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14

**The transition of
Uzbekistan's agriculture
to a market policy**

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Preface

This paper is one of a series of three chapters chosen from the volume prepared for the ILO/UNDP multidisciplinary mission on **Social Policy Review** which was requested by the Government of Uzbekistan, and which took place over the period of 21 March to 21 April 1995, with Professor Keith Griffin as its Chief.

The volume provides a systematic and critical review of the macroeconomic and social policies in Uzbekistan. To our knowledge, this is the first attempt to provide a coherent policy framework which combines the objectives of social policy as an integral part of macro-economic reform. **The main message of the report is that Uzbekistan should speed-up its pace towards economic reform, and at one and the same time, ensure that the social dimensions of reform are taken into account.** Thus, the thrust of the argument is that sound social policy is a prerequisite for the success of economic reform. It should form an integral part of the overall development strategy, and not simply react to whatever negative consequences macro-economic policies may create. Social development policies must therefore be carefully designed to ensure that during the transition to a more market-oriented economy, average living standards are not allowed to deteriorate, thus threatening the whole process of reform and the prospects for long-run growth.

To implement this strategy, a number of **policy reforms, institutional changes and investment programmes** were recommended. The main objective of the **programme of action** is to identify a limited number of areas of intervention that would help to translate the major recommendations of this report into reality. The list is not exhaustive, but contains the critical elements of a social development strategy designed to support the process of reform. Four major programmes are proposed: (a) The creation of a Social Development Fund; (b) Launching a Social Assistance Programme; (c) Initiating a programme for National Capacity Building; (d) Improving the Data Base for Social Development.

An important question relates to the **finance strategy of these recommendations.** Despite the serious difficulties encountered during the transition from a centrally-planned to a more market-oriented economy, Uzbekistan finds itself in a relatively good financial position and thus has some room for manoeuvre in launching a more expansionist development strategy.

This report provides an excellent example of the way in which social policy could be integrated in a systematic manner into the framework of macro-economic policies. It also demonstrates the possibility of striking a balance between the requirements of rapid economic reform and social cohesion. We are confident that the relevance of this report goes beyond Uzbekistan especially to other Central Asian Republics.

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The Transition of Uzbekistan's Agriculture to a Market Economy

This paper begins with a brief analysis of the evolution of Uzbekistan's agriculture during the Soviet period. This provides essential background information for understanding current issues of agricultural development. This is followed in section 2 by an account of the changes in output, income and employment that have occurred in agriculture since independence. The following two sections contain an analysis of the main elements of the current agricultural strategy in Uzbekistan. We discuss both the reform of institutions and the reorganization of incentives. The final section contains a summary of policy issues and suggestions for improving productive efficiency and protecting the livelihood of those employed in the rural economy. The two annexes contain case studies of transitional institutions and calculations of indicators of incentives.

1. Background

Uzbekistan, like the rest of former Soviet Central Asia, was rapidly transformed during the decades after the mid 1930s. By 1976 per capita income in Uzbekistan was above US\$1,300 in current dollars at the official rate of exchange. Even allowing for the inappropriateness of the official rate of exchange and differences in the systems of accounting in comparing income in Uzbekistan with incomes in other countries, this is indicative of a much higher material standard of living in Uzbekistan than in most of its Asian neighbours by the mid 1970s. In terms of non-income indicators of social development -- e.g., education and health -- the performance of Uzbekistan was even more remarkable in comparison with the performance of its Asian neighbours. By the early 1960s virtually universal literacy was achieved for both males and females (compared to 20 per cent in the Indian subcontinent) and there were seven times as many doctors per person as the average for Asia.¹

Economic and social development in Uzbekistan was not attained through the classical path of industrialization. Industrial progress was of course quite substantial, but the rapid growth of agriculture and the continued predominance of the rural economy and society were the key elements of its progress. Uzbekistan was ahead of the rest of the USSR in terms of urbanization immediately before the Soviet revolution. By the time of the dissolution of the USSR, the proportion of the population living in urban areas was far lower in Uzbekistan (40 per cent) than in the rest of the USSR.

The continued predominance of the rural society and the low rate of urbanization were not the outcome of inadequate economic growth. What Uzbekistan experienced was a *pattern* of growth that was very unusual both historically and in contemporary experience, namely, rapid agricultural growth leading to a rise in living standards in rural areas and a relatively low urban-rural income differential which weakened the incentive to emigrate from the rural areas.

The chief elements accounting for the material progress of agriculture were specialization in cotton and the achievement of high yields per hectare. By 1976 the output of raw cotton per hectare in Uzbekistan had reached three tons, the highest yield among all major producers at the time.² Specialization in cotton was brought about by high price incentives within the institution of collective agriculture. While collectivized agriculture in much of the rest of the USSR was an institutional vehicle for extracting resources from agriculture through what came to be known as a policy of "primitive socialist accumulation", cotton, the principal marketed crop of Uzbekistan, was granted extraordinarily favourable terms of trade compared to the other major products of Soviet agriculture.

For a period after collectivization, the policy towards cotton was no different from the policy towards the rest of agriculture: there were officially dictated output targets that were compulsorily procured at very low prices. While this policy succeeded in increasing the area under cotton beyond the pre-revolution peak, the yield per hectare continued to fall and was as low as 0.79 tons in 1932 as compared to 1.22 tons in 1913. In 1935 the Soviet authorities initiated a major shift in policy by nearly quadrupling the procurement price of cotton. The result was dramatic: by 1937 the production of raw

cotton in Uzbekistan was nearly three times the pre-revolution peak and yield per hectare was at an all time high of 1.6 tons.

For the next two decades cotton retained its extraordinarily favourable position in comparison with other major agricultural products. To illustrate the extent of positive discrimination in favour of cotton, one might consider that in 1952 the procurement price per ton of cotton was nearly 37 times the procurement price for grains while the average cost of production per ton was probably about seven times as high as that for grains for the USSR as a whole and less than four times for Uzbekistan.³ Another way to look at the relative prices is to compare them with the prevailing international prices. For grains and meat the average procurement prices paid to producers in the USSR in 1952 was less than one-seventh of the international prices. For cotton the procurement price was nearly a third above the international price.⁴

The exceptionally favourable terms of trade for cotton led to a sharp shift of the area sown -- especially in irrigated land -- away from grain into cotton. Labour requirements per hectare of cotton in Uzbekistan in the mid 1970s were six times as much as for grain for the kolkhozy and 11.5 times for the sovkhozy. Thus increased specialization in cotton led to a much greater demand for labour in agriculture than would otherwise have been the case. The payment of a sufficiently high income to make the increased demand for labour effective and to weaken the attraction of wages offered by urban industries was made possible by the favourable terms of trade for cotton. Unfortunately, the earliest year for which sectoral earnings differentials can be documented is 1965, after the beginning of the reversal of the favourable treatment of cotton. In that year earnings in industries were only 14 per cent higher than earnings in kolkhozy in Uzbekistan. The difference was 56 per cent for the USSR! Without doubt the sectoral earnings differential was even more favorable for agriculture in Uzbekistan relative to the USSR in the years prior to the post-Stalinist relaxation of the strategy of primitive socialist accumulation.

The primary motivation behind this policy of favourable terms of trade for cotton was to ensure quick Soviet self-sufficiency in this basic commodity. This was achieved with singular success. It remains to be determined if the spectacular increase in specialization in cotton was consistent with the comparative advantage of Uzbek agriculture or whether the specialization in cotton went beyond the dictates of economic efficiency. Another important question is whether the specialization of Uzbekistan in producing raw cotton for use in textile industries elsewhere in the USSR was consistent with the criteria of comparative advantage, especially once dynamic considerations -- e.g., the potential advantages in overcoming the "infancy" of textiles manufacturing -- are taken into account.⁵

The remarkable shift in the cropping pattern and the consequent retention of a high proportion of the labour force in agriculture and a relatively low urban-rural income differential were the result, not of administrative coercion, but of a systematic use of price incentives. This probably explains the relative success of the strategy even though it was implemented within the institutional framework of collective agriculture, an institution which proved to be a hindrance to agricultural growth both in the USSR and outside. Rural Uzbekistan was forced into a transition from backward feudal relations to collective and state farms with only a momentary interregnum during which private peasant agriculture existed. And yet adaptation to these institutions did not prove too difficult once the initial experimentation with overtly coercive methods was abandoned. The experience of Uzbekistan -- as of much of the rest of Soviet Central Asia -- suggests that collectivized agriculture is not necessarily inconsistent with agricultural growth if overall policies provide appropriate incentives and rewards.

Starting in the 1950s the highly discriminatory procurement pricing for Soviet agriculture came gradually to an end. During this period cotton lost much of its extraordinarily advantageous position and for a period the price-cost ratio for cotton fell well below that for grain with a consequent decline in the growth of cotton output and yields and a rather severe decline in peasant earnings. By 1963 the procurement price of cotton was adjusted upwards and from then onwards price policy was carefully balanced to keep the price-cost ratio higher for cotton than for grain. Thus in 1976 the ratio of the procurement price of cotton to the procurement price of grains was 3.73 while the ratio of the costs of production on Uzbek kolkhozy was 3.53. The ratios of procurement prices to international prices (converted at the official exchange rate) were 1.32 for cotton, 1.01 for grain and 2.02 for meat in the same

year. Assuming that the exchange rate was only moderately overvalued, cotton was subjected to little "concealed" taxation while grain was subjected to significant "concealed" taxation.⁶ The difference between industrial and agricultural earnings became wider than in the years of greater positive discrimination in favour of cotton, but the differential was still lower than for the USSR as a whole.⁷ As Annex B shows, the procurement price of cotton continued to rise in real terms throughout the 1980s until the eve of independence. It is therefore reasonable to assume that the overall system of incentives described above continued throughout the 1980s.

2. Output, income and employment in agriculture since independence

Table 1 contains estimates of growth in GDP and agricultural output in the period since 1989. The estimates in the table must be considered as approximations. It is difficult to measure these aggregates in a generally chaotic period characterized by a very high rate of inflation which makes estimating income and output exceptionally hazardous.

Table 1. Indices of GDP and agricultural output
(1989= 100)

Year	GDP	Agricultural Output	Population	Per capita GDP	Per capita agricultural Output
1990	106.6	106.2	102.2	104.3	103.9
1991	106.1	105.1	104.7	101.3	100.4
1992	94.3	98.4	107.2	88.0	91.8
1993	92.1	99.9	109.6	84.0	91.1
1994	88.9	96.2	112.1	79.3	85.8

Source: GDP: 1990: World Bank, *World Tables*, 1994. For other years indices were supplied by Goskomprognostat (GKPS). Agricultural output: 1990-1992: based on the data in World Bank, *Uzbekistan Economic Memorandum*, Vol. II, 1994, Table 7-2. For 1993 and 1994 data were supplied by GKPS. Population: based on GKPS data converted to mid-year population estimates by interpolation.

The annual compound rates of decline in GDP and in per capita GDP in Uzbekistan between 1989 and 1994 were respectively 2.33 per cent and 4.53 per cent. These rates of decline are far smaller than the rates experienced by the countries of the former Soviet Union, in which annual rates of decline in GDP and in per capita GDP were respectively 13.2 per cent and 14.2 per cent. Even so, per capita GDP in Uzbekistan in 1994 was 21 per cent lower than in 1989. Given an unchanged distribution of income -- a rather optimistic assumption for an economy going through a transition to a market economy -- this could imply a sharp increase in the incidence of absolute poverty. According to a 1989 survey, 44 per cent of Uzbekistan's population were estimated to be below a poverty income threshold of 75 rubles per capita per month and another 23 per cent were estimated to have per capita incomes between 75 and 100 rubles.⁸ By 1994, under the assumption of an unchanged distribution of income, 67 per cent of the population would have been below a per capita monthly income of 79.3 rubles at constant 1989 prices. With the same poverty income threshold as the one used in the 1989 survey, 62 per cent of Uzbekistan's population would have been poor in 1994.⁹ This represents a 41 per cent increase in the headcount *ratio* of the incidence of absolute poverty. Because of the growth of the population base by 12 per cent, the increase in the *number* of the absolute poor is higher, namely 58 per cent. The actual situation was almost certainly worse than this because of the near certainty that income inequality increased. This is a widely observed phenomenon during the transition to a market economy and it must have occurred here too.

2.1 *Change in output and income*

The decline in agricultural output -- at an annual compound rate of three-quarters of one per cent per year -- was much slower than the decline in GDP. In per capita terms, the decline in agricultural output was of the order of three per cent per year. The decline in agricultural output however was less than the decline in real income of agricultural households. The reason for this is that the terms of trade for agriculture appears to have deteriorated drastically. As Annex B shows, the procurement price of agricultural products, particularly cotton, declined sharply. While one can hardly claim precision in measurements in a period of a violent rise in absolute prices and dramatic short-term movements in relative prices, the weight of evidence unmistakably points to an end of the era of favourable procurement terms for cotton. Trends in all indicators -- procurement price as a proportion of international price and procurement price at constant domestic purchasing power -- point to a catastrophic fall in the real price of cotton. The same is true, though to a lesser extent, of the real price of grain, the other major agricultural product subject to state procurement. As the estimates in the Annex show, the income transfer out of agriculture due to the discriminatory pricing of cotton alone amounted to more than 10 per cent of the value of GDP originating in agriculture even after all direct and indirect subsidies -- including that implicit in the provision of free irrigation water -- are taken into account. One is forced to conclude that the fall in income in agriculture and in the rural economy may easily have exceeded the fall in national per capita income. Consequently, the *increase* in the incidence of absolute poverty in the rural areas has almost certainly been greater than the increase in absolute poverty in the rest of the society.

2.2 *Change in employment*

Table 2 contains information on the distribution of the employed labour force in 1989 and 1992 and the total and agricultural employed labour force in 1994. Reported unemployment consists only of those who are registered as unemployed. Their number has been negligible so far, a mere 14,400 by September 1993.

One remarkable feature of the employment scene is that agriculture (defined to include forestry, employing a meagre 5,000 persons) has experienced a dramatic increase in the share of total employment since 1989. The shares of all other sectors taken together fell.

Details for the non-agricultural sectors are available for the period up to 1992. Between 1989 and 1992, employment in industry, construction and transport declined absolutely, by an aggregate of 6.7 per cent or an annually compounded rate of 2.3 per cent. Employment in services increased but only at an annual rate of 1.9 per cent, as compared to the growth in the employed labour force of 2.8 per cent per year.

Between 1989 and 1994 employment in agriculture grew at an annual compound rate of 4.6 per cent. During this period agricultural output declined by 3.8 per cent. Clearly, the observed increase in agricultural employment is an indicator of labour supply, not of labour use in agriculture. In a period of shrinking employment opportunities in other sectors, labour simply moved into agriculture, the residual employment sector, and shared work with the existing labour force.¹⁰

Table 2. The distribution of the employed labour force

	1989 Thousand	%	1992 Thousand	%	1994 Thousand	%	Percentage change 1989-94
Agriculture	2 941.1	39	3 594.7	43	3 690.0	44	25
Industry	1 183.8	16	1 147.2	14			
Construction	689.5	9	597.7	7			
Transport	390.5	5	368.4	4			
Services	2 422.2	32	2 565.3	31			
Total	7 627.1		8 273.3		8 334.7		9

Note: The data are from GKPS although for 1989 and 1992 they have been obtained from their figures quoted in World Bank, *Uzbekistan Economic Memorandum*, 1994. For 1994 the data are provisional and have been supplied by GKPS.

The signs of declining aggregate demand for labour are far too many and too apparent to be ignored. The fall in aggregate output is one. The increase in agricultural "employment" at 4.6 per cent per year during a period when aggregate "employment" was growing at 1.8 per cent per year is another. The growth rate in aggregate employment fell significantly behind the growth of the potential labour force -- the number of persons in the relevant age group -- which grew at more than two per cent per year. Aggregate employment, as a proportion of potential employment (termed "total labour resources" in official reporting of data) fell from a peak of 79.4 per cent in 1990 (not shown in the table) to 76.8 per cent in 1994.

How might the change in labour use in agriculture be estimated? During this period there was a shift of about 0.5 million hectares of land from cotton to grain. It has been estimated that a hectare of kolkhoz land under cotton requires 908 hours more of labour than a hectare of kolkhoz land under grain.¹¹ Because of the somewhat dated nature of the estimate, let us assume that the labour requirement per hectare of cotton exceeds the labour requirement per hectare of grain by three-quarters of the above figure, or 681 hours. Assuming 8 hours of work per day and 220 days of work per year, this represents a loss per hectare of 0.39 person years of employment due to the shift from cotton to grain, or an aggregate loss of employment of 195,000 person years, 6.6 per cent of benchmark employment in agriculture. To this might be added the loss of another 3.8 per cent of employment due to the reduction of output, making a total loss in employment of approximately 10 per cent.

With labour requirements declining by 10 per cent and labour supply increasing by 25 per cent, the degree of underemployment should have increased by approximately 28 per cent.¹² Thus, the "time measure" of unemployment appears to have *increased* by about 28 per cent.

Next one can estimate the *increase* in the "income measure" of unemployment as the fall in agricultural income per "employed" worker. Agricultural output per worker employed in agriculture fell by 23 per cent by 1994.¹³ Once the decline in agriculture's terms of trade is taken into account, the fall in *income* per worker employed in agriculture -- the increase in the "income measure" of unemployment -- may turn out to be closer to 30 per cent. Thus an average worker in agriculture was working about 23 per cent fewer days/hours (at unchanged intensity) for about 30 per cent less income. Admittedly the statistical foundations of these measurements are weak. There is however hardly much doubt that they represent correct orders of magnitude.¹⁴

What can one say about the distribution of rural income? Not very much. Private economic activities, private farming outside the framework of the kolkhozy and cooperatives and household contracts within the framework of the kolkhozy and cooperatives (see below) have undoubtedly unleashed forces of inequality in rural society. But the guaranteed access to land has almost certainly limited these disequalizing forces. The increase in inequality in the distribution of earnings may therefore be presumed to have been limited. Work sharing was widely distributed among the labour force, the great majority of whom were toiling within an overall framework of cooperative agriculture.

3. Institutional reforms in agriculture

At the time of independence Uzbekistan's agriculture was organized into kolkhozy (collective farms) and sovkhozy (state farms) with a tiny proportion of the total sown land allocated to workers as personal plots. The principal difference between the two main forms of ownership was that a sovkhoz is like a state enterprise in which the workers are employed at fixed wages whereas a kolkhoz pays its workers from its own residual earnings. The trend before independence was towards an increase in the proportion of sovkhozy. State ownership was considered to be "ownership by the entire population", a superior form of ownership in the "transition towards a communist society", as compared to the cooperative ownership that characterized the kolkhozy.

Uzbekistan's agriculture has experienced radical changes in its institutional structure in the years since independence. Some of the main features of the change are represented by Tables 3 and 4.

3.1 *The abolition of the sovkhozy*

The most visible change in agricultural institutions consists of the abolition of the sovkhozy and their conversion into cooperative enterprises resembling the transformed kolkhozy (see below). One reason for this was the practical consideration of relieving the state budget of the burden of wage payments to the large sovkhozy work force in a period in which agriculture was subjected to a high rate of resource extraction (see below). In addition, the abolition of the sovkhozy can almost certainly be defended on efficiency considerations.¹⁵ By 1994 the only remaining state farms in agriculture were those engaged in experimental work, e.g., development of improved seed varieties. All others had been converted into cooperative farms or enterprises under other forms of ownership.

Table 3. Distribution of sown land (Per cent of total)

Year	Kolkhozy & cooperatives	Sovkhozy	Private farms	Others
1990	34.9	58.7	0.1	6.3
1991	34.0	57.7	0.1	8.1
1992	36.4	51.8	0.4	11.5
1993	47.5	39.0	0.6	12.9
1994	75.3	1.0	2.1	21.6

Source: GKPS.

3.2 *The development of individual farming*

The second most important change that has occurred in Uzbekistan's agriculture in the post-independence period is the move towards individual farming. This has advanced along the following three parallel fronts:

(i) The amount of land allocated to the personal plots of the workers of kolkhoz and other forms of agricultural organization has been increased very substantially. According to one estimate total land under personal plots increased from 110,000 ha before independence to 630,000 ha in 1994 (of which crop land amounted to 362,840 ha).¹⁶ In most places the limit on the size of the personal plot was raised from something between 0.08 and 0.1 ha to 0.25 ha per household.

(ii) A limited programme of distributing land among private farmers has been implemented. In 1994, about 10,408 private farms were actually in operation covering an area of 89,690 ha or 8.6 ha per farm.¹⁷ By 1994 these farms occupied two per cent of the sown land.

(iii) Perhaps potentially the most important step towards individual farming is the ongoing tendency of the kolkhozy to enter into contract with individual kolkhozniks (kolkhoz members) under which production is managed and organized by individual farmers while the kolkhoz provides certain services and inputs and receives a share of revenues. A typical arrangement is for the kolkhoznik to meet the state procurement order at a fraction of the price received by the kolkhoz and to share with the kolkhoz according to agreed proportions the revenue for above quota sales. This system of contracting strongly resembles the household contracting that characterized the early phase of transition of the Chinese communes to individual farming. The objective is to create stable individual responsibility for land. Contracts are reportedly signed for as long a period as the kolkhozniks want. According to the information available on the kolkhozy that are practicing individual household contracting, land is allocated in proportion to the available family labour after making allowance for the ability to work. Every household is guaranteed a minimum amount of land.¹⁸

The practice of household contracting is spreading very rapidly. It is possible that by the end of 1995 this will become the overwhelmingly dominant -- if not the universal -- form of organization in the 75 per cent of land that Table 3 reports as being under collective and cooperative management. In Samarkand oblast, for example, all crop and grain kolkhozy have chosen individual household contracting and have renamed themselves associations of peasants and farmers cooperatives. Available reports suggest that a similar transformation of the kolkhozy is taking place all over the country. A convergence of former systems is taking place in so far as the sovkhozy have also been transformed into similar cooperatives.

The system is essentially individual farming. A much reduced administrative structure of the former kolkhoz (or sovkhoz) continues to exist to facilitate the transformation itself, to provide some common services and, most importantly, to intermediate in the implementation of state procurement. Annex A contains an example of a kolkhoz that has undergone this transformation.

Personal plots for the kolkhozniks and other workers is an old institution, originally intended to enable households to supply themselves with food for consumption, although they have traditionally been a major source of marketed output, especially for perishable products. The personal plots are by and large non-competitive with other forms of private farming. Their continuation presents little difficulty for the reorganization of agriculture. Further increases in the amount of land allocated for this use may however create problems because of the very different system of incentives for this form of private farming as compared to some of the other forms of private farming.

It is however difficult to see what benefit might be derived from the simultaneous adoption of the other two tracks towards individual farming, viz., the creation of private farms and the development of individual household contracting within the kolkhozy and sovkhozy. The principal transition facing Uzbekistan's agriculture consists of the transformation of the farming system on 75 per cent of the arable land now under kolkhozy and under cooperatives on former sovkhozy land. The best way to achieve this transformation is to develop, standardize and universally apply the household contracting system. To continue simultaneously along a separate track of creating and developing private farms

Table 4. A detailed distribution of land in 1994 (Per cent of total)

Kolkhoz	49.0	Mixed enterprise	0.8
Cooperative (former Sovkhoz land)	26.4	Personal plots	8.6
Leased enterprise	6.4	Private farmers	2.1
Sovkhoz	1.0	Other state and cooperative plots	2.4
Cattlebreeding cooperatives	1.6	All other forms	1.8

Source: GKPS, Final Data Recording Land Under Agricultural Crops for 1994, Tashkent, 1995.

appears both undesirable and unnecessary. It is undesirable because of the distinct conflict of incentives between this form and the system of household contracting. The private farms are not subject to state procurement orders and this is a major advantage compared to the rest of agriculture.¹⁹ It is unnecessary to have a separate track of private farms because the desired features of individual farming can be achieved through household contracting under the kolkhoz. It is sometimes argued as a justification for the separate track that the private farms are given government reserve land, not kolkhoz land. But government reserve land might just as well be channelled through the kolkhozy to develop individual farming. The point is that it is potentially highly disruptive to develop two different forms of individual farming that have vastly different private rates of return.

3.3 Other forms of ownership

Nothing that is said above should be interpreted to preclude the possibility of making separate arrangements for special categories or crops, e.g., orchards and vineyards. Widespread leasing of such farms has taken place (see Table 4). Each of the remaining forms of organization and ownership are quite small in terms of their share of sown land.

4. Incentives

The two far-reaching changes in the incentive structure of Uzbekistan's agriculture after independence are: (i) a very sharp decline in agriculture's terms of trade; and (ii) a sharp shift in relative incentives against cotton and in favour of grains. The motivations behind both changes are closely related to the circumstances of Uzbekistan's independence. Independent Uzbekistan was cut off from the budgetary grant that it used to receive from the USSR.²⁰ The government had to find new sources of revenue. Extraction of surplus from agriculture by driving a wedge between the procurement price and export price of cotton was an attractive and readily available choice. Indeed, the extraction of surplus from agriculture was extended to grain crops (and other agricultural produce until recently) by reducing their procurement prices well below the market prices.

The policy of shifting relative incentives against cotton and in favour of grains reflected concern about Uzbekistan's dependence on grain imports. Self-sufficiency in grain in the near future was accepted as a goal of economic policy. To achieve self-sufficiency it was decided to transfer land from cotton to grain. A shift in incentives against cotton and in favour of grain was one of the instruments to bring about a shift in the area under cultivation.

In Annex Table B.1 several alternative measures of the decline in the procurement price of cotton are presented. The extraordinarily rapid rate of inflation that has characterized the Uzbek economy in recent years makes estimates of values in real terms subject to wide variance. Thus one must be careful and not interpret these measurements too literally. The point is to get a clear idea of the direction and broad magnitude of movement of the structure of incentives. To achieve this as many different measurements as possible have been made.

At constant domestic purchasing power, the procurement price of cotton increased steadily through 1990, in which year it stood at about a quarter higher than the price in 1976. By October 1994 the procurement price of cotton in real terms was a tiny fraction of what it was in 1990.²¹ At the official exchange rate, the decline in the dollar equivalent of the procurement price was even more severe. At the market exchange rate, too, the dollar equivalent of the procurement price of cotton declined sharply between the years for which information is available.

Annex Table B.2 contains a more complete accounting of the extraction of resources from the producers of cotton and grain by taking into account both the facts that their procurement prices have been lower than what the prices would have been in the absence of government controls over trade and that the prices of many of their inputs have been lower than what the market price would have been. These estimates also take into account the fact that while the procurement prices have been falling in real terms, agriculture has been granted some relief in the form of declining shares of outputs that have been subjected to state procurement orders as follows:

	Cotton	Grain
1991	95	100
1992	85	85
1993	80	80
1995	60	50

State orders for procurement at fixed prices have recently been abolished for all other agricultural products. The estimates of resource extraction in Annex Table B.2 relate to the procurement prices that prevailed in the 1994/95 crop season on the assumption of the 1995 levels of state orders.

The current world market price for cotton is exceptionally high. Only 75 per cent of that price has been used after due allowance for transport costs and conversion from fibre prices to raw cotton prices. The World Bank's estimate of the *dollar value* of the entire subsidy on cotton inputs has been assumed to fall entirely on the procured quantity to arrive at the subsidy in dollars per ton procured. To this has been added the sum value of procurement per ton converted to dollars at the official exchange rate.²² We thus arrive at an estimated total payment per ton of procured cotton of \$227, which is only 43 per cent of the value per ton of cotton procured. Net state receipts on total cotton procurement in 1994 amounted to \$703 million. This must be considered a minimum estimate. Had the actual price of cotton in the international market been used, the amount would have been \$1.12 billion. It would be greater still if the market exchange rate, rather than the official exchange rate, were used in making calculations. Furthermore, one should make an additional allowance for the 10 per cent export tax to which the above quota sales of cotton are subject. Be that as it may, this minimum estimate is a staggering 12 per cent of the GDP originating in the agricultural sector as a whole.²³ The budget of 1993 shows "cotton revenue" as amounting to 24 per cent of GDP originating in agriculture at current prices and 13.4 per cent of total government revenue.²⁴ Since the official estimate of cotton revenue does not net out subsidies, as our estimate does, it exaggerates the resource transfer. If we exclude subsidies from our estimates, the estimated resource transfer turns out to be less than 19 per cent of GDP originating in agriculture. It therefore seems that ours is almost certainly an underestimate.²⁵ Note that the budget estimate of cotton revenue also almost certainly uses the official exchange rate.

A similar method of estimation, reported in Annex Table B.2, shows that grain is also subject to resource extraction, though to a much smaller extent. The net payment per ton of grain -- the procurement price, converted into dollars at the official exchange rate, and per ton subsidy, estimated as the total value of subsidy on grain spread over the procured amount -- turns out to be 79 per cent of the value of a ton of grain imported from abroad, after due allowance for transport costs.

As can be seen in Table 5, the effect of the strong discrimination against cotton relative to grain has been not only to reduce the area under cotton cultivation but also to reduce the yield per hectare. Clearly resources other than land have also been moved out of cotton. The area devoted to grains has increased

sharply. Total output of cotton has fallen by 15 per cent over the last four years and by as much as 27 per cent since 1985. Output of grain has increased by 30 per cent over the last four years and by more than two-thirds since 1985.

Table 5. Area and yield of cotton and grain (thousand ha and tons per ha)

Year	Cotton		Grain	
	Area	Yield	Area	Yield
1985	1 989.8	2.70	969.3	1.52
1990	1 830.1	2.76	1 008.1	1.88
1991	1 720.6	2.70	1 079.9	1.77
1992	1 666.7	2.48	1 212.2	1.86
1993	1 695.1	2.50	1 280.3	1.67
1994	1 540.0	2.56	1 522.2	1.62

Source: GKPS.

That the government should turn to agriculture as a source of revenue does not seem unreasonable, especially in the context of the traumatic loss of revenue from traditional sources that it experienced. The issues that should be considered in formulating future policies are:

- (a) Is the existing system of procurement pricing the best available method of resource extraction?
- (b) Is it necessary for the extraction of resources to be so very discriminatory? Should cotton be subjected to so severe a rate of concealed taxation in order to bring about a shift of resources away from cotton in favour of grain? Should cotton and grain be singled out as the only crops subject to taxation?

The existing system of taxing agriculture is contrary to the principle of adhering to market incentives. The existing system distorts incentives in a totally arbitrary way from what the market would dictate. This system of taxation is too cumbersome an instrument to use in making systematic corrections in "market failures".

Nor is it obvious that this system is the only feasible method of taxing agriculture. The abolition of subsidies would probably compensate for about half the resources lost by the abolition of compulsory procurement. With a land tax added to the menu, it might be possible to compensate for most of the revenue lost from abolishing procurement. Finally, the government should seriously consider whether the average rate of taxation of agriculture -- once all forms of taxation are taken into account -- should be as high as it currently is.²⁶

Preliminary judgements based on a number of discussions suggest that it would not be politically difficult to abolish subsidies and institute a land tax. While it may be wise to phase in these changes, there is no reason to believe that the peasants and the cooperatives would prefer the existing system to a far more transparent system of taxation. Discussions at some associations of peasants cooperatives made it clear that the peasants are aware that it is only a matter of time before they will have to pay a land tax and they know that the justification for compulsory procurement is that it finances state subsidies. One hopes that the government, in announcing its intention to abolish compulsory procurement in two years, actually accepts the validity of this argument.

The shift of incentives against cotton and in favour of grain is another thorny issue whose resolution is extremely important for the efficient development of the economy of Uzbekistan. Once again, the right strategy is to allow the market to decide the extent to which import substitution of grain is desirable after making necessary interventions for the correction of whatever legitimate market failures might be

identified. The thrust of actual policy appears to have been to decide that it is desirable to substitute the import of grain at the cost of reducing the export of cotton and to adjust all instruments of policy to achieve this outcome. The ratio of the procurement price of cotton to the procurement price of grain has been allowed to drop to about 2.5 or lower, as compared to 3.5 or more in the past. The rate of subsidy has been higher for grain than for cotton. By now the proportion of output subject to state procurement is higher for cotton than for grain. Cotton exports have been subjected to a tax which further reduces the profitability of above quota sales.

Let us consider some of the arguments that are usually advanced to justify the shift of resources in favour of grain. One of the most common arguments is that the specialization in cotton during the Soviet period was artificially encouraged far beyond the dictates of comparative advantage. This was done in order to satisfy the requirements of Soviet economic policy, namely, obtaining a guaranteed supply of a vital industrial raw material. As discussed in the introductory section, incentives during the two decades or so after the mid 1930s were indeed sharply turned in favour of cotton while they were very unfavourable for grain. By the mid 1960s this had been substantially corrected and the incentive to grow grain was improved, though perhaps not quite equalized with that for cotton. This does not justify discrimination against cotton. All that is implied is that incentives for cotton and grain should be equalized. There is no need for different rates of taxation to be imposed on the two crops. Market incentives should be allowed to determine the relative output of the two crops.

Another argument that one encounters is that the claim of higher profitability of cotton compared to grain is not correct because grain cultivation permits double cropping and this generates more profits per hectare than does cotton. Even if this argument is valid, there is again no case for a higher rate of taxation on cotton. One should promote double cropping of grains by providing adequate technical support and allow incentives to be dictated by the market. If double cropping of grain is feasible and more profitable, land will naturally shift away from cotton into grain.

Yet another argument is often made that a shift of land from cotton to grain need not reduce cotton output. By more "intensive" cultivation of cotton, its total production and export revenue can be preserved. This argument is a delusion given the evidence that cotton yields have been declining as a result of the disincentives created by state policy. As Uzbekistan's agriculture rapidly moves in the direction of individual farming, the allocation of resources will increasingly be decided by market incentives, not administrative dictates. It is essential to recognize that individual farming will be inconsistent with administrative preferences if they are not adequately backed by incentives.

Another argument to justify the reduction in cotton area is that cotton is intensive in the use of water which is scarce and that the past pattern of the excessive use of water has been a major contributor to the ecological problems that Uzbekistan is facing. This is an argument for the appropriate pricing of water. The estimates of discrimination against cotton in Annex B allow for the recovery of the cost of water.

A final argument that has sometimes been mentioned is that Uzbekistan should deliberately accept the loss of welfare entailed by promoting grain at the expense of cotton against the dictates of comparative advantage because the country must ensure its food supply. The justification is that it is dangerous to depend on imports for the supply of this essential commodity and, moreover, it is argued that suppliers often exercise monopoly power. These arguments however are greatly exaggerated. Some degree of promotion of grain production, through support for the development of improved seeds and technology, would be desirable and could lead to a steady increase in the proportion of consumption that is produced domestically. But, beyond that, there does not seem to be much insecurity in importing residual requirements of grain. The international market in grains is reasonably competitive. One can monitor trends in the international market to see if they warrant a change in domestic policies. In any case, changes in the world market would be reflected in changed domestic incentives to produce and these would bring about changes in the composition of output. If insurance against uncertainty and insecurity is desired, this can be obtained by creating a buffer stock, the cost of which might be included when calculating comparative advantage on which domestic incentives are based.

The costs to the country of a forced reduction in cotton area, brought about by the discriminatory incentives, could be substantial. First, there is the loss of welfare due to the fostering of a production structure that is contrary to comparative advantage. At the margin, it is cheaper to supply the country with grain by producing cotton and trading internationally than by transferring land from cotton to grain, even after allowing for all cost differences including the cost of carrying a modest buffer stock of food.²⁷ But there are other important distributional consequences of shifting land from cotton to grain. The shift that has already occurred has created a significant problem of reduced labour demand in farming. At this phase of the transition and given the decline in overall output and income, a decline in the demand for labour may have serious distributional and social consequences.

A final point that needs emphasis is that a continued comparative advantage in the production of cotton does not mean that Uzbekistan will continue indefinitely to be a supplier of raw cotton to the rest of the world. In the context of a complete economic union with the Soviet Union in the pre-independence period, with the effective protection of cotton exports being high, Uzbekistan emerged as the specialized supplier of raw cotton. Almost certainly reliance on market incentives in post-independence Uzbekistan would lead to import substitution, and possibly the export, of cotton textiles. Investment in and initial promotion of textile manufacturing should feature prominently in national economic plans.

5. Conclusions and future policy

Our review of the agricultural scene in Uzbekistan suggests that many of the changes in policy in the post-independence period have been broadly right. There are however certain important policies that need urgent consideration. The following is a summary of the main policy issues that deserve attention.

1. The main direction of institutional change -- transforming the existing kolkhozy and sovkhozy into associations of cooperatives of individual peasant farmers -- is right. This process appears to be going ahead at a very rapid rate. The necessary legal framework should be created to bring the process to a quick completion. Universal access to land and the broad equality of the distribution of land within each local collective unit should be ensured.
2. Although the bureaucratic administrative structures of the kolkhozy and sovkhozy are being and should be dismantled,²⁸ the transformed associations of cooperatives of peasants' and farmers' households should be preserved. At the moment they are performing such essential functions as organizing the transformation and implementing state procurement orders. Once these functions become redundant, these organizations should be able to continue to provide certain services to the farmers, e.g., the distribution of inputs and provision of extension services.
3. The focus of institutional transformation should be on the creation of individual farming within the structure of the associations of cooperatives of peasants' and farmers' households. A separate track creating private farmers who are not subject to the same incentive system as the associations seems both unnecessary and disruptive.
4. The present system of state procurement orders should be terminated at the earliest possible date. The revenue lost by the termination of state orders could be substantially recouped by a reduction -- complete termination unless fully justified -- of subsidies, pricing water appropriately and instituting a land tax. There appears to exist an administrative network that taxes the incomes of individual farmers. It should therefore be feasible to administer a land tax as well and to collect water and other fees. Adjusting to a changed structure of revenues should not be terribly difficult. There should however be a dialogue between donors of foreign aid and the government to determine whether a loan specifically designed to enable the government to make a quick transition from procurement to alternative sources of revenue would ease and hasten the process of adjustment.
5. In making the transition, a comprehensive analysis of the aggregate tax burden on agriculture should be undertaken. There are reasons to suspect that the aggregate burden of taxation at present is too high to enable the newly emerging individual farmers to generate adequate resources to meet their investment needs.

6. The discrimination against cotton should end and incentives for the production of cotton, grain and other major products should be equalized. The abolition of procurement, the termination of subsidies and an appropriate pricing of inputs are necessary, but not sufficient, for this to occur. The existing export taxes -- principally punishing cotton -- should also be terminated.
7. All legitimate policies for moving towards self-sufficiency in grain should be encouraged. These include improvements in the productivity and profitability of grain, through investment in the development of seed and technology.
8. The possibility of greatly expanding cotton textile manufacturing should be properly studied and if, as we expect, the results are favourable, a plan to expand the industry should be implemented. It seems almost certain that Uzbekistan has a comparative advantage in cotton textiles. At worst this comparative advantage will have to be realized by treating the industry as an infant and providing it with some initial promotion.
9. Even after reforms of the incentive system, the rural economy may face a problem of inadequate demand for labour. In the absence of reforms the problem would be far greater in magnitude. It is therefore a priority to consider organizing a public works programme to employ redundant rural labourers. The purpose of the programme would be to develop rural infrastructure and create productive assets. It is unlikely that substantial resources can be found from the state budget for this purpose. However the associations of cooperatives of peasants' and farmers' households can be given the important task of organizing capital construction works on a voluntary basis for the benefit of individual farmers. If the distribution of land is egalitarian, a basis will exist for the organization of such work, the benefits of which will accrue equally to all.
10. The transition to individual farming will leave labour poor households in a particularly vulnerable position. The government has an existing programme, operating through *mahalla* committees, to assist vulnerable households. This programme must monitor changing conditions and be alert to provide protection to households that fail to benefit from the transition to individual farming.
11. The phasing out of the kolkhozy and sovkhozy means that the welfare services that they provided are being curtailed. In Uzbekistan the number of such services was rather limited, compared, for example, with the services provided by the Chinese communes before they were dismantled in the early 1980s. Even so, as Annex A shows, certain services have been reduced beyond acceptable limits. The state should find resources to protect these services through its local government network.

ANNEX A

Transformation of Collective Agriculture: Illustrative Case Studies

Kolkhoz Murad Juraiev (formerly Kolkhoz Khalkabad) in Ishtikhon raion in Samarkand oblast has recently transformed itself into an association of cooperatives of peasants and farmers households. It has divided its 2,200 households, with 13,000 people and 3,100 kolkhoz members, into 23 cooperatives of peasants and farmers. The cooperatives were formed along the lines of the former brigades. Each cooperative is a group more in the sense of having historically belonged to the same brigade and kolkhoz than in the sense of farming cooperatively.

The distribution of land was based on the number of able-bodied workers per household. A household with an average number of workers received a minimum of about 1.5 ha of land (total irrigated land was 3,564 ha or 1.62 ha per household). Households with more productive workers or more productive resources received more land.²⁹ The contract is initially signed for 10 years with the provision that if land is not properly used the Association can terminate the contract. The expectation is that the contract will be of indefinite duration provided the land is properly used and, moreover, that it will be inherited by one's children. Land can not be sold or exchanged.

The Association receives from each household 10-20 per cent of its income as payment for the use of the land. The payment is usually not very transparent and depends on the nature of each contract. For grain and cotton it usually amounts to the sale to the Association of the amount of the state procurement order at a fraction of the procurement price and the contribution of an agreed proportion of the revenue or output of the above-quota sales. For other products, payments can take a variety of forms: an agreed cash payment or the sale to the Association of an agreed amount at an agreed price or a combination of these methods.³⁰

The Association uses its income to administer the transformation and operation of the 23 cooperatives of households, engage in capital construction and in the provision of common services (e.g., operation of kindergartens, contribution to the maintenance of a sanatorium and some welfare services). It however appears that its capital construction and common services activities are far fewer than that of the kolkhoz in the past. The Association's bureaucracy is a tiny fraction of the bureaucracy of the kolkhoz in the past. In 1989 the kolkhoz had 104 employees (those on the kolkhoz payroll as accountants, specialists and other employees at a fixed wage -- not the members of the kolkhoz). The total number of employees of the Association is down to four in 1995! In 1989 the kolkhoz operated five kindergartens which employed 70 teachers. Today the number of teachers is down to 27. The Chairman of the Association argued that the number of students in the kindergartens has declined because of a decline in the birth rate. But obviously the decline in the number of teachers has been far more rapid than the decline in the number of children.

The area of land under cotton fell from 2,000 ha in 1991 to 1,386 ha last year, a 31 per cent decline! This happened in spite of the fact that the yield of cotton in this area is much higher (3.25 tons per ha) than the national average and the quality of cotton, as evidenced in the unit price of the above-quota sales, was far superior to the average. The Chairman of the Association agreed that total employment in agriculture has declined substantially due to the shift of land from cotton to grain but said that employment in small business and other activities has increased.

ANNEX B

Table B.1. Procurement Price of Cotton

	Current ruble per ton	Exchange rate		Price index 1988= 1.00
		Official	Market	
1976	562	-	-	0.77
1988	816	0.61	-	1.00
1989	900	0.63	8.9	1.02
1990	1 000	0.59	19.3	1.10
	Current sums per ton	Sums per dollar		In sums
1993 Oct.	120	2.43	-	3.38
1994 Oct.	1 200	20.00	31.0	29.61
	Procurement price in current \$		Index of procurement price at constant 1988 purchasing price	
	Official rate	Market rate		
1976	-	-		730
1988	1 388	-		816
1989	1 429	101		882
1990	1 695	52		909
1993 Oct.	49	-		36
1994 Oct.	60	39		41

Note: Price index is the most difficult thing to construct. Depending on the method used, post 1990 estimates would change violently. The method used here is as follows: 1988 to 1992 January: Industrial wholesale price index shown in World Bank, *Uzbekistan Economic Memorandum*, Volume II. Between 1992 January and 1993 October, wholesale price index shown in IMF, *Economic Reviews*, Uzbekistan, 1994. Between 1993 October and 1994 October, the consumer price index from GKPS. The 1976 price is based on the USSR price index with 1988 as base (reported in World Bank, *Historically Planned Economies*). Exchange rates are from the above World Bank source except for October 1994 which is from the Central Bank. Procurement prices are from Azizur Rahman Khan and Dharam Ghai, *op. cit.* for 1976 and from the Institute of Market Reforms for other years.

Table B.2. Resource Extraction from Procurement

Cotton

This is based on what resource extraction would be with prices and quantities in the 1994/95 season and state procurement order rates of 1995. Export price has been very high. Hence we use only 75 per cent of it during the season after deduction for transport cost. This comes to \$1,575 per ton of fibre or \$525 per ton of raw cotton.

The World Bank estimates \$100.05 subsidy per ton of production in 1993 (World Bank, *Uzbekistan Economic Memorandum*, Vol.II, 1994). Assume that all of it is additional payment on procurement, i.e., an additional \$167 per procured ton. Procurement price per ton = \$60 (sum value converted at official rate in October 1994). Thus total payment, direct and indirect, per ton procured = \$227. This is 43 per cent of the net value of a ton of cotton. Net receipt of the state per ton = \$298 or \$703 million on total procurement of 2.36 million tons.

Grain

Wheat procurement price is 500 sum = \$25. Total subsidy is \$34 million (World Bank, *Ibid*) on an output of 581,400 tons. Assume it is entirely paid to the 290,700 tons procured, i.e., \$117 per ton procured. Thus total direct and indirect payment per ton procured = \$142. Import price per ton including transport cost is approximately \$180 (this is considerably higher than the cheapest source of import). Thus total payment, direct and indirect, per ton is 79 per cent of the alternative cost. Government "revenue", i.e., saving due to domestic procurement (after subsidy) rather than external procurement is \$38 per ton or a total of \$11 million. If the government saving per ton of procurement for all grain was the same, then total government revenue on 1.23 million tons of procurement was \$47 million.

Needless to repeat that the estimates are very rough. There is however little doubt that the orders of magnitude are broadly right.

Notes

1. For references to these and other historical data for the region see Azizur Rahman Khan and Dharam Ghai, Collective Agriculture and Rural Development in Soviet Central Asia, London: Macmillan, 1979.
2. This contemporary Soviet estimate compares with the yield officially estimated to be 2.56 tons in 1994 (see Table 5). Whether the difference is due to a reduction in yield over time, or to an overstatement of output estimates in the past, or both is something that needs to be resolved. One hears of current official admissions of overstatement of past output although we have not seen a careful analysis of the extent of overestimation. As Table 5 shows, there has been a fall in yield in recent years as well. It is also important to emphasize that the high yield per hectare does not by itself represent high efficiency in the production of cotton. Output per worker was very low and there are indications that the use of water and other inputs in cotton cultivation was inefficient.
3. The cost estimates are for the 1970s. They are not available for the 1950s.
4. See Azizur Rahman Khan and Dharam Ghai, op.cit. for details.
5. Later in this chapter we shall address these questions in the context of Uzbekistan's future development. A tentative answer to the question seems to be that the specialization in cotton was perhaps broadly consistent with Uzbek agriculture's comparative advantage. It is however almost certain that in the absence of complete economic union with the rest of the USSR, Uzbekistan would have used substantial proportions of its cotton production for textiles manufacturing for domestic consumption and, possibly, exports.
6. The question of "concealed" taxation is complex and an accurate estimate would require information on the pricing of all inputs as well as outputs of the goods that the agricultural sector sold and purchased. See Azizur Rahman Khan and Dharam Ghai, op.cit. for some discussion of the issues involved.
7. In 1975 earnings in industries were 32 per cent higher than the earnings in Kolkhozy in Uzbekistan. The difference for the USSR was 43 per cent.
8. The official survey results as reported in World Bank, Uzbekistan: An Agenda for Economic Reform, 1993, p.98. The poverty income threshold of 75 rubles, used during the Soviet period, perhaps exaggerates the minimum nutritional and human needs that countries at levels of development comparable to Uzbekistan's typically use to characterize absolute poverty. This however does not invalidate the hypothesis that the incidence of poverty increased.
9. This is based on a linear interpolation of the proportion of population below specified income levels.
10. Note that according to the GKPS, Uzbekistan in Figures for 1993, Tashkent 1994, the proportion of the population living in rural areas increased from 59.7 per cent in 1991 to 61 per cent in 1994.
11. This estimate is somewhat dated, referring to the mid 1970s (see Azizur Rahman Khan and Dharam Ghai, op.cit.). It is however not obvious if this has changed and, if so, in what direction.
12. This is arrived at as follows: $U = 1 - (D/S)$ where U = index of change in the degree of underemployment ($U = 0$ represents unchanged degree of underemployment), D = the index of labour use ($D = 1$ means unchanged labour use as compared to the benchmark year) and S = the index of labour supply ($S = 1$ means unchanged supply of labour). In this case $D = 0.90$, $S = 1.25$, hence $U = 0.28$.
13. This is given by $1 - (YA/S)$ where YA = the index of agricultural output and S = the index of agricultural employment (labour supply). By 1994 YA was 0.962 and S was 1.25 so that the fall in agricultural output per worker was 23 per cent.
14. During field visits to kolkhozy, cooperatives and local administrative agencies, it was universally accepted that the shift of land from cotton to grain reduced agricultural employment. Nearly universally it was claimed that the problem was alleviated by an expansion in employment in services and non-farm activities. Note that such increases should have been captured by the employment figures for non-agricultural sectors in Table 2.
15. Output per unit of land, the scarce factor of production, has been higher in kolkhozy than in sovkhozy. In addition, the overall unit cost was lower in kolkhozy than in sovkhozy. Output per worker has been higher in sovkhozy than in kolkhozy but this has been due to much larger amounts of capital and complementary resources per unit of labour in the sovkhozy. See Azizur Rahman Khan and Dharam Ghai, op.cit.

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16. This information was provided by the Institute of Market Reforms under the Academy of Agriculture.
 17. This information is from GKPS, Final Data Recording Land Under Agricultural Crops for 1994, Tashkent, 1995. Another report from the State Committee on Property, quoting GKPS as the source, claims that there were 13,768 private farms in 1994 occupying an area of 184,933 ha or 13.4 ha per farm. There are two possible ways of reconciling the two different estimates. First, that the former refers to the farms actually in operation in 1994 while the latter refers to the cumulative number of farms created by 1994, not all of which were in operation in 1994. A second explanation of the discrepancy is that the first refers to the farms with crop land while the latter also includes farms with exclusively non-crop (i.e., grazing) land.
 18. Information on these practices was obtained both from personal visits to kolkhozy and from the Institute of Market Reforms under the Academy of Agriculture and the oblast authorities in Samarkand.
 19. This information was provided, among others, by the State Committee on Property. Presumably private farms cannot be brought under the system of state orders because of the difficulty of implementing these measures in the case of numerous small entities.
 20. In the late 1980s the budgetary grant from the USSR amounted to 7 to 10 per cent of the republic's GDP. In 1990 and 1991 it amounted to more than 19 per cent of GDP. It is not being suggested that the grant was a net transfer to Uzbekistan from the rest of the USSR. The complexity of real and monetary flows between Uzbekistan and the rest of the USSR is beyond the scope of this paper. All that is being said is that with the cutting off of the grant Uzbekistan had an immediate budgetary problem.
 21. A warning should be repeated that these estimates are very sensitive to which of the alternative indicators of price increases is used. No matter which reasonable indicator is used, the broad conclusions would remain unaltered.
 22. Note that this procedure, rather than the conversion of prices at the market rate of exchange, seriously underestimates the extent of resource extraction.
 23. The dollar value of total agricultural output is very crudely estimated as follows: using the World Bank's atlas method estimate of the dollar value of GDP per capita -- the World Bank estimate actually refers to GNP and the difference between the two has been ignored -- an approximate estimate of GDP of \$20 billion has been arrived at. Agriculture's share has been put at a third.
 24. World Bank, Uzbekistan Economic Memorandum, Vol. II, June 1994, Statistical Annex Tables 2-1 and 5-1.
 25. Note however that our estimate does not relate to 1993.
 26. It appears that agriculture is significantly taxed beyond what is extracted through procurement pricing. Discussions with the Samarkand oblast and raion authorities and interviews with individual farmers made it clear that farmers are subject to an 18 per cent tax on net income.
 27. This judgement is not based on an estimate of the cost of creating a buffer stock. The cost advantage of cotton seems strong enough not to be overwhelmed by an allowance for a modest buffer stock.
 28. See Annex A for some estimates of the dramatic decline in the number of administrative personnel employed on the former kolkhozy.
 29. An example of contracting an above average amount of land from another kolkhoz -- Kolkhoz Ehsan Tordif in Jomoi raion in Samarkand oblast -- is as follows: A cattlebreeding household contracted 20 ha of irrigated land from the kolkhoz which had an average of 2 ha of irrigated land per member. When asked why she qualified for such a large amount of land, the writer was informed that she had a large herd of cattle. She earned an income of approximately 1 million sums in 1994!
 30. An example of such a payment by a cattlebreeder who contracted 20 ha from another kolkhoz -- Kolkhoz Ehsan Tordif referred to above -- is as follows: her entire payment to the kolkhoz consists of selling 45 tons of milk at 3,500 sums per ton. The average price she received for the remainder that she sold freely was 5750 sums per ton. This means her payment was 101,250 sums. Her income was approximately 1 million sums, so that her payments to the kolkhoz as land rent and whatever other services she received was about 10 per cent of her income.