

Report No. 12989-KG

The Kyrgyz Republic Agricultural Sector Review

(In Two Volumes) Volume II

May 17, 1995

Agriculture, Industry and Finance Division
Country Department III
Europe and Central Asia Region



World Bank

CURRENCY EQUIVALENTS

Until May 10, 1993

After May 10, 1993

Currency Unit = Ruble
Ruble = 100 kopecks

Currency Unit = Som
1 Som = 100 tiyns

	<u>Period Average</u>		<u>End of Period</u>
	(Rubles or Som per US Dollar)		
<u>1992</u>		<u>Rubles</u>	
Quarter I	102.4		100.0
Quarter II	94.6		100.0
Quarter III	177.7		254.4
Quarter IV	396.4		414.5
<u>1993</u>			
Quarter I	580.1		684.0
		<u>Som</u>	
Quarter II ¹	4.1		4.3
Quarter III	5.6		6.5
Quarter IV	7.8		8.0
<u>1994</u>			
Quarter I	10.1		11.7
Quarter IV	10.9		

¹ May 10 - June 30, 1993

WEIGHTS AND MEASURES

Metric System

GOVERNMENT FISCAL YEAR

January 1 - December 31

ABBREVIATIONS

AMPC	Antimonopoly and Pricing Committee
ERRA	Enterprise Restructuring and Resolution Agency
ESAF	Extended Structural Adjustment Facility
GDP	Gross Domestic Product
FSU	Former Soviet Union
IMF	International Monetary Fund
JSC	Joint Stock Company
MITMR	Ministry of Industry, Trade and Material Resources
NBK	National Bank of Kyrgyzstan
SOE	State Owned Enterprise
SMP	Special Means of Payment
SPF	State Property Fund
VAT	Value-added Tax

PREFACE

The report is based on findings of a World Bank mission to the Kyrgyz Republic in October 1993 comprised of Messrs./Mmes. K. Brooks (Mission Leader), R. Chisholm, P. McInnes, T. Daves, K.W. Easter, S. Goodbody, J. Hammond, D. Michael, G. Pederson, S. Sheffield, B. Zegge, R. Prosterman, L. Rolfes. Ms. B. Johnson (International Fund for Agricultural Development) participated in the wrap-up meeting. The World Bank wishes to thank the authorities of the Kyrgyz Republic for their support and cooperation. The text incorporates revisions based on comments on an earlier draft received from the Ministry of Water Resources, Ministry of Agriculture, Agricultural Department of the Government, the Agrarian Alliance, Ministry of Economy, and Ministry of Finance, for which we are very grateful. The report was prepared by Karen Brooks with valuable comments and contributions by Barnabas Zegge, Zeynep Taymas and Tevfik Yaprak. The report was processed by Corazon Solomon and Nancy Atwell. The work was carried out under the general supervision of Michael Gould, Division Chief, and Russell J. Cheetham, Director.

THE KYRGYZ REPUBLIC AGRICULTURAL SECTOR REVIEW

TABLE OF CONTENTS

ANNEX 1: AGRICULTURAL FINANCE	1
Overview of the Agricultural Credit System	1
Flow of Credit in 1993	2
The Arrears Problem	5
Financial Stress in Agriculture	6
Reaction of the Banks	7
Short-term Farm Credit in 1994	7
Credit Arrangements in 1994	8
Supplier Credit in Agriculture	9
Financing Private Farms	10
Bank Lending Criteria and Procedures	10
Performance of Agroprom Bank	11
Conclusions and Recommendations	14
ANNEX 2: THE CROP SECTOR	16
Principal Crops	16
Fertilizers and Agricultural Chemicals	20
Seed Production	20
Agricultural Research and Extension	20
Ecological Issues	22
Conclusions and Recommendations	23
ANNEX 3: WATER POLICY	24
Irrigation	24
Institutional Change	24
Finance and Water Charges	27
Water Rights and Farm Reorganization	29
Environmental Concerns	29
Competition for Water	30
Conclusions	31
ANNEX 4: A STRATEGY FOR RECOVERY IN THE LIVESTOCK SECTOR: PASTURE, SHEEP, WOOL, AND MEAT	33
Influence of Climate and Soil on Pasture	34
Soils	34

Pastures and Forage	35
The Problem of Grazing Leases	36
Grazing Management	37
Problems of Privatization	37
Research and Extension	38
Environmental Issues	38
Sheep Husbandry	38
The Wool Industry	43
Meat Processing	46

STATISTICAL ANNEX 53

Table 1.1: Gross Domestic Product at Constant Prices	53
Table 1.1a: Gross Domestic Product at Current Prices	54
Table 1.2: January 1 Population	55
Table 1.2a: January 1, 1993 Population, by Oblast	55
Table 1.3: Administrative-territorial Organization, by Oblast, 1993	55
Table 1.4: Agricultural Output, Constant 1983 Prices, Million Rubles	56
Table 1.4a: Agricultural Output, Current Prices, Million Rubles	56
Table 1.5: Exchange Rate	57
Table 1.6: Grain Balance	58
Table 1.7: Per Capita Apparent Consumption	59
Table 1.7a: Per Capita Apparent Consumption and Share of Family Budget	60
Table 1.8: 1993 Average Monthly Wages, by Oblast	61
Table 1.8a: Agricultural Earnings and Expenditures by Farm Type	62
Table 2.1: Total land Area and its Allocation by Use, Jan. 1, 1993	63
Table 2.2: Grain Area, by Grain Type, 1986-93	64
Table 2.3: Grain Yield, by Grain Type, 1986-92	65
Table 2.4: Grain Production, by Grain Type, 1986-93	66
Table 2.5: Area, Yield, and Production of Feed Crops	67
Table 2.6: Area, Yield, and Production of Non-grain Crops, 1986-93	68
Table 2.7: Fruit, Berries, and Grape Area, Yield, and Production, 1986-92	69
Table 2.8: Grain Area, Yield, and Production, by Oblast, 1986-90	70
Table 2.9: Main Aggregates of Animal Husbandry	71
Table 2.10: Livestock productivity, by Type of Farm	72
Table 2.11: Feed Supply for State and Collective Farms, Inter-farm Enterprises	73
Table 2.12: Feed Balance, 1991-93	74
Table 2.13: Livestock Birth and Death Rates, 1985-93	75
Table 2.14: Livestock Inventories, by Oblast, 1980, 1985-91	76
Table 2.14a: January 1 Sheep Inventories in the Kyrgyz Republic	77
Table 2.14b: Kyrgyz Republic Wool production and Procurement, by Oblast	78
Table 2.14c: October 1 Wool Production, by Oblast	79
Table 2.14d: October 1 Sheep and Goat Indicators, by Oblast	80
Table 3.1: State Procurement Prices, 1992-1993	81
Table 3.2: Grain Procurement Prices, 1993	82
Table 3.3: Procurement Prices for Livestock Products, by Oblast	82
Table 3.4: Kazakhstan Procurement Prices, 1991-92, October 1993	83
Table 3.5: Retail Prices of Basic Foods, 1993 by Month	84

Table 3.5a:	Average Farm (Kolkhoz) Market Prices, 1993 by Month	85
Table 4.1:	Marketing of Beef and Poultry Meat, 1993	86
Table 4.2:	Marketing of Milk, 1993	86
Table 4.3:	Grain processing and Storage, by Oblast, by Product	87
Table 5.1:	Farm Machinery Supply and Prices, 1991-1993	88
Table 5.2:	Mineral Fertilizer Availability and Use, 1980-92	89
Table 5.3:	Pesticide Supply and Application, 1990-93	89
Table 6.1:	Crop Area, Yield, and Production, by Type of Farm, 1990-92	90
Table 6.2:	January 1 Livestock Inventories, by Type of Farm	91
Table 6.3:	Data on Private Farms, August 1, 1993	92
Table 7.1:	Budgetary Allocations to Agriculture and Food	93
Table 7.2:	Yearly Irrigation Budgets, by Oblast, Million Rubles	94
Table 7.3:	Drainage and Salinity, 1992, 1,000 ha	95
Table 7.4:	Allocation of Water Resources	96
Table 8.1:	Production of Processed Foods	97
Table 8.1a:	production of Processed Products, by Oblast	98
Table 8.2:	Structure of Kyrgyz Food Industry	98
Table 8.3:	Grain Processing in the Kyrgyz Republic	99
Table 9.1:	Agricultural Imports and Exports, non-FSU Partners, 1993	100
Table 9.1a:	Agricultural Imports and Exports, non-FSU Partners, 1992	101
Table 9.2:	Agricultural Imports and Exports, FSU Partners, 1993	102
Table 9.2a:	Agricultural Imports and Exports, FSU Partners, 1992	103
Table 9.3:	Production of Processed Products by Oblast, 1000 tons	104
Table 9.4:	Structure of Kyrgyz Food Industry	104

LIST OF BOXES, FIGURES AND TABLES

Box A1.1:	Recommended Components of Farm Business Plan and Credit Analysis	12
Box A4.1:	Specific Actions to Improve the Kyrgyz Wool Industry	47
Box A4.2:	Mobile Modular Slaughterhouses	50
Figure A2.1:	Wool productin, Processing and Distribution Flow chart Kyrgyz Republic: 1992	46
Table A1.1:	Short-term Credit to Agricultural Enterprises, Commodity Procurement Agncies, Food Industry and Input Suppliers in September, 1993	3
Table A1.2:	Allocation of Outstanding Short-term Bank Credit to Agriculture (current som)	4
Table A2.1:	Mineral Fertilizer Consumption Kyrgyz Republic, 1990-92 (thousand ton nutrient equivalent)	21
Table A2.2:	Consumption of Agricultural Chemicals Kyrgyz Republic, 1990-92	21
Table A3.1:	Total Irrigated Area and Irrigated Crops Sown in 1992 by Oblast in the Kyrgyz Republic	26
Table A3.2:	Yields of Irrigated Crops in 1992 by Oblast in the Kyrgyz Republic (tons/ha)	27
Table A3.3:	Annual Budgets for the Ministry of Irrigation in the Kyrgyz Republic	

	from 1988-92	28
Table A3.4:	Drainage and Salinity in the Kyrgyz Republic, January 1993 (000 ha) .	30
Table A3.5:	Water Requirements and Amount of Water Available for Irrigation by Oblast in the Kyrgyz Republic	32
Table A3.6:	The Allocation of Water Resources to the Kyrgyz Republic	32
Table A4.1:	The Kyrgyz Republic: Annual Sheep Management Cycle, Selected Problems and Suggested Responses	40
Table A4.2:	The Kyrgyz Republic: Wool Production by Genetic Type, 1993	43
Table A4.3:	The Kyrgyz Republic: Selected Wool Processing Data, 1993	44

THE KYRGYZ REPUBLIC AGRICULTURAL SECTOR REVIEW

ANNEX 1

AGRICULTURAL FINANCE

Overview of the Agricultural Credit System

1. The banking system in the Kyrgyz Republic consisted of 20 banks and the central National Bank of Kyrgyzstan (NBK) in October 1993. Among the commercial banks, four banks could be considered agricultural lenders through their extension of credit to farms (state, collective and private), farm commodity and input procurement agencies, the food-processing industry, and various input suppliers. Those banks include (a) Agroprom Bank (properly the Kyrgyzagroprom Bank), (b) Kyrgyzstan Bank, (c) Promstroi Bank (Kyrgyzpromstroi Bank), (d) Dyikan Bank (the Kyrgyzdyikan Bank). The first three banks are the largest banks in the Kyrgyz Republic and were transformed from earlier sector-specific banks in 1991. Those three banks have retained much of their previous sector-oriented lending activity and do not yet mobilize private savings through deposit creation. Thus, the formal agricultural credit system remains highly concentrated within a few banks as shown in Table A1.1. Supplier credit is virtually nonexistent.

2. The Agroprom Bank is the largest bank in the Kyrgyz Republic. It had 50 operating branches and employed about 1,100 people in June 1993. It is also the largest bank in terms of total loans with about 399 million som in outstanding loans in October 1993, or 41 percent of total bank loan volume. It became a joint-stock company in December 1991, and had 1,800 shareholders in May 1993. The bank provides short-term credit to farms, consumer cooperatives, state commodity-procurement agencies, food processors, and state agencies that supply farm inputs. In September 1993, the Agroprom Bank accounted for over 89 percent of all outstanding short-term bank credit to farms. Majority ownership in the bank is held by state agro-processing enterprises and consumer cooperatives.

3. *Kyrgyzstan Bank* is the second largest bank with 23 branches and employment of 840 in June 1993. Kyrgyzstan Bank is a joint-stock company that is owned primarily by state commercial and manufacturing enterprises (55 percent) and the remaining ownership is with private shareholders (45 percent). The bank reported short-term loans of just over 322 million som in October 1993, which was about 33 percent of total banking sector loans. During 1993 the Kyrgyzstan Bank was a major lender to agro-processing plants (tobacco, cotton and wool), bread-producing amalgamations and other food processing enterprises, and textile firms. Loans to farms represented only a small part of the overall loan portfolio.

4. *Promstroi Bank* was also converted into a joint-stock company in 1991. It operated 27 bank branches with 769 employees in May 1993. Although Promstroi Bank specializes in energy sector loans, it has also provided some farm loans (just over 4 percent

of its loan portfolio in September 1993). Ownership is highly concentrated in state-owned enterprises.

5. *Dyikan Bank* has remained quite a small bank since its creation in 1992. The *Dyikan Bank* was developed for the purpose of providing special credit to the newly created private farms. In this role it was to channel subsidized funds from central government sources to qualifying farmers and agricultural trading companies. Funds made available for this purpose were less than anticipated, and *Dyikan's* lending volume has been small. It operated 7 branches in September 1993. Although loans to primary agriculture represented over 20 percent of *Dyikan Bank's* total loan volume in September 1993, those loans accounted for less than a 2 percent market share of the loans to farms. Increasingly, the bank's loan portfolio has expanded into commercial and trading enterprises.

6. Reforms within the banking and rural credit system have been slow to evolve. The banks have continued to operate as "cash managers", not as independent financial intermediaries which pool the funds of savers, appropriately transform the rate, maturity and denomination characteristics of those funds for on-lending, and pool the risks of borrowers. Rather, the banks commonly practice a liquidity-driven funds allocation which directs own-resources into investments and tangible bank assets, while channeling higher-cost, short-term refinance credits into loans with matching maturities and only nominally higher interest rates. Thus, their primary function has continued to be one of providing cash to meet enterprise liquidity needs. Long-term investment credit currently represents an extremely small share of total bank lending activity. For example, at *Agroprom Bank* long-term loans represented less than 2 percent of total bank loan volume in October 1993. *Agroprom Bank*, *Kyrgyzstan Bank*, and *Promstroi Bank* carry high concentrations of loans with their major shareholders. These owner-borrower links are unhealthy; they discourage bank competition and jeopardize the financial positions of the banks.

Flow of Credit in 1993

7. Credit was provided to agriculture through directed lending and, later in the year, through the increased use of credit auctions. Directed credits were extended through the NBK to the commercial banks. While the NBK serves as the central bank with responsibilities for monetary control and bank supervision, it is through the extension of credit to the commercial banks that the NBK has affected the allocation of credit. In the past, the NBK allocated refinance credit to the banks using an overdraft arrangement which generally interfered with bank lending decisions, discouraged bank competition, and led to resource misallocations. The percentage of "centralized resources" in the banking system reflects the past (and continuing) practice of directed lending. In October 1993, NBK funding was nearly 63 percent of total bank credit (that percentage typically exceeded 50 percent during 1993). Among the banks lending to agriculture, *Agroprom Bank* reported the highest percentage of funds from NBK at 69.2 percent in October 1993 (Table A1.2). The continued high percentage of NBK funds for the three major banks through 1993, reflects the importance of this directed funding mechanism for agriculture and the economy at large.

Table A1.1: Short-term Credit to Agricultural Enterprises, Commodity Procurement Agencies, Food Industry and Input Suppliers in September, 1993

<i>Bank</i>	<i>Agriculture^a</i>	<i>Commodity Procurement</i>	<i>Food Industry</i>	<i>Input Supply^b</i>
AGROPROM BANK:				
Volume ('000)	136,200	42,392	40,310	28,185
Bank Credit (%) ^c	31.8	9.9	9.4	6.6
Market Share (%) ^d	89.4	39.5	36.5	37.5
KYRGYZSTAN BANK:				
Volume ('000)	7,977	64,299	70,004	4,494
Bank Credit (%)	2.7	22.1	24.1	1.5
Market Share (%)	5.2	59.9	63.4	6.0
PROMSTROI BANK:				
Volume ('000)	5,355	661	86	36,281
Bank Credit (%)	4.2	0.5	0.1	28.4
Market Share (%)	3.5	0.6	0.1	48.4
DYIKAN BANK:				
Volume ('000)	2,562	0	0	0
Bank Credit (%)	20.3	0	0	0
Market Share (%)	1.7	0	0	0
TOTAL:				
Volume ('000)	152,094	107,351	110,399	68,960
Bank Credit (%)	17.7	12.5	12.8	8.0
Market Share (%)	99.8	100.0	100.0	91.0

^a Includes state and collective farms and other enterprises that are under the Ministry of Agriculture. In the case of Agroprom Bank, the state and collective farms accounted for 88% of all agricultural loans by the Bank in September 1993.

^b Includes farm and nonfarm input supply companies.

^c The percent bank credit reflects the proportion of each bank's total loan volume outstanding which is loaned to the subsector (e.g., 31.8% of Agroprom Bank's total loan volume was extended to agriculture as short-term loans).

^d The percent market share reflects the proportion of all bank loan volume outstanding to the subsector which is held by each bank (e.g., Agroprom Bank accounted for 89.4% of all short-term bank loans to agriculture).

Source: Derived from National Bank of Kyrgyzstan summary data tables.

8. In February 1993, the NBK began to provide refinance credit to eligible banks through periodic credit auctions. The NBK determined the timing of the auctions and the amount of credit to be offered (with reference to monetary targets). Due to inflationary pressures the credit auctions were over-subscribed and auction interest rates increased sharply from 105 percent in June to a high of 340 percent in October 1993. The percentage of total bank credit flowing through the credit auction increased from 10 percent in May to 25 percent in October 1993. The implication is that nearly all new loanable funds provided to

agriculture through the banking system carried higher nominal interest rates, although even those higher auction rates were significantly negative in real terms.

**Table A1.2: Allocation of Outstanding Short-term Bank Credit to Agriculture
(current som)**

<i>Bank/Category</i>	<i>December</i>	<i>March</i>	<i>June</i>	<i>October</i>
ALL BANKS:				
Loan volume (incl. nonagric. loans in '000 som)	300,163	609,970	855,287	981,678
Pct. from NBK (%)	50.8	58.2	45.6	62.8
Pct. to all agriculture (%)	17.9	31.5	37.4	35.7
Pct. to primary agriculture (%)	7.4	8.7	15.0	14.7
Pct. to state and collective farm (%)	5.6	7.5	13.2	12.7
Pct. to private farms (%)	1.8	1.2	1.8	2.0
KYRGYZSTAN BANK:				
Loan volume (incl. nonagric. loans in '000 som)	77,678	76,119	247,538	322,261
Pct. from NBK (%)	40.9	33.7	21.5	59.0
Pct. to all agriculture (%)	36.2	37.9	58.1	34.5
Pct. to primary agriculture (%)	1.8	3.2	3.1	2.7
Pct. to state and collective farm (%)	1.3	2.7	2.6	2.3
Pct. to private farms (%)	0.5	0.5	0.5	0.4
PROMSTROI BANK:				
Loan volume (incl. nonagric. loans in '000 som)	42,452	136,917	122,295	99,002
Pct. from NBK (%)	41.3	68.7	53.6	55.5
Pct. to all agriculture (%)	1.6	1.2	4.9	4.8
Pct. to primary agriculture (%)	1.3	0.6	4.1	4.2
Pct. to state and collective farm (%)	0.8	0.5	3.4	3.7
Pct. to private farms (%)	0.5	0.1	0.7	0.5
DYIKAN BANK:				
Loan volume (incl. nonagric. loans in '000 som)	1,040	5,136	17,253	13,596
Pct. from NBK (%)	72.1	42.8	71.8	62.5
Pct. to all agriculture (%)	43.8	14.7	18.2	20.3
Pct. to primary agriculture (%)	43.8	14.7	18.2	20.3
Pct. to state and collective farm (%)	0.0	0.6	2.2	6.9
Pct. to private farms (%)	43.8	14.1	16.0	13.4

Note: Primary agriculture includes all farms (state, collective and private). To reconcile the amount of short-term credit from Agroprom Bank (above) with agriculture as shown in Table 1, one must multiply 31.7% (October 1993) times the total loan volume (392,058,000 som). The result is 124,282,000 som in October 1993 compared with 136,200,000 som in September 1993. The difference is due to timing of the reports and small differences in how agriculture is defined.

Source: Derived from National Bank of Kyrgyzstan summary data tables.

9. Directed credit was extended to agriculture at preferential interest rates throughout 1993. For example, in October 1993, the Agroprom Bank was directed to provide 136 million som in special credit to the state and collective farms in order to complete the fall harvest, which was in jeopardy due to sharply higher costs of fuel and the shortage of spare parts for machinery. The NBK provided the funds to Agroprom Bank at the credit auction rate of 190 percent with the understanding that the government would subsidize the rate by 90 percent, leaving the borrower's annual rate at 103 percent (which included a 3 percent spread for Agroprom Bank). The implied real interest rate is *negative* 74.6 percent. Corresponding implicit subsidies occurred earlier in the spring of 1993, when interest rates on 6-month farm production loans were set at 53 percent—well below the existing rate of inflation.

10. In addition to the targeting and subsidizing of agricultural credit, two characteristics of the 1993 credit allocation to agriculture are important to note. First, an increasing share of the total, short-term bank credit to agriculture went to nonfarm, agricultural activities (e.g., commodity procurement, processing, and various state enterprises). This is illustrated by comparing the percentages of bank credit flowing to all agriculture and the corresponding percentages to primary agriculture during 1993 (Table A1.2). Second, nearly all of the existing bank credit to farms was allocated to the state and collective farming units with relatively little credit to the new individual and cooperative private farms. Moreover, the allocation of bank credit to farms was dominated by production loans with terms of three to six months. The flow of investment credit (with maturities significantly exceeding one year) is seriously insufficient to fund long-term capital improvement of the farm sector.

The Arrears Problem

11. There was a significant increase in inter-enterprise arrears (accounts payable) throughout the agricultural sector during 1993. The problem of increasing arrears threatens both the level of financial intermediation in rural areas (because of the impact on the banks) and the monetization of the agricultural sector (because of the impact on farm financing). In 1993, crop and livestock farms involuntarily provided financing to various state commodity procurement and processing entities by selling their products and not receiving timely payment. In several instances, farmers and bankers complained that wool and grain-procurement payments had not been made for three months to one year after delivery. The result was a reduced cash flow to the farms, which were unable either to pay their workers or to repay the banks on time. An analogous financial problem occurred in the rural branch banks. As a consequence, bank refinancing of existing farm debt increased during 1993, and became a significant (but difficult to quantify) part of the observed expansion in farm sector lending. Successively higher interest rates further exacerbated the problem of nonrepayment, since the banks applied the higher interest rates plus rate penalties to the refinanced loan balances. This situation caused increased financial stress among farms, many of which were already technically bankrupt.

12. Commodity pricing and procurement policy lies at the center of the arrears/loan repayment problem. The existence of state orders for farm products revealed

two important weaknesses; low administered farm commodity prices (which reduce farm profitability and the ability of farms to self-finance), and a demonstrated inability of state agencies to pay farmers on time (which reduces farm liquidity and increases the dependency of farms on bank funds). The implication is that restructuring, price policy, and credit policy must be strongly linked. Governmental efforts to improve productivity and the financial performance of farms should be approached in terms of policies to promote farm restructuring and market prices that allow farms to self-finance out of earnings. Credit would thus become a supplementary rather than primary source of funds.

Financial Stress in Agriculture

13. During 1993, financial problems in the agricultural sector were reflected by conditions of enterprise illiquidity and growing financial stress. Underlying these developments in the farm sector were the rapid rate of inflation and a continuing government policy of state orders for the major farm commodities. Inflation generated strong upward pressure on the prices of purchased farm inputs, while state orders placed a severe constraint on the upward movement of farm commodity prices. The inevitable result was a severe cost-price squeeze on farm profits that reduced the ability of farm enterprises to self-finance and brought cash flow stress (where cash outflows exceeded cash inflows from operations). Since credit discipline was not imposed by the banks, there was a tendency for farms to meet the cash flow deficit problem with increased short-term borrowings—regardless of the ability to repay. Rising interest rates significantly worsened the financing gap problem, since stagnant farm earnings were insufficient to service the rising level of operating debt.

14. As credit allocations became constrained, the level of arrears that commodity purchasers and processors owed to farms escalated. Jointly, the arrears problem, rapid inflation of purchased input prices, and rising interest rates led farms increasingly to engage in barter exchanges rather than cash market transactions to meet their liquidity requirements and to control costs. In addition, farms withdrew from commercial production and oriented more toward consumption needs of employees. The escalation of arrears forced many farms to use high-cost, bank refinancing credit to defer repayment on their existing loans.

15. Unequivocal evidence of the significant increase in arrears is not to be found in bank reports. The banks have not defined nonperforming loans according to western accounting practices and they do not classify loans according to risk. Moreover, the banks have typically decided to refinance the unpaid loans. Thus, the available information on the loan portfolio substantially disguises the problem. Directed lending has also contributed to several additional distortions in the marketing of commodities and the purchasing of farm inputs. Directed loans to the state purchasing agencies and agroprocessing firms promoted a system that has severely restricted the commodity marketing opportunities of the farms. Similarly, the directed credit allocations to agriculture were provided for the purpose of acquiring designated production inputs through the state supply agencies at relatively low interest rates. These credits probably had the effect of distorting farm decisions concerning which inputs to purchase (and when) with little concern about repayment.

Reaction of the Banks

16. Through October 1993, the financial problems of the agricultural sector progressed without the occurrence of massive bankruptcies because the banks were not required to collect on bad debts or to make sufficient provisions for the uncollectible portion of their loan portfolios. Moreover, the banks elected not to use the existing law on insolvency to break the circle of arrears. Rather, the banks continued to follow a defensive lending strategy where additional (refinancing) loans were provided to cover enterprise losses and to postpone bankruptcies. Additionally, the banks proceeded to shorten maturities on new agricultural loans to three months, and to redirect their lending efforts toward commercial activities (where profits, sales turnover, and repayment capacity are stronger). The net effect of these banking practices was to reduce the availability of investment credit for primary agriculture, to reduce the overall allocation of bank credit to agriculture, and to postpone dealing with the problem of accumulating arrears and the threat that nonrepayment of loans poses to the banks.

Short-term Farm Credit in 1994

17. As part of the existing process for allocating agricultural credit, the Ministry of Agriculture and Food (MOA) has annually estimated the amount of operating credit that is required by state and collective farms. Traditionally, the resulting farm credit "needs" estimate has been forwarded to the NBK as part of the state planning process, along with the *sectoral credit "needs" estimates of the other ministries*. The NBK in conjunction with the Ministry of Economy and Finance has used the sector estimates to develop an administered sectoral allocation of funds at the national level.

18. The MOA estimation of farm credit "needs" utilizes a basic accounting method where aggregate operating expenses (in 1992, for example), as reported by the state and collective farms and other public farm enterprises, are multiplied by an inflation factor to project future operating expenses (for 1994). Further, the aggregate expected farm revenues are projected (into 1994) using information about farm production levels and prices (in 1993) and an extrapolation of commodity market price increases (from 1993 into 1994) and a small upward adjustment for commodity price increases under the state procurement plan. A proportion of farm revenues in one year is assumed to be retained to make input purchases in the following year. In 1993, the proportion is assumed to be 26.6 percent of total farm revenues, based on 1992 conditions. The sector credit "need" is computed as the amount of projected total production expense less the estimate of retained farm revenues.

19. The MOA methodology has several deficiencies that affect the resulting credit estimate. First, the calculation of expenses requiring credit appears to ignore several important expense items (e.g., labor, and interest). Thus, the estimate of credit need is too low. For example, by including the interest expense for six months at the rate of 103 percent (per annum), the 408 million som credit need increases to over 618 million som. Second, the calculation assumes too little change in the structure of production from one year to the next and builds the existing operating inefficiencies of the state and collective farms into the sector credit estimate. For this reason, the estimate of credit needs is too high. A third

problem arises from the assumption about retained farm earnings, which is overly optimistic under current circumstances. This means that a financing gap is automatically built into the annual farm sector credit estimate. In fact, under procurement prices for the major farm commodities and input prices in 1993, the 1993 level of retained earnings in the farms was theoretically negative.

20. However credit needs are estimated, it is unlikely that agriculture will be granted credit in this amount. Nor would it be advisable to launch a program of targeted lending of this magnitude. Substantial continued directed lending to agriculture undermines efforts to control inflation. As argued throughout this report, inflation damages agriculture, and agriculture is one of the beneficiaries of successful efforts to stabilize the economy. The estimate of credit "needs," either under the MOA methodology or alternative approaches, serves primarily to demonstrate that "needs" as traditionally defined cannot be met under current circumstances. Farms must substantially increase their ability to self-finance by selling animals, orienting toward export markets where prices are higher, reducing costs, and raising productivity. The government must, as a matter of urgency, allow prices to rise to border levels, and allow product to move to export markets so that farms can raise profitability.

Credit Arrangements in 1994

21. During 1993, the banks began to retreat from agricultural lending because of repayment problems in the sector. Thus, the supply of credit shifted back. Also, farm demand for formal bank credit fell because of reduced capacity to repay loans. There was also a decrease in demand for credit as farm interest rates have risen in response to inflation and the introduction of the national credit auction during 1993. Therefore, at the level of interest rates on farm loans that existed during early 1993 (53 percent), a significant credit shortage emerged.

22. As interest rates rose to 103 percent and higher during the fall of 1993, the excess demand for credit in agriculture diminished as farms turned to barter exchange and reduced use of purchased, commercial inputs. This condition will probably become more severe in 1994.

23. Until farm profitability recovers and until changes in the banking system facilitate better provision of commercial financial services for agriculture, special programs of directed credit to agriculture are likely to be needed. While directed credit is retained, it should be channeled to farms for a period corresponding to the production cycle and with more rigorous enforcement of loan security than has been the case in the past. To address concerns about loan recovery these production loans should be adequately secured with collateral in the form of liens on crops and livestock and additional collateral where available. Adherence to the monetary targets for the macroeconomic stabilization program suggests that the volume of money will grow at a relatively slow rate during 1994. Commercial interest rates will remain relatively high, and pressure on the government to provide directed and subsidized credit for agriculture will remain strong. If special programs for agricultural credit are retained, several measures should be taken to improve the effectiveness of these

programs. New loans should not be used to roll over inherited debt. New loans should instead be used to finance current inputs for primary production. Applicants for credit should be required to show a sound business plan that demonstrates projected earnings adequate to repay the loan. The loan should be collateralized with crop or livestock products. Subsidized and directed credit should be phased out as state orders are dropped and pricing and trade are fully liberalized, and as farm profitability recovers.

Supplier Credit in Agriculture

24. The previous Soviet system of financing agriculture made it unnecessary for supplier credit institutions to develop in the Kyrgyz Republic. Government agencies provided inputs to the farms, and the banks channeled the requisite amount of cash to make the purchases at state-determined prices. Liquidity was a hallmark of the system. The situation in the Kyrgyz Republic agricultural sector today is quite different. It is characterized by severe illiquidity and a lack of farm suppliers and supplier credits with which to purchase farm inputs.

25. The banks commonly provide production loans with short maturities of three to six months. Consequently, the farms are forced to refinance at higher interest rates before they have the production with which to repay those loans. This short loan maturity strategy allows the banks effectively to pass the interest rate risk through to the farms, although the burden of risk-bearing revisits the banks in the form of higher loan defaults. The dilemma in agriculture is that availability of credit through farm suppliers would at least temporarily ease the short-run problem of access to credit, but the development of viable agricultural supply institutions (which could also extend credit at competitive interest rates) is a long-run process. Indeed, the economic conditions that would be conducive to the emergence of supplier credit in the short- and long-run are also those that would lead to more effective banking operations in the sector.

26. The input financing programs of agricultural supply cooperatives in the U.S. are quite instructive concerning the parameters for success. Credit guidelines of those suppliers stipulate that loan approvals be based on the size and complexity of the farming operation, but that the common credit standards include knowledge of the value of farm assets (primarily products) that can be pledged as collateral, limitation of financing to the inputs being purchased, evidence of insurance (and assignment of the benefits), and good credit history of the borrower. The additional factors include an adequate legal framework to secure and enforce liens and related collateral claims.

27. In the short run a strategy to increase supplier (and other nonbank) credit activities in agriculture could include:

- instituting a seasonal financing facility through the NBK for supporting the extension of credit for farm inputs (with nine-month to one-year maturities) which would be available to the banks and input suppliers (via discounting with the banks)

- the introduction of a national commodity credit scheme for the purposes of financing marketing of the major crops once they have been harvested, and allowing farmers to repay their production loans without delay.

Financing Private Farms

28. The expanding number of private farms presents a unique and difficult financing challenge to the banking sector. Currently, the small private farms are reported to have few resources with which to undertake production activities. They have extremely limited access to production credit (for seeds, fertilizers, herbicides, fuel, livestock feeds and supplies, etc.), and virtually no opportunities to receive investment credit (for capital improvements) through the banks. The larger private cooperative farms are only slightly better served by the banks.

29. Unless financing for private farms improves, many small private farms will be trapped in subsistence farming activities and their productivity will be slow to increase. The development of remedial policies to address the financing needs of small private farms at this juncture is fraught with problems, including lack of sufficient data on farm numbers, sizes, types, and operational characteristics. A brief survey and study of these farms could reveal opportunities to extend production, marketing, and investment credits. At present their credit needs appear to be significant, but they remain largely unmet by the banks.

Bank Lending Criteria and Procedures

30. The banks in the Kyrgyz Republic have operated historically as instruments of the state, as have their counterparts throughout the FSU. Although reforms in the banking sector are underway, lending practices and procedures do not yet represent sound banking practices. Moreover, as a reflection of the repayment problems in the sector, the agricultural banks are particularly threatened by the perpetuation of these practices and by the deterioration of their loan portfolios. Banks must use more rigorous screening in evaluating loan applications. Procedures used in the past do not adequately account for the repayment of interest on the loan or for the uncertainty of farm expenses due to inflation. Second, the procedure does not appropriately distinguish between cash and noncash items, which leaves unclear the annual cash flow pattern of the farm. Without this information it is difficult to determine clearly the size of the cash deficit and, therefore, the amount of operating credit that is required. Moreover, without a cash flow projection it is difficult to recognize the borrower's ability to repay. Third, the procedure does not yield a meaningful estimate of expected farm profitability, since an income statement is not prepared. Without that information it is not possible to determine if credit will be productively used in the farming operation.

31. The deficiencies of the existing loan procedures suggest an approach for improving the way in which branch banks evaluate and monitor farm borrowers. Banks should require that farms submit a simplified farm business plan. A generic farm business plan consists of an outlook, a description of present farming operations (production and

marketing), a statement of financial objectives, and a set of strategic and operating plans. A critical aspect of business planning is the coordination of financial objectives with the strategic and operating plans. Farms in the Kyrgyz Republic currently exhibit illiquidity, weak profitability, and a lack of operational efficiency. Thus, a farm business plan should focus on the preparation of a whole-farm cash flow budget that requires the integration of projected production, marketing, and financing activities of the farm.

32. Moreover, the whole-farm budgeting procedure requires that the sources and uses of cash be determined. Thus the bank is able to identify the size and timing of the operating cash deficit, and the availability of cash receipts to repay the loan. In addition, cash flow budgeting can be used to evaluate the impacts of inflation, changes in interest rates, commodity price and production variability, and changes in farm operations on the cash flow performance of the farm business. For crop farms an annual cash flow budget may be adequate, but livestock and mixed crop-livestock farms should prepare more frequent cash flows because of the more rapid turnover of production assets. Banks can use the simplified farm business plan (which includes a current balance sheet and whole-farm cash flow budget) effectively to screen farms for credit.

33. A minimum positive net cash flow criterion could be imposed on farms to identify those with adequate repayment capacity. Additional liquidity and equity capital standards could be imposed on farm borrowers based on a current balance sheet. For example, a minimum liquidity position would require the value of current assets (cash, crop and livestock inventories, receivables, growing crops, etc.) to be a multiple of the current liabilities of the farm. However, balance sheet factors should receive secondary importance in the credit decision until the existing Soviet accounting procedures are replaced with western accounting standards and problems with determining appropriate farm asset values are addressed.

Performance of Agroprom Bank

34. The Agroprom Bank's financial performance is representative of the financial problems in the agricultural sector, since the Bank's loan portfolio accounts for nearly 90 percent of total bank loans to primary agriculture and significant proportions of the total loans to other segments of agriculture. In brief, the financial problem is one of weak profitability which can be attributed to two primary factors; a weak profit margin and slow asset turnover. In the bank context the contributors to weak profit margins are inappropriate pricing of loans and services, ineffective control of costs, and operational inefficiency. Slow turnover of bank assets is predominantly a reflection of poor loan collection and the build-up of arrears in the loan portfolio.

35. The Agroprom Bank is not unique in this under-capitalization problem, since the other large banks in the Kyrgyz Republic have also been unable to generate nominal earnings at rates comparable to the rate of inflation. However, for Agroprom Bank this situation is critical because of deterioration in the agricultural loan portfolio and various technical problems concerning management of those assets. Interviews at the branch and national bank levels indicate that loan repayment problems escalated in 1993. At a

Box A1.1: Recommended Components of Farm Business Plan and Credit Analysis

1. **Business Plan Components:**

A. Business outlook

Economic environment, commodity prices and markets, input availability, government programs, tax and legal regulations

B. Description of present operations

Production activities—for crops (type, area, yields, costs), for livestock (type, head, reproduction program, feeding program, health, costs), employees, machinery and equipment, draft animals, etc.

Marketing activities—for crops and livestock (quantities sold, prices received, method of sale, inventories held, storage facilities, transportation costs)

Financing and investing activities—balance sheet, primary lenders (formal, informal), business organizational form, earnings history (one to three years), capital investments, leases

C. Financial objectives

Farm liquidity, solvency and profitability; ownership; growth target(s)

D. Strategic and operating plans

Long-term production, marketing, financing and investing strategy

Projected whole-farm cash flow budget of operations and financing.

2. **Farm Financial Data:**

A. Balance sheet (current)

Total farm assets, total farm liabilities, total equity capital, current assets, current liabilities

B. Cash flow summary (previous year and projected)

Gross cash farm receipts, total farm cash expenses, net cash from operations, interest and principal payments, wages and distributions in kind, income tax expense, gross nonfarm cash earnings

C. Depreciation expense (previous year and projected)

3. **Credit Analysis:**

- A. Repayment margin (cash basis) = (net cash farm income from operations + gross nonfarm cash earnings + interest earned - taxes)

Repayment margin/principal and interest payments ratio: 1.0 (minimum)

B. Liquidity

Current assets/current liabilities ratio:

1.0 (minimal)
1.0 - 1.5 (moderate)
over 1.5 (strong)

Net working capital (current assets less current liabilities):

Positive (minimal)
Moderate-to-strong position depends on the inflation scenario

C. Solvency

Owner equity/total farm assets ratio:

0 - 0.30 (minimal)
0.30 - 0.60 (moderate)
over 0.60 (strong)

D. Profitability (previous year and projected)

Gross cash farm receipts - total farm cash expenses - depreciation expense +/- change in value of crop and livestock inventories:

Positive (minimal)
Moderate-to-strong performance depends on the inflation scenario

representative branch in the Issyk-Kul oblast, the level of nonrepayment reportedly increased from virtually zero percent in October 1992 to 13.5 percent of loan volume in October 1993. An in-depth analysis of the loan portfolio is not possible, since the data provided by Agroprom Bank tends to obscure the actual level of problem loans and the reporting of uncollectible loans is generally quite deficient. In place of internally generated funds from operations, the Agroprom Bank has become more dependent on central NBK funds. The proportion of Agroprom Bank's funds provided by the NBK has risen from 53 percent (in June 1993) to over 69 percent (in October 1993). Moreover, the Bank subsequently experienced a slowdown in loan repayment and reduced profitability and was unable to repay the NBK on time.

36. In the past, overdrafts of Agroprom Bank at the NBK were assumed by the government to keep the Bank operating. The current dilemma, however, suggests that a more significant transformation (restructuring and recapitalization) of the Bank needs to occur in 1994. Additionally, several operational improvements should be undertaken to improve the level of credit analysis and administration at the national and branch levels. This will

require that the existing managerial information systems be upgraded, accounting systems be totally revised, and credit standards and extensive loan officer training be implemented.

37. The challenge of inadequate loan collections and the increase in arrears requires a response combining changes in policy and law. While the arrears problem reflects the distorted agricultural pricing policy, in addition, the banks have not enforced their legal claims on pledged assets. The general inadequacy of the "bankruptcy law" has been cited by the banks as a deterrent to the collection of bad debts. In fact the law has consisted of the law on pledge (which covers liens on chattel) and the law of insolvency. Neither law has been perceived by the banks to be legally enforceable. Therefore, the law has not been used by the banks to "break the circle of arrears". When the law on insolvency is improved, the approach of the Agroprom Bank should be to foreclose only as a last resort after restructuring of inherited debt has been attempted in each case.

Conclusions and Recommendations

38. During 1993, there was a significant decline in farm sector demand for new borrowed money in the Kyrgyz Republic. This was in response to sharply higher nominal interest rates, lower real farm incomes, and a general tightening of short-term bank credit. New, long-term credit was virtually nonexistent. The decline in borrowing led to greater dependence on severely limited internal farm resources and available cash as well as to the demonetization of the farm sector (as even the large farms turned away from the markets toward increasing self-sufficiency for their employees) and a further loss of farm operating efficiency.

39. Farms that can demonstrate an ability to repay should receive credit to purchase inputs such as fertilizers, fuel, chemicals, feeds, etc. Special measures for credit should be considered in the interim until inflation is reduced and farm sector price policies are changed. Production loans should be made with sufficiently long maturities for the farms to complete production, market their products and receive payment (e.g., nine months to one year). The loans should be collateralized by farm production using market prices and enforced according to the new law on insolvency. Interest rates should be on variable-rate terms, and indexed to the national credit auction rate. A subsidy element will be necessary until price and marketing controls are lifted, but should thereafter be removed. The initial interest rate will need to be lower than the credit auction rate until farm prices are liberalized and farm earnings can sustain higher debt-servicing levels. All interest rate subsidies that are provided should be shown in the Kyrgyz Republic budget. However, the objective should be for interest rates eventually to be determined by markets and to be positive in real terms, preferably by the end of 1994. Directed credit for agriculture should be phased out as pricing and marketing of agricultural products are fully liberated.

40. Banks should adopt improved methods for evaluating credit applications and managing the loan portfolio. All farm borrowers should be required to prepare a brief business plan which informs the bank about the existing financial position of the farm and the plan of farming operations. The plan should clearly show the projected cash flows of the business, including the repayment of debt. The banks should actively use this information

to screen borrowers before lending. Banks should also adjust the amounts, terms, and conditions on loans that are granted. Farm business projections should be modified appropriately by the banks to reflect expected rates of inflation. The use of business plans and credit criteria to assess the creditworthiness of farm borrowers and to change bank procedures for administering loans will require that expert technical assistance be provided to develop credit manuals and to train the bank managers and loan officers. This technical assistance should be provided in the context of training and the implementation of best practices in all aspects of rural banking at the earliest possible stage of sector adjustment.

41. The banks are currently carrying significant amounts of loans that are in arrears and are not likely to be repaid. The banks should be required to charge off the uncollectible loans. The banks should be assisted in collecting on loans where a significant recovery is possible, and encouraged to restructure the nonperforming loans of financially viable farming operations. As part of that strategy, the banks should be allowed to increase their spreads on loans. By improving the financial health of the banks, the prospects for expanding the availability of long-term funds in agriculture will also be improved. A decision regarding restructuring or alternative options for Agroprom Bank should be made in 1994.

42. The current banking system largely ignores the small, private farms. Some of the factors that contribute to this situation are: the high unit transactions costs of small loans, the lack of assets for collateral, the high level of subsistence activities, unproven management, and poor records. Banks will have to make more efforts to serve small farmers. Before that can occur, however, banks need a clearer understanding of the financing and credit needs of small farms. The Kyrgyz Republic should commission a short-term study with the assistance of donor funds, and should develop an appropriate strategy for providing financial services to the emerging small-farm population. The relative merits of grants versus loans should be considered in financing the start-up costs of private farms.

ANNEX 2

THE CROP SECTOR

1. Production figures for the crop sector in the Kyrgyz Republic are given in Tables 2.4 and 2.6 of the statistical annex. They show a modest decline since 1990, plus significant changes in crop mix; most notably an increase in area under wheat and sugarbeet.

Principal Crops

2. *Winter Wheat:* Approximately 90 percent of the wheat grown in the Republic is winter wheat. About 75 percent of winter wheat is irrigated. The recommended time of planting for winter wheat is between 20 September and 20 October. For various reasons however—shortage of machinery, delayed harvesting of sugarbeet, etc.—the crop is frequently sown in November and sometimes in December. The crop should be ready for harvesting in the first week of July, but again this is often delayed into August. Losses per hectare due to late harvesting have been estimated at approximately 700 kg/hectare, or about one-quarter of the yield.

3. The yield potential of the recommended varieties is high, matching international levels. Yields of 6 t/ha are said to be not unusual for "Spartanka" on state and collective farms with good management, and where fertilizer and irrigation requirements have been fully satisfied. On average, however, yields of 3.4 t/ha are achieved under irrigation. In fall of 1993, much of the winter wheat was sown without a basal dressing of fertilizer, and yields are expected to be approximately 2.7 t/ha, even if it is possible to apply a top-dressing in the spring. With irrigation and no fertilizers, yield is depressed by the leaching of mobile nutrient (especially nitrogen) from the soil. Non-irrigated wheat yields are very low at between 1.2 t/ha and 1.5 t/ha; in a dry year the crop may fail completely.

4. *Spring Wheat:* "Intensivna" is the usual spring wheat variety now grown in the republic. It is sown in March and should be harvested at the beginning of July. As expected, yields are somewhat lower than those for winter wheat.

5. *Spring Barley:* About 85 percent of the barley produced in the Republic is spring barley, and most (about 60 percent) is unirrigated. It is all grown for livestock feed. The yield potential of these varieties is approximately 7.0 t/ha to 7.5 t/ha. In reality, the yields achieved are low, averaging about 2.5 t/ha (4.0 t/ha under irrigation, and 1.5 t/ha rainfed).

6. Barley is the first crop to be planted in March. Recommended seed rates are high at 250 kg/ha, but this recommendation is apparently under review. Harvesting occurs at the beginning of July.

7. *Winter Barley*: "Yugodar," a winter barley developed in Odessa, may give yields of over 5 t/ha on irrigated farms and about 2 t/ha rainfed.

8. *Maize for Grain*: Maize production is based on hybrids. The recommended time to sow maize is at the end of April or the beginning of May, but sowing is frequently delayed until the end of May. The crop is ready for harvesting by early or mid-September, but the harvests frequently delayed until late October.

9. *Maize for Silage*: "Chuiski 62TV" is the variety generally grown for silage, producing about 26 t/ha (yields of 75 t/ha have been achieved experimentally). As with grain maize, the crop is sown at the end of April or the beginning of May and should be cut during the second half of August. There are occasional delays in harvesting which lead to loss of leaf. Most delays are caused by silage cutters being either unavailable or in need of repair.

10. *Alfalfa*: Alfalfa may be cut for hay (25 percent moisture) or haylage (55-60 percent moisture), used as a pasture crop with grass, or pelleted. It is sown in March at seed rates of 2.0 kg/ha to 2.5 kg/ha when drilled and 8 kg/ha to 10 kg/ha when broadcast. These seed rates appear to be rather low and would certainly be worth investigating experimentally if this has not been done already. Elsewhere, seed rates of 10 kg/ha are recommended for drilling and up to 20 kg/ha for broadcasting. The few fields seen had poor stands which may indicate too low a seed rate; equally they may indicate a crop that had passed the end of its productive life, a crop cut too close to the crown, soil fertility problems, or irrigation problems.

11. The recommended practice is that the crop remain in the field for from three to five years; sometimes, however, it may be left for up to seven years, long after it has passed its peak of its productivity. Three to five cuts may be taken in a season, giving a total annual yield of hay of 7.5 t/ha to 8.0 t/ha (but less than 6 t/ha in 1993). The timing of cutting alfalfa is extremely important for maximizing the digestibility of the harvest and for minimizing leaf loss. Improvement in the timing of cutting could possibly increase production and enhance quality.

12. It is estimated that approximately 85-90 percent of the soil suitable for alfalfa contains the appropriate species of Rhizobium. Additional nitrogen application is therefore not recommended. Alfalfa often responds to a small initial application of nitrate, however; perhaps this has not been investigated. P_2O_5 is recommended at the rate of 200-250 kg/ha, and K_2O at 100-130 kg/ha.

13. *Sugarbeet*: The Chui valley used to be a very important area for the production of sugarbeet by virtue of the fact that it was one of the areas where high yields of sugar could be obtained within the FSU. Consequently the area was over-cropped, with little consideration given to the rotational requirements of the crop. Soil-borne diseases accumulated and the population of nematodes grew, so that by the mid-1980s yields were down to 10 t/ha or less, and the sugar content was down to less than 10 percent. In 1985 the crop was abandoned and six of the eight processing factories in the Republic were converted to other uses. The remaining two factories remained open to refine raw sugar

imported from Cuba. The land that had been under sugarbeet was given several years to reduce its pest and disease load.

14. In recent years sugarbeet production has begun again. Most production is in the Chui valley, but there are also very significant areas of production (about 5,000 ha) in Talas oblast. Only monogerm varieties have been grown in recent years. Sowing takes place in April. The recommended seed rate is 6 kg/ha to 7 kg/ha but this rate is usually exceeded. Thinning is done by hand. In good years, average yields of 37 t/ha to 38 t/ha have been reported; the long-term annual average yield on some farms is about 25 t/ha, with 15-17 percent sucrose, i.e. about 4.25 t sugar/ha. Nationally however, recent yields have generally averaged less than 20 t/ha. This compares poorly with a world average of 30 t/ha or more.

15. A major problem that the industry faces now is the shortage of processing facilities. One (Kainda) is once again fully operational for sugarbeet, and the second one (Novotroitsk) is in the process of being overhauled for its original function. In 1993 much of the Republic's production was taken to Jambul oblast in neighboring Kazakhstan for processing. Once again an increase in production is planned; high yields of sugarbeet of high sugar content (greater than 20 percent) can be obtained in Issyk-kul oblast, but farms in this area may be up to 500 km from a processing facility. Unless a factory is built in Issyk-kul (perhaps a small-scale plant) transport costs would probably make such an operation uneconomic. The yield advantages of the area would possibly be forfeited through reductions in sugar content as a result of protracted processing delays. It has been estimated that sugar losses between harvest and processing can be as great as 30 percent (10-15 percent is the expected level elsewhere). Osh and Dzalalabad are also designated for increased production and will need at least small-scale processing plants. Careful feasibility studies of the economics of production and processing should be undertaken prior to investment. The investment should be made by the private sector, and feasibility studies may attract such investment.

16. *Cotton:* Cotton is produced mostly in Osh and Dzalalabad oblasts in the southwest of the country. It is all grown using furrow irrigation, with four to six irrigations per season, depending on rainfall. The variety grown at present, "Kyrgyzski 3," has a staple length of 34 mm, which is long but not extra-long. It has been selected for its disease resistance and its short growing season.

17. Sowing, usually at the high rate of 100 kg/ha, is carried out in April. Harvesting starts at the beginning of September; two mechanized harvests are followed by one or more manual harvests. Yields generally range from 2.2 to 3.2 t/ha, with the higher yields being achieved in the Aravan region at the lower altitudes of the fertile Fergana Valley. The oil content of the seed is 35-40 percent.

18. Crop pest and disease problems include thrips and Verticillium wilt. Only about 40-50 percent of the crop's pesticide and fertilizer needs are currently met. Small amounts of insecticide—enough for spot spraying—were obtained this year from Italy in exchange for raw cotton. Sulphur, which is applied once or twice per season around the edges of fields to foil insect invasions, was obtained this year from Uzbekistan in exchange

for tobacco. Much of the fertilizer for the crop is said to come from Russia via Uzbekistan, again in exchange for wool, tobacco, and cottonseed oil.

19. The usual period between successive cotton crops is three to six years. Ginning facilities are old and under-utilized. This year, the ginnery at Karasu in Osh, which has a capacity of 100,000 t/season, has only processed 11,000 t, and part of this came from Uzbekistan. Dzalalabad used to supply raw cotton, but since it has split off from Osh as an autonomous oblast, this arrangement has ceased. Farms now pay the ginnery in kind (10 percent of their raw cotton). They get back 90 percent of their cotton after it has been processed and they may then sell this on to the textile factory or use it for barter. The textile factory in Osh, a major employer in the area, has been closed for much of the time in recent months since it cannot meet the price demanded by farms for their cotton. This cotton textile factory, the only one in the Republic, has a capacity of 115 million m² annually; in 1993, it has produced only 22 million m².

20. *Tobacco:* Tobacco production in the Kyrgyz Republic started in the 1930s with the advent of refugees from Armenia and the Caucasus. At first it was grown in the Chui Valley, but during World War II tobacco gave way to the more urgent production of grain. Now it is grown in Osh, Dzalalabad, and Talas oblasts. "Dubek," the only variety grown, is an aromatic, oriental tobacco. It is used primarily as an additive to other types of tobacco. Virginia tobacco has been tried but it produced disappointingly small leaves.

21. Nurseries are sown in February and seedlings are transplanted to the field in March or April. Harvesting starts in August and continues through September into October. Average yields in Talas are 2.2 t/ha, whereas further south in Osh the mean yield is about 3.0 t/ha. Pests and diseases have posed no serious problems in the past; leaf-sucking insects have been controlled with sprays. Two factors may change this. The first is the shortage of pesticide, and poor application when it is available. The second is the tendency of growers to neglect rotational requirements in the pursuit of fast returns on a crop that can be traded across the border. A period of three to seven years between successive tobacco crops is recommended, but some farms are reported to grow tobacco as a continuous crop.

22. There are five tobacco factories in the country—in Bishkek, Kizelkiya, Karasu (Osh), Dzalalabad, and Tashkumer. The factory at Bishkek is the smallest with a capacity of 4,500 t/year. The others have capacities of 10,000 t/year apart from Kizelkiya which has a capacity of 20,000 t/year. Financial problems and restrictive marketing rules interfered with marketing of the crop in 1993. The cigarette factory in Bishkek used to be part of the tobacco factory but was split off. It can take 5,000 t of tobacco per year (much of it imported) and produce 4.5 billion cigarettes, but because of its poor cash flow, it is now finding it difficult to buy tobacco, cigarette paper and filters. A large quantity of processed tobacco remains in store at the tobacco factory because the cigarette factory cannot afford to buy it.

23. Silk is produced in Osh oblast. The factory, which employs 5,000 people, can process 800 tons of cocoons into 4 million to 5 million m² of pure silk cloth, at present selling for 16 som/m². In 1993, because it could not pay the price demanded by the supplying farms (it pays 16 som/kg), farms held supplies of unprocessed cocoons.

24. Efforts are underway to increase the production of silk in the oblast by the introduction, in 1994, of a more productive silkworm from Japan, and by employing technology to determine the sex of silkworms with 98 percent accuracy. The Japanese breed produces a larger cocoon with a greater thread length, and female silkworms in general produce longer threads than males. The silk factory is cooperating with a Japanese firm, Nissan Gonze, in this project, and trials have been conducted at Osh to establish its biological viability. The factory wishes to expand and re-equip with Nissan Gonze looms and other equipment. A loan of \$60 million has been promised to the Republic by the Japanese government, and of this the silk factory is endeavoring to secure \$16 million, the sum it calculates is required for rehabilitation, expansion and commercial viability. At present, the factory appears to operate as efficiently as possible within the existing constraints. A small export market (to Italy and Bulgaria) has been established.

Fertilizers and Agricultural Chemicals

25. National fertilizer consumption fell each year for the years 1990-92, as the figures in Table A2.1 show. Figures are not yet available for 1993, but it is certain that they will show a continuing fall in consumption. The fertilizers most commonly used in the Republic are: ammonium nitrate, urea, ammonium phosphate, diammonium phosphate, and potassium chloride. Appropriately for soils giving a basic reaction, none of these is base-forming.

26. The Institute of Crop Farming is conducting a program of trials on vermiculture and the production of compost on a commercial scale with a view to reducing the country's reliance on imported mineral fertilizers.

27. As with fertilizers, the national consumption of agricultural chemicals has been falling dramatically in recent years. Table A2.2 shows the consumption of various types over the period 1990-92.

Seed production

28. The republic is self-sufficient in seed production. It appears that material of an acceptable quality is generally produced. Foundation seed is produced from breeder seed on an Institute of Crop Farming farm; this is then distributed to designated multiplication farms. Certification of seed is carried out by state certification laboratories.

Agricultural Research and Extension

29. There are five institutes that deal with agricultural research, two of which come under the umbrella of the MOA. The most important of these in the field of agricultural trials is the Institute of Crop Farming which has, at least until recently, carried out roughly 60 percent of the experimental work conducted in agriculture in the country.

Table A2.1: Mineral Fertilizer Consumption Kyrgyz Republic, 1990-92 (thousand ton nutrient equivalent)

<i>Fertilizer</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>
Total	201	86	81
Nitrate	104	86	43
Phosphate	84	71	32
Potash	13	12	6

Source: Kyrgyz Selkhozkhimia.

Table A2.2: Consumption of Agricultural Chemicals Kyrgyz Republic, 1990-92

<i>Type of Agricultural Chemical</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>
Total	4,530	3,479	2,380
Insecticide	695	554	364
Fungicide	2,515	1,892	1,274
Herbicide	726	553	487
Dessicant	438	352	152
Seed dressing	127	115	88
Microbiological	33	14	14

Source: Kyrgyz Selkhozkhimia.

30. The other institute under the MOA is the Institute of Pastures and Forage. The Institute of Soil and Land Use was under the MOA until very recently but is now, like the Institute of Agricultural Chemistry, directly answerable to the government. The Institute of Biochemistry and Physiology comes under the Academy of Science which in turn is directly answerable to the government.

31. In theory, recommendations resulting from agricultural trials reach farms through the MOA. The institute concerned publishes its results for a supervisory committee in the Ministry. If this committee considers the recommendations valuable, it will relay them to users by convening a meeting of state and collective farm chairmen, raion agronomists, and others. These people will then disseminate the information in their own raion. Demonstration plots are used for extension purposes; many of these are run by technicians of the Institute of Farming, of which there are 150 at the raion level.

32. This description of the system of research and extension is largely theoretical since very little research is being carried out at present. Many qualified and experienced members of staff have left the institutes for financial reasons.

33. The Institute of Crop Farming carries out fertilizer trials on a variety of crops, both at its Experimental Farm for Sugarbeet Breeding (not exclusively for sugarbeet) and on farms around the country. The Institute has a soil-testing laboratory but, because of a lack of funds to buy reagents, this is not functioning at the moment. The Institute also possesses a computerized atomic absorption spectrophotometer for the analysis of farm soils, but farms have no funds to avail of the service. The facility is therefore largely unused. A start was made fairly recently on micronutrient trials. Initial results indicated possible zinc and boron deficiencies in the Chui valley with positive yield responses, especially to boron application, in maize and sugarbeet. Lack of funding has curtailed the trial program.

34. Staff at the Institute of Farming expressed a growing disillusionment with fertilizer trials. They know that farmers are unable to follow their recommendations because of the high cost of fertilizer relative to farm income. Since 1985, the Institute has been conducting trials on vermiculture and the biological production of a soil additive or compost. Commercial quantities have been produced and have been tried, with promising results, on some production farms. The additive has been found to be especially effective on the heavy serozems of the Chui valley. The Institute has requested government support for large-scale production and testing, but so far this has not been granted.

35. Early in 1993, a State Committee on the Coordination of Research in Science and Technology was formed. A primary objective of the Committee should be to focus research on priority tasks and avoid duplication within the system.

Ecological Issues

36. Salinity affects about 36,000 ha of irrigated land in Chui and more than 6,000 ha in Naryn. This may be a problem that could be alleviated by better management of irrigation water and by drainage. If so, the potential for increased crop production in these areas would be significant.

37. At present, no testing of water downstream from irrigated areas is undertaken, although the Environment Institute has plans to do so. (The Environment Institute has an atomic absorption spectrophotometer but it has not yet been commissioned by the supplier. The Institute also has a laboratory in each oblast and a total of 700 staff nationally.) Drainage from the Chui scheme goes back into the Chui River. The downstream river water should be tested to monitor any build-up of salinity or nitrates (although the latter is most unlikely with the present dearth of mineral fertilizers).

Conclusions and Recommendations

38. While there are some technical questions that need to be resolved—as there are in any country’s agriculture—the overwhelming problem in the of the Kyrgyz crop sector is one of economics.

39. Yields are falling, largely because of a lack of financing to buy inputs. Low yields have a low income potential, but even this low potential is not realized, because the state purchasing agencies have no funds to pay the producers. Producers are therefore unable to pay for the requisite crop inputs for the following crop. Producers cannot carry out adequate maintenance on machinery and irrigation and other structures. For example, in late 1993, more than 4,000 tractors (16 percent of total supply), 3,000 trucks (19 percent), 570 silage and forage harvesters (24 percent), 201 maize combines (26 percent) and 195 cotton harvesters (41 percent) were idle because of disrepair. On the agricultural support side, well-qualified and experienced people are leaving the employment for which they have been trained, or else they are leaving the country.

40. Deregulation and improved provision of financial services are key to improved performance of the crop sector. In addition, specific investments in processing would improve opportunities for marketing crop products. Cotton ginneries should be renovated, since some are antiquated and dangerous. The capacity to mill sugarbeet should be increased by both upgrading existing plants and constructing small-scale plants in zones where of production of up to about 5,000 ha is foreseen. Processing plants for the manufacture of finished agricultural products with export potential, such as tobacco and textiles, should be upgraded. Careful feasibility studies should precede any of these investments, and they should be made by the private sector.

41. Production of alfalfa might be increased in several ways. Since Kyrgyz agriculture is very heavily invested in livestock—to the extent of severe over-grazing—forage production is of the utmost importance. Seed rate, irrigation frequency, cutting frequency and timing, and duration of crop are all factors which need to be examined.

42. At present, many private smallholders receive no formal technical advisory service. If privatization is to proceed, smallholders must be given assistance in matters relating to crop production, livestock production, and financial management. Some overseas training of technical staff in the agricultural support institutes should be considered, with a view to giving a wider perspective of approaches, methodology, and achievements elsewhere.

ANNEX 3

WATER POLICY

Irrigation

1. Irrigation is a key input into the agricultural sector of the Kyrgyz Republic, reaching over 80 percent of the arable land (see Table A3.1). It has also been critical in maintaining and stabilizing agricultural crop production. Although yields are generally low for irrigated land by world standards, they are about four to five times higher than yields in nonirrigated areas (Table A3.2). The irrigation is provided by a well-managed and maintained main system. As highlighted by the 1992 World Bank Irrigation Subsector mission report, however, the distribution systems among and within farms are generally in poor condition. The end result is that only 42 percent of the irrigated area is classified as well engineered while a third is considered irregularly irrigated.

2. Three key issues need immediate attention to assure the sustainability of irrigation in the Kyrgyz Republic. First, new institutional arrangements must be made at the farm level to manage and maintain the distribution of water within the former state and collective farms as farming units are privatized. Second, the financing of maintenance and operations of the existing systems must be secured and obtained, in a large part, from water users. Finally, environmental degradation of the irrigation systems and the irrigated lands must be guarded against through increased efforts to improve drainage and to reduce salinity and soil erosion.

Institutional Change

3. The irrigation systems are designed and operated to deliver water to the state or collective farms. Since these farms are 1,000 ha to 2,000 ha, it has been a relatively straight-forward task for the Irrigation Ministry to deliver water to each farm. This is likely to change if and when the government fully implements its program to privatize agricultural production and, as a consequence, the number of small scale farms of 5 ha to 50 ha increases. The MOI will in that case need to change how it interfaces with farmers. Some new legally constituted entities such as water users' associations will need to be created to take delivery of water from the Ministry and manage the water allocation below the point of delivery. It is doubtful that the MOI will ever have the funds and personnel to manage the system any more intensively than it has in the past.

4. The new water law is, in general, a strong one. The law (article 18) includes specific provisions for establishing water users' associations that can take delivery of water from the MOI, and allocate the water among members of the association, many of whom will be farmers. The associations should have legal standing independent of the government, and be able to collect taxes from their members, borrow funds, and take appropriate actions to

maintain and upgrade "their" part of the irrigation system (the on-farm systems formerly operated by state and collective farms). The Ministry of Water Resources and Ministry of Agriculture and Food should design a model charter of a water users' association.

An Effective Water User Organization

A Water Users' Association is a voluntary organization, the members of which are independent producers. Either a group of water users or the government may take the initiative to establish a water users' organization. The responsibilities of the association include the improvement, operation and maintenance of the water system, the prevention of damage to the facilities, and the financing of system costs. The members of a water users' association are entitled to water and the related benefits and are required to pay fees and perform certain duties for the association. Failure of members to fulfill their obligations to pay fees or perform duties can lead to a suspension of rights to water use.

While members of the water users' association are entitled to receive water, there will be times when, due to shortages, not all members can receive enough water. Mechanisms are established to allocate the water efficiently and equitably during those periods of water scarcity. What makes the system effective is that the allocation mechanisms are well understood by the water users and the users know the quantity of water they will receive before planting decisions have to be made.

The government will usually cover part of the construction costs of the water supply system, but water users pay a significant part of the capital costs and all of the operational expenses. There may be separate schedules for the construction costs and operating expenses. The fees are based on the approximate amount of water received by each user or group of users.

The association membership elects a general assembly which has the responsibility for formulating policies and operating rules. The policies and rules are implemented by the association staff who are hired by the association. One important role of the association and its staff is the exchange of information between water users and managers of the water system. Not only is the information important for the management of the system, but it is also important for improving the efficiency of water allocation.

A key feature of most effective water users' associations is a strong sense of ownership by the water users regarding the water system and its management. In some cases, the water users actually own the system, while in others, they have made an important contribution to its construction and/or management. Another key element of these effective associations is strong staff incentives for efficient water management. These incentives are provided by making staff directly responsible to the water users' association and by providing bonuses for good performance.

Table A3.1: Total Irrigated Area and Irrigated Crops Sown in 1992 by Oblast in the Kyrgyz Republic

<i>OBLAST ('000 ha)</i>							
<i>Crops</i>	<i>Osh</i>	<i>Dzhalal</i>	<i>Issyk-Kul</i>	<i>Naryn</i>	<i>Talas</i>	<i>Chu</i>	<i>Total Irrigated</i>
Total area	200.2	132.3	168.9	132.2	115.0	328.5 ^b	1,007.1
Perennial Grasses	48.9	26.9	69.7	44.3	37.5	126.9	353.4
Sown crops of which	126.4	83.7	136.0	95.1	82.7 ^a	245.1	769.1
Cereals	35.9	31.5	51.9	40.6	35.7	92.7	288.3
Cotton	7.6	13.1	-	-	-	-	20.7
Sugar beets	-	-	0.2	-	1.7	3.9	5.8
Tobacco	12.8	5.5	-	-	1.9	-	20.2
Sun-flowers	0.5	0.7	0.1	-	1.0	0.6	2.8
Potatoes	2.2	0.9	5.5	0.4	0.3	1.5	10.8
Vegetables	2.6	2.6	0.7	0.1	0.9	7.6	14.5
Melons	0.4	0.5	-	-	-	1.6	2.5
Annual Grasses	15.3	2.7	7.3	9.7	2.4	6.2	43.5
Other Industrial Crops	0.1	0.2	0.6	-	1.4	3.2	5.6

^a Garden plots, orchards, vineyards and other perennial crops are not included.

^b Of this total irrigated area, only about 42 percent is classified as well engineer while 22 percent is classified as not well engineered. The remaining 36 percent is considered semi-engineered. In addition, not more than 35 percent is irrigated with systems with reservoir storage.

Source: Ministry of Irrigation.

5. Water users' associations should be granted water licenses that they would distribute to their members. To provide an incentive for efficient water use and a flexibility to adjust to rapidly changing farming systems, these licenses should be *tradable* among associations within a given irrigation system, and among members. The licenses for water use should also be secure and for a duration of at least 50 years with provisions for easy renewal. Without such security and duration, farmers will not have an incentive to invest in their irrigation systems or feel any obligation to pay their water fees. At present, while interrepublican obligations with regard to water supply are uncertain, water licenses carry

a duration of 5 years. It will be desirable to lengthen the duration of licenses as this uncertainty is reduced.

Table A3.2: Yields of Irrigated Crops in 1992 by Oblast in the Kyrgyz Republic (tons/ha)

Crops Irrigated	OBLAST						Total
	Osh	Dzhalal	Issyk-Kul	Naryn	Talas	Chu	
Grain	4.01	3.52	3.40	2.93	3.63	3.89	3.61
Cotton	2.20	2.56	-	-	-	-	2.43
Sugar beets	16.20	20.20	10.06	-	21.83	21.70	21.41
Tobacco	2.24	1.39	-	-	1.69	-	2.05
Sunflowers	1.03	0.59	0.67	-	0.41	0.52	0.6
Potatoes	7.50	7.48	12.09	3.52	7.78	7.89	9.76
Vegetables	16.33	12.40	14.18	3.93	12.92	14.62	14.36
Melons	9.30	7.84	-	-	1.88	6.74	7.36
Grass for Hay	2.00	2.03	2.11	3.59	2.17	2.71	2.55
Perennials Sown Prior Year	5.62	7.19	5.50	5.80	5.33	6.90	6.00

Source: Ministry of Irrigation.

Finance and Water Charges

6. In past years, the MOI has obtained its budget from the state. Farmers were not charged for water although the land tax is two or three times higher on irrigated land than it is on non-irrigated land of similar quality. The financial situation has changed dramatically with the Ministry no longer able to obtain most of its budget from general tax revenues. In 1992, only 87 percent of the budget was provided by the state (Table A3.3). In 1992-93, a water fee was imposed on the state and collective farms of .026 rubles per m³. This was called a service charge for delivering the water. Reportedly, only 20-30 percent of the farms paid the fee. Even if all farms paid the fee, it would still be too low to cover the operating and maintenance cost of the irrigation system. According to the draft budget for 1995, water users will pay 78% of the maintenance costs of the irrigation system, and the state budget will pay 22%.

7. The new water law has a section devoted to water fees and taxes (articles 37-43). There are charges for water use, for the service of providing water (collection, transport, distribution, and purification) and for the discharge of polluting substances into water. There are also provisions for increased fees if water consumption rates exceed these forecast levels and are fee exemptions for the use of water-saving technologies and other

water conservation measures. The law gives the legislature the power to determine the procedures and conditions for establishing the water fees. Unless procedures are flexible and allow the government to make annual fee adjustments to keep up with inflation and rising costs, these procedures are likely to mean continued low water fees.

8. For the Kyrgyz Republic to sustain well-operated and maintained irrigation systems, farmers will have to pay most of the operation and maintenance costs. If the new water law is adopted and it allows annual fee adjustments, this would facilitate the process of collecting adequate fees from water users. The draft law is not specific about the type of fees to be charged. Yet where possible, these fees should be based on the quantity of water used and supplemented with a land tax where it is difficult to measure the quantity of water delivered to a given outlet. The water users' associations, state farms, or collectives can be the points of collection of water fees. They can then pass the charges down to the private peasant farmers where they exist. This is already happening in some cases where private farmers are buying their water from state or collective farms.

Table A3.3: Annual Budgets for the Ministry of Irrigation in the Kyrgyz Republic from 1988-92

<i>Year</i>	<i>Construction</i>	<i>Operations</i>	<i>Maintenance</i>
1988	109.5	26.1	11.0
1989	80.7	27.3	11.5
1990	87.4	27.2	11.7
1991	107.7	37.0	16.0
1992	512.9	311.0	133.0

9. Peasant farmers, through their water users' associations and state or collective farms, will have to be more directly involved in decisions concerning expenditures for irrigation system rehabilitation and maintenance if user fees are to fund the system. This can be accomplished through an ongoing consultative process in which the MOI regularly asks users about their priorities concerning maintenance and rehabilitation. In addition, farmer labor could be used in the rehabilitation and maintenance activities and serve as partial payment for water. This was done in some areas in the past and is common in community irrigation systems around the world. To keep operations and maintenance costs at reasonable levels, the Ministry will have to reduce costs and concentrate only on high-priority tasks of maintenance and rehabilitation. The priority will have to be on maintaining the *economically viable* parts of the *existing* irrigation system. This will require a careful evaluation of investment alternatives. Projects that require extensive pumping to irrigate grain crops are not likely to be economically viable.

Water Rights and Farm Reorganization

10. Rehabilitation or reconstruction of irrigation systems will have to be coordinated with the restructuring of the agricultural sector. Construction and rehabilitation projects will have to be designed around a future agriculture of smaller private or cooperative farms, organized into water users' associations. This will be particularly important for on-farm rehabilitation investments and investments in sprinkler systems.

11. The existing sprinkler systems are not well suited to farms of only 5 ha to 20 ha. In addition, the current stock of sprinkler systems is old and is difficult to keep operating due to theft and lack of spare parts. Yet for many areas in the Republic, the topography and lack of land leveling makes sprinkler systems the most efficient means of applying water as, for example, in the mountain areas and piedmonts of the Chu Valley. Thus, decisions concerning future types of irrigation technology will be difficult unless innovative ways can be devised to organize the peasant farmers.

12. The restructuring of agriculture, combined with an increased use of market prices to guide input and output decisions could significantly change existing patterns of cropping. At present, it is difficult to determine what these changes will be or in which crops the Kyrgyz Republic has a comparative advantage under new relative prices. Not only is the information very limited on the cost of production by cropping regions, it is also difficult to predict how the farmers will respond to price signals. This, again, argues for caution in making major new investments in irrigation until new production patterns, farm organization, and water needs become clearer.

Environmental Concerns

13. Levels of salinity are shown in Table A3.4 for January 1993. Salinity and drainage problems are likely to increase in the near future. With the very restricted budget facing the MOI, it is unlikely that the Ministry will be able to maintain and operate the existing drainage system effectively, or improve or extend it. This will pose difficult choices for future irrigation investments even if farmers take over more of the responsibilities for on-farm water management, including drainage.

14. The Chu oblast has, by far, the most serious salinity and drainage problems relative to the other oblasts. Over 80 percent of the drainage and 67 percent of the lands with salinity problems are in the Chu oblast. Most of the drainage and salinity problems are in the lower part of the Chu Valley and are exacerbated by over irrigation in the higher piedmont lands of the valley. A program to improve irrigation efficiency and reduce water applications in the higher lands would help reduce the salinity and drainage problems. More efficient use of chemicals would also reduce pollution in the lower part of the Chu Valley. Such improvements should be high-priority activities of the Ministries of Irrigation and Agriculture since the individual producers will tend to ignore the environmental costs that their use of chemicals imposes on the lower part of the valley. Pollution fees and high water charges should be used if producers continue to overuse water and chemicals. In addition, irrigation rehabilitation might be focused on improving water use. If effective water users'

associations can be established, they should also be encouraged to play an active role in maintaining and improving the drainage systems.

15. Another growing problem is the increased erosion caused by overgrazing of pasture lands throughout the country. This has increased the siltation rates in many reservoirs and streams and caused a decline in the quality of water services in a number of areas. For example, the Papan reservoir near Osh has, in twelve years, lost an estimated 10 percent of its storage capacity due to siltation. This is compared with the planned rate of 3 percent in 100 years expected before the degradation of pasture became so severe. The silt-laden water has also made domestic water supplies drawn from the reservoir almost unusable after periods of heavy rains. Thus, the *upgrading and preservation of pasture* lands should be recognized in the *new water law* as an important means of reducing soil erosion and protecting water supplies for both domestic and irrigation uses. Since the livestock owners will tend to ignore the erosion that they create through overgrazing, government needs to take an active role in curtailing excessive grazing practices that cause soil erosion. The government also should promote pasture improvement and preservation. This will involve reducing sheep numbers, primarily by establishing and enforcing grazing permits, increasing access to export markets, and improving producers' knowledge about management.

Table A3.4: Drainage and Salinity in the Kyrgyz Republic, January 1993 (000 ha.)

<i>Oblast</i>	<i>Saline Lands</i>				<i>Groundwater Level</i>		
	<i>Drained Lands</i>	<i>Slight</i>	<i>Moderate</i>	<i>High</i>	<i><1.5m</i>	<i>1.5 to 2m</i>	<i>2 to 3m</i>
Osh	9.6	4.1	1.4	0.7	2.4	4.6	4.9
Dzhalal	7.0	2.5	0.3	0.0	1.1	1.1	2.1
Naryn	1.9	8.0	3.2	3.3	1.2	0.4	0.8
Issyk-kul	4.7	5.9	1.8	0.5	1.8	2.6	10.1
Talas	5.4	3.5	1.8	0.6	3.0	2.7	3.2
Chu	118.1	39.3	25.7	10.8	12.8	33.6	72.7
Total*	146.8	63.4	34.2	25.8	22.3	45.1	93.7

* May not add due to rounding.
Source: Ministry of Irrigation.

Competition for Water

16. Competition for water occurs at two different levels. The first level is competition within the Kyrgyz Republic among and within sectors during drought periods. The new water law may help in this regard since it gives priority to domestic and livestock uses. The major areas that are affected are those served by streams that have no reservoir storage capacity and do not have glaciers as a major source of water supply. Both glaciers and reservoirs help stabilize water flows and prevent droughts from causing serious water shortages. In those streams fed by glaciers, the melting pattern is very closely related to crop water demands.

17. Currently, the competition for water appears to be concentrated in the Chu, Naryn and Dzhalal oblasts. All the other oblasts show surpluses of water diverted for irrigation relative to crop water requirements, particularly Osh, with a 560 million m³ surplus (Table A3.5). The largest deficit is in the Chu Oblast which has been some 483.2 million m³ short of its water requirements. The Naryn Oblast also has a large deficit relative to its water requirements. In the other three oblasts, the surpluses or deficits are small relative to the water requirements.

18. The second level of competition is among countries in the region over the allocation of stream flows that originate in the Kyrgyz Republic. Of the over 47 billion m³ that originates in the Kyrgyz Republic, 11.6 billion m³ has been allocated for internal use (see Table A3.6). The rest is allocated to the surrounding republics of Kazakhstan, Uzbekistan, and Tajikistan. The competition for this water will intensify as these countries maintain their agricultural production while trying to reduce negative effects on the Aral Sea. The draft water law is quite good in this respect. It calls for the cooperative management of international water resources and does not propose any major changes in water allocation among countries.

19. Regional efforts at water management should take into account the difference between activities that involve consumptive water uses (irrigation, industrial and domestic water use) and those that involve non-consumptive uses (hydropower, fish production, and recreational water use). With improved management techniques and the innovative use of small holding ponds, the Kyrgyz Republic should be able to develop more of its hydropower potential while still meeting the irrigation and environmental demands downstream. There are also many opportunities for improving irrigation efficiency that could allow stream flows to be increased downstream to the Aral Sea. In the regular review of water allocation among countries, The Kyrgyz Republic should negotiate to obtain the full value of the scarce water resources originating in its territory.

Conclusions

20. As the restructuring and privatization of agriculture takes place, irrigation management also needs to change. New institutional arrangements will be needed to allocate water among peasant farmers and reorganized collective enterprises. This means that a system of farmer-organized and operated water user associations will most likely be required. Funds must be obtained to operate and maintain the existing irrigation and drainage infrastructure. This will require a much greater emphasis on user fees and their collection.

Table A3.5: Water Requirements and Amount of Water Available for Irrigation by Oblast in the Kyrgyz Republic

<i>Oblast</i>	<i>Irrigated Area ('000 ha.)</i>	<i>Average Annual Diversion for Irrigation 1985-92 (million m³)</i>	<i>Water Requirement for Area Irrigated (million m³)</i>	<i>Water Surplus or Deficit (million m³)</i>	<i>surplus or Deficit as a Percentage of Water Requirement (%)</i>
Osh	200.2	2,912.4	2,352.7	+559.7	+24
Dzhalal	132.3	1,604.1	1,647.0	-42.9	-3
Naryn	132.2	809.1	937.0	-127.9	-14
Talas	115.0	970.1	955.6	+14.5	+2
Chu	328.5	3,018.8	3,502.0	-483.2	-14
Issyk-kul	168.9	1,457.7	1,435.0	+22.7	+2
Total	1,077.1	10,772.2	10,829.3	-57.1	1

Source: Ministry of Irrigation.

Table A3.6: The Allocation of Water Resources to the Kyrgyz Republic

<i>River Basin</i>	<i>Allocation</i>			
	<i>Average Monthly Flow (km³)</i>	<i>Average Annual Flow (km³)</i>	<i>Total Water (km³)</i>	<i>Groundwater (km³)</i>
Amu Darya	0.16	1.93	0.42	0.04
Syr Darya	2.25	27.04	4.88	0.85
Talas	0.14	1.74	0.95	0.02
Chu	0.42	5.00	3.85	0.40
Issyk-kul	0.39	4.65	1.50	0.10
Karkyra	0.03	0.36	not estab	not estab
Tarim	0.51	6.15	not estab	not estab
Total	3.90	47.23	11.60	21.41

Source: Ministry of Irrigation.

ANNEX 4

A STRATEGY FOR RECOVERY IN THE LIVESTOCK SECTOR: PASTURE, SHEEP, WOOL, AND MEAT

1. The Kyrgyz Republic, with a total pasture area of 8.8 million ha, can support profitable wool production from an extensive grazing resource. While the climate is generally cool-temperate to alpine, rainfall is similar to arid and semi-arid areas of the United States and Australia (between 100 mm and 350 mm) where stocking rates and pasture management are much more conservative than recently in the Kyrgyz Republic. The Republic has only moderately fertile and environmentally fragile soils as well as a winter pasture that is sensitive to overgrazing. In the past, livestock policy has emphasized an increase in stock numbers regardless of long-term stable pasture carrying capacity, animal productivity, or profit. As a result, severe pasture degradation has occurred, particularly in winter pastures. This degradation has created an overwhelming reliance on supplemental hay and grain for winter feeding. Since both hay and grain productivity are low and declining, a severe winter feed shortage occurs every year.

2. The relatively slow pace of privatization and the insecurity of land tenure have worsened the problem of overgrazing. Security at present is in livestock rather than land. Animals have been transferred to the household sector within collectives, but no additional provision has been made to increase householders' access to feed. The public sector (state and collective) ownership of sheep has been reduced from 8.7 million in 1985 to 4.2 million in October 1993. Figures A4.1-A4.3 illustrate the growth of household and private livestock inventories and the decline of state inventories of livestock. Sheep in the private and household sector have increased from 1.5 million to 4.6 million in the same period. Large and poorly maintained household flocks are now further degrading the pasture around population centers. These flocks graze common lands and state farms since the latter are now popularly regarded as common land. They spread pests such as lice, mange, and forms of brucellosis dangerous to the human population.

3. Tracts of summer pasture land are currently leased to other countries (Uzbekistan, Kazakhstan, Tajikistan) and the Kyrgyz Republic does not have use of this land. Leased winter pasture from Kazakhstan is poor compensation since these lands are heavily degraded and unable to carry the required stock numbers.

4. A strategy for addressing the very serious problems of the livestock industry includes the following elements:

- A reduction of sheep numbers from 8.7 million to a maximum of 6.0 million in 1996.

- A change in flock structure to reduce stock numbers over winter and emphasize turnoff of prime lambs and excess stock from summer pasture. The cattle herd should also be reduced.
- Research, training and technical assistance for hay and grain production.
- Deregulation of livestock and grain markets to give producers free access to international markets
- Support for research institutions and for the establishment of an agricultural extension service to advise private farms and smallholders
- Continued and more thorough restructuring of collective and state farms, rather than the piecemeal transfer of animals to the household sector
- Key investments to improve the marketability of wool and sheep meat on international markets.

This reduction in animal numbers should be accomplished without direct government orders to reduce herds. Instead the government should create a policy environment in which herd reduction is accomplished through economic decisions of producers and traders. The government should make key investments in dissemination of market information and in revising and enforcing grades and standards so that foreign buyers can be confident of the quality of Kyrgyz products.

Influence of Climate and Soil on Pasture

5. The sharp change in elevation from 700 m to a maximum of 7,400 m is associated with distinct climatic zones. The agricultural valleys and hay meadows at 700 to 2,000 meters are affected by dry winds from adjacent deserts in Uzbekistan and Kazakhstan. The zone between 2,000 to 4,000 meters provides spring/fall and summer pastures, but west and northwest slopes receive more than twice the rainfall of southern slopes. The zone from 3,000 m to 4,000 m is a cold desert. Land above 4,000 meters is generally subject to year-round frost and is non-agricultural. Climate thus places severe restrictions on the potential productivity of pastures.

Soils

6. About 50 percent of all agricultural soils are located on the mountain slopes and are used for pasture production. Moderately fertile cinnamon (Argiustoll) and chestnut (Haplustoll, Hapludoll) soils are used for haymaking at 700 m to 1,500 m in the southern part of the country. At higher elevations, chernozem soils (Ustolls, Udolls), often with shallow organic horizons, form on steeper slopes and under forest cover. At still higher elevations alpine meadow and meadow steppe soils (Argiudolls) form with heavy clay subsoils and restricted drainage. The common characteristic of all the soils of the mountain

slopes is their susceptibility to erosion. Approximately two-thirds of all mountain slope soils suffer some degree of erosion.

Pastures and Forage

7. With a pasture area of approximately 8.8 million ha and supporting forage areas of some 600,000 ha (of which 400,000 ha are irrigated alfalfa and other legumes), the Kyrgyz Republic appears to have a rich grazing resource suggesting comparative advantage in extensive livestock production. However, past policies aimed solely at increasing livestock numbers have resulted in considerable degradation of the resource.

8. The Kyrgyz Republic's harsh continental climate and altitude zonality divide the country into:

- High altitude (2,500 m to 3,500 m) summer pasture with a three- to four-month grazing season, covering 3.927 million ha
- Spring/fall pastures at 1,500 to 2,500 m with a six-month grazing season, covering 2.717 million ha
- Winter pastures at a range of altitudes, usually on lower rainfall southern slopes with a 4-5 month grazing season, covering 2.171 million ha.

The spring/fall and summer pastures are principally annual grasses, notably *Festuca*, *Bromus* and *Hordeum* and are reasonably resilient under heavy grazing. Their overall productivity has declined from 639 kg/ha to 414 kg/ha (summer pasture) and 465 kg/ha to 301 kg/ha (spring/fall pasture) on a national basis over the period 1963-91. The winter pastures are composed primarily of perennial browse and shrub species such as *artemisia*, *kochia*, *salsola* and *cobresia*. Such species are hardy, drought tolerant, and adapted to cold but if overgrazed for a sufficient period are lost from the pasture and replaced by woody weeds and ground covers. Years of winter overgrazing have accelerated this process in the Kyrgyz Republic and productivity has been reduced from 297 kg/ha to 93 kg/ha on a national basis over the period 1963-91. Woody weeds now exist on areas estimated at 4.5 million ha to 5.3 million ha, with 540,000 ha considered severely affected.

9. As a result of this loss of winter pastures and a continued reliance on wool production from wethers (male castrates) kept over winter, the Kyrgyz Republic has become increasingly reliant on relatively high cost supplemental feeding for four to five months of the year. Shortages of feedgrain in particular during 1991-93 have resulted in a high proportion of tender and broken wool. Winter starvation may in fact explain a large proportion of the sheep flock reduction (approximately 800,000 head) between 1992 and 1993. Effects of cold and grain shortage will be even more severe in 1993/94 since the winter is earlier and more severe.

10. The solution to the problem lies in continued flock reduction to a maximum of 6 million sheep and a change in emphasis from wool production using ewes and wethers

to wool and meat production from a flock oriented toward seasonal prime lamb. Such a strategy would aim to turn off young prime lambs from summer pasture when they are between five and seven months old and reduce the stock numbers of wethers to be held over winter. A growing market for younger prime lamb exists in the Middle East and could be further developed.

The Problem of Grazing Leases

11. Each year the Kyrgyz Republic leases out 601,400 ha of spring and summer pasture to the neighboring republics of Uzbekistan, Kazakhstan, and Tajikistan under agreements expiring in 1996. The Kyrgyz Republic, having poor winter/spring pasture, leases 615,300 ha of winter pasture from Kazakhstan, principally for sheep from the Chu Valley. The quality of these winter pastures is poor, however. In 1991 approximately 300,000 head or one-third of all sheep pastured on these lands died during winter. This resulted in considerably reduced use of the leases in 1992. In contrast, the spring/summer pastures leased out in Djalalabad and Osh oblasts are some of the best in the country, but there is no control of stock movement to them or the numbers of stock involved. Moreover, lease payments to the Kyrgyz Republic are in arrears. If the country is successfully to implement a strategy of reduced flock numbers and increased prime lamb offtake from summer pastures, efforts should be made to secure return of leased summer pasture to the Kyrgyz Republic's control.

12. The distribution of fodder and pasture adequacy is highly variable across the country. Osh and Naryn have developed a shortage of hay owing to a switch to barley production on former hay meadows. The productivity of irrigated alfalfa is declining nationally because of overcutting followed by intense autumn and spring grazing, and because of shortages of both fuel for irrigation and fertilizer. Productivity of stands in Chu Oblast has declined from 5,000 kg/ha to around 3,000 kg/ha. Productivity of annual rainfed hay meadows nationally is only 870 kg/ha, a very low figure even compared with a water use efficiency of 5 kg/ha/mm of rain (about half that expected for similar pastures elsewhere). Research work in 1960-70 indicated potential productivity of hay fields at least three to four times higher than that currently achieved.

13. Annual production of hay is estimated as adequate for only 18-days supply to the total flock at recommended feeding rates. In practice, hay provides about 30 days to 40 days of feed in winter for ewes. Crop residues of 600,000 t to 700,000 t form a mainstay of winter feed in the absence of adequate pastures and are supplemented by grain. A considerable grain deficit estimated at 721,000 t (511,000 t in official data) occurs owing to excessive dependence on grain, rather than pasture or fodder, for feeding excess livestock. Both mission estimates and official data indicate severe shortages of feeds of all types for the 19 million sheep equivalents currently on hand. By official estimates, the grain shortage is 49 percent of that required, while 30 percent of hay and 38 percent silage requirements are lacking.

Grazing Management

14. At a certain grazing intensity for any pasture, a break occurs in the animal production-stocking intensity relationship where the pasture undergoes a qualitative change. If the pasture is based on long-lived perennials, this change can take many years to reverse. Where the concept of maximum profit is followed, however, the stocking rate is usually much lower than that required to cause pasture deterioration, usually less than 50 percent of the maximum number of animals that can theoretically be carried on the basis of total dry matter production.

15. From 1963-91 pasture productivity on an annual basis for the Kyrgyz Republic declined almost linearly by approximately 33 percent, or in direct proportion to the increased stock numbers. The largest decline in pasture productivity has been in winter pastures followed by spring/fall and summer pastures.

16. In terms of adequacy of the feed base, it is immediately obvious that even on an annual basis (e.g., disregarding seasonal problems,) a stocking rate of one sheep per hectare is excessive. The national annual average pasture productivity is only approximately 300 kg/ha dry matter (90 kg/ha in winter). This is sufficient for 0.75 dry sheep per hectare under no climatic stress if all pasture is eaten. Under an ideal strategy of 50 percent utilization, the country is carrying more than twice the number of sheep sustainable in the long term.

17. The mission developed a feed balance using pasture production data and conventional values for energy content of low fibre forages found in spring/summer pasture and medium fibre forage forages found in autumn/winter pasture. Probable maximum intake of forage for a unit flock of 100 sheep was compared with pasture feed availability and the deficit in megajoules calculated. The analysis demonstrates that feed deficits (based on 100 percent utilization) of pasture year round are about 25 percent. The seasonal deficits in winter are more severe, however, at 78 percent. The spring deficit is 25 percent.

18. The problem of over-utilization remains and suggests that to halt the decline in pasture productivity and to achieve stability of pasture production, particularly in winter and spring, a considerable reduction in total flock size and a change in flock structure will be needed. A future flock would emphasize (a) rapid turnoff (no over-wintering) of prime lambs from the summer pastures, (b) a reduction in the numbers of wethers to be carried over winter, and (c) a revitalized forage crop and grain base to supply the winter/spring requirements and avoid the wool tenderness problems currently observed from mid-winter feed shortage.

Problems of Privatization

19. Household flocks of sheep are poorly maintained and even private farm flocks often have unrestricted access to forage resources of state farms and collectives or roadsides. Pasture lands near villages are severely degraded and lucerne stands on state farms are losing density due to intensive harvesting (without proportional inputs of fertilizer and water)

followed by intensive grazing in autumn by private sheep. Part of the solution to overgrazing lies in providing a full and marketable title to private lands, so that land rather than livestock serves as security and a store of wealth. Private farms would then become self-regulating by controlling trespass of livestock onto their land and could be expected to reduce their flocks to sustainable sizes appropriate to the area of their own land.

20. In addition to appropriate tenure and area allocation, each private holding or long-term leasehold should have an attached, non-tradeable grazing permit for a specified number of animals per hectare. The information needed to determine carrying capacity is readily available from Institute Kyrgyzgiprozem and can be modified to allow for any desired utilization ratio.

Research and Extension

21. The major problems facing research are gross underfunding and resulting loss of the best personnel plus a need to reorient activities to serve clients other than the state. Key institutes supporting pasture management are the Pasture Research Institute and The Land Use Planning Institute. Each needs technical assistance to reorient research in support of privatization and to incorporate economic analysis in the traditional emphasis on technical solutions. Budget restrictions have already forced closure of the Institute of Soil Science and will have reduced the Land Use Planning Institute from 970 staff in 1989 to 125 by 1994. Immediate support is needed to prevent the total loss of the research base.

22. Extension services are largely non-existent apart from the technical specialists on state farms. A totally new extension resource center with connections to research and a supporting field network of extension personnel needs to be developed.

Environmental Issues

23. Erosion affects 4.5 million ha of pastures or about half the total area. A further 87,000 ha of the total of 188,000 ha of hay meadows are eroded. Erosion is made worse by cultivation of hay meadows (on fragile soils and steep slopes) for grain. Estimates of weed invasion vary from 4.5 to 5.3 million ha with 540,000 ha severely affected. Due to shortages and higher cost of environmentally superior agricultural chemicals, inferior ones which had formerly been abandoned are reappearing. These chemicals contribute to pollution of watercourses.

Sheep Husbandry

24. Ecological and economic factors have contributed to the fall in production and productivity in the sheep and wool industries. The Kyrgyz sheep population has declined from 10.2 million in 1985 to 8.8 million in October 1993. Production of wool has fallen from 38,000 t (greasy weight) on average between 1986 and 1990 to 32,000 t in 1993. Production of mutton has fallen from 72,000 t to 70,000 t over the corresponding interval.

The average greasy fleece weight per head has decreased from 3.5 kg in 1989 to 3.0 kg in 1992.

25. The major breeds are the Kyrgyz fine-wool (91.5 percent of the sheep population), the Tian Shan semi fine-wool (7.0 percent), and the Alai semi-coarse wool (1.5 percent). These breeds appear to have adapted well to the agro-ecological environment for which they were bred. The breeds were developed some years ago by using the local sheep as a base and crossing them with imported breeds. This crossbreeding was followed by continued selection to improve particular performance traits. A classification and registration system evolved to identify elite and less superior (first and second class) sheep. Selected rams (or semen) move from these breeding plants throughout the Kyrgyz sheep enterprises through affiliated "daughter" farms and state breeding stations.

26. Although semen from superior rams has been distributed by artificial insemination, the use of multiple ovulation and embryo transfer to spread superior ewe genes has not been commercially practiced. Since the early 1970s, over 100 Australian rams have been imported to improve the fine-wool breed. The last imports were in 1991. Although records indicate improved wool production caused by the introduction of Australian merinos, the results in recent years have been masked by poor nutritional regimens, which have prevented the opportunity of appropriate expression of the genotype.

27. Sheep are managed by movement from about June to September between mountainous summer pastures, previously covered by snow, and lower altitudes (2,500 m and lower). In the latter areas some crops and pastures can be conserved (e.g., grain, silage, haylage, hay) for use in supplementary feeding in many of the other months of the year. This grazing system is traditional in many parts of the Kyrgyz Republic and is practiced to utilize as much as possible the available national cellulose feed resource. The system will remain the management cycle for many years to come. The cycle, and its problems and solutions are described in Table A4.1.

28. The system is labor-intensive with the only capital cost being sheep housing sheds and, in larger enterprises, a separate shearing shed (up to 80 strands at sheep breeding plants). About three shepherds (often all family members) manage at least 500 sheep throughout the year, with peak periods such as lambing, artificial insemination of ewes, and shearing requiring more labor and other production inputs. Sheep are housed in winter for a period which ranges from six weeks (lambing only) to four months when pastures are sparse or absent.

29. The decline in sheep productivity is due to policies that have rapidly increased the sheep population in this century from 2.8 million in 1913 to 4.5 million in 1955, 8.3 million in 1965 and to 10.5 million in 1990.

30. Even though sheep numbers are now decreasing there are currently factors sufficient to urge continued reduction. These major include:

- The presence of a high incidence of tender wool at scouring

- The continued decline in wool productivity per sheep
- The continued reduction in clean fleece weight, for example, at well-managed sheep breeding plants even when sheep numbers are decreasing.

Table A4.1: The Kyrgyz Republic: Annual Sheep Management Cycle, Selected Problems and Suggested Responses

<i>Month</i>	<i>Activity</i>	<i>Problems</i>	<i>Additional Strategies Required</i>
Jan to Feb	• House	• Nutritional requirements not met. Lack of sufficient supplement.	• More supplements conserved. Better utilization of supplements.
Mar to May	• Lambing, shearing	• Above plus low yield. Wool contamination, for example, dust.	• Above plus improved cleanliness at shearing.
Jun to Aug	• Grazing in mountains	• Degradation of land resource.	• Non-grazing of 20 to 25 percent of area each year.
Sep to Oct	• Down from mountains	• Decreasing AI. Greater use of rams.	• More advice on improved breeding methods.
Nov to Dec	• Commencement of housing	• Nutritional requirements and level of supplementation not determined accurately.	• Appropriate lower level of feeding for early to mid-pregnancy.

31. Until recently, artificial insemination (AI) of ewes has been used almost exclusively for reproduction. However, now this practice is being partly replaced by some private sheep owners who are relying on joining ewes with rams. Currently it is estimated that AI has fallen to 87 percent usage among the total national breeding flock. The move away from AI by some private owners has the consequences of increasing the spread of some diseases by unhealthy rams, and decreasing wool quality and quantity by inferior performance rams.

32. There is an absence of regular routine accounting systems for any of the types of sheep ownership enterprises. The government requires accurate recording of sheep numbers regularly but little physical and financial data is collected at the same time that might account for changes in productivity or profitability. The sheep industry is production-

driven. It is insufficiently influenced by environmental or economic considerations. The push is for volume with scarce attention to product quality and financial return.

33. The most immediate way to improve productivity would be to improve nutrition in general, and in particular the quality and quantity of the animal diet in winter. The ability of sheep to adjust to low metabolic rates in times of stress and undernutrition, to draw upon body protein and energy for survival at reduced body weights as well as shepherding and housing in winter have all no doubt contributed to a relatively low mortality rate (10 percent per annum). The decreased sheep population in the past year will reduce nutrient demand but the prognosis for the immediate future is that there will be insufficient pasture and concentrates to arrest mortality. Unless nutrition improves, there is no chance that productive potential can be reached.

34. The incidence of *Brucella melitensis* in sheep is of particular concern because of the increased diagnosis of the brucellosis in humans in the Kyrgyz Republic. The number of persons testing positive has increased from 15.5 per 100,000 population in 1992 to 17.5 in 1993. The incidence continues to grow in sheep tested (from 1.0 percent in 1992 to 1.8 percent in 1993) thereby placing humans increasingly at risk.

35. Although a five-year program has been formulated by the Veterinary Department to eradicate brucellosis in sheep and brucellosis and tuberculosis in cattle, the funds provided have been insufficient. The vaccination and diagnosis that is occurring for the control of brucellosis in sheep is obviously inadequate. Some private owners are not cooperating in current diagnostic services provided by the government because no compensation is paid for sheep which have to be slaughtered or disposed of after testing positive.

36. The control of helminth and ecto-parasites is being threatened by the lack of funds to import veterinary medicines and drugs. Also the use of vaccines against a range of diseases is decreasing, placing the sheep industry in increasing exposure to a variety of infectious diseases. The potential to produce many of these vaccines is present in the Kyrgyz Republic and the possibility of export should be explored.

37. Recent reforms affecting sheep ownership, land rights and use, privatization policies, and changes in prices for inputs and outputs have had a somewhat negative short-term impact on the sheep industry. The poor quality of household and many private herds has been described above. In addition, the rate of genetic improvement is slowed as inferior rams are used instead of semen from superior selected rams.

38. Private farmers and householders managing sheep must have access to information on improved management, and must be required to participate in public programs of disease control. With appropriate incentives and with access to markets, private producers can be effective managers. The incentives until recently have been inappropriate. When output prices are depressed and external markets are closed, it does not pay to invest in disease control or superior breeds. As long as inflation erodes the value of monetary savings, excessive inventories of poorly fed animals represent an instrument of savings with a negative real return, but one that exceeds the return to bank deposits. The poor condition

of private and household flocks of sheep thus reflects the distortions in the economic environment, and does not indicate poor potential for private management more generally.

39. The approach to privatization of the large state farms engaged in the breeding program should take into account the economies of scale in breeding. The state sheep breeding plants and some state farms have been a vital resource for developing superior sheep. Any disaggregation from the current unit size of 25,000 to 40,000 sheep would not allow, for example, an effective improved breeding program for the nation. Such a program is vital to continue to produce better genotypes which are ultimately used through the industry. These large breeding farms should therefore be privatized as single units, rather than broken up. Breeding farms can be privatized under the share system and the resulting reorganized farms should be open joint stock companies. Farms engaged primarily in production of wool and mutton, not breeding, can be broken into smaller units during privatization.

40. Input prices of chemicals, medicines, and drugs for sheep disease control and productivity improvements have all increased substantially to international market prices during the last two years. Previously these items were obtained in many circumstances by a bartering system. However, as input prices have risen, international prices are not being received by sheep operators for marketed output.

41. The capacity for research and development for sheep and wool production is regressing. The Livestock Institute, the Veterinary Institute and Veterinary Department have constraints in producing technological advances due to inadequate funding. Staffing, training, communication, provision of equipment and chemical reagents and library acquisitions are all affected.

42. There is little evidence of dissemination of technical, managerial, or market information from researchers to sheep owners. Prior to the upsurge in private ownership the government could enforce practices routinely but now only recommendations can be made. The information being generated is insufficient, and very little of it is even being received. An effective information resource center to transmit technical, managerial, and market information is needed.

43. Changes in policy with regard to pricing, international trade, and marketing are necessary for recovery of the sheep industry. In addition, a number of specific activities could be undertaken to overcome constraints and assist in increasing productivity and profitability of sheep enterprises.

- Sheep breeding improvement program to accelerate breed improvement initially in the fine wools by using the multiple ovulation and embryo transfer technique as well as ram selection.
- Sheep brucellosis eradication program to implement an expanded testing and vaccination program to eradicate Brucellosis over a five year period.

- Expansion of sheep vaccine production to evaluate, and if assessed viable, to develop an expanded sheep vaccine production unit
- Sheep research and development program to identify ways of improving the productivity of Kyrgyz research and increasing coordination between institutions. New criteria for choosing among potential research projects are needed.
- Information resource center to develop a center to prepare and distribute technical and managerial advice and packages to improve productivity.

The Wool Industry

44. The wool industry is an important part of the Kyrgyz economy. Wool and wool products are among the country's main exports. In 1992-93 wool production was equivalent to about 16.25 million kg clean weight, valued domestically at 170 million som (US\$21.25m). At world prices, the value of Kyrgyz wool production would be approximately 30 percent higher. The Kyrgyz Republic represents about 10 percent of wool production in the former Soviet Union and 1 percent of global wool production. The Kyrgyz Republic is seen as a producer of relatively fine fibre among members of the former Soviet Union. Over 75 percent of wool produced in the Kyrgyz Republic is classified as having a fine fibre diameter of less than 25 micron, the main source of which is the Kyrgyzskaia Tonkorunnia breed, a derivative of the Australian merino (Table A4.2). On balance, however, the wool classified as fine in the Kyrgyz Republic would be classified as medium-strong in Australia.

Table A4.2: The Kyrgyz Republic: Wool Production by Genetic Type, 1993

<i>Genestock</i>	<i>Flock Share (%)</i>	<i>End Use</i>
Kyrgyzskaia Tonkorunnia	80	Woollen and worsted yarn
Tianshanskaia	7	Woollen and carpet yarn
Alai	3	Carpet yarn
Rough and Black Woolled Types	10	Carpet yarn/Industrial

Source: Livestock Institute.

45. Over 95 percent of greasy wool is processed further into scoured wool in the Kyrgyz Republic and over 50 percent of scoured wool produced is processed further into yarn, cloth and garments, from which most is exported to other members of the former Soviet Union. A diagram of the Kyrgyz wool industry is shown in Figure A4.1.

46. The low value added in primary wool production at present is a result of many factors including low productivity, depressed international wool prices and severe discounts for greasy wool from the Kyrgyz Republic. A recovery in earnings depends largely on higher productivity, a recovery in international wool prices, and significant policy and

institutional change to overcome price distortions, inadequate market infrastructure, and serious problems in the quality of greasy wool.

47. In wool processing, the problems relate mainly to inadequate attention to and representation in export markets, though some processors also need to replace their physical plant and need training in certain activities.

48. While the problems are widespread and serious, there are significant opportunities to expand the wool industry and to increase quality, with the aim of realizing price premiums in the production, textile, and garment sub-sectors. The Kyrgyz wool industry has important natural advantages in its location between major markets in Western Europe, Russia, and China. It also has the capacity to produce high-quality wool and most importantly it has low labor costs. These are key attributes in gaining a competitive advantage in global textile and garment industries. The wool processing industry has significant potential to increase both capacity utilization ratios and capacity. In this context an expanded wool processing sector could outstrip the raw wool production capacity and become an importer of raw wool, with the foreign currency requirements financed from exports of textiles and finished garments.

49. The objective of change in the wool industry should be creation of a more competitive industry with a bias towards higher quality at all stages of production, distribution and processing. At present greasy wool prices in the Republic appear to be at least 30 percent below world market prices, but realization of world parity wool prices involves a range of corrective programs to enhance the attractiveness of Kyrgyz wool. While removal of regulations and taxes and increased quality are necessary, they would not by themselves induce competition and give producers access to world prices. Of equal importance is the establishment of a viable greasy wool selling system so that producers have access to independent wool testing facilities, a central handling system for taking samples and communication with buyers. There may be an additional need to regulate the scouring monopoly if it does not offer competitive prices. There is substantial international trade in greasy wool, but in order for Kyrgyz producers to participate, they need wool selling regulations that protect the integrity of the product and security of both the buyer and seller.

Table A4.3: The Kyrgyz Republic: Selected Wool Processing Data, 1993

<i>Process</i>	<i>Key Operation</i>	<i>Capacity (t)</i>	<i>Production Current (t)</i>	<i>Capacity Utilization Ratio</i>
Scouring	8 lines	20,000	16,250	0.81
Woollen Spindles	45,000 spindles	5,200	3,000	0.58
Worsted Spindles	33,000 spindles	3,800	2,100	0.55
Carpet Yarn Spindles	4,560 spindles	5,000	4,000	0.80
Weaving Cloth (m ²)		11,500	8,000	0.70

Source: Mission Data.

50. To implement the measures described in this report, a range of preparatory actions are required and are listed in Box A4.1. In the case of removal of taxes and regulations the response can be immediate and without further investigation. But other areas listed in Box A4.1 under B and C require more preliminary investigation, feasibility studies, and preparation of business plans.

51. The effluent from wool scouring has a very high pollution potential because it contains a high level of organic waste as well as mineral dirt. The effluent is high in suspended solids, in COD (Chemical Oxygen Demand), and in BOD (Biological Oxygen Demand), all of which make it difficult to treat. When running at full capacity the discharge from the Tokmak scour has, prior to treatment, about the same pollution load as a population of 100,000 people.

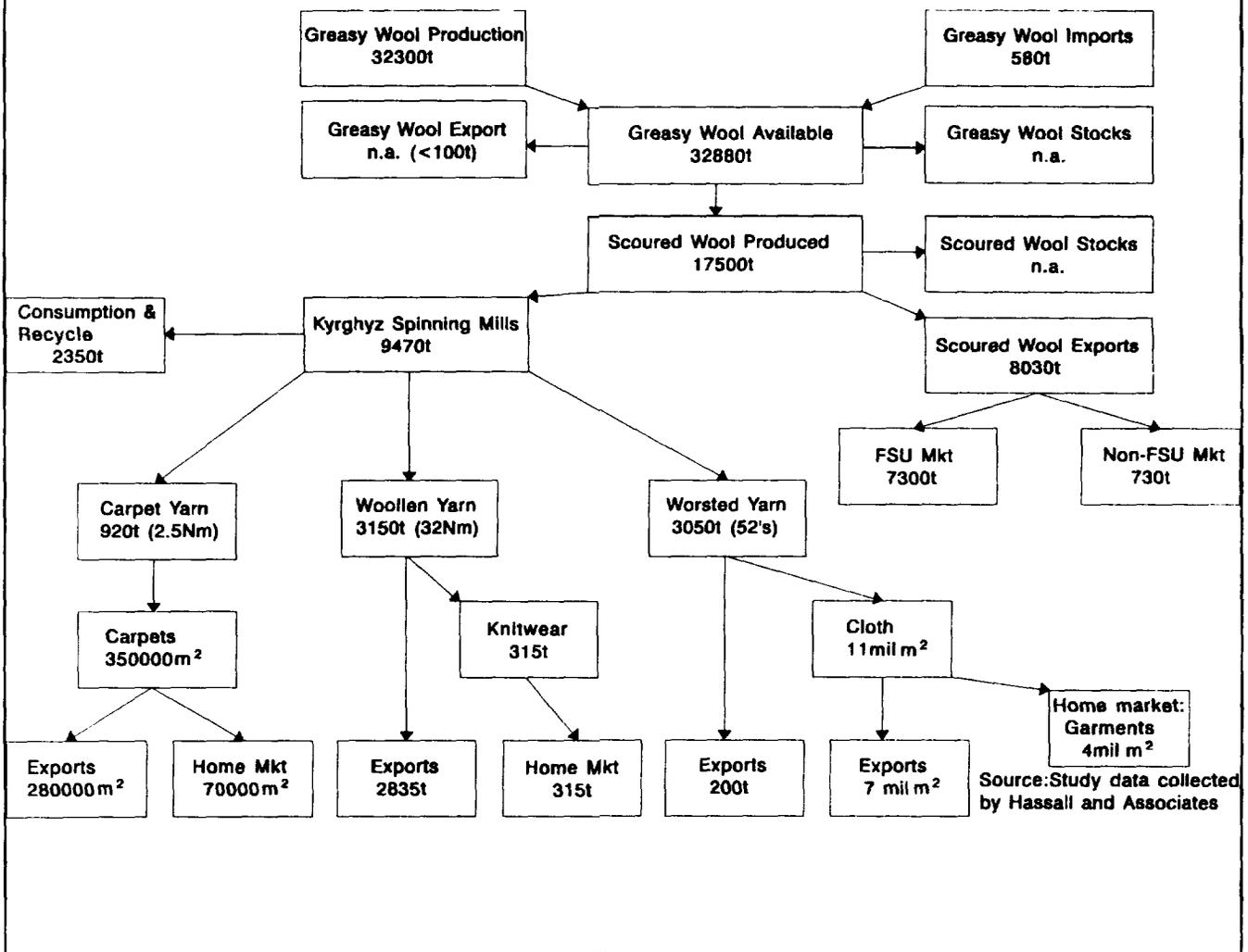
52. Effluent control in both the Tokmak scour and the planned new scours at Osh and Naryn is very important to the Kyrgyz Republic, particularly as the Republic is a major water source and has a reputation for a relatively clean environment as a result of its position high in the watershed. The effluent control standards at the new mills should meet international standards and ensure full protection of mountain streams and watercourses. Tax levels and the tax structure should be designed to preserve the environment and the water asset in particular. Clean water has much greater value than the potential value added from scouring.

53. The environmental levy should be replaced with an effluent tax schedule that encourages scour operators to reduce contaminant discharges into waterways and waste water treatment plants. Furthermore, scouring plants should be excluded from the tax benefits associated with special economic zones. The general tax benefits of economic zones should not encourage a scour to be established that would otherwise be unviable because of properly structured effluent taxes. The Kyrgyz Republic has a very significant asset in its glacier and snow fed mountain streams and this should be protected.

54. The measures summarized in Box A4.1 can be expected to lead to a number of outcomes which, on balance, will be positive. Costs of production will fall and prices received will be higher, but more variable. Prices will more appropriately reflect differences in quality. Productivity will increase, particularly in production of greasy wool. Exports to markets in the former Soviet Union and on world markets will grow, and growth will be greatest in world markets. Trade in greasy wool will grow most. Employment in wool production will fall, but employment in wool handling, wool testing and research processing will increase. Wool production is anticipated to fall somewhat and recover later (5 years), along with world wool prices and improved quality of pastures. In the meantime, wool quality will improve at somewhat lower gross production. Pollution from scours will decline.

55. Greasy wool prices can be expected approximately to double in real terms, with greater increase for fine fiber wool, and 'rough' wool prices remaining unchanged. For spinning enterprises the removal of indirect taxes, lower scouring costs and improved spinning performance from scoured wool are expected to more than offset the increased price of greasy wool, not to mention the higher net prices received from exports of yarn.

Figure A4.1: Wool Production, Processing and Distribution Flow Chart Kyrgyz Republic: 1992



Meat Processing

56. Meat and byproducts can be sold on hard currency export markets only if standards throughout the industry are thoroughly upgraded and enforced. Control of disease (particularly brucellosis), should be improved, as should basic health and hygiene standards for both domestic and export markets. Modern profit oriented management should be adopted at all stages. A higher standard of environmental control in disposal of waste products should be implemented.

Box A4.1: Specific Actions to Improve the Kyrgyz Wool Industry

NOTE: Items in A can be undertaken immediately.
Items in B, C, and D may require feasibility studies.

A. Deregulation of the Wool Industry

1. Permit producers to sell to any buyer, e.g., abolish state orders and domestic supply agreements.
2. Rebate the value added tax on all inputs used in exported products.
3. Reduce or remove tariffs on imports of raw materials, machinery and equipment.

B. Programs to Develop the Kyrgyz Wool Market Infrastructure

4. Establish an independent wool testing laboratory with commercial capability to process large volumes of samples.
5. Establish a reputable and secure wool sample collection system.
6. Set up electronic links with buyers and brokers to transmit data on wool samples and other documentation.
7. Encourage the Livestock Institute to establish a wool information system and extension service.
8. Encourage a foreign investor with expertise in wool broking, handling and distribution systems to establish a centralized wool handling facility for sample collection and display.
9. Develop an acceptable and comprehensive set of wool selling regulations that protect the integrity of the product and the security of both buyer and seller.

C. Programs to Enhance Quality, Processing Performance and the Environment

10. Develop training programs for total quality management of production and processing, commencing immediately with an on-farm wool handling program to reduce contamination in greasy wool.
11. Encourage processors to attain international certification in total quality management.
12. Develop training programs for just-in-time management of wool processing operations.
13. Encourage processors to obtain WOOLMARK licenses.
14. Adopt sheep and pasture breeding and management techniques to enhance the quality of Kyrgyz wool by producing finer fibre diameter, increased fibre strength and longer fibre staples and higher yield.
15. Replace the environmental tax on output with a new differential tax schedule based on the severity of the components of the discharge.
16. Review effluent taxes to encourage scouring plants to introduce improved equipment and process controls to capture grease and adopt procedures that reduce contaminant discharge.
17. Exclude effluent taxes of scouring plants from the taxation benefits of locating in Special Economic Zones.

57. Export markets are developing, largely due to the initiative and patience of the foreign buyers, and despite formidable disincentives to export embodied in local regulations. Removal of all export taxes and barriers to export is the first major task in rehabilitating the meat export industry, and this has been done at the national level. A second important reform is the provision of credit to a private enterprise for purchase of self contained mobile abattoir(s) (see Box A4.2). These are an important infrastructure requirement, since the unhygienic and dilapidated facilities currently used cannot be upgraded sufficiently in the short run to meet export requirements. The main purpose of mobile abattoirs is to enable herd and flock reduction over the next 2-3 years, and to allow the meat to be sold outside the former Soviet Union. After completion of the herd drawdown, exports can be maintained through processing of domestic meat and meat from neighboring republics if necessary in order to build up a reliable export volume of interest to major importers.

58. Beef, mutton, and pork are processed through 14 major plants, 2 canneries, and numerous small backyard enterprises and slaughterhouses attached to collectives. Poultry processing is separate and was not investigated. Total daily capacity of the processing plants is 12,000 sheep equivalents with a total cannery capacity of approximately 50 million (338g) cans.

59. About half of farm livestock previously processed in the state slaughterhouses are now killed on farms. Throughput of major slaughterhouses in 1993 is 50 percent of 1992 volumes. All major slaughterhouses were state controlled until 1992 when they were taken over by a parastatal Kyrgyz Tamakash (KTA). In 1993, the Osh slaughterhouse and cannery moved from KTA control to a joint-stock company structure. Bishkek cannery will move to joint-stock structure in 1994. Most plants are now making a loss because of reduced throughput, increased cost of inputs, and reduced demand for meat. The development of barter trade now based on subjective deals between enterprise managers obscures measurement of true profitability of processing and makes management reform even more difficult.

60. The main slaughterhouses consist of old buildings with broken walls, ceilings and floors, flaking paint and plaster in processing areas, and inadequate cleaning facilities. Cold storage rooms are similarly dilapidated with broken floors and ceilings, door locks etc. The freezer and chiller units have a substantial capacity of 120,000 sheep equivalents in both chillers and freezers at Bishkek and Osh, plus 400,000 sheep equivalents in long term freezers. This capacity promotes a tendency to hold large inventories of increasingly ageing carcasses. Hygiene in all stages is very poor. The kill is expeditious but inhumane and non-halal. Veterinary inspectors are present, but given the general conditions of processing, are largely irrelevant. No establishment could meet standards of the European Union or United States Department of Agriculture.

61. Carcass quality of sheep and cattle is no higher than European Grade III in conformation, reflecting poor feed availability. Hides are not held in brine for 24 hours after kill, but are often held in salt packs for much longer than the ideal three or four weeks. They are therefore of poor quality and are sold at low prices.

62. Intestines are processed and stored adequately and could be sold for export. Tallow is also processed adequately and either refined for cannery use in sausages or rendered for use in soaps. Meat and bone meal processing requires thorough overhaul and is unhygienic at all stages. Stomach contents are disposed of in the sewerage system.

63. All of the infrastructure problems of slaughterhouses are repeated in canneries. Meat affected by brucellosis is canned, relying on heat for sterilization. This is reasonable but there is an inadequate check for foreign bodies in cans and considerable reliance on the thoroughness of checking of cans after a 14-day incubation period. The main profit of canneries comes from sausage manufacture rather than canning. Hence, the trend in small slaughterhouses is to install sausage machines. Nevertheless profits are small and declining.

64. Marketing is currently almost all domestic, although declining consumption has provided an opportunity for exports. The profit margin in meat marketing is nominally limited to 12 percent but this is not enforced and there is strong competition between backyard slaughter and the larger (inefficient and high cost) slaughterhouses. Carcass meat, fat and offal follow official prices more than do cans and sausages. Canned meat is sold to Government reserves (50 percent) bartering (45 percent) and cash sales to shops, schools, military etc (5 percent) leaving little incentive to improve the process. Wet salted hides are sold to Bishkek tannery. Export is now forbidden but quotes from exporters are low and reflect product quality.

65. The major exports of meat are live animals or carcass including 3,000 live cattle to Turkey, and 25,000 chilled mutton carcasses to Saudi Arabia in 1993. The major potentials in 1994 are for live animal exports and air freighted carcasses to the Middle East, Mediterranean and North African markets. Shipping companies do not have insulated reefer boxes to handle chilled and frozen meat from Baltic or Black Sea ports. In 1995-96 meat should be exportable to Europe if hygiene standards are adequate and infrastructure is in place.

66. Projected sales of mutton and beef in world markets suggest potential revenues from flock and herd reduction of \$2 million in 1993, \$17 million in 1994, \$34 million in 1995 and \$29 million in 1996. These are based on a flock reduction of 2.4 million sheep over three years and disposal of 95,000 cattle to export markets in the same period. Home consumption is projected to fall from 7.3 million sheep equivalents in 1994 to 6 million sheep equivalents in 1996.

67. The barriers to the export trade in 1993 were numerous and included export licenses and costs, veterinary certificates and costs, export tax (5 percent) on live animals, emergency insurance (5 percent) on live animals, airport tax on carcasses, customs duty, trade verification certificates and an artificial foreign exchange rate of 6.4 som per dollar (the commercial rate was at the time 8 som per dollar). In addition, producers paid a 37 percent exporters income tax on profit. A major problem above these costs, however, was interference in trade by local administrators who can elect to reinterpret contracts or hold up shipments for any reason. Licenses and export taxes were removed in 1994, and this should substantially improve export prospects. The government should guard against reinstatement

Box A4.2: Mobile Modular Slaughterhouses

These are to EEC approved standards.

Each unit will consist of 2 x 25 ton Diesel driven road trucks mounting a 20 ft Chiller/Freezer Container and pulling, on trailers, a second 20 ft Chiller/Freezer container followed by a 20 ft trailer (extending to 35 ft) containing a complete slaughterhouse.

One truck will also have attached a 20 ft trailer with Veterinary/hygiene accommodation - the cleaning control unit.

The trailers when set in place rest on hydraulic-jacked legs in any conditions.

The units carry:

- 35kVa generators
- Water pressure pump (hot & cold)
- Hydraulic switches & hoists
- Diesel oil (low grade can be used)
- Refillable potable water tanks, ample for several days full operations and readily detachable for refill
- Ample tanks and bins for blood, water, effluent & intestines.

The units are well insulated, heavy gauge and built for all conditions.

Apart from normal daily clean, overhaul and thorough cleaning requires one day per week.

One chiller container is hermetically attached to each slaughterhouse and when filled is jacked on to its wheels and set aside for an empty container to replace it. The truck will transport the 2 filled "boxes" to railhead, port or market place and return with them empty to replace the second boxes when filled, and so on

It is proposed that the trucks will carry 2 drivers to cover long distances in shortest time.

The capacity of each of these twin slaughterhouse units is 1280 sheep units per day (2 shifts).

Estimating 25 weeks x 5 days	160,000 sheep
" " "	80,000 "
(1/2 kill off season)	
per annum 50 weeks x 5 days	240,000 "
Proposed 3 complete twin-units	720,000 " p.a.
In 2 years total	1,440,000 "

Total cost of all 3 twin units f.o.b. Europe quoted US\$2,000,000 plus freight & delivery costs to Bishkek.

of export barriers either at the local or national levels.

68. Major environmental problems are:

- The conduct of operations in unhygienic conditions which encourages all forms of bacteria.
- Slaughter of a high proportion of diseased livestock. At Tokmak slaughterhouses, *all* of the August 1993 mutton, pork, and horse throughput and 53 percent of beef throughput was relegated to the sanitary slaughterhouse, where diseased carcasses undergo special treatment.
- Excess stomach contents material is disposed to the sewerage system, causing overloading. This could easily be retrieved for use as fertilizer.
- Bishkek cannery, within the city limits, generates noise and odor pollution. The original intent of moving slaughter to Tokmak was to reduce these hazards, but the cannery has now opened a very substantial slaughterhouse at the plant.

69. The overall objective of changes in the meat industry must be profit through targeted marketing to export markets. Continued reliance on the home market will mean declining profits, since domestic consumption is declining and home slaughter rising. The needed steps should be undertaken by the management of private meat processing plants after privatization is complete. These steps include the following:

- Appoint and train able departmental controllers.
- Insist on repair, maintenance and cleanliness of all buildings, machinery and equipment.
- Ensure cleanliness and working practices of all employees.
- Ensure that meat carcasses (the main product) are hygienically and expeditiously handled at all stages including when in the cold stores and when despatched to the market.
- Ensure good handling standards apply equally to all red offals and edible fats.
- Experiment in canneries with new products and market test them looking hard also at the possibilities abroad.
- Look for markets abroad for meat and bone meal at considerably higher prices than present local sales.
- For hides and skins, improve processing procedures and storage and ensure that they are despatched to the market at the prescribed times, and do not

languish to deteriorate in store waiting for better prices. Export business and better prices will ensue if this procedure is followed rigorously.

70. The government should also play a role. Standards for hygiene and product grading should be revised to conform to international norms, and should be enforced. If no private investor is willing to buy mobile slaughterhouses, the government could purchase them and lease them to private operators on terms of full cost recovery. Research and extension for improved animal health, as discussed above, will benefit the meat industry. The plan for brucellosis control must be implemented to reduce brucellosis incidence from 19.8 per 100,000 human population (18 in 1992) to zero. Brucellosis incidence is particularly severe in Naryn (31 per 100,000). The Ministry of Health and the Veterinary Department must rigidly enforce hygiene standards in processing plants. Adequate control will probably not be achieved without purchase of new portable abattoirs for export meats processed under privatized management. Meat quality will not be improved until the national herd and flock are reduced.

STATISTICAL ANNEX

Table 1.1: Gross Domestic Product at Constant Prices

	1985	1986	1987	1988	1989	1990	1991
<i>in millions of 1983 rubles</i>							
Total GDP	5,846	6,045	6,076	6,869	7,133	7,361	7,094
Net Value Added	5,005	5,063	5,148	5,770	6,012	6,242	5,950
Depreciation	841	982	928	1,100	1,121	1,118	1,144
Gross Material Product	4,945	5,089	5,103	5,800	6,063	6,212	5,982
By source:							
Agriculture	1,644	1,749	1,788	1,966	2,047	2,160	1,988
Net Value Added	1,489	1,568	1,609	1,782	1,873	1,986	1,812
Depreciation	155	181	179	184	174	174	176
Percentage change				<i>percent</i>			
Total GDP	--	3.4	0.5	13.1	3.8	3.2	-3.6
Net Value Added	--	1.2	1.7	12.1	4.2	3.8	-4.7
Depreciation	--	16.8	-5.6	18.5	2.0	-0.2	2.3
Gross Material Product	--	2.9	0.3	13.7	4.5	2.5	-3.7
By source:							
Agriculture	--	6.4	2.2	9.9	4.2	5.5	-8.0
Net Value Added	--	5.3	2.6	10.8	5.1	6.0	-8.8
Depreciation	--	16.9	-1.1	2.5	-5.0	-0.3	1.2

Source: World Bank (August 1993).

Table 1.1a: Gross Domestic Product at Current Prices

	1985	1986	1987	1988	1989	1990	1991 ¹
in millions of rubles							
Total GDP	6,109	6,098	6,278	6,940	7,620	8,320	15,389
Net Value Added	5,152	5,079	5,263	5,742	6,397	6,995	12,936
Depreciation	957	1,019	1,015	1,198	1,253	1,325	2,903
Gross Material Product	5,151	5,127	5,260	5,840	6,464	7,007	13,273
By source:							
Agriculture	1,826	1,905	2,002	2,160	2,510	2,805	4,505
Net Value Added	1,649	1,717	1,806	1,960	2,315	2,599	4,058
Depreciation	177	188	196	200	195	206	447
Share of GDP				percent			
Total GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Net Value Added	84.3	83.3	83.8	82.7	83.6	84.1	81.7
Depreciation	15.7	16.7	16.2	17.3	16.4	15.9	18.3
Gross Material Product	84.3	84.1	83.8	84.2	84.8	84.2	83.8
By source:							
Agriculture	29.9	31.2	31.9	31.1	32.9	33.7	28.4
Net Value Added	27.0	28.2	28.8	28.2	30.4	31.2	25.6
Depreciation	2.9	3.1	3.1	2.9	2.6	2.5	2.8

¹ Preliminary.

Source: World Bank (August 1993).

Table 1.2: January 1 Population

Year	Total	Urban	Rural	Urban	Rural
	<i>in thousands</i>			<i>percent</i>	
1980	3,593.2	1,379.9	2,213.3	38.4	61.6
1990	4,367.2	1,663.8	2,703.4	38.1	61.9
1991	4,422.2	1,684.3	2,737.9	38.1	61.9
1992	4,484.5	1,697.4	2,787.1	37.9	62.1
1993	4,502.0	1,678.7	2,823.3	37.3	62.7

Source: State Statistical Committee.

Table 1.2a: January 1, 1993 Population, by Oblast

Oblast	Total	Urban	Rural	Urban	Rural
	<i>in thousands</i>			<i>percent</i>	
Dzhalal--Abad	812.8	323.3	580.5	39.8	71.4
Osh	1380.9	388.5	1012.4	28.1	73.3
Chui	774.0	219.6	554.4	28.4	71.6
Issyk-Kul	429.3	139.0	290.3	32.4	67.6
Naryn	267.9	56.0	211.9	20.9	79.1
Talas	203.0	32.5	170.5	16.0	84.0
Bishkek	634.1	630.8	3.3	99.5	0.5

Source: State Statistical Committee.

Table 1.3: Administrative-territorial Organization, by Oblast, 1993

Oblast	Territory	Raions		Total	Cities	
	1000 sq. km	Rural	Urban		Oblast	Raion
Osh	46.2	10	--	5	3	2
Dzhalal--Abad	33.7	9	--	5	5	--
Chui	18.8	9	--	5	1	4
Issyk-Kul	43.1	5	--	3	2	1
Naryn	46.7	6	--	1	1	--
Talas	11.4	4	--	1	1	--
City of Bishkek	--	--	4	1	1	--
Total	199.9	43	4	21	14	7

Source: State Statistical Committee.

Table 1.4: Agricultural Output, Constant 1983 Prices, Million Rubles

	1987	1988	1989	1990	1991	1992
Total	2,797	2,912	2,985	3,024	2,723	2,574
Crops	1,117	1,148	1,118	1,107	922	930
including:						
Grain	180	194	184	173	159	176
Potatoes	60	64	62	70	62	69
Vegetables	150	171	183	155	127	114
Fruits	91	81	64	81	66	65
Grapes	13	13	16	20	14	15
Tobacco	261	262	258	282	220	225
Cotton	56	59	56	63	47	40
Sugar beet	--	--	--	--	1	7
Oilseeds	1	4	4	5	2	2
Other	306	301	292	259	223	217
Livestock	1,680	1,765	1,867	1,917	1,801	1,644
including:						
Cattle	289	311	348	381	356	333
Pigs	88	101	103	103	95	92
Sheep and goats	321	321	312	332	300	276
Poultry	146	96	104	52	105	70
Milk	396	422	477	471	449	382
Eggs	59	64	67	42	62	57
Wool	326	332	336	400	319	294
Other	56	118	120	136	115	140

Table 1.4a: Agricultural Output, Current Prices, Million Rubles

	1987	1988	1989	1990	1991	1992
Total	3,025	3,136	3,459	3,845	8,640	72,575
Crops	1,210	1,331	1,294	1,546	3,409	41,099
including:						
Grain	304	281	293	502	606	12,810
Potatoes	47	62	63	79	163	2,856
Vegetables	318	261	302	400	897	18,341
Fruits	65	85	128	140	897	3,746
Grapes	102	129	131	129	610	2,126
Tobacco	8	9	15	27	25	--
Cotton	20	13	14	28	23	250
Sugar beet	7	2	2	2	2	--
Oilseeds	38	62	39	78	139	669
Other	301	427	307	163	47	301
Livestock	1,815	1,805	2,165	2,299	5,231	31,476
including:						
Cattle	146	155	182	295	416	4,602
Pigs	62	73	76	115	142	1,562
Sheep and goats	129	144	159	213	254	2,881
Poultry	63	65	65	64	132	922
Milk	416	496	569	448	735	6,313
Eggs	56	58	60	68	133	1,070
Wool	372	398	627	412	1,388	9,692
Other	571	416	427	684	2,031	4,434

Source: State Statistical Committee.

Table 1.5: Exchange Rates

Unit	1991	1992	1993	1993 1st half	1993 2nd half	1993 IQ	1993 IIQ	1993 IIIQ	1993 IVQ
Rubles/\$	1.8	222.0	955.3	746.5	1,164.0	574.0	919.0	1,028.0	1,300.0
Som/\$	0.0	0.0	5.5	4.1	0.0	4.0	4.2	5.7	8.0
Rubles/som	0.0	0.0	0.0	210.2	0.0	200.0	220.4	180.4	162.5

Source: IMF

Table 1.6: Grain Balance

July/June	Area	Yield	Production	Net imports	Availability	Total use	Seed	Industry	Food	Feed	Waste	Stock change
Total grain	<i>1,000 ha</i>	<i>ton/ha</i>	----- 1,000 tons -----									
1987/88	550	3.32	1,827	1,000	2,827	2,850	150	65	764	1,670	201	-23
1988/89	552	3.04	1,676	1,000	2,676	2,715	150	60	768	1,570	168	-39
1989/90	526	3.04	1,601	1,100	2,701	2,718	145	64	799	1,550	160	-17
1990/91	538	2.79	1,503	1,100	2,603	2,653	150	58	785	1,510	150	-50
1991/92	557	2.47	1,374	900	2,274	2,331	150	52	770	1,250	110	-57
1992/93	578	2.62	1,516	500	2,016	1,962	150	35	781	875	121	54
1993/94 ¹	590	2.54	1,500	580	2,080	1,828	160	25	813	680	150	252
Wheat												
1987/88	225	3.15	709	571	1,280	1,310	53	5	650	525	78	-30
1988/89	197	2.78	548	600	1,148	1,165	53	5	652	400	55	-17
1989/90	197	2.95	581	600	1,181	1,203	51	5	679	410	58	-22
1990/91	194	2.48	482	640	1,122	1,131	53	5	670	360	43	-9
1991/92	194	2.24	434	500	934	996	53	5	654	250	35	-62
1992/93	249	2.55	634	250	884	849	53	2	663	80	51	35
1993/94 ¹	342	2.39	820	350	1,170	988	64	1	691	150	82	182
Coarse grains												
1987/88	325	3.44	1,118	429	1,547	1,540	98	60	115	1,145	123	7
1988/89	355	3.18	1,128	400	1,528	1,550	98	55	115	1,170	113	-22
1989/90	329	3.10	1,020	500	1,520	1,515	94	59	120	1,140	102	5
1990/91	344	2.97	1,021	460	1,481	1,522	98	53	115	1,150	107	-41
1991/92	363	2.59	940	400	1,340	1,335	98	47	115	1,000	75	5
1992/93	330	2.68	882	250	1,132	1,113	98	33	117	795	71	19
1993/94 ¹	248	2.75	680	230	910	840	96	24	122	530	68	70

¹ Preliminary.

Sources: World Bank estimates, based on data from Khleboprodukt, State Statistical Committee and USDA/ERS.

Table 1.7: Per Capita Apparent Consumption

Product	1980	1985	1986	1987	1988	1989	1990	1991	1992
	<i>kilograms</i>								
Bread and grain products	149	144	144	141	139	141	139	134	135
Potatoes	56	65	66	63	66	70	69	62	68
Vegetables and melons	74	98	92	84	86	91	78	73	75
Fruits and berries	28	25	26	29	23	17	16	18	25
Sugar	33	32	36	38	38	34	37	36	24
Vegetable oil	7	9	9	9	9	10	11	9	7
Meat and meat products ¹	38	40	42	43	48	51	54	48	46
Fish and fish products	6	7	7	6	6	6	6	4	2
Milk and milk products	177	182	217	236	253	278	266	249	208
Eggs, number	108	124	129	133	142	152	154	144	128

¹ Includes fat and subproducts.
Source: State Statistical Committee.

Table 1.7a: Per Capita Apparent Consumption and Share of Family Budget ¹

Product	1987	1988	1989	1990	1991	1992	1993 ²
	<i>kilograms</i>						
Bread and grain products	137.3	135.7	134.4	128.6	121.2	122.4	67.2
Potatoes	63.1	57.6	60.4	61.0	62.4	68.6	40.8
Vegetables and melons	92.0	86.5	90.9	86.1	77.7	82.3	34.6
Fruits, berries, and grapes	42.4	33.3	34.9	33.3	37.0	36.4	15.9
Sugar	24.5	22.6	19.5	18.6	17.8	11.6	7.4
Vegetable oil	7.7	7.4	7.5	7.6	6.6	5.6	2.7
Meat and meat products ³	45.6	42.3	44.2	42.2	33.4	32.9	15.4
Fish and fish products	4.9	4.4	4.1	4.5	2.8	1.3	0.4
Milk and milk products	245.6	242.0	244.5	241.1	191.3	173.4	75.8
Eggs, number	161.0	159.0	166.0	159.0	147.0	154.0	76.0
Share of family budget spent on food							
Percentage	32.0	31.4	31.5	30.1	35.4	45.7	48.5

¹ Based on family budgets of 2,000 families interviewed.

² January - June.

³ Includes fat and subproducts.

Source: State Statistical Committee.

Table 1.8: 1993 Average Monthly Wages, by Oblast

	January	February	March	April	May	June	July	August
	<i>soms</i>							
Kyrgyz Republic								
Total	23.0	37.1	43.0	47.9	53.8	63.4	69.5	84.3
of which:								
Agriculture	17.5	20.5	21.4	24.8	26.5	29.6	35.8	44.9
of which:								
State farms	12.6	15.3	17.2	20.8	22.3	26.2	34.2	43.9
Collective farms	13.1	13.8	17.3	25.0	24.7	32.5	36.5	42.8
Issyk-Kul								
Total	20.1	26.7	32.2	34.5	37.9	46.4	52.9	58.5
of which:								
Agriculture	11.4	16.1	19.5	23.0	26.0	28.6	42.1	39.5
of which:								
State farms	10.5	14.1	17.2	23.2	24.7	28.8	38.7	39.6
Dzhalal-Abad								
Total	25.0	35.7	40.5	48.0	52.6	55.7	64.8	78.7
of which:								
Agriculture	10.1	14.7	18.2	26.0	31.5	30.0	37.1	50.2
of which:								
State farms	9.1	12.8	16.6	25.3	29.2	27.8	35.2	48.9
Osh								
Total	22.9	29.5	33.5	36.9	40.5	44.5	48.6	62.9
of which:								
Agriculture	19.0	19.8	20.0	20.1	20.1	20.8	22.2	32.1
of which:								
State farms	8.4	8.5	12.1	12.7	13.0	13.1	21.4	31.4
Chui								
Total	32.3	41.1	49.4	55.5	58.7	76.8	88.2	105.0
of which:								
Agriculture	22.5	30.6	29.3	36.2	35.7	53.3	62.7	79.0
of which:								
State farms	22.2	31.0	27.3	34.5	34.1	57.2	62.5	71.7
Naryn								
Total	24.6	27.0	32.9	35.9	37.5	46.9	53.3	64.8
of which:								
Agriculture	20.1	20.9	19.8	21.3	22.9	24.6	34.0	39.0
of which:								
State farms	18.0	20.5	26.9	21.8	21.9	35.6	35.3	46.2
Talas								
Total	18.2	22.5	24.3	28.1	32.4	34.2	38.8	59.0
of which:								
Agriculture	18.3	18.8	19.2	20.9	31.4	30.6	30.6	39.4
of which:								
State farms	19.0	19.3	18.4	19.1	30.0	29.1	31.0	41.2
Bishkek (city)								
Total	38.7	53.5	61.7	68.0	81.9	99.3	101.4	120.3
of which:								
Agriculture	27.2	37.9	41.1	52.0	46.4	65.9	69.6	91.5

Source: State Statistical Committee.

Table 1.8a: Agricultural Earnings and Expenditures by Farm Type ¹

	Kolkhoz		Sovkhoz		Private farms
	1992	1993	1992	1993	1993
	soms				
Income					
Total	13.26	109.54	8.91	72.29	116.18
Wages	1.89	14.59	3.90	24.73	8.92
Received from kolkhoz	4.79	42.65	na	na	8.03
Pensions, stipends, and receipts from the social consumption fund	1.83	13.91	1.35	10.39	6.88
Sale of agricultural products, cattle, poultry	3.56	24.53	2.67	25.41	79.99
Other income	1.19	3.85	0.99	11.75	14.35
Expenses					
Total	12.71	101.18	9.44	69.32	257.96
Food	4.17	37.76	4.22	35.39	73.20
Non-food purchases	4.87	35.72	2.77	19.68	84.43
Housing	0.20	1.97	0.10	1.01	2.16
Taxes	0.24	3.06	0.26	1.89	17.94
Other	2.06	14.64	0.84	5.38	66.04

¹ January-June.
na=Not applicable.
Source: State Statistical Agency.

Table 2.1: Total Land Area and its Allocation by Use, Jan. 1, 1993

	Total land area	Total land under cultivation	Plowed land	of which: Tree crops	Hay	Pasture
<i>1,000 hectares</i>						
Total land (territory)	20,266.2	10,923.6	1,400.5	68.0	192.9	9,250.8
Agricultural enterprises and farms	15,724.6	9,904.6	1,372.8	65.0	186.9	8,268.6
Collective farms	4,605.6	2,925.2	434.8	11.9	53.2	2,422.0
Land for general use	4,572.0	2,896.2	412.2	7.0	51.7	2,422.0
Land for employee's individual use	33.6	29.0	22.6	4.9	1.5	0.0
State farms	6,126.7	3,900.1	576.5	25.3	79.0	3,215.7
Inter-farm agricultural enterprises and organizations	1.5	1.3	0.1	0.9	0.0	0.3
Individual use	102.2	87.9	65.9	18.9	3.1	0.0
Private farms	1,773.1	1,142.3	106.9	1.5	27.3	1,005.0
Land reserve and forest organizations	3,399.5	879.3	22.5	1.3	5.0	850.4
Other land uses	1,142.1	139.7	5.1	1.7	1.0	131.8
Agriculture cooperatives and organizations	2,969.2	1,741.3	171.4	6.2	23.0	1,538.3

Source: State Statistical Committee.

Table 2.2: Grain Area by Grain Type, 1986-93

	1986	1987	1988	1989	1990	1991	1992	1993 ¹
	1,000 hectares							
Total grain	535.6	550.6	551.6	526.1	537.4	556.5	576.5	641.0
of which:								
Winter wheat	197.4	216.7	184.2	188.3	182.8	175.5	208.8	267.0
Spring wheat	9.0	8.0	13.0	9.0	10.8	18.1	39.6	75.4
Winter barley	5.0	13.0	12.7	26.0	51.6	77.4	78.4	57.1
Spring barley	246.0	232.0	254.3	224.8	214.8	212.6	185.1	188.0
Oats	6.0	6.0	7.0	6.0	6.2	5.1	4.4	3.0
Corn for grain	65.0	67.1	71.3	66.4	65.7	62.3	54.7	46.0
Pulses	3.8	4.6	4.8	3.4	3.1	1.9	1.4	na
Share of area:	percent							
Total grain	100	100	100	100	100	100	100	100
of which:								
Winter wheat	37	39	33	36	34	32	36	42
Spring wheat	2	1	2	2	2	3	7	12
Winter barley	1	2	2	5	10	14	14	9
Spring barley	46	42	46	43	40	38	32	29
Oats	1	1	1	1	1	1	1	0
Corn for grain	12	12	13	13	12	11	9	7
Pulses	1	1	1	1	1	0	0	na

¹ Preliminary.

na = Not available.

Sources: State Statistical Committee, USDA/ERS.

Table 2.3: Grain Yield, by Grain Type, 1986-92

	1986	1987	1988	1989	1990	1991	1992
Bunkerweight							
	<i>tons/hectare</i>						
Total grain	3.05	3.47	3.19	3.14	2.93	2.60	2.78
of which:							
Winter wheat	2.87	3.34	2.98	3.14	2.68	2.43	2.86
Spring wheat	2.22	2.75	na	2.15	1.82	2.17	2.05
Winter barley	na	na	na	3.38	3.23	2.53	2.68
Spring barley	2.33	2.72	2.42	2.14	2.16	1.88	2.27
Oats	2.50	3.33	2.71	2.52	2.65	2.46	2.97
Corn for grain	6.61	6.86	6.98	6.81	6.18	5.85	5.13
Pulses	1.53	1.59	1.44	1.26	1.41	1.30	1.06
Cleanweight							
Total grain	2.93	3.32	3.04	3.04	2.80	2.47	2.63
of which:							
Winter wheat	2.72	3.18	2.83	2.99	2.54	na	na
Spring wheat	2.12	2.51	2.14	2.07	1.71	na	na
Winter barley	2.91	2.76	2.35	3.17	3.07	na	na
Spring barley	2.21	2.55	2.24	2.06	2.01	na	na
Oats	2.15	3.01	2.15	2.41	2.48	2.29	2.78
Corn for grain	6.61	6.86	6.98	6.81	6.18	5.85	5.13
Pulses	1.33	1.22	1.31	1.21	1.29	na	na

na = Not available.

Sources: State Statistical Committee, USDA/ERS.

Table 2.4: Grain Production, by Grain Type, 1986-93

	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Bunkerweight								
	1,000 tons							
Total grain	1,633	1,909	1,758	1,655	1,573	1,446	1,602	1,593
of which:								
Winter wheat	568	724	549	591	491	426	598	na
Spring wheat	20	22	29	18	20	39	36	na
Winter barley	16	39	na	86	167	196	210	na
Spring barley	574	630	676	482	464	401	411	na
Oats	15	20	19	18	16	13	13	9
Corn for grain	430	460	497	452	406	499	281	235
Pulses	6	7	7	4	4	3	1	na
Cleanweight								
Total grain	1,568	1,827	1,676	1,601	1,503	1,374	1,516	na
of which:								
Winter wheat	536	689	521	564	464	na	na	na
Spring wheat	19	20	27	17	18	na	na	na
Winter barley	15	36	31	81	159	na	na	na
Spring barley	544	592	571	463	433	na	na	na
Oats	13	17	16	15	15	12	12	na
Corn for grain	430	460	497	452	406	365	281	na
Pulses	5	6	6	4	4	na	na	na

¹ Preliminary.

na = Not available.

Sources: State Statistical Committee, USDA/ERS.

Table 2.5: Area, Yield, and Production of Feed Crops

Crop	1990			1991			1992		
	Area 1,000 ha	Yield tons/ha	Production 1,000 tons	Area 1,000 ha	Yield tons/ha	Production 1,000 tons	Area 1,000 ha	Yield tons/ha	Production 1,000 tons
Sugar beet for feed	0.5	38.47	19.2	0.6	37.43	21.8	0.5	31.79	17.4
Corn for silage and green chop	89.6	30.13	2,735.5	89.2	27.30	2,473.6	90.3	22.87	2,068.8
Silage crops	11.9	16.30	193.4	10.6	17.36	186.3	7.9	14.85	137.5
Annual grasses:									
for hay	50.1	3.04	152.3	50.9	2.62	137.8	50.6	2.50	126.6
for green chop	42.7	12.30	580.8	38.1	11.49	488.9	29.8	11.88	418.3
Perennial grasses sown the previous year:									
for hay	188.5	5.82	1,097.9	185.6	5.31	986.2	188.6	5.31	1,001.6
for green chop	158.5	22.93	3,588.1	159.8	20.41	3,262.3	150.9	21.97	3,318.5
Natural hay	300.5	1.03	604.4	271.1	0.98	553.5	259.6	1.16	570.7

Source: State Statistical Committee.

Table 2.6: Area, Yield and Production of Non-Grain Crops, 1986-93

	1986	1987	1988	1989	1990	1991	1992	1993
Area	<i>1,000 hectares</i>							
Cotton	29.1	31.0	31.8	26.9	29.7	25.9	21.5	20.3
Sugar beets	--	--	--	--	0.1	0.8	6.3	11.7
Tobacco	18.6	21.2	19.3	19.9	19.1	19.9	20.8	22.4
Potatoes	21.7	21.0	21.3	22.6	25.2	22.5	27.2	26.2
Vegetables	19.1	19.7	23.2	23.4	20.6	19.5	22.2	14.7
Yield	<i>tons/hectare</i>							
Cotton	2.34	2.35	2.47	2.75	2.73	2.45	2.44	2.47
Sugar beets	--	--	--	--	15.90	15.60	21.30	17.70
Tobacco	3.12	2.40	2.61	2.53	2.82	2.48	2.08	2.10
Potatoes	14.10	12.60	14.55	13.40	13.60	13.66	12.38	10.60
Vegetables	22.50	20.70	20.10	21.50	19.60	18.00	15.43	14.10
Production	<i>1,000 tons</i>							
Cotton	68.2	72.9	78.7	74.0	80.9	63.4	52.4	50.0
Sugar beets	--	--	--	--	1.7	12.7	126.5	206.7
Tobacco	57.9	51.0	50.4	50.3	53.9	49.3	43.2	48.5
Potatoes	328.9	287.3	332.3	324.4	365.1	326.3	362.0	190.5
Vegetables	511.9	490.7	553.1	585.3	487.3	398.9	404.0	249.2

Source: State Statistical Committee.

Table 2.7: Fruit, Berries, and Grape Area, Yield, and Production, 1986-92

	Unit	1986	1987	1988	1989	1990	1991	1992
Fruits and berries								
Area:	1,000 ha							
End of year		48.5	47.8	47.4	47.0	48.0	46.6	46.6
Fruit-bearing		35.1	34.5	33.9	33.9	34.0	32.8	33.1
Yield	tons/ha	5.55	2.57	4.23	2.41	4.12	2.59	3.54
Production	1,000 tons	196.4	89.1	145.2	81.8	141.0	85.3	117.5
Grapes								
Area:	1,000 ha							
Vineyards, end of year		9.6	9.3	9.3	9.4	9.0	8.9	8.3
Fruit-bearing area		6.8	6.2	6.3	6.5	7.0	6.5	6.1
Yield	tons/ha	9.22	5.75	4.46	3.01	6.32	4.53	5.06
Production	1,000 tons	62.7	36.0	28.4	33.1	43.3	29.3	31.0

Source: State Statistical Committee.

Table 2.8: Grain Area, Yield, and Production, by Oblast, 1986-90¹

	Unit	1986	1987	1988	1989	1990
Kyrgyz Republic						
Area	1,000 ha	542.4	550	551	527	536.8
Yield	tons/ha	3.01	3.47	3.19	3.14	2.93
Production	1,000 tons	1632.7	1908.7	1757.7	1654.8	1572.9
Osh						
Area	1,000 ha	78.0	94.0	98.2	74.9	87.4
Yield	tons/ha	2.79	2.84	2.83	3.07	2.41
Production	1,000 tons	217.8	267.2	277.8	229.9	210.6
Dzhalal - Abad						
Area	1,000 ha	60.3	59.0	59.6	60.2	57.2
Yield	tons/ha	2.84	3.10	3.01	2.79	2.64
Production	1,000 tons	171.3	182.7	179.5	167.9	150.9
Issyk - Kul						
Area	1,000 ha	73.8	72.6	58.1	70.0	65.8
Yield	tons/ha	3.62	4.16	3.92	4.18	3.07
Production	1,000 tons	267.3	302.0	227.6	292.3	202.2
Naryn						
Area	1,000 ha	64.2	63.3	61.6	60.5	58.8
Yield	tons/ha	2.95	3.4	3.01	2.89	3.06
Production	1,000 tons	189.3	215.3	185.3	174.9	180.1
Talas						
Area	1,000 ha	50.6	50.9	49.3	48.7	51.1
Yield	tons/ha	2.59	3.11	2.86	2.99	2.79
Production	1,000 tons	131.1	185.3	141.0	145.8	142.5
Chui						
Area	1,000 ha	179.6	167.1	175.4	172.6	173.4
Yield	tons/ha	3.18	4.07	3.61	3.21	3.39
Production	1,000 tons	571.0	688.3	633.3	553.9	588.0

¹ Bunkerweight.

Source: State Statistical Committee.

Table 2.9: Main Aggregates of Animal Husbandry

	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993 ¹
Livestock inventories, Jan. 1										
	1,000 head									
Cattle	965	1,056	1,110	1,129	1,141	1,190	1,214	1,205	1,190	1,122
of which: cows	375	423	427	434	460	487	507	506	519	515
Pigs	326	323	350	379	388	416	445	393	358	247
Sheep	na	10,128	9,838	9,908	10,005	10,013	10,060	9,545	9,107	8,362
Goats	na	345	362	355	385	392	423	428	418	380
Horses	251	281	277	284	293	304	310	313	321	313
Poultry	9,486	12,008	12,394	13,496	13,900	14,441	15,207	13,915	13,571	10,421
Livestock production										
	1,000 tons									
Meat	159.4	169.1	192.6	203.6	222.5	241.4	254.1	229.7	228	250.4
of which:										
Beef and veal	51.1	56.4	63.7	65.7	71.9	85.4	91.2	87.5	87.8	na
Pork	25.2	59	66.4	67.2	71.7	75.1	77.2	70.9	70.3	na
Mutton and goat meat	61.4	23	28.2	32.3	36.4	37.6	40.5	32.7	35.6	na
Poultry	14.9	22.8	25.5	29.8	31.9	31.5	33.3	28.8	22.2	na
Horse meat	5.2	5.9	6.7	6.5	8	9.2	9.04	8.3	11	na
Rabbit meat	1.6	2	2.1	2.1	2.6	2.6	2.5	1.5	1.1	na
Milk	682	771	909	998	1063	1202	1185	1131	957	708
Eggs ²	416	532	573	612	666	704	714	650	527	315
Wool ³	34	33	36	37	38	39	39	37	32	30
Honey	na	11	12	13	14	13	12	14	14	na

¹ 1993 meat, milk, eggs, and wool production are January–September. Inventories are as of January 1, 1993.

² Millions.

³ Greasy weight.

na=Not available.

Sources: State Statistical Committee, USDA/ERS.

Table 2.10: Livestock Productivity, by Type of Farm

	Unit	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993 ¹
All farms											
Average annual milk yield per cow	kg	1,927	1,914	2,240	2,395	2,401	2,417	2,438	2,329	na	na
Average annual wool yield per sheep	kg	3.0	3.2	3.6	3.8	3.8	3.8	3.8	3.8	na	na
Average daily weight gain, cattle	kg	325	308	328	na						
Average daily weight gain, pigs	kg	119	111	115	na						
Average daily weight gain, sheep & goats	kg	39	36	37	na						
Average egg production per chicken	number	142	186	204	213	223	222	219	204	na	na
State, collective farms, inter-farm enterprises											
Average annual milk yield per cow	kg	2,717	2,686	2,956	3,007	3,106	3,213	3,070	2,811	2,188	1,280
Average annual wool yield per sheep	kg	3.3	2.8	3.2	3.3	3.4	3.4	3.2	3.1	3.0	2.7
Average daily weight gain, cattle	kg	326	308	327	na	na	na	397	359	283	na
Average daily weight gain, pigs	kg	107	111	114	na	na	na	261	232	189	na
Average daily weight gain, sheep	kg	38	36	36	na	na	na	89	89	75	na
Average egg production per chicken	number	181	186	204	213	223	222	219	206	185	85

¹ January–August 1993.

Source: State Statistical Committee.

Table 2.11: Feed Supply for State and Collective Farms, Inter-Farm Enterprises

	1991	1992	October 25:		1993 as a % of 1992
			1993	1992	
	<i>1,000 tons</i>				
Coarse feeds	3,692.3	3,872.8	3,411.4	3,775.1	90.4%
of which:					
hay	1,389.4	1,455.3	1,360.9	1,440.9	94.4%
haylage	1,543.7	1,601.5	1,277.0	1,572.1	81.2%
straw	759.2	816.0	773.5	762.1	101.5%
silage	2,145.7	1,764.0	1,152.9	1,657.5	69.6%
grass meal, tons	37,570.3	8,024.0	2,800.0	7,525.4	37.2%
Grain fodder stocks	614.0	531.0	204.0	274.0	74.5%
Supply of coarse and succulent feeds (not incl. grain-fodder), feed equiv.	2020.0	1948.2	1599.3	1864.7	85.8%
Supply per head of cattle, in feed equivalent, centners	14.39	14.61	11.44	13.99	81.8%

Source: State Statistical Committee.

Table 2.12: Feed Balance, 1991-93

Type of feed	1991			1992			1993 ¹		
	Requirement	Actual	Percent	Requirement	Actual	Percent	Requirement	Actual	Percent
	<i>1,000 tons</i>								
Coarse feed, total	4,582.4	3,692.3	80	4,273.5	3,872.8	91	3,621.3	3,450.0	95
of which:									
hay	2,388.5	1,389.4	58	2,082.1	1,455.3	70	1,916.7	1,350.0	70
haylage	1,843.7	1,543.7	84	1,801.9	1,601.5	89	1,389.2	1,300.0	95
straw	350.2	759.2	217	389.5	816.0	209	335.4	800.0	238
Succulent feed, total	3,369.2	2,368.2	70	2,999.9	1,929.1	64	2,518.0	1,605.0	64
of which:									
silage	2,975.8	2,145.7	72	2,596.3	1,764.0	68	2,433.5	1,500.0	61
feed rootcrops	na	222.5	na	na	165.1	na	na	105.0	na
Concentrated feed	1,335.5	710.0	53	1,088.4	692.0	63	1,041.0	530.0	51
Summer green fodder	14,531.0	13,042.0	90	13,792.2	12,615.0	91	11,550.0	11,402.0	99
Total feed in feed equiv.	7,181.0	5,240.0	73	6,268.8	5,079.0	81	5,518.4	4,454.0	81

¹ Expected.

na = Not available or not applicable.

Source: Ministry of Agriculture.

Table 2.13: Livestock Birth and Death Rates, 1985-93

	1985	1986	1987	1988	1989	1990	1991	1992	1993
<i>head</i>									
Birth rates per 100 mothers									
Calves	81	84	84	86	88	86	81	46	42
Piglets	2,752	3,232	3,253	3,351	3,414	2,702	2,443	1,134	820
Lambs	89	95	95	97	100	96	91	86	89
Foals	50	65	62	66	71	65	57	47	48
Livestock deaths									
Cattle	15,141	11,926	12,049	10,314	9,195	11,193	11,196	12,050	na
% of herd	1.5	1.2	1.2	1.0	0.9	1.1	1.1	1.4	na
Pigs	27,091	22,891	25,525	22,289	25,457	28,548	28,560	39,104	na
% of herd	5.3	4.1	4.2	3.7	4.0	4.6	4.6	7.7	na
Sheep and goats	1,331,435	1,053,500	1,064,156	1,064,156	980,167	1,138,978	1,339,214	1,017,848	na
% of herd	10.0	8.1	8.2	8.1	7.5	8.9	8.9	10.1	na
Horses	7,305	5,203	5,201	4,862	5,120	6,295	6,302	6,196	na
% of herd	3.0	2.2	2.2	2.0	2.0	2.5	2.5	3.0	na

na=Not available.

Source: State Statistical Committee.

Table 2.14: Livestock Inventories, by Oblast, 1980, 1985 - 91¹

	1980	1985	1986	1987	1988	1989	1990	1991
	1,000 head							
Cattle								
Kyrgyz Republic	982.0	1,110.0	1,129.6	1,161.0	1,190.1	1,214.3	1,205.2	1,190.0
Dzhalal - Abad	146.6	168.9	176.4	179.9	186.6	194.9	190.4	192.6
Issyk - Kul	139.8	147.8	150.0	154.8	163.8	167.7	167.9	161.9
Naryn	75.6	78.7	78.4	811.0	82.3	85.1	90.3	92.6
Osh	251.8	300.7	302.3	315.8	331.5	337.2	338.1	345.5
Talas	75.9	89.9	88.5	87.6	81.5	83.1	81.7	72.3
Chui	291.6	322.9	332.9	340.6	343.1	345.1	335.7	324.3
of which: cows								
Kyrgyz Republic	384.1	426.9	434.4	460.1	487.4	507.4	506.1	518.6
Dzhalal - Abad	57.5	68.8	69.5	77.5	82.1	89.0	87.6	88.9
Issyk - Kul	55.3	58.7	59.9	62.7	63.6	63.9	65.0	66.5
Naryn	31.2	33.2	34.3	37.7	39.0	41.6	43.7	45.9
Osh	100.9	119.5	122.2	131.0	146.6	154.1	155.2	162.8
Talas	28.1	31.2	30.8	28.6	30.8	33.5	31.7	29.9
Chui	110.8	115.0	117.3	122.0	124.7	124.8	122.3	124.2
Pigs								
Kyrgyz Republic	335.8	349.3	379.0	387.6	416.4	444.8	393.4	357.7
Dzhalal - Abad	14.1	15.2	16.7	16.4	18.9	22.3	18.8	12.4
Issyk - Kul	25.9	25.1	27.5	31.3	32.3	32.0	25.6	21.8
Naryn	0.2	0.2	2.1	0.8	1.4	0.6	0.4	0.3
Osh	10.8	15.0	16.2	16.9	20.7	27.3	26.0	24.9
Talas	24.2	29.4	34.0	36.5	36.9	39.8	34.8	22.3
Chui	257.3	259.7	278.0	280.2	299.5	317.4	281.8	271.5
Sheep and goats								
Kyrgyz Republic	10,058.4	10,200.0	10,263.0	10,389.8	10,404.9	10,483.0	9,968.0	9,524.0
Dzhalal - Abad	1,519.3	1,551.0	1,564.8	1,573.8	1,576.4	1,634.9	1,525.1	1,400.2
Issyk - Kul	1,861.0	1,895.8	1,901.7	1,946.0	1,955.1	1,970.0	1,881.7	1,768.8
Naryn	2,213.9	2,327.0	2,361.0	2,387.6	2,353.9	2,366.3	2,363.9	2,350.9
Osh	1,974.0	2,068.8	2,065.7	2,078.5	2,115.0	2,147.2	2,042.9	1,920.0
Talas	975.4	925.1	934.9	960.5	956.5	956.1	886.5	871.4
Chui	1,509.8	1,425.7	1,429.1	1,437.1	1,441.9	1,402.0	1,262.0	1,208.8
Poultry								
Kyrgyz Republic	3,770.0	5,238.0	6,241.7	6,236.0	6,507.2	6,934.6	5,919.2	6,246.2
Dzhalal - Abad	750.0	740.6	1,002.5	735.2	930.6	997.1	678.9	653.0
Issyk - Kul	142.5	579.1	682.6	634.8	627.6	687.5	593.4	542.6
Naryn	8.6	1.5	5.5	9.5	9.8	3.8	na	1.4
Osh	598.0	409.9	613.1	616.3	715.1	787.9	620.4	577.6
Talas	30.5	47.4	54.5	67.7	63.5	64.5	48.1	45.1
Chui	2,240.4	3,457.3	3,881.8	4,167.8	4,159.0	4,393.9	3,977.0	4,425.6
Horses								
Kyrgyz Republic	258.5	276.5	283.7	293.4	303.5	310.0	312.6	320.5
Dzhalal - Abad	47.1	49.3	51.0	52.0	54.9	55.7	56.1	59.9
Issyk - Kul	43.5	45.1	46.0	48.2	48.7	48.5	48.4	48.8
Naryn	51.9	55.8	57.1	58.6	60.7	63.4	67.0	67.1
Osh	53.4	60.2	61.4	64.6	68.0	70.1	70.0	73.8
Talas	20.9	22.3	21.9	22.5	23.1	23.8	23.8	24.2
Chui	41.3	43.4	45.9	47.1	47.7	48.1	46.9	46.4

¹ End of year.

na = Not available.

Source: State Statistical Committee.

Table 2.14a: January 1 Sheep Inventories in the Kyrgyz Republic

	Total inventories	Inventories by farm type				Household plots Total
	All farms	Socialist sector Total	of which: mothers	Peasant farms Total	of which: mothers	
	<i>1,000 head</i>					
Kyrgyz Republic	7,314.2	3,234.6	1,530.5	1,233.7	587.0	245.9
Osh	1,615.7	861.7	439.1	72.1	39.6	681.9
Dzhalal-Abad	896.4	148.8	66.9	350.3	174.0	397.3
Chui	1,220.6	538.6	253.0	69.9	36.7	612.1
Issyk-Kul	1,198.9	651.5	228.0	172.1	80.4	375.3
Naryn	1,624.5	510.0	204.0	509.9	231.0	604.6
Talas	758.1	524.0	209.0	59.4	39.3	174.7

Source: Ministry of Agriculture.

Table 2.14b: Kyrgyz Republic Wool Production and Procurement, by Oblast

	1980	1985	1986	1987	1988	1989	1990	1991
1,000 tons								
Production ¹								
Kyrgyz Republic	27.1	32.5	35.9	37.4	38.0	38.6	39.0	36.5
Dzhalal - Abad	3.2	4.2	5.0	5.1	5.2	5.3	5.8	5.3
Issyk - Kul	5.5	6.0	6.5	6.8	7.0	7.0	6.9	6.7
Naryn	6.5	8.0	8.7	8.7	6.6	6.5	6.4	6.3
Osh	4.3	6.4	6.8	7.2	7.3	7.3	6.2	7.5
Talas	2.7	2.8	3.2	3.8	3.9	4.1	3.9	3.5
Chui	4.9	5.1	5.7	5.8	6.0	6.4	5.8	5.2
Procurement ²								
Kyrgyz Republic	18.3	17.1	19.0	20.2	20.4	21.0	20.6	18.7
Dzhalal - Abad	1.9	2.5	2.9	3.0	3.0	3.0	3.0	2.6
Issyk - Kul	3.4	3.3	3.6	3.7	3.8	4.0	3.9	3.2
Naryn	4.7	4.1	4.5	4.8	4.7	4.7	4.8	4.3
Osh	2.9	3.3	3.5	3.7	3.8	3.9	3.6	3.6
Talas	2.6	1.5	1.7	2.0	2.0	2.2	2.1	2.0
Chui	2.8	2.4	2.8	3.0	3.1	3.2	3.0	2.8

¹ Greasy weight.

² Cleanweight.

Source: State Statistical Committee.

Table 2.14c: October 1 Wool Production, by Oblast

	Total			State sector production			Avg. wool yield per sheep		1993 State procurement			1992 procurement	1993 as a % of 1992
	1992	1993	+/-	1992	1993	+/-	1992	1993	State order	Procured	Share		
	<i>tons</i>			<i>tons</i>			<i>kg</i>		<i>tons</i>		<i>percent</i>	<i>tons</i>	<i>percent</i>
Kyrgyz Republic	18,785	13,900	(4,885)	16,546	12,268	(4,278)	3.1	2.9	14,258	11,564	81	12,552	92
Osh	3,465	2,816	(649)	3,339	2,687	(652)	3.0	2.9	2,850	2,161	76	2,186	99
Dzhalal-Abad	1,686	1,385	(301)	1,664	1,375	(289)	3.1	3.1	2,150	1,584	74	1,260	126
Chui	2,489	2,019	(470)	2,086	1,820	(266)	3.1	3.0	1,649	1,605	97	2,066	78
Issyk-Kul	4,199	2,916	(1,283)	3,418	2,197	(1,221)	3.0	2.6	2,829	2,405	85	2,669	90
Naryn	4,599	2,961	(1,638)	3,968	2,659	(1,309)	2.9	2.7	3,300	2,419	73	3,016	80
Talas	2,347	1,803	(544)	2,072	1,635	(437)	3.5	3.3	1,450	1,390	96	1,355	103

Source: Ministry of Agriculture.

Table 2.14d: October 1 Sheep and Goat Indicators, by Oblast ¹

	Inventories			of which:	Births and birthrates:			Deaths:		Deathrate	
	1992	1993	1993 as a % of 1992	Ewes 1993	Total 1993	Per 100 mothers ² 1992	1993	1992	1993	1992	1993
	1,000 head				head			head		percent	
Kyrgyz Republic	5,664.9	4,199.7	74	2,079.1	2,068,669	86	89	860,754	689,694	10.54	10.65
Osh	1,238.0	993.1	80	582.1	485,581	76	81	132,991	124,928	7.75	8.45
Dzhalal-Abad	590.6	457.3	77	246.5	258,732	89	93	78,740	67,798	9.55	9.34
Chui	713.6	583.7	79	284.3	311,599	86	89	112,461	98,561	10.58	10.66
Issyk-Kul	1,195.7	763.6	64	308.5	342,008	89	90	227,875	165,098	13.08	13.80
Naryn	1,316.5	896.6	68	410.2	414,927	90	89	224,328	163,672	11.77	11.66
Talas	610.5	525.4	86	247.5	255,822	94	97	84,359	69,637	9.41	9.30

¹ Socialist sector.

² Beginning of year.

Source: Ministry of Agriculture.

Table 3.1: State Procurement Prices, 1992 – 1993

Commodity	1992		1993: Volume procured ¹ 1,000 tons	March 1		October 1		Per unit price soms ²	Compared to 1992:	
	Per unit price rubles	Total cost mil. rubles		Per unit price rubles	Total cost mil. rubles	Per unit price rubles	Total cost mil. rubles		March 1 percent	October 1 percent
Grain	12,071	5,568.4	461.3	33,000	15,223	70,000	32,291	431	2.7	5.8
Hay	3,800	27.7	7.3	6,200	45	6,200	45	38	1.6	1.6
Vitamin-grass meal	48,000	398.4	8.3	50,000	415	50,000	415	308	1.0	1.0
Cotton fiber	113,010	1,853.4	16.4	122,625	2,011	156,000	2,558	960	1.1	1.4
Raw tobacco	154,320	6,589.5	42.7	405,425	17,312	600,000	25,620	3,692	2.6	3.9
Potatoes	7,315	517.2	10.7	25,000	1,767	160,000	11,312	985	3.4	21.8
Vegetables	4,796	1,233.0	257.1	18,000	4,628	300,000	77,130	1,846	3.7	62.5
Melons	358	95.6	26.7	7,000	187	120,000	3,120	738	2.0	32.6
Fruits and berries	30,000	1,842.0	61.4	45,000	2,763	400,000	24,400	2,462	1.5	3.2
Grapes	35,000	731.0	20.9	40,000	836	400,000	8,000	2,462	1.1	1.1
Sugar beet seeds	300,000	180.0	0.6	480,000	288	2,000,000	1,200	12,308	1.6	6.7
Lucerne seeds	250,000	250.0	1	250,000	250	1,000,000	1,000	6,154	--	4.0
Silk cocoons	400,000	400.0	1	100,000	1,000	900,000	9,000	5,538	2.5	22.5
Cattle and poultry	22,220	3,217.5	144.8	104,000	15,059	420,000	60,816	2,585	4.7	18.5
Milk	5,894	1,975.8	335.4	28,500	9,559	72,000	54,149	443	4.8	12.2
Honey	1,000,000	2,590.0	2.59	1,500,000	3,887	1,200,000	3,108	7,385	1.5	1.2
Eggs (million pieces)	14,750	405.0	274.8	18,000,000	4,946	18,000,000	4,946	110,769	12.2	12.2
Wool in clean fiber	400,841	5,715.2	14258	881,400	12,516	2,358,400	33,626	14,513	2.2	5.9
Total	na	29,637.4	na	na	93,692	na	321,737	na	3.2	10.8

¹ Estimated.

² October 1993 som prices were derived using the IVQ exchange rate.

na = Not available.

Source: State Statistical Committee and Ministry of Agriculture.

Table 3.2: Grain Procurement Prices, 1993¹

	Price/ton		
	soms	rubles	dollars
Durum wheat			
1st class	708	141,600	\$88.50
2nd class	605	121,000	\$75.63
3rd class	531	106,200	\$66.38
Unclassified	418	83,600	\$52.25
Soft wheat			
1st class (strong, 40% gluten)	605	121,000	\$75.63
1st class (strong)	531	106,200	\$66.38
2nd class	478	95,600	\$59.75
3rd class	418	83,600	\$52.25
4th class	350	70,000	\$43.75
4th class (forage)	300	60,000	\$37.50
Corn	340	68,000	\$42.50
Oats			
Valuable types	506	101,200	\$63.25
Common	300	60,000	\$37.50
Barley			
For beer production	446	89,200	\$55.75
Valuable types	372	74,400	\$46.50
Common feed	300	60,000	\$37.50
Peas			
Food	862	172,400	\$107.75
Feed and other types	517	103,400	\$64.63

¹ Based on April 22, 1993 protocol on grain procurement prices.
Source: Khleboprodukt.

Table 3.3: Procurement Prices for Livestock Products, by Oblast

Oblast	Milk	Meat ²
	soms/liter	soms/kg
Osh	0.24	3.50
Dzhalal - Abad	0.28	3.50
Chui	0.80	3.40
Issyk - Kul	0.37	2.40
Naryn	0.37	2.70
Talas	0.38	3.20

¹ On October 27, 1993

² Live weight.

Source: Ministry of Agriculture.

Table 3.4: Kazakhstan Procurement Prices, 1991-92, October 1993

Item	Unit	1991	1992	1993
Grain	ruble/ton	577	8,840	48,332
Potatoes	ruble/ton	860	7,784	108,359
Vegetables	ruble/ton	1,080	8,973	182,530
Melons	ruble/ton	290	2,435	52,134
Grapes	ruble/ton	1,091	6,773	117,495
Berries	ruble/ton	2,638	17,729	203,214
Cotton	ruble/ton	2,373	24,021	--
Sugar beet	ruble/ton	117	2,942	--
Tobacco	ruble/ton	19,104	23,037	--
Oilseeds	ruble/ton	727	15,362	42,172
Meat ¹	ruble/ton	3,869	23,871	171,447
Milk	ruble/ton	884	5,053	36,720
Eggs	ruble/1,000 pc.	203	1,852	13,506
Wool ²	ruble/ton	33,297	154,987	400,875
Silk	ruble/1,000 pc.	85,372	436,827	47,812

¹ Live weight.

² Greasy weight.

Source: Goskomstat Kazakhstan.

Table 3.5: Retail prices of basic foods, 1993 by month

Product	Unit	January	February	March	April	May	June	July	August	September
		----- rubles -----				----- som -----				
Bread:	kg									
Rye		--	11.42	--	--	--	--	--	--	--
Rye-wheat		10.88	10.88	10.88	10.88	--	0.18	0.18	--	--
Wheat, highest sort		17.82	17.82	19.25	22.88	0.25	0.25	0.25	0.73	0.73
Wheat, first sort		14.82	14.82	14.82	13.49	0.19	0.2	0.21	0.48	0.49
National type		15.5	15.5	15.5	15.5	0.25	0.2	--	0.65	0.65
Wheat flour:	kg									
Highest sort		60.58	66	76.67	76	0.37	0.43	0.43	0.58	0.64
First sort		40	45.75	52.67	57.17	0.33	0.35	0.39	0.53	0.55
Beef, 1 category	kg	201.83	267.58	343.38	374.83	2.51	3.39	3.61	4.7	4.58
Mutton, 1 category	kg	198.56	289.08	392.38	515.75	3.19	3.77	4.39	4.55	5.33
Pork	kg	258.67	298.38	375.25	432.9	2.77	3.87	4.38	4.5	5.65
Poultry	kg	219	317	346.67	475	2.93	3.22	3.68	6.6	8.3
Duck	kg	132	--	--	402	2.39	2.8	3.9	4.55	5.2
Fish, live	kg	100	200	300	380	1.9	--	3	3.3	4.8
Sugar	kg	165.58	196	208.97	252.1	1.5	1.78	2.28	2.56	2.95
Sugar cubes	kg	--	--	--	--	--	--	--	2	--

Source: Goskomstat.

Table 3.5a: Average farm (kolkhoz) market prices, 1993 by month

Product	Unit	January	February	March	April	May	June	July	August	September	
		----- rubles -----					----- som -----				
Wheat	kg	31.94	54.86	42.60	32.32	0.22	0.30	NA	NA	NA	
Potatoes	kg	29.73	40.05	46.54	53.30	0.40	0.51	1.91	1.48	0.93	
Fresh cabbage	kg	21.64	36.63	46.13	90.28	0.68	0.97	1.60	2.04	1.39	
Onion	kg	14.75	23.12	26.64	28.11	0.20	0.37	1.17	1.32	0.98	
Beets	kg	30.85	38.37	41.40	45.96	0.46	0.73	1.03	1.39	1.49	
Carrot	kg	20.20	31.04	36.45	39.45	0.56	1.38	1.74	1.48	1.25	
Apples	kg	85.65	148.53	192.08	258.87	1.73	2.26	2.82	2.60	2.47	
Beef	kg	239.13	313.10	371.13	457.33	2.84	3.33	3.79	4.63	5.28	
Mutton	kg	287.85	398.06	474.53	583.14	3.67	4.11	4.50	6.26	6.84	
Pork	kg	309.51	430.53	494.37	546.08	3.37	3.85	4.20	5.24	6.64	
Chicken	piece	449.25	672.16	910.71	1115.62	6.03	8.48	11.45	12.67	15.68	
Milk	liter	38.21	82.00	98.23	90.13	0.51	0.49	0.64	0.94	1.09	
Butter	kg	516.17	662.22	872.12	986.39	4.99	5.83	6.25	6.66	7.56	
Sour cream	kg	278.27	558.98	595.78	720.22	4.07	5.13	5.30	5.51	6.29	
Cottage cheese	kg	82.84	161.36	147.36	178.99	1.12	1.12	1.10	1.31	1.99	
Eggs	dozen	105.16	138.01	148.49	145.49	0.76	0.82	0.96	1.25	1.92	

NA = Not available.

Source: Goskomstat

Table 4.1: Marketing of Beef and Poultry Meat, 1993¹

	Sales as of October 1:				1993 compared to 1992				Forecast for the end of 1993					
	1993		1992		Total		Proc. orgs.		Head	Cattle ²	Total weight	Head	Sheep and goats ²	Total weight
Total sales	of which: proc. orgs.	Total sales	of which: proc. orgs.	actual	percent	actual	percent							
Kyrgyz Republic	84,355	40,083	110,262	72,046	(25,907)	77	(31,963)	55	34,335	305	10,461	276,284	38	10,454
Osh	18,205	10,774	18,255	12,082	(50)	100	(1,308)	89	7,330	296	2,169	46,176	38	1,760
Dzhalal-Abad	8,159	5,153	11,276	7,491	(3,117)	72	(2,338)	69	4,980	290	1,444	30,245	36	1,088
Chui	34,399	10,818	44,907	29,845	(10,008)	78	(19,027)	36	9,560	350	3,343	23,230	36	836
Issyk-Kul	12,809	5,483	18,149	8,311	(5,340)	71	(2,828)	66	8,200	270	2,214	80,100	36	2,883
Naryn	6,656	5,592	11,394	9,383	(4,738)	58	(3,791)	60	2,775	288	799	65,773	40	2,688
Talas	3,627	2,263	6,278	4,931	(2,651)	58	(2,668)	46	1,490	330	492	30,760	39	1,199

Proc. orgs = Procurement organizations.

¹ Live weight, tons unless otherwise noted.

² Average live weight.

Source: Ministry of Agriculture.

Table 4.2: Marketing of Milk, 1993¹

	Sales as of October 1:				1993 compared to 1992				4th quarter forecast			End of year ²			
	1993		1992		Total		Proc. orgs.		October	November	December	Total sales	1993		1992
Total sales	of which: proc. orgs.	Total sales	of which: proc. orgs.	actual	percent	actual	percent	Total sales					of which: proc. orgs.	Total sales	of which: proc. orgs.
Kyrgyz Republic	191,036	152,532	249,187	236,579	(58,151)	77	(84,047)	64	21,582	21,535	23,557	255,823	217,319	310,839	297,896
Osh	24,518	22,642	37,024	36,410	(12,506)	66	(13,768)	62	2,740	2,720	2,809	32,787	30,911	45,739	45,468
Dzhalal-Abad	17,406	16,917	29,340	28,816	(11,934)	59	(11,899)	59	2,350	2,350	2,600	24,706	24,217	34,776	34,776
Chui	107,445	75,031	128,747	117,991	(21,302)	83	(42,960)	64	12,000	12,000	11,890	143,335	1,110,921	165,314	153,474
Issyk-Kul	28,868	25,399	34,199	33,856	(5,331)	84	(8,457)	75	3,044	3,000	2,900	37,812	34,343	41,691	41,342
Naryn	4,950	4,867	6,644	6,530	(1,694)	75	(1,683)	75	450	455	460	6,315	3,262	80,000	7,861
Talas	7,849	7,676	13,233	12,976	(5,384)	59	(5,900)	59	998	1,010	1,011	10,868	10,695	15,319	15,142

Proc. orgs = Procurement organizations.

¹ All units in tons unless otherwise noted.

² Forecast for 1993.

Source: Ministry of Agriculture.

Table 4.3 -- Grain processing and storage, by oblast, by product

Oblast	Productive capacity, tons/shift					Grain storage capacity 1000 tons
	Flour	Grains	Noodles	Bread	Mixed feed	
Chui	804	186	40	521.3	1672	378.4
Issyk-Kul	316	--	--	123.1	600	193.6
Naryn	--	--	--	29.9	125	19.2
Talas	43	--	--	--	203	43.3
Osh	314.7	--	--	142.3	350	110.4
Dzhalal-Abad	346.7	--	--	130.1	315	64.2
Total	1826.4	186	40	946.7	3265	809.1

Source: Khleboprodukt

Table 5.1: Farm Machinery Supply and Prices, 1991-1993

Model	1991				1992				1993			
	Inventories ¹	Sold to private farms	Delivered	Avg. Price 1,000 rubles	Inventories ¹	Sold to private farms	Delivered	Avg. Price 1,000 rubles	Inventories ¹	Sold to private farms	Delivered	Avg. Price 1,000 rubles
Tractors MTZ-80	29,060	1,450	1,050	10.4	28,660	2,078	608	190	27,190	270	50	11,000
Trucks GAZ-53	18,030	1,800	1,790	6.0	18,020	1,060	520	209	17,480	280	255	2,700
Grain combines SK-5	3,753	337	164	9.0	3,580	280	300	350	3,600	186	250	14,000
Silage combines KSK-100	2,500	225	125	33.0	2,400	80	20	480	2,340	75	20	18,000
Corn harvesters KKP-3	813	73	55	6.7	795	55	50	301	790	28	2	12,000
Grain sowing machines, SZ-3 6	5,020	350	130	2.2	4,800	240	35	45	4,525	45	50	3,000
Hay balers	2,240	134	164	7.5	2,270	115	105	168	2,260	105	70	12,000

¹ On January 1.

Source: State Statistical Committee.

Table 5.2: Mineral Fertilizer Availability and Use, 1980-92

	Deliveries				Application rate			
	Total	Nitrogen	Phosphate	Potash	Total	Nitrogen	Phosphate	Potash
	1,000 tons				kg/ha			
1980	204.4	120.6	65.1	18.6	153.9	na	na	na
1981	216.0	na	na	na	162.3	na	na	na
1982	224.0	na	na	na	168.3	na	na	na
1983	248.0	na	na	na	158.7	na	na	na
1984	250.0	na	na	na	187.4	na	na	na
1985	281.3	158.6	87.6	35.1	174.0 ¹	na	na	na
1986	279.5	157.1	98.6	23.7	189.0 ²	na	na	na
1987	296.4	160.2	101.6	34.4	220.5	na	na	na
1988	276.7	159.1	91.9	25.6	na	na	na	na
1989	228.8	121.9	81.9	24.9	na	na	na	na
1990 ³	175.7	86.8	78.5	10.3	155.2	80.1	64.8	10.2
1991 ³	176.9	90.9	75.9	10.0	131.5	66.8	55.3	9.4
1992 ³	na	na	na	na	63.6	33.7	25.1	4.9

na = Not available.

¹ Another source gives 210.1 tons.

² Another source gives 208.0 tons.

³ Estimates.

Sources: State Statistical Committee, USDA/ERS.

Table 5.3: Pesticide Supply and Application, 1990-93

	1990	1991	1992	1993 ¹
	tons			
Supplied, total ²	5194	3269	2996	1,645
Used, total	4530.1	3479.1	2380.4	na
of which:				
insecticide	694.9	553.6	364.4	na
fungicides	2515.3	1891.8	1274	na
herbicides	725.5	552.9	487.1	na
desiccant	437.7	351.8	152	na
seed dressing	126.6	114.7	88.4	na
micro-biological prep.	32.6	14.3	14.1	na

¹ January-September 1993.

² Supplies of the Kyrgyzsel'khozkhimiia State company.

Source: Sel'khozkhimiia.

Table 6.1: Crop Area, Yield, and Production, by Type of Farm, 1990-92

	Area			Yield			Production			Share of 1992 prod.
	1990	1991	1992	1990	1991	1992	1990	1991	1992	
1. All Farms:	<i>1,000 hectares</i>			<i>tons/hectare</i>			<i>1,000 tons</i>			
Grain, total	537.4	556.6	576.5	2.93	2.60	2.78	1572.2	1445.2	1601.7	100
Cotton	29.7	25.9	21.4	2.73	2.41	2.44	80.9	62.5	52.4	100
Tobacco	19.1	19.1	22.8	2.83	2.78	2.67	53.9	55.0	54.5	100
Sugar beets	0.1	0.8	6.3	15.90	15.60	21.35	1.7	12.7	134.8	100
Potatoes	21.5	22.4	27.1	13.60	13.70	12.40	342.6	326.3	362.0	100
Vegetables	20.6	19.5	22.2	19.60	17.00	15.40	404.8	399.0	404.0	100
Melons	4.5	3.8	2.9	13.10	10.30	7.55	59.7	47.9	34.5	100
Fruits and berries	33.8	32.4	32.9	4.12	2.87	3.55	140.9	86.9	117.5	100
Grapes	6.8	6.5	6.1	6.32	4.53	5.06	43.3	29.3	31.0	100
Corn for silage and green chop	89.6	89.1	80.3	30.10	27.30	22.90	2700.0	2774.0	2089.0	100
Hay from perennial grasses from the previous year	188.5	185.6	188.6	5.82	5.30	5.31	1089.0	985.5	1001.5	100
2. Collective and State farms										
Grain, total	528.8	543.8	425.5	2.96	2.62	2.89	1504.7	1371.1	1193.4	75
Cotton	29.7	25.9	21.5	2.73	2.41	2.44	80.9	62.5	52.4	100
Tobacco	19.1	19.9	20.8	2.83	2.78	2.67	53.9	55.0	54.5	100
Sugar beets	0.1	0.8	6.3	15.90	15.60	21.30	1.7	12.7	134.8	100
Potatoes	14.8	11.5	13.4	12.10	11.50	10.60	178.0	142.8	152.7	42
Vegetables	14.7	13.4	12.4	19.30	17.40	15.20	277.1	225.1	191.8	47
Melons	4.4	3.6	2.3	13.60	10.50	7.50	56.7	31.2	18.8	54
Fruits and berries	18.3	16.9	17.4	2.70	1.21	2.40	50.7	20.1	42.8	36
Grapes	6.4	6.0	5.6	5.70	3.82	4.32	36.8	21.7	24.6	79
Corn for silage and green chop	89.6	88.7	72.8	30.50	28.00	23.80	2700.0	2467.4	1747.0	84
Hay from perennial grasses from the previous year	178.6	174.3	123.7	5.85	5.37	5.20	1009.0	906.3	619.0	62
3. Cooperatives, Peasant farms, Associations										
Grain, total	--	2.1	140.3	--	1.90	2.46	--	0.4	343.6	21
Cotton	--	--	--	--	--	--	--	--	--	0
Tobacco	--	--	0.4	--	--	1.49	--	--	0.7	1
Sugar beets	--	--	0.4	--	--	20.60	--	--	8.9	7
Potatoes	--	--	2.8	--	8.80	8.71	--	--	34.4	10
Vegetables	--	--	3.7	--	8.10	12.58	--	--	45.3	11
Melons	--	--	0.4	--	--	6.70	--	--	2.8	8
Fruits and berries	--	--	0.6	--	--	0.59	--	--	3.5	3
Grapes	--	--	--	--	--	--	--	--	--	0
Corn for silage and green chop	--	0.3	17.5	--	14.00	19.50	--	5.0	342.0	16
Hay from perennial grasses from the previous year	--	1.3	54.9	--	5.29	5.90	--	7.7	318.1	32
4. Household plots										
Grain, total	10.6	10.7	10.7	6.33	6.58	6.01	67.5	70.4	64.7	4
Cotton	--	--	--	--	--	--	--	--	--	0
Tobacco	--	--	0.1	--	--	2.38	--	--	0.1	0
Sugar beets	--	--	--	--	--	--	--	--	--	0
Potatoes	10.3	10.9	10.9	16.10	16.80	14.40	166.6	183.5	184.9	51
Vegetables	5.9	6.1	6.1	21.30	28.50	18.00	127.7	173.9	167.1	41
Melons	0.2	0.2	0.2	17.00	8.40	10.70	3.0	18.7	14.8	43
Fruits and berries	15.5	15.5	16.0	5.83	4.34	4.86	90.2	66.8	77.7	66
Grapes	0.4	0.5	0.5	15.16	15.20	14.53	6.7	7.6	6.4	21
Corn for silage and green chop	--	0.1	--	--	22.00	--	--	1.6	--	0
Hay from perennial grasses from the previous year	9.9	10.0	10.0	8.91	7.15	6.47	89.0	71.5	64.5	6

Source: State Statistical Committee.

Table 6.2: January 1 Livestock Inventories, by Type of Farm

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1993	Share of total ¹
	1,000 head										percent
All farms											
Cattle	1,056	1,110	1,129	1,161	1,190	1,214	1,205	1,190	1,122	1,096	100
of which: cows	423	427	434	460	487	507	506	519	515	507	100
Pigs	323	349	379	388	416	445	393	358	247	173	100
Sheep and goats	10,473	10,200	10,263	10,390	10,405	10,483	9,973	9,525	8,742	8,734	100
Horses	281	277	284	293	304	310	313	321	312	318	100
Poultry	12,008	12,394	13,496	13,927	14,461	15,207	13,915	13,571	10,402	4,803	100
State, collective farms, inter-farm enterprises											
Cattle	na	750	750	745	741	745	718	645	531	474	43
of which: cows	na	208	209	207	208	211	202	188	157	147	29
Pigs	na	279	310	317	342	367	318	276	182	117	67
Sheep and goats	na	8,765	8,817	8,669	8,509	8,398	7,708	6,256	4,659	4,200	48
Horses	na	212	215	215	na	220	212	185	148	138	43
Poultry	na	5,238	6,162	6,223		6,935	5,919	6,146	3,039	2,427	51
Private farms											
Cattle	na	na	na	na	na	na	0	17	52	53	5
of which: cows	na	na	na	na	na	na	0	8	29	26	5
Pigs	na	na	na	na	na	na	na	1	0	0	0
Sheep and goats	na	na	na	na	na	na	12	665	1,334	1,381	16
Horses	na	na	na	na	na	na	1	12	41	41	13
Poultry	na	na	na	na	na	na	3	56	152	58	1
Household plots											
Cattle	na	361	379	416	449	470	488	528	539	569	52
of which: cows	na	219	225	254	279	297	304	323	329	334	66
Pigs	na	70	69	71	74	78	75	81	65	57	33
Sheep and goats	na	1,435	1,506	1,721	1,896	2,085	2,253	2,604	2,749	3,173	36
Horses	na	65	69	78	na	90	100	123	124	139	44
Poultry	na	7,156	7,254	7,691	na	8,272	7,993	7,269	6,629	2,318	48

na=Not available.

¹ October 1, 1993.

Sources: State Statistical Committee, USDA/ERS.

Table 6.3: Data on Private Farms, August 1, 1993

	Republic	Osh	Dzhalal- Abad	Issyk-Kul	Naryn	Talas	Chui
Number of kolkhoz & sovkhos	488	115	106	70	62	30	105
Privatized No. on August 1, 1993:	165	43	47	11	32	4	28
Peasant farms	21,084	717	1,086	955	11,899	1,345	5,382
Ag cooperatives	191	81	50	11	14	2	53
Small enterprises	120	74	8	0	0	3	35
Assoc. of peasant farms	109	0	35	2	25	28	19
Joint-stock	9	4	0	0	5	0	0
Numbers on peasant farms							
Total land, ha	1,749,179	65,850	675,181	11,605	827,018	47,492	122,033
Avg. farm size	83	92	622	12	70	35	24
of which:							
plowlands	150,272	10,779	57,228	5,256	37,669	12,345	25,995
pasture	880,850	48,142	541,795	6,310	171,258	29,783	83,564
gardens	2,374	850	884	73	0	83	479
hayfields	39,996	6,332	28,299	1,590	0	1,645	2,129
sown area, total, ha	115,810	3,772	43,126	2,306	29,098	9,832	27,676
of which:							
grain	65,007	2,083	24,420	1,504	9,675	7,329	19,995
vegetables	1,000	254	400	30	0	48	258
potatoes	1,665	268	164	238	420	81	494
tobacco	2,077	418	1,509	0	0	150	0
cotton	1,198	0	1,198	0	0	0	0
feed crops	34,104	497	3,340	1,227	19,003	4,121	5,916
others	13,340	252	12,095	10	0	0	983
Livestock inventories, head							
of which:							
cattle	46,882	4,050	11,825	1,972	16,022	2,072	10,941
of which: cows	13,122	1,416	4,309	589	0	1,148	5,660
sheep and goats	1,424,500	78,313	374,724	91,536	590,800	57,527	231,500
avg inv./farm	68	109	345	96	50	43	46
swine	227	0	0	40	0	0	187
poultry	4,400	600	0	3,500	0	0	300
horses	39,445	2,289	12,051	1,519	16,420	1,664	5,502
Machinery stocks, units							
trucks	1,360	111	566	88	307	118	170
cars	557	2	33	40	297	0	185
tractors (wheel)	1,629	161	644	77	436	123	188
tractors (caterpillar)	613	28	140	26	300	47	72
seeding machines	353	80	75	0	138	14	46
plough	392	62	87	0	175	22	46
baler	261	16	64	0	143	9	29
1992 Production, 1,000 tons							
meat	8,505	610	2,331	294	2,593	9	2,668
milk	9,526	1,638	4,014	402	1,116	6	2,351
eggs, 1,000 unit	74	2	0	0	0	0	70
wool	2,627	105	652	146	1,235	8	481
grain	84,855	6,677	19,691	3,431	23,410	1,826	29,820
potatoes	14,536	1,985	774	2,190	308	6	9,273
vegetables and melons	6,536	1,286	740	0	0	134	4,378
fruits and berries	1,010	933	69	0	0	8	0
tobacco	776	509	221	0	0	46	0
cotton	1,000	0	1,000	0	0	0	0
hay of sown and natural grasses	192,650	746	82,769	0	84,372	1,279	23,465

Source: Ministry of Agriculture.

Table 7.1: Budgetary Allocations to Agriculture and Food

Allocation	1993	1994 ¹
	som	
Agriculture	14,015,000	29,700,000
Capital investment	3,225,000	4,600,000
Operation expenses	6,600,000	19,639,000
Irrigation construction	3,381,000	3,961,000
Other projects	809,000	1,500,000
Food retail subsidies	154,000,000	345,000,000
Total budget	1,266,200,000	4,473,000,000
Ag and food allocations as % of budget	13.3%	8.4%

¹ Preliminary.

Source: Ministry of Finance

Table 7.2: Yearly Irrigation Budgets, by Oblast, Million Rubles

Oblast	Year	Yearly budget				Primary prod expenses
		Construction	Operation	including: operating capital repair		
Osh	1988	15.2	12	8.4	3.6	--
	1989	8.3	12.3	8.6	3.7	--
	1990	29.7	12.4	8.7	3.7	343.7
	1991	15.5	12	8.4	3.6	228.9
	1992	42.7	88.3	62	26.3	231.2
Dzhalal-Abad	1988	--	--	--	--	--
	1989	--	--	--	--	--
	1990	--	--	--	--	--
	1991	15.6	6.8	4.8	2	112.6
	1992	41	53	37	16	130.9
Issyk-Kul	1988	20.2	9.5	6.7	2.8	--
	1989	16.1	9.5	6.7	2.8	--
	1990	10.4	9.6	6.7	2.9	--
	1991	11.5	6.8	4.8	2	66.5
	1992	80.8	51.2	36	15.2	52.1
Naryn	1988	--	--	--	--	--
	1989	--	--	--	--	--
	1990	--	--	--	--	--
	1991	12.6	6.6	4.6	2	81.8
	1992	62.7	50	35	15	95.1
Chui	1988	43.7	15.6	11	4.6	--
	1989	26.7	17	12	5	--
	1990	25.6	16.9	11.8	5.1	--
	1991	35.1	15.9	11	4.9	234.7
	1992	117.3	108.6	76	32.6	272.2
Talas	1988	--	--	--	--	--
	1989	--	--	--	--	--
	1990	--	--	--	--	--
	1991	10.7	4.9	3.4	1.5	50.1
	1992	51.7	48	33.6	14.4	106.2
Ministry of Irrigation	1988	30.4	--	--	--	--
	1989	29.6	--	--	--	--
	1990	21.7	--	--	--	--
	1991	6.7	--	--	--	--
	1992	116.7	44.9	31.4	13.5	--
Kyrgyz Republic	1988	109.5	37.1	26.1	11	--
	1989	80.7	38.8	27.3	11.5	--
	1990	87.4	38.9	27.2	11.7	--
	1991	107.7	52	37	16	774.6
	1992	512.9	444.9	311	133	897.7

-- = Not available.

Source: Goskomstat.

Table 7.3: Drainage and Salinity, 1992, 1,000 ha

Oblast	Drained Lands	Slight	Saline Lands		Groundwater level		
			Moderate	High	<1.5m	1.5–2m	2–3m
Osh	9.6	4.1	1.4	0.7	2.4	4.6	4.9
Dzhalal–Abad	7.0	2.5	0.3	0.0	1.1	1.1	2.1
Issyk–Kul	1.9	8.0	3.2	3.3	1.2	0.4	0.8
Naryn	4.7	5.9	1.8	0.5	1.8	2.6	10.1
Talas	5.4	3.5	1.8	0.6	3.0	2.7	3.2
Chui	118.1	39.3	25.7	10.8	12.8	33.6	72.7
Total	146.8	63.4	34.2	15.8	22.3	45.1	93.7

Source: Goskomstat, Ministry of Irrigation.

Table 7.4: Allocation of Water Resources

River basin	Avg. Monthly	Avg. Annual	Total water	Allocation	
	Flow	Flow		Bm3	Groundwater
	Km3	Bm3			
Amu Darya	0.16	1.93	0.42		0.04
Syr Darya	2.25	27.04	4.88		0.85
Talas	0.14	1.74	0.95		0.02
Chui	0.42	5	3.85		0.4
Issyk-Kul	0.39	4.65	1.5		0.1
Karkyra	0.03	0.36	--		--
Tarim	0.51	6.15	--		--
Total	3.9	47.23	11.6		1.41

-- = Not established.

Table 8.1: Production of Processed Foods

Product	Unit	1980	1985	1986	1987	1988	1989	1990	1991	1992	1992 as a % of 1991
Sugar	1,000 tons	270.4	281.7	433.4	435.4	377.6	414.8	379.9	371.2	114.3	30.8%
Vegetable oil	"	20.4	12.3	12.6	13.5	14.4	15.2	14.0	14.8	7.5	50.7%
Margarine products	"	na	na	na	na	na	9.6	17.5	12.4	4.8	38.7%
Confectionery	"	37.0	40.0	42.4	44.2	47.9	54.3	58.9	57.3	34.0	59.3%
Preserves	Jars	147.8	106.4	142.6	139.7	175.2	161.0	146.7	117.7	82.8	70.3%
Bread and bread products	1,000 tons	233.1	249.1	248.7	229.5	226.3	229.7	244.1	258.7	273.9	105.9%
Pasta	"	6.3	6.7	6.6	6.6	6.5	6.7	6.8	6.5	6.2	95.4%
Flour	"	419.0	444.0	470.0	467.0	479.0	479.0	476.0	488.0	352.0	72.1%
Groats	"	42.6	45.1	45.6	42.3	41.0	38.4	42.5	37.0	28.0	75.7%
Vodka and liqueurs	1,000 dl	3037.0	2549.0	1018.0	921.0	1302.0	1964.0	2315.0	2590.0	1782.0	68.8%
Wine	1,000 dl	3550.0	2654.0	802.0	1042.0	1349.0	1575.0	1512.0	1805.0	977.0	54.1%
Champagne	1,000 bottles	5690.0	4488.0	3551.0	5000.0	6518.0	7035.0	4932.0	4104.0	3199.0	77.9%
Cognac	1,000 dl	102.0	94.0	90.0	120.0	136.0	137.0	134.0	138.0	90.0	65.2%
Beer	1,000 dl	4660.0	4842.0	3699.0	4079.0	4253.0	4251.0	4045.0	4447.0	3101.0	69.7%
Non-alcoholic drinks	1,000 dl	1955.0	2723.0	3813.0	4795.0	5543.0	5756.0	5474.0	4207.0	1378.0	32.8%
Mineral water	1,000 dl	854.0	963.0	1259.0	1310.0	1326.0	1303.0	1138.0	1035.0	600.0	58.0%
Cigarettes	Million pcs.	3818.0	4819.0	4767.0	4930.0	4256.0	4010.0	3974.0	4015.0	3120.0	77.7%
Meat and category I subproducts	1,000 tons	109.5	105.5	125.7	131.4	136.9	132.8	113.8	87.9	67.5	76.8%
Kolbasa	1,000 tons	16.7	17.6	18.2	20.4	21.8	23.0	19.8	15.5	9.1	58.7%
Lard	1,000 tons	4.9	5.9	6.0	6.0	6.1	6.3	6.2	5.1	2.7	52.9%
Whole milk products	1,000 tons	197.8	224.3	234.6	244.7	255.0	260.4	257.9	235.3	111.6	47.4%
Butter	1,000 tons	10.3	11.6	12.9	13.2	13.4	13.8	12.5	10.1	8.6	85.1%
Fish products	1,000 tons	1.9	2.4	2.7	2.5	2.8	3.0	2.9	2.2	1.1	50.0%

na=Not available.

Source: State Statistical Committee.

Table 8.1a: Production of Processed Products, by Oblast

	Meat and subprods.		Confectionary		Canned food ¹		Whole milk prods.		Butter	
	1991	1992	1991	1992	1991	1992	1991	1992	1991	1992
	1,000 tons									
Osh	14.6	7.3	3.7	1.0	27.3	19.0	32.3	16.0	2.0	1.4
Dzhalal-Abad	8.7	5.2	6.4	2.4	12.9	9.3	25.8	12.5	1.3	1.0
Chui	37.7	36.8	13.3	16.8	43.8	27.5	52.7	23.3	3.7	2.5
Issyk-Kul	15.1	9.5	0.6	0.2	7.5	8.0	21.4	10.1	1.5	1.2
Naryn	3.9	4.3	na	na	na	na	4.4	3.2	0.3	0.1
Talas	5.6	3.9	0.1	0.1	2.2	1.1	5.7	2.6	1.0	0.7
Bishkek	2.4	0.4	33.6	13.6	24.1	17.9	93.1	43.9	0.4	1.6
Kyrgyz Republic	88.0	67.4	57.3	34.1	117.8	82.8	235.4	111.6	10.2	8.5

na=Not available.

¹ Cans.

Source: State Statistical Committee.

Table 8.2: Structure of Kyrgyz Food Industry

Division	Number of enterprises	Capacity ¹
Sugar	4 Sugar processing plants	na
Oils and Fats	1 Oil extraction factory 1 Oil and fat enterprise	380,000 tons of vegetable oil per shift
Confectionery	3 Confectionery factories 11 Bread bakeries and other enterprises	42,600 tons of confectionery per year
Liqueur-vodka	3 Liqueur-vodka producing plants	4,711 thousand dl of vodka/liqueur products per year
Wine	1 Champagne enterprise 12 Wine enterprises (on kolkhoz)	685,000 dl of champagne per year, 134,100 dl of cognac, and 134,555 thousand dl of wine per year.
Beer	8 Beer breweries	5,291 thousand dl of beer per year.
Fruits and vegetables	16 Fruit canning enterprises	163.4 jars of fruit preserves per year.
Tobacco	1 Tobacco enterprise 5 Fermenting factories	5.6 billion cigarettes and papirosy per year.
Meat	15 meat processing plants	449 tons of meat per shift.
Milk	na	690,400 tons of whole milk per shift 51.1 tons of butter and 8.5 tons of cheese per shift.

na=Not available.

¹ On January 1, 1993.

Source: State Statistical Committee.

Table 8.3 - Grain Processing in the Kyrgyz Republic¹

Oblast	Number	Capacity	Production	Oblast	Number	Capacity	Production
		tons/shift	1,000 ton/yr			tons/shift	1,000 ton/yr
Flour mills				Groat mills			
Chui	4	804	240	Chui	2	186	56
Bishkek	1	188	57	Bishkek	1	120	36
Karabaltin	1	188	57	Karabaltin	1	66	20
Chui	1	375	110	Pasta factory			
Tokmak	1	53	16	Chui	1	40	13
Issyk - Kul	3	316	96	Kara - Balta	1	40	13
Rybachin	1	188	57	Bakeries			
Balykchin	1	75	23	Chui	13	521	110
Karakol	1	53	16	Bishkek	6	294	68
Talas	1	43	14	Kemin	1	24	5
Talas	1	43	14	Tokmak	2	74	12
Osh	3	315	97	Shopokovo	1	26	6
Osh	1	75	23	Kara - Balta	2	75	15
Karasui	1	202	62	Kant	1	29	4
Uzgen	1	38	12	Issyk - Kul	6	123	236
Dzhalalabad	4	349	107	Issyk - Kul	1	43	7
Dzhalalabad	1	191	58	Kara - Kol	1	49	12
Azrat - Aiyb	2	120	37	Kadzhi - Sai	1	6	1
Kyzyl - Kii	1	38	12	Tamga	1	1	0
TOTAL	15	1,826	552	Chop - Sary - Oi	1	1	0
Mixed feed mills				Grigorevka	1	24	4
Chui	4	1,672	528	Naryn	2	30	6
Bishkek	1	304	111	Naryn	1	25	5
Karabaltin	1	600	183	Min - Kush	1	5	1
Chui	1	630	192	Osh	6	142	31
Tokmak	1	138	42	Osh	2	72	18
Issyk - Kul	2	600	184	Kara - Su	1	21	3
Rybachin	1	500	153	Syliukta	1	6	1
Karakol	1	100	31	Kyzyl - Kii	1	27	6
Naryn	1	125	38	Kadamzhai	1	17	3
Naryn	1	125	38	Dzhalalabad	6	130	24
Talas	1	203	62	Dzhalalabad	1	42	10
Talas	1	203	62	Kok - Yangak	1	14	3
Osh	1	350	106	Kochkor - Ata	1	16	2
Karasui	1	350	106	Maili - Sai	1	14	3
Dzhalalabad	1	315	96	Tash - Kумыr	1	24	4
Dzhalalabad	1	315	96	Kaka - Kul	1	19	2
TOTAL	10	3,265	1,014	TOTAL	33	947	194

¹ State sector.

Source: Khleboprodukt.

Table 9.1: Agricultural Imports and Exports, non-FSU Partners, 1993 ¹

Commodity	Unit	Trade partner	Volume	Value	of which: Barter	Per unit price
Imports		Exporter		\$1,000		\$/ton
Honey	tons	China	1	0.53	0.53	530
Wheat	1,000 tons	US	35.6	4583.3	--	129
Corn	tons	China	58.3	5.5	5.5	94
Rice	1,000 tons	China	6.2	1751.9	1750.7	283
Sugar	1,000 tons	Total	23.9	6641.3	6510.2	278
		China	23.75	6513.2	6499.1	274
		Germany	0.01	11.1	11.1	1110
		Hungary	0.14	17	--	121
Black tea	tons	Total	209.9	124.5	93.2	593
		India	186.7	90.4	90.4	484
		China	8	2.8	2.8	350
		Singapore	15.2	31.3	--	2059
Green tea	tons	China	31.3	44.7	44.6	1428
Exports		Importer				
Live animals	tons	Total	233	192.9	17.8	828
		China	3	17.8	17.8	5933
		Turkey	230	175.1	--	761
Meat and meat prods	tons	Total	43.7	37.8	1.3	865
		China	7.7	1.3	1.3	169
		Cyprus	36	36.5	--	1014
Milk and condensed milk	tons	Afghanistan	40	5.9	--	148
Lucerne seeds	tons	Romania	30	27.1	27.1	903
Raw leather materials	na	Total	--	456	422.5	NA
		China	--	150	150	NA
		Italy	--	101.7	92.4	NA
		Turkey	--	195.6	171.3	NA
		India	--	8.7	8.7	NA
Silk cocoons	tons	Total	99.1	407.2	407.2	4109
		Austria	51.5	67	67	1301
		India	47.6	340.2	340.2	7147
Wool	tons	Total	281	488	488	1737
		India	59.3	132	132	2226
		China	100	128.5	128.5	1295
		Poland	121.7	227.5	227.5	1869
Cotton fibre	tons	Total	3053.4	3391.4	3339.1	1111
		Turkey	300.5	342.5	290.2	1140
		Austria	1985.5	2461.5	2461.5	1240
		Switzerland	186.6	252.9	525.9	1355
		Pakistan	280.7	61.5	61.5	219

¹ January - June 1993.

na = Not applicable.

Source: State Statistical Committee.

Table 9.1a: Agricultural Imports and Exports, non-FSU Partners, 1992

Commodity	Unit	Trade partner	Volume	Value	Per unit price
Imports		Exporter		\$1,000	\$
Honey	tons	China	50.0	0.9	17
Wheat	1,000 tons	Total	221.0	31,065.2	141
Corn	1,000 tons	US	67.9	8,827.0	130
Rice	1,000 tons	Total	5.6	1,740.0	311
		China	2.0	704.4	352
		Germany	3.6	1,035.6	288
Barley	1,000 tons	US	42.9	5,019.3	117
Sugar	1,000 tons	Total	21.7	9,833.8	453
		China	15.7	9,826.1	626
		Bulgaria	6.0	7.7	1
Exports		Importer			
Live animals	na	Korea	--	34.3	--
Animal organs	tons	Turkey	5.1	37.6	7,373
Lucerne seeds	tons	Total	447.8	402.0	898
		Poland	359.5	353.0	982
		Germany	88.3	49.0	555
Raw leather materials	na	Total	--	1,271.2	--
		China	--	208.8	--
		Italy	--	534.5	--
		Turkey	--	250.1	--
		India	--	258.9	--
		Czech Rep.	--	4.1	--
Wool	tons	Total	733.5	856.8	1,168
		India	15.8	28.9	1,829
		China	20.6	27.6	1,340
		Turkey	66.3	258.0	3,891
		Poland	163.6	220.1	1,345
		Czech Rep.	10.0	16.2	1,620
		Switzerland	457.2	306.0	669
		Cotton lint	tons	China	1,401.1
Tobacco	tons	Total	312.3	734.7	2,353
		England	100.2	26.7	266
		Fmr Yugosl.	205.0	683.2	3,333
		Mongolia	7.1	24.8	3,493
Honey	tons	Total	337.1	249.1	739
		Holland	8.0	7.6	950
		Turkey	329.1	241.5	734

na=Not applicable.

Source: State Statistical Committee.

Table 9.2: Agricultural Imports and Exports. FSU partners, 1993 ¹

Exports	Unit	Importer	Volume	Value	Per unit price	
				1,000 soms	som	\$
Meat and subprods	1,000 tons	Total	0.4	674.7	1,687	337
		Russia	0.3	539.0	1,797	359
		Kazakhstan	0.1	135.7	1,357	271
Leather materials	1,000 pcs.	Total	74.5	144.9	2	0
		Russia	34.5	47.7	1	0
		Uzbekistan	4.3	2.1	0	0
		Tajikistan	35.7	95.1	3	1
Wool	1,000 tons	Total	3.1	13,398.7	4,322	864
		Russia	2.8	12,187.0	4,353	871
		Ukraine	0.1	698.0	6,980	1,396
		Belarus	0.2	513.7	2,569	514
Cotton fibre	1,000 tons	Total	3.4	5,092.5	1,498	300
		Russia	3.3	5,007.1	1,517	303
		Belarus	0.1	85.4	854	171
Refined sugar	1,000 tons	Total	2.6	2,483.5	955	191
		Russia	0.9	395.9	440	88
		Kazakhstan	1.1	1,301.1	1,183	237
		Tajikistan	0.6	786.5	1,311	262
Fermented tobacco	1,000 tons	Total	6.7	24,967.1	3,726	745
		Russia	5.6	19,627.3	3,505	701
		Ukraine	0.6	2,465.0	4,108	822
		Belarus	0.1	955.0	9,550	1,910
		Kazakhstan	0.4	1,919.8	4,800	960
Fresh and processed vegetables	1,000 tons	Total	1.4	125.0	89	18
		Russia	1.3	121.0	93	19
		Kazakhstan	0.1	4.0	40	8
Corn	tons	Total	779.0	361.4	464	93
		Ukraine	179.0	91.6	512	102
		Turkmenistan	600.0	269.8	450	90
Non-ferm. tobacco	tons	Total	339.0	614.4	1,812	362
		Russia	150.0	236.4	1,576	315
		Ukraine	189.0	378.0	2,000	400
Lucerne seeds	tons	Total	109.7	171.6	1,564	313
		Belarus	58.2	45.0	773	155
		Kazakhstan	51.5	126.6	2,458	492
Eggs and egg prods	1,000 pcs.	Total	2,627.6	180.2	--	--
		Uzbekistan	2,337.1	144.9	--	--
		Kazakhstan	43.2	4.5	--	--
		Tajikistan	110.5	12.4	--	--
		Turkmenistan	136.8	18.4	--	--
Honey	tons	Georgia	61.6	92.4	1,500	300
Butter	tons	Tajikistan	75.0	262.9	3,505	701

¹ January-June 1993

Source: State Statistical Committee.

Table 9.2a: Agricultural Imports and Exports, FSU Partners, 1992

Exports	Unit	Importer	Volume	Value	Per unit price	
				mil. rubles	rubles/unit	\$/unit
Meat and subprods	1,000 tons	Total	2.9	142.8	49,241	223
		Russia	1.6	99.7	62,313	282
		Uzbekistan	0.1	1.4	14,000	63
		Kazakhstan	0.1	1.8	18,000	81
		Turkmenistan	1.1	36.0	32,727	148
		Lithuania	0.0	3.9	195,000	881
Leather materials	1000 pcs.	Total	123.6	22.7	184	1
		Russia	18.5	4.5	243	1
		Belarus	3.2	3.2	1,000	5
		Kazakhstan	2.4	2.4	1,000	5
		Tajikistan	10.7	10.7	1,000	5
		Moldova	5.1	0.7	137	1
		Latvia	10.4	1.2	115	1
Scoured wool ¹	1,000 tons	Total	7.3	2,413.1	330,562	1494
		Russia	4.3	1,293.7	300,860	1360
		Ukraine	0.9	278.6	309,556	1399
		Belarus	1.1	593.5	539,545	2439
		Kazakhstan	0.2	31.1	155,500	703
		Azerbaijan	0.1	42.0	420,000	1898
		Lithuania	0.7	174.2	248,857	1125
Cotton fibre	1,000 tons	Total	3.9	311.8	79,949	361
		Russia	2.6	94.0	36,154	163
		Uzbekistan	1.1	206.9	188,091	850
		Moldova	0.2	10.9	54,500	246
Refined sugar	1,000 tons	Total	2.6	66.8	25,692	116
		Russia	1.9	13.6	7,158	32
		Uzbekistan	0.5	48.9	97,800	442
		Kazakhstan	0.1	2.3	23,000	104
		Turkmenistan	0.1	2.0	20,000	90
Fermented tobacco	1,000 tons	Total	33.9	2,302.0	67,906	307
		Russia	24.0	1,570.1	65,421	296
		Ukraine	4.2	357.4	85,095	385
		Belarus	1.1	45.9	41,727	189
		Kazakhstan	2.1	176.9	84,238	381
		Armenia	0.3	20.2	67,333	304
		Moldova	0.3	30.2	100,667	455
		Lithuania	0.6	44.8	74,667	337
		Estonia	1.3	56.5	43,462	196
Fresh and processed vegetables	1,000 tons	Total	47.7	483.5	10,136	46
		Russia	42.1	438.3	10,411	47
		Ukraine	2.2	18.0	8,182	37
		Belarus	0.6	5.5	9,167	41
		Uzbekistan	0.2	0.6	3,000	14
		Kazakhstan	1.4	10.5	7,500	34
		Armenia	0.5	2.4	4,800	22
		Moldova	0.5	7.2	14,400	65
		Latvia	0.1	1.0	10,000	45
Corn	tons	Total	1,452.0	6.7	4,614	21
		Uzbekistan	15.0	0.1	6,667	30
		Kazakhstan	19.0	0.1	5,263	24
		Azerbaijan	495.0	2.3	4,646	21
		Tajikistan	188.0	0.8	4,255	19
		Turkmenistan	735.0	3.4	4,626	21
Non-fermented tobacco	tons	Total	143.0	11.2	78,322	354
		Russia	3.0	0.2	66,667	301
		Uzbekistan	140.0	11.0	78,571	355

Table 9.3: Production of processed products by oblast, 1000 tons

	Meat and subprods.		Confectionary		Canned food 1/		Whole milk prods.	
	1991	1992	1991	1992	1991	1992	1991	1992
Osh	14.6	7.3	3.7	1.0	27.3	19.0	32.3	16.0
Dzhalal-Abad	8.7	5.2	6.4	2.4	12.9	9.3	25.8	12.5
Chui	37.7	36.8	13.3	16.8	43.8	27.5	52.7	23.3
Issyk-Kul	15.1	9.5	0.6	0.2	7.5	8.0	21.4	10.1
Naryn	3.9	4.3	--	--	--	--	4.4	3.2
Talas	5.6	3.9	0.1	0.1	2.2	1.1	5.7	2.6
Bishkek	2.4	0.4	33.6	13.6	24.1	17.9	93.1	43.9
Kyrgyz Republic	88.0	67.4	57.3	34.1	117.8	82.8	235.4	111.6

1/ Cans.

Table 9.4: Structure of Kyrgyz Food Industry

Division	Number of enterprises	Capacity 1/
Sugar	4 sugar processing plants	NA
Oils and Fats	1 Oil extraction factory 1 Oil and fat enterprise	380,000 tons of vegetable oil per shift
Confectionery	3 Confectionery factories 11 bread bakeries and other enterprises	42,600 tons of confectionery per year
Liqueur-vodka	3 liqueur-vodka producing plants	4,711 thousand dl of vodka/liqueur products per year
Wine	1 Champagne enterprise 12 wine enterprises (on kolkhoz)	685,000 dl of champagne per year, 134,100 dl of cognac, and 134,555 thousand dl of wine per year.
Beer	8 Beer breweries	5,291 thousand dl of beer per year.
Fruits and vegetables	16 Fruit preserves enterprises	163.4 jars of fruit preserves per year.
Tobacco	1 Tobacco enterprise 5 Fermenting factories	5.6 billion cigarettes and papirosy per year.
Meat	15 meat processing plants	449 tons of meat per shift.
Milk	NA	690,400 tons of whole milk per shift 51.1 tons of butter and 8.5 tons of cheese per shift.

1/ On January 1, 1993.

IMAGING

Report No: 12989 KG
Type: SR