm (ha)	7	29	21	19	18
Average agricultural land per farm (ha)	174	332	231	283	171
% of total arable land	8.7	24.4	16.8	18.2	19.4
Individual/family dekhhan farms					
Number	1 141	4 779	13 110	15 406	18 300
Average arable land per farm (ha)	64	18	21	20	18
Average agricultural land per farm (ha)	501	280	231	159	171
% of total arable land	8.8	10.25	34.1	38.0	40.6
Land-share use certificates issued (no.)	95 693	243 781	465 476	515 144	615 225
Land-use titles issued (no.)	13 742	13 714	16 639	19 922	27 294
State farms					
Number	508	342	267	239	193
Average arable land per farm (ha)	584	532	354	336	332
% of total arable land	35.6	21.9	11.6	9.8	7.9

Source: World Bank, 2006:18.

the transition from collective to private agriculture was somewhat slow until 2004 (Table 9) when a presidential decree ordained that the privatization process should be completed by the end of 2005. The state retained ownership of livestock breeding and crop research farms, however.

Incomplete and poorly communicated land privatization

By January 2006, around 18 300 individual and family dekhhan farms had been created, encompassing around 40 percent of the country's arable land, and a further 8 740 collective dekhans controlled an additional 20 percent (Table 9). *Nevertheless, the reform has been both incomplete and poorly communicated.* It is incomplete in the sense that while over 600 000 land-share certificates naming all members of the dekhhan were distributed⁵⁰ by the end of 2006, the government had conferred less than 30 000 individual use rights to the beneficiaries of the reform. This absence of tenure security was compounded by legislation allowing state and local government to confiscate dekhhan land that was being used "irrationally", rational usage being interpreted by some local authorities as obliging the dekhans to give as much as 76 percent of farmland over to cotton cultivation (FAO, 2007a:2). The reform is poorly communicated in the sense that many members of the collective dekhhan farms were unaware of the new modality of ownership and hence continued to work for wages as before under the collective management of former brigade leaders (World Bank, 2008:8).⁵¹ In the words of the World Bank: "Privatisation had occurred in name only and has not significantly affected farmers' freedom to use their land as they choose... it is not surprising that land privatisation has not significantly improved producer incentives" (World Bank, 2006:19).

⁵⁰ Few collective dekhans had issued such certificates, despite being legally obliged to do so (World Bank, 2006:19).

⁵¹ The World Bank also suggests that this ignorance has allowed wealthy, politically well-connected individuals to exploit their knowledge of the programme so as to acquire large areas of good quality arable land, thereby increasing rather than reducing rural inequalities.

The major impacts upon dekhani livelihoods

Land privatization too has not brought increased recognition of the, albeit admittedly, often supplemental role⁵² that pond culture and capture can play in the livelihoods of the newly “independent” dekhani farmers. The World Bank publication *Priorities for Sustainable Growth: A Strategy for Agriculture Sector Development in Tajikistan* (2006) singularly fails to mention the sector, as does a latter World Bank paper (2008), an earlier sectoral review study by Muminjanov (2003), and the *Emergency Food Security Assessment in Rural Areas of Tajikistan* undertaken by WFP, FAO, UNICEF and the government in May 2008. However, some of these documents do raise the spectre of ineffectual water management strategies, a shortcoming that undermines the livelihood-supporting potential of fisheries for aquaculture on dekhani farms. Physical capital in the form of earthen drainage and irrigation canals has deteriorated following the winding up of the kolhoz and sovkhoz and with it, the fish-producing capacity of these networks. In addition, as waterflow is impeded by the widespread non-functioning of pumping systems (as many as two-thirds may be out of operation), flow pipes which are over 30 years old, and poor management (MIWM, 2006:34; Toderich *et al.*, 2004:7), dekhani farms have been obliged to adopt a “water when water is available” strategy (Muminjanov, 2003:32). Land is thus more susceptible to salinization and waterlogging. The Global Environmental Facility (2008:7) cites 2000 data showing that over 10 percent of the country’s 720 000 ha of irrigable land fell into this category and reduced productivity. Although unquantified, the arbitrary discharge of water by the hydropower and irrigation sectors has detrimental effects upon dekhani and community-level aquaculture, releasing spawn and fry into cotton and grain fields where they perish and cause local ponds to overflow and the fish therein to be lost, and inhibiting the development of aquatic activities (most notably trout farming) for which a regular waterflow is imperative.

The developmental prospects of the agriculture sector are further hampered by input scarcities. The World Bank (2006:22) notes that current lending for agriculture is “well below” sectoral requirements, a factor it attributes to the lack of clarity surrounding land-use rights, weak lending skills and high margins across the formal banking sector. Cartella (2008), in a snapshot study of five dekhani farms benefiting from the FAO Emergency Assistance Programme, noted that not only had the groups used their own accumulated cash balances to restock ponds (balances which were now largely exhausted), but that financial services available in terms of loan maturities and interest rates did not match the aquatic production cycle. Microfinance, while growing in volume, nevertheless has to date failed to provide opportunities of note to stimulate or support pond production within the dekhani agriculture sector.

The scenario has been further exacerbated by the privatization of state hatchery facilities, in particular those at Kuybyshev (see Box 4).⁵³ Prior to and for a short period after privatization, carp larvae and fry were sold off by the hatchery at a price of dirhans2 a fingerling (equivalent to around US\$1 for 1 000 fry). The current price varies between dirhans50 and somoni1 per fingerling (US\$1 = 3–4 fingerlings) depending on the season. This price has sharply restricted the capacity of local dekhani farms to restock their ponds. In response, the state unitary enterprise Mohiparvar is seeking to reactivate the Kumsangir facilities located on the Afghan-Tajik border. Located between, and fed by the Vakhsh and Panj Rivers, the former state enterprise

⁵² While UNDP (2004:16), for example, suggests that the wealthiest 10 percent of rural dwellers consumed 0.01 kg of fish monthly (0.08 kg of fish monthly in urban areas), there is no data for other income groupings, although field research suggests consumption does occur.

⁵³ By independence, eight state hatcheries/fish farms remained. Kuybyshev, Dijikul (now Guli Surkh), Romit (now Forel), Kayrakkum (now Shukufon) were all privatized, Mohniparvari Pyanjakent is now a state-private joint venture, Kumsangir was closed (although it is scheduled to re-open shortly) as was Baypazi on the Nurek reservoir, and Chubek remains in state hands.

encompassed 1 300 ha (currently around 377 of these hectares comprise ponds), with the state presently retaining use rights to just over 150 ha.⁵⁴ Although current output is low (5 tonnes of mature fish were produced and a further 7 tonnes were lost due to the winter freeze-over) in the first months of 2008, plans are in hand to excavate ponds and commence fingerling production on a large-scale in 2009. The expectation is that this should not only help to drive local fingerling prices down, to the benefit of dekhkan pond fishers and other aquaculturists, but also open up export markets in neighbouring Afghanistan where there is a buoyant fingerling demand (personal communication, Ahmadjon Gafurov, Chairman, Mohiparvar, September 2008).

Socially, too, the demise of state influence and intervention within the fisheries sector has impacted upon levels of social capital. Khaitov (2008:67) notes how fishing enterprises constructed housing, schools and kindergartens for their employees, provided them with food and free medical care, and made provision for their children to attend summer camps. As these enterprises sharply scaled back activities (some being subsequently privatized), employment opportunities declined and employees migrated. Houses and fishery facilities became derelict (as in the case of the hatchery in Kuybyshev, Box 4), workplace-based labour organizations folded, and social activities (concert clubs, libraries) ceased to function.⁵⁵ In their place, the new breed of private fish farmers employ salaried staff earning around somonis100–150 per month and allow such staff to rent adjacent land for household food production. Fisher brigades do continue to function (they are to be employed to reconstruct the Kumsangir facilities, rather than local dekhkan labour, for example), but the level of social support offered to them is limited. Khaitov suggests that brigade contractors generally provide food, clothing and temporary accommodation proximate to the location of where the work is to take place, but little else.

Undoubtedly, however, the major impact upon dekhkan livelihoods in recent years has been the severe winter of 2007–2008, the coldest for almost half a century (UN, 2008:1), with daily temperatures of -15 °C plunging to -25 °C at night during January. Prices of oil, bread and wheat-based products doubled in a matter of months and led to increased indebtedness, reduced food intakes, growing remittances,⁵⁶ the sale of physical assets (principally livestock) and out-migration from the rural areas. Dekhkan farmers were identified as one of the four most severely affected groupings (WFP *et al.*, 2008:7–35).⁵⁷ In respect to the latter, it should be noted that a significant part of

FIGURE 17
A newly established agricultural training centre with demonstration fish ponds in Tajikistan



COURTESY OF R. VAN ANROOY

⁵⁴ The remainder of the area was transferred over to 12 dekhkan farms (employing 10–12 workers each), which grow rice and watermelons and raise livestock. Fishing is also practiced by the dekhkan farmers in the numerous ponds that dot the area, catches being the property of the catcher rather than the dekhkan.

⁵⁵ Nevertheless, even at the height of the civil war, social capital and market relations were not entirely destroyed. During fieldwork, the authors were told how a local commander of one of the factions, in order to encourage his troops, offered a price of somonis10 for every enemy soldier captured. Shortly thereafter, one of his command returned with more than ten enemy soldiers. Somewhat surprised, and realizing the potential cost of his promise, the commander attempted to negotiate a reduction to somonis5 per enemy soldier, only for the capturer to exclaim that this was not acceptable as he had himself paid somonis5 to various friends and peasants so as to obtain this quantity of enemy soldiers (personal communication, September 2008).

⁵⁶ In the first six months of 2008, an estimated US\$1 billion was received in the form of remittances (UN, 2008:6).

⁵⁷ The other groups were large families with many small children, other families with a high dependency ratio and the elderly living alone.

BOX 4

The hatchery and feeding ponds in Kuybyshev

The origins of the hatchery date from 1951, when the Vakhsh River changed course leaving a series of large ponds on its original watercourse. Scientists introduced new herbivorous species (principally carp and bighead) into these ponds and established a small hatcheries facility in the early 1970s. Expansion was rapid. By the late 1970s, 10–14 million fingerlings were being produced annually for restocking of both local ponds and those ponds further afield in the former USSR. Productivity was so high (40–45 tonnes per ha) that a fisher brigade at the facility was given the Award of the Red Banner, a gold medal and recognition by the former USSR Exhibition of Economic Achievements in 1983. In 1988, a larvae reproduction complex was constructed at Kuybyshev, with a projected capacity of 250 million units to supply all the former USSR's needs for herbivorous stock.

However, independence and the fracturing of economic links with the former Soviet bloc (discussed in the section *Fisheries in Tajikistan*), caused utilization to swiftly fall to between 25 percent and 30 percent of capacity by the mid-1990s. Production declined further thereafter, the main reproduction unit being destroyed during the civil war. The decision was taken to privatize the facility, and the hatchery and feeding ponds passed into the hands of the joint-stock company A. Djami in 2002/2003, which has since invested in the reconstruction of the reproduction facilities. The present enterprise covers 23 ponds (varying in size from 10 ha to 43 ha) and more than 600 ha. Thirty people are currently employed at the main hatchery facility, and fisher brigades are employed seasonally to net the river and the adjacent reservoir for the company. Although production is substantially lower (1.1 million fingerlings were produced in 2007) and costs are high due to the necessity of importing feed and minerals from Kazakhstan and Uzbekistan, the company sells fingerlings to pond culturists, including dekhan farms, and retails grown fish through shops in the capital of Dushanbe.

Source: Khaitov, 2008, and fieldwork, September 2008.

the 2008 cotton production could not be harvested before winter as a consequence of the out-migration, which saw the working population in some districts reduce by half. Rural diversification into aquaculture may provide livelihood options that would suit the current situation in some districts better than the present focus on cotton production. Mohiparvar recognizes the advantages of aquaculture over cotton in terms of inputs (labour, land, capital) required and their distribution over the year.

National and international responses were timely. Joint food security, livelihoods, agriculture and nutrition needs assessments were carried out across the country in April–June 2008, and US\$35 million had been raised by August 2008. However, the project activities proposed for the immediate- (provision of a temporary safety net for those most at risk) and long-term (support for the proximate agricultural cycle/ rehabilitate critical infrastructure) alleviation of hunger and vulnerability reduction largely neglected pond aquaculture despite the loss of an estimated 65 percent of fingerlings. See, for example, the list of projects and activities proposed in the *UN Humanitarian Food Security Appeal, 2008–2009* (UN, 2008). The exception was the FAO US\$393 000 Emergency Assistance to Tajikistan in the Aquaculture Sector, Livestock Sector and Comprehensive Assessment and Programme Development project, TCP/TAJ/3104(E).

As most dekhan farms that carry out aquacultural activities are not yet registered, despite the efforts of Mohiparvar in 2008, it has become clear that, with the one exception of Bobojon, dekhan pond fishers did not *directly* benefit from the government's restocking strategy and from the emergency assistance provided by donors. The major beneficiaries of support in 2008 remained the medium- and large-

scale sector. This was largely a consequence of the lack of information on the damage suffered by dekhan farms after the cold spell in early 2008. Nevertheless, the support directed to the Kumsangir state farm and the Forel Farm in particular could well translate into future increased fingerling supply at reduced prices in the local markets, thus aiding the restocking of local dekhan ponds.

5. Conclusions

Central Asian fisheries have been profoundly affected by policy-makers over the last half-century or more. One of region's major waterbodies, the Aral Sea, was largely sacrificed to the dictates of an agrarian "irrigation first" policy. Not only did the Aral Sea lose 70 percent of its surface area and suffer a 90 percent reduction in its volume since 1960, but it also became increasingly saline. Dam construction on the region's rivers, most evident on the Naryn River in Kyrgyzstan (in part to this irrigation first policy, in part to counter water surges in spring and early summer, and in part to contribute to regional energy needs through hydropower generation), also impeded fish migration and often forced fisheries managers to adopt "second-best" management policies, reacting to changes in water flows occasioned by the prioritization of other sectors. In some instances, fisheries policies alone were responsible for introducing dramatic changes into aquatic ecosystems, most notably with the introduction of Lake Sevan trout, and subsequently other predatory "high-value" species such as pike-perch, into Lake Issyk Kul, where the dace fishery had, historically, been dominant. Consequently, as Petr and Mitrofanov (1998:161) note, "there is probably not a single waterbody in the region left with only the original indigenous fish fauna" and, in some environments, such as Lake Balkhash, introduced species account for over half the catch.

The nature of the region's already precarious fisheries was further exacerbated by the collapse of the former USSR. Institutional failure and the fragmentation of social capital saw a growth in illegal fishing and the fracturing of supply chains. No longer could the Kuybyshev hatchery in Tajikistan sell the larvae it produced across the former USSR (nor procure the inputs it required to maintain its feeding programmes), and Aralrybprom found itself unable to source fish for processing from outside Kazakhstan. Sectoral output in all the Central Asian economies fell significantly (Chapter 3, *The evolution of Central Asia's inland fisheries*).⁵⁸ The impact was most keenly felt by those people most closely linked to the sector. Academics specializing in fisheries and aquaculture now found their opportunities to participate in international training and research activities severely circumscribed,⁵⁹ state fisheries employees now found themselves unemployed as fisheries departments and ministries were downsized (in some cases, even disappearing for a period), while the livelihoods of many fishers and farmer-fishers were severely compromised by the decline in the natural (and farmed) aquatic resource base. Consequently, as FAO (2008d:12) stresses, "... fisheries in most of the Central Asian countries can be considered in need of considerable attention and assistance".

INCREASING GOVERNMENT ATTENTION TO THE FISHERIES SECTOR

Fortunately, a partial recovery is underway. Production began to rise in Turkmenistan after 1997 and in Kazakhstan and Uzbekistan after 2003. Governments have come to belatedly recognize the economic benefits that the sector can potentially provide

⁵⁸ Thorpe and van Anrooy (2008) attribute this decline to a combination of factors: *ecological* (the introduction of alien invasive species and pollution), *economic* (increasing abstraction of water for irrigation and power generating purposes), *social* (increased poaching due to impoverishment following the removal of employment guarantees) and *governance* (collapse of local management structures, decrease of support to the sector and deterioration of trade relationships with neighbouring countries).

⁵⁹ One of the main barriers was linguistic. Scholars across the region were generally fluent in both Russian and their native tongue but had (and in many cases, still have) minimal knowledge of English, French or Spanish, thereby obstructing their participation in global fisheries forums.

in terms of rural poverty alleviation, employment generation, the assurance of food security and export earnings. A sign of this increased governmental attention is reflected in the introduction and updating of policy and legal frameworks for sectoral development and management that are occurring in some of the republics (FAO, 2008e). The Kyrgyz and Uzbek line ministries responsible for fisheries convened all relevant stakeholders in fisheries and related sectors in 2007, for example, to develop new aquatic development strategies (*Strategy for Fisheries and Aquaculture Sector Development and Management in the Kyrgyz Republic, 2008–2012*, and the *Aquaculture and Capture Fisheries Development Policy and Strategy of Uzbekistan, 2008–2016*). Similarly, Kazakhstan has recently allocated significant budgetary resources for the development and management of the fisheries and aquaculture sector in the country through a state investment fund and the Ministry of Agriculture in Tajikistan has recently updated the national law that regulates fisheries and aquaculture.

A HOLISTIC APPROACH TO DETERMINING LIVELIHOOD-SUPPORTING POLICY INTERVENTIONS

However, identifying interventions that may improve the livelihoods of those people who derive an income (no matter how supplemental) from fishing, aquaculture or fisheries-related activities is not an easy task. Yet, what is undeniable is that responsibility for such interventions is not simply a matter for fishery planners, given the way policy decisions taken in other sectors can impinge upon the fisheries resource and the management thereof. As Petr and Mitrofanov (1998:161) counsel: “What is needed is to place government priorities for food and other crops and animal husbandry, as

FIGURE 18
Participants at the regional intergovernmental meeting to initiate the establishment of a Central Asian fisheries organization, Dushanbe, Tajikistan, November 2008



COURTESY OF R. VAN ANROOY

well as for hydropower production, into the framework of a holistic approach, leading to *implementation of a complex management programme in which fisheries will be elevated from its frequently subordinated position to an equal partner in discussions and the decision-making process*" (the italics are the authors).

However, to date this holistic approach by and large remains stillborn as was also recognized by the fisheries and irrigation sector experts recently gathered at the ICWC-FAO Regional Scoping Workshop on the Use of Irrigation Systems for Fish Production in Central Asia (FAO, 2008f), who echoed that "Linkages between irrigation and fisheries authorities are very limited or non-existent as far as planning and management issues are concerned (e.g. fish passes and screens)".

It is clear that concerted efforts need to be focused to redress the lack of linkages between fisheries and irrigation authorities. PRSPs or their national equivalents, for example, invariably ignore the role the fisheries sector might play in promoting pro-poor growth and alleviating poverty. Similarly, United Nations Development Assistance Frameworks (UNDAF) prepared for the individual Central Asian countries by the UN system agencies have so far largely ignored the fisheries sector. This situation may change with the establishment of the FAO Subregional Office for Central Asia (SEC) in 2007.

ACTIONS NEEDED AT THE REGIONAL LEVEL

At the regional level, it is imperative to insert the fisheries agenda into wider regional development and planning discourses. In November 2008, a start was made in this respect by Tajikistan, which hosted the regional intergovernmental meeting to initiate the establishment of a Central Asian fisheries organization (FAO, 2009). The meeting is expected to be followed up in both Central Asia and the Caucasus, leading to the possible formation of a regional fisheries organization or commission that would be well-positioned to advance and promote the fisheries sector and to ensure (regional) policy coherence.

ACTIONS NEEDED AT THE NATIONAL LEVEL

At the national level, action needs to be taken to restore the "five capital assets of the community".

Natural capital

Providing effective environmental safeguards is imperative. Livelihoods are only sustainable if the resource base itself is harvested in a sustainable manner. While action is thus needed to reduce the incidence of poaching and IUU fishing across the republics, the answer is not necessarily greater monitoring, control or surveillance (MCS) of waterbodies. One (alternative) option is to increase the alternative income-generating opportunities on offer, although this is not so practical in Aralsk and its environs where fishing and the receipt of state supports are likely to remain the major components of household incomes for some time. Clarification of property regimes affecting access to waterbodies provides another option, an option which will support longer-term investment by the private sector in both capture fisheries and aquaculture. Transfers to private property regimes and/or opportunities for long-term lease will implicitly improve the sustainable use of the resources. It should be noted, however, that the role of the government may change, although not necessarily reduce (e.g. on subjects such as species introductions, the government should continue to play a decisive role) as a consequence of such regime change.

Human capital

Providing training opportunities is essential to improving the sector's human capital. The limited national-level capacity for higher level education in fisheries science, in terms of scientific and technical manpower, calls for increased attention. The low enrolment in fisheries and aquaculture studies over the last decade is constraining the development of educational programmes catering specifically to the sector. Very few national vocational schools and training institutes currently provide opportunities for training in capture fisheries, and there are almost no schools for aquaculture. Yet, strengths in training and education within biological and engineering disciplines, which are essential foundations for technical specializations in fisheries and aquaculture, are in evidence and have largely survived the downturn after independence in 1991. These areas can provide with minor investments entry-points so as to improve the sector's human capital. Nevertheless, regional collaboration in training and education might be more economic at these incipient stages in the recovery process. Development, strengthening and rehabilitation of the technical manpower base for fisheries and aquaculture development and management may take some time, but as it is the key to development for the entire sector, it should be prioritized and strong government and private sector support provided.

Financial and physical capital

Providing infrastructure and technical support is important to the development of the sector. The demise of the former USSR largely erased financial and technical support to the sector. Privatization of state facilities (Kuybyshev hatchery in Tajikistan, Karakol-Balgy in Kyrgyzstan, Aralrybprom in Kazakhstan, for example) either removed or reduced input or market opportunities for local fishers. While homemade remedies (raising of fingerlings in one's own dekhan ponds) or fortuitous external support (case of Danish nets for the Aral fisher brigades) helped ameliorate the situation in the short term, there is a real need to ensure that the longer-term needs of fishers are better accommodated within the emerging institutional frameworks. This may mean renewed state involvement in the sector such as in Tajikistan with the impending opening of the Kumsangir hatchery, repairing roads so as to reduce post-harvest losses (the case of NAS) or providing/facilitating access to key inputs, namely credit and training, and markets. The current lack of vessel building and maintenance facilities, outdated and dysfunctional cool-storage and fish-freezing facilities, the limited number of hatcheries and unavailability of fish-feed plants make it easy to conclude that the infrastructure required for a viable fisheries and aquaculture sector has been lost over the last decade. Needed public and private investments in these necessary infrastructures will only be made if and when the sector can be seen to be profitable and/or that it is contributing to food security, poverty reduction, nutritional, environmental and trade balance objectives.

Supplying credit services to the sector is the key to sustainable development. Microfinance and credit, let alone insurance services, are generally not available to the fisheries sector in Central Asian countries. In those cases where such services do exist, they involve conditions, such as interest rate levels, length of repayment periods, guarantee requirements and insurance premiums, that are inconvenient or unattractive for fishery-sector stakeholders. The relatively small-scale nature of the sector allied to the perceived risks involved in lending to the sector reduces the attraction for private financial institutions to develop products and services that meet the needs of the sector. There are, however, examples of NGOs (e.g. Aral Tenizi in Kazakhstan) and projects (e.g. the second phase of the World Bank/Uzbekistan Rural Enterprise Support project) that have recently commenced supplying credit services to the sector. Financial institutions in Central Asia, whether they are publically or privately owned, possess the keys to sustainable development of the regional fisheries sector, and ways must be

found to encourage their greater involvement in what could be both a lucrative and nutritionally important sector.

Social capital

Strengthening institutions is also necessary to combat the institutional failure of the recent past. This can take a variety of forms, but should include, *inter alia*, the development of new or the updating of policy and legal frameworks for the sector. Progress in organizational development and institutional strengthening of national fisheries and aquaculture authorities is slowly but steadily advancing, as is shown, for example, by the establishment of a Department of Fisheries in Kyrgyzstan, the upgrading of Mohi Tajikistan (into Mohiparvar) and the ongoing discussions in the Ministry of Agriculture and Water Resources of Uzbekistan to establish a specific department for fisheries and aquaculture. However, private sector extension services in fisheries and aquaculture are presently almost non-existent in Central Asia and, as the public sector line agencies do possess neither the manpower, the technical skills nor the financial capacity to currently deliver extension services to fisherfolk and aquaculturists, there remains a (recognized) institutional void, which demands rapid attention so as not to prejudice the sustainability of the sector or its growth.

Clarifying access rights to waterbodies is important. As has been noted with regard to the community fishers of Kyrgyzstan, while the recently approved (April 2008) national fishing strategy makes provision for the assignation of fishing rights to “small-scale” fishers, historic access rights of the HFA are being challenged in court by private interests intent on developing commercial fisheries in place of subsistence and recreational fisheries at these waterbodies. In Tajikistan, the benefits of the recent land reform *vis-à-vis* dekhan farms have largely side-stepped the question of fishing rights. Hence, social needs must be carefully reconciled with pecuniary gains when modifying property regimes *vis-à-vis* waterbodies across the region.

Establishing a basis for (promoting) public-private partnerships, including state partnerships, will contribute to sectoral growth. Co-management is very much on the agenda in Kazakhstan (World Bank, 2004:41) and is exemplified at the local level by the NGO Aral Tenizi’s acquisition of half the Aral Sea fishing quotas auctioned, for division and subsequent distribution to its members. However, impressions suggest this forward-looking arrangement is more the exception than the rule in Kazakhstan and elsewhere at present. In Kyrgyzstan, for example, there is a need to better integrate the HFA as a spokesperson for small-scale fishers into the decision-making process. However, the present limited number of fishery-producer organizations, associations, cooperatives and self-help groups active in fisheries and aquaculture makes it difficult for public agencies to involve the sector in decision-making processes. Private sector organizations that would present and represent sectoral interests to public agencies at both the national and the regional level could facilitate the management of the sector. While the emergence of independent private sector organizations was not encouraged in both the Soviet or post-Soviet-era, the mind-set about the private sector seems to have been broken in recent years and renewed interest in the sector has seen new associations being founded in Uzbekistan, Kyrgyzstan, Tajikistan and Kazakhstan. Such initiatives need to be nurtured if they are to contribute to increasing the sectoral contribution to growth, employment, trade, livelihoods and nutrition within the Central Asian republics.

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Inland fisheries livelihoods in Central Asia have been highly affected by the deterioration in the economic environment after the collapse of the former Union of the Soviet Socialist Republics in 1991. This publication, which is based on a study conducted in 2008 under a partnership between Portsmouth University, United Kingdom of Great Britain and Northern Ireland and the Food and Agriculture Organization of the United Nations (FAO), discusses current policies and potential livelihood-enhancing policy interventions. Examples are given of livelihood or coping strategies that have evolved for those people who currently derive an income from the sector. Three distinct groupings are highlighted in the examples presented in this paper. They include the “community” fishers of the Kyrgyz Republic, the Kazakh fisher brigades based on the North Aral Sea and the pond culturalists of the Republic of Tajikistan. A concluding section identifies the pre-requisites for more effective livelihood-supporting policy interventions within the fisheries sphere across the Central Asian republics.

