RELAXING CONTROL OVER THE CROPPING STRUCTURE: THE NEXT STEP FOR LAND REFORM IN UZBEKISTAN

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ABSTRACT

Omnipresent control of Uzbekistan government in agriculture undermines land tenure security among the farmers and as result leads to low productivity and low incentives for investment into the land. In its turn low productivity in cotton farms worries the Uzbek policy makers on whether giving more freedom to "private" farms will adversely alter vital production of cotton. In this study we hypothesized on opportunity of enhancing land tenure security in today's Uzbekistan without altering government's demand for cotton. Specifically we showed that relaxing requirement over the land occupation under cotton while leaving only government demand for output will result in freeing significant percentage of land area and consequently enhancing land [property] rights. Indeed, our estimates suggest that depending on the soil quality and entrepreneurship skills of farmer, from 3% to 6% of farm lands can be potentially taken out off the cotton production and used for producing alternative crops.

Keywords: Uzbekistan, cropping structure, land tenure security

1. INTRODUCTION

Late history of land reform in Uzbekistan evolves around the restructurisation of collective farms. After gaining the independence all collective farms and state farms were reorganized into [collective] production cooperatives (shirkats) and medium-scale land-leasing farms. In 1995 there were 3699 production cooperatives and 17.1 thousand land-leasing farms in Uzbekistan. Yet, transforming collective farms into production cooperatives was only intermediate stage in the restructurisation reform. In 2003 the "Concept of Development of Farms" initiated restructuring large-scale production cooperatives to more than 200 thousand medium-scale land-leasing frams.

According to the law private land-leasing farms are entitled to more rights for land use than production cooperatives were. Under current land rights farmers lease land from the state for the maximum period of 49 years. At the same time farmers cannot sub-lease their plots to the third parties, and cannot use plots as collateral in obtaining credits. In addition farmer face risks of losing the land if he/she does not meet the government order for cotton or used cotton plot for cultivating other crops.

Experts agree that such land rights are far from solving long-set issues in Uzbekistan's agriculture. Macroeconomic statistics suggest that production levels go down. Excessive application of mineral fertilizers continues. As result soil quality keeps deteriorating. (Chertovitskiy, 2007).

The government has long recognized these problems and has been seeking ways to encourage farmers to increase cotton production and invest into soil improvement. Current practice forbids farmers to produce second crops after winter wheat grain is harvested, prohibits any rotation schemes in cotton fields, and provides more mineral fertilizers at low prices. Alongside government encourages farmers to use longer-term agritechnological activities, which aim at soil improvement.

However, farmers are under heavy pressure of submitting the government orders for cotton. This factor determines the choice that most farmers do in favoring short-term agricultural technology activities vs. long-term acitivities. In order to meet the government order for cotton, which every year is getting higher, farmers extensively use fertilizers. Attractiveness of this activity is that use of greater quantities of fertilizers allow increase production levels to meet the government orders and thus avoid the risk of losing the land. However, excessive use of fertilisers negatively impacts the soil quality in longer term. On the other hand the reason why farmers do not use long-term activities is that result from them [i.e. increase in production levels] cannot be achieved immediately, but rather after some years.

Clearly current land rights in Uzbekistan have weak foundation. In turn weak land rights hinders farmers incentives to invest to the soil imrpovement. Relationship between land rights and farmers

incentives have been thoroughly investigated in the past. (Alchian and Demsetz, 1972; Feder and Feeny, 1993; Lin, 1993; Besley, 1995).

These studies established four linakges between farmer's investment incentives and land rights. Li et al. (2000) summarised these four linkages with investment incentives as following: (1) tenure security (Jacoby et al., 2000); (2) ability to collaterize the land plot (Feder and Feeny, 1993); (3) land transfer rights (Besley, 1995); and (4) quota policy (Lin, 1993).

In our study we used arguments from mentioned studies to estimate the welfare effects from relaxing the control over the land use on quota crops, which corresponds with relationship (4) between quota policy and farmers investment incentive, and fixing cotton quota for three years instead of one, which corresponds with relationship (1) between secure tenure rights and farmers incentives to invest.

Rest of the paper is shaped in the following way. Section 1 provides the results of welfare analysis. Section 2 discusses results and provides policy implications.

2. QUOTA POLICY AND FARMERS INVESTMENT INCENTIVES

2.1 CURRENT SITUATION

The Law on Farming Entities and long-term lease agreements stipulate areas of land under cotton and grain and minimum crop yields for the leased land, which local governments annually pass down to farmers. Minimum crop yields and output orders, in turn, are based on the last year supplies.

Further state order for cotton is setting both the land area under cotton cultivation and the levels of cotton output. Such decisions are made first on the national level, then on oblast' levels, and then further on rayon levels. Rayon khokim receives from the top the amount of cotton his/her rayon has to submit. Then, khokim divides the amount of cotton order to the land area that farmers obliged to grow cotton on [when designing business plans], and as such derives the [planned] average cotton yield per hectare. This [planned] average yield is then applied to all farmers as control measure for cotton production to meet state order. In turn it means that all farmers in spite of differences in land quality and plot size should obtain the same yield figures.

Obviously, linkage of the state orders to the requirement to use lands only for one crop considerably undermines production and financial capabilities of farmers. In addition our survey indicated that virtually all cotton farmers produce almost exactly the amount of cotton that they are assigned as their quota. Farmers appear able to produce the required amount regardless of the quality of their land. While it may be difficult for farmers with low quality land to increase their production it seems clear that given the proper incentives, farmers with medium or high quality land could produce more.

The government has long recognized this problem and has been seeking ways to encourage farmers to increase their production. For a few years the Government tried experimental payments of bonus price 20% higher than the regular price for any cotton submitted above the quota. However, even with this promised bonus few farmers produced more than their quota. Indeed it seems strange that 80% of farmers produce cotton in amounts exact equal to government quota (see Figure 1).

Figure 1:   **Cotton yield in farmers union "Istiqlol", t/ha**
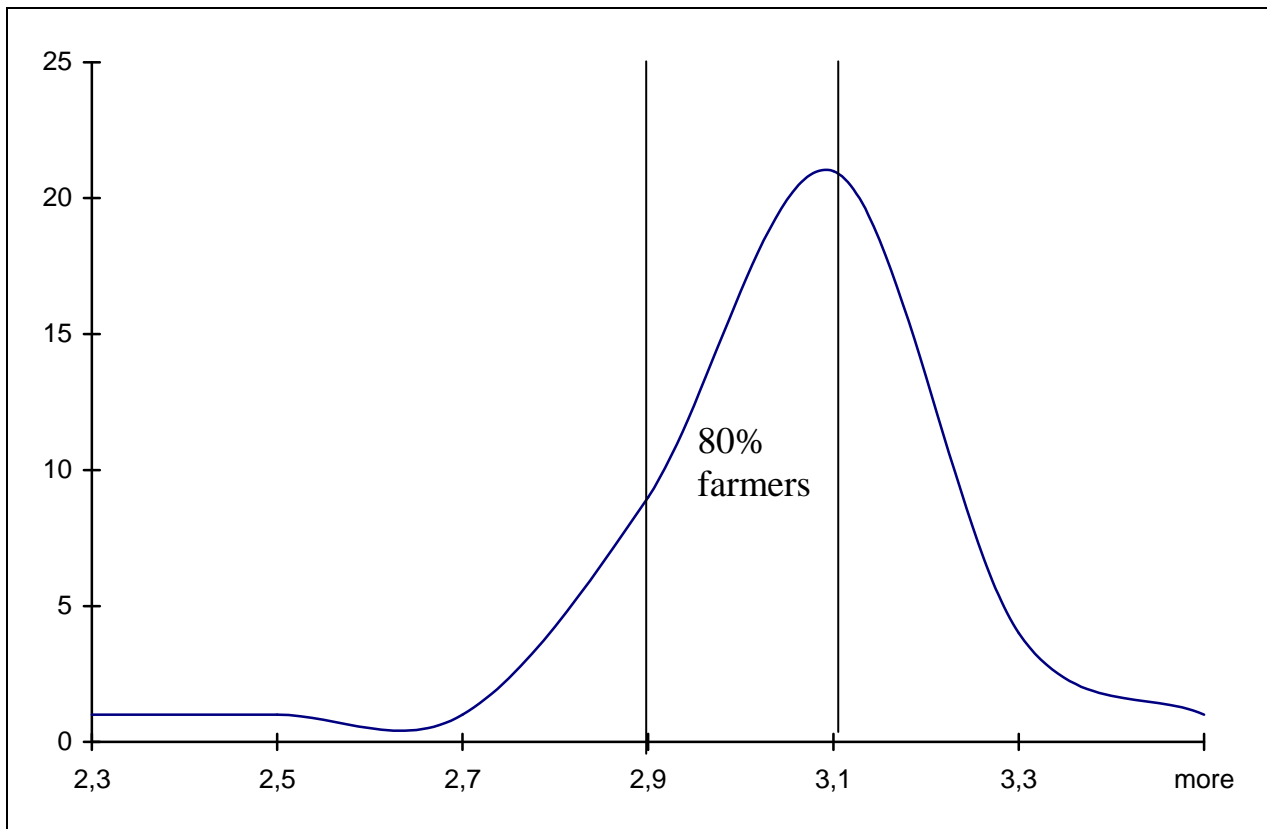
Source: Farmers survey, Syrdarya, 2006 in Chertovitskiy (2007).

Farm level calculations showed us that number of farmers in Syrdarya region that produced above quota is few. 10% of farmers produced above the quota by maximum of 5%. We thus were interested in exploring the reasons for that.

There are at least three possible explanations:

- The quotas are calculated very precisely and farmers cannot produce more than their quota;

- Farmers do not have sufficient knowledge of how they can increase their production; or

- Farmers believe (correctly or not) that they will not receive the calculated profit or that they will be penalized in future years.

We will examine each of these possible explanations.

(1) Possibility that quotas are calculated precisely.

Farmers reported to us that within a rayon, all farmers are assumed to have the same yield per hectare when their quotas are calculated. Even within a small geographical area, some land is of much higher quality than others, so this hypothesis is easily rejected.

(2) Possibility that farmers lack knowledge of methods to increase their production.

It seems unlikely that this hypothesis fully explains the failure of more farmers to increase their production. Each collective had a number of managers who had an understanding of the factors influencing production. The new owners of the private farms live very closely with other farmers and would quickly emulate techniques successful applied by their neighbors. While increased training of farmers could improve their understanding of modern farming techniques there are clearly some farmers who have the technical knowledge necessary to increase their production if they believed that they would be compensated properly for their increase.

(3) Possibility that farmers believe that they will not be rewarded for increased production.

Survey results suggest that most farmers produce exact amount of the cotton because they are afraid that even if they receive compensation for extra cotton this year, next year they can be penalized in the future by higher cotton quotas. If quota in future years will be increased to reflect additional production of this year, then farmers risk losing lease if they are unable to meet the higher quota.

Finally, it is possible that the actions to enable a farmer to increase his cotton yield have a delayed result. For example, washing the land to reduce salinity should be done every 3-4 years to maintain production. However, the loss of production in any one year from delaying the washing is insufficient to offset the cost if the farmer believes that he may lose his lease.

Review of the current system of government cotton orders and government set incentives suggest that there are still more farmers who is not interested in increasing their production. Such finding moved us in analysing alternative approaches that government may try to make farmers interested in increasing cotton production.

2.2 ALTERNATIVE APPROACHES

One alternative approach is to relax government control over the land use. That is to permit farmer to grow other crops on a small portion of his land if he/she agrees to grow enough cotton on his remaining land so that he/she can meet the quota.

The attractiveness of this approach depends on the farmer's confidence that he can divert some of his land to other crops and still meet his quota and on the profitability of alternative crops. An advantage for the farmer is that he does not feel that he will be at the mercy of the khokimiat regarding whether or not he will receive his bonus because at the beginning of the year he will plant some of his land with alternative crop. One disadvantage is that the farmer will need to find the funds necessary to pay for seeds and fertilizer for the alternative crop. Currently farmers are charged for the cost of cotton seeds and fertilizers but these are paper transactions against the payments they will eventually receive for their cotton crop. In contrast, the farmers will have to pay cash for vegetable seeds and fertilizers.

Another alternative is fixing quota for number of years instead of making quota every year. This way farmer will have certainty that whether first year supplies of cotton will be greater than or equal to quota this is not going to affect the next year quota.

We now consider in greater detail the feasibility of the exist practices and alternative options.

Notably, the bulk of farmers emphasized that it would be better for them to sign contracts for supply of certain volumes of production having no provision to grow cotton/grain on specifically designated lands. Thus farmers would have had more freedom in managing their land.

In fact, the analysis of 39 farms of Istiqlol Association in Sirdarya region reveals that freedom in selection of lands for cotton cultivation in contrast to current practices of growing cotton on the specifically designated areas would result in savings from 3 to 6% of the land area, while the volumes of the government procurement would remain at the same level. Freed lands could be used both for crop rotation and for growing of other commercial crops (forage, rice and other). (See Table 1)

In farmers union under our survey cotton is cultivated on the total area of 461 hectares. The average size of farms and crop capacity of cotton vary depending on land fertility. Therefore in analysis we thought it would be reasonable to group farms by land quality. According to the land quality scoring method (BBP) we broke down the 39 farms into three groups. Group 1 – farms with BBP 41-50, group 2 – farms with BBP 51-60, group 3 – farms with BBP 61-70.[1]

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[1] In order to justify groupping farmers according to the soil quality we preformed two-tail t-test for significant difference in cotton yield between three mentioned groups. In two out of three groups we were able to reject the hypothesis of no difference between the yields across the groups.

Our estimates of the areas which might be freed we based on two assumptions. First, we made an assumption that farmers in our study are risk neutral, meaning they do not react to any risk of making profit. Secondly, we made an assumption that farmers in our study have naive expectations about the levels of productions. That means that farmers expect to have output in the next year at the same level as they had in the past. Based on these expectations and knowing *a priori* the government order that he/she has to submit, farmer will manage the land tenure for cotton production.

In theory we expect that the higher the land quality is the greater amount of output can be produced from that land. However, under the naïve expectations we do not take into account land quality. In its turn projected output levels reflect the current production levels.

Group-based analysis showed that the area of freed land vary by group of the farms. Under maintaining state orders with freedom in determining areas under the crops (line F) provided the actual crop yield in the group of farms remain the same (line E) it looks that in order to produce the required order it is sufficient to grow cotton on the total area of 450 hectares (line H). Thus the area of 11.2 hectares (line I) can be potentially freed. (Table 1)

Comparing results from group estimates suggest that the higher the quality of land the larger is the freed area. In group 1 with BBP 41-50 for 9 farms only 0.8 hectare can be freed, or 0.1 hectare per the farm on the average. In group 2 with BBP 51-60 for 20 farms 3.2 hectares can be freed, or 0.2 hectare per the farm on the average. In group 3 with BBP 61-70 for 12 farms potential saving of land would be 7.2 hectares, or 0.6 hectare per the farm on the average.

Table 1: Analysis of Impact of Granting More Freedom to Manage the Lands

Name		BBP (Land quality score)			Total
		41-50	51-60	61-70	
Group		**1**	**2**	**3**	
Number of Farms	A	9	20	12	
Total Land Area, hectares	B	118.0	234.1	109.4	461.5
Average cotton field, ha/farm		13,1	11,7	9,1	
Cadastre crop yield, 100 kg/ha *	C	18.04	23.28	25.33	
Planned crop yield, 100 kg/ha **	D	27.9	28.3	28.5	
Actual crop yield, 100 kg/ha ***	E	28.1	28.6	30.6	
Group-based estimations					
Production of quotas according to the state order, centners	F = B * D	3293.3	6613.3	3121.5	13028.1
Production of state order, actual, centners	G = B * E	3315.8	6704.6	3342.2	13362.6
Area of land necessary to produce the quota (state order), hectare	H = F / E	117.2	230.9	102.2	450.3
Area of potentially freed land, hectare	I = B – H	0.8	3.2	7.2	11.2
Average area of freed land, hectare/farm	K = I / A	0.1	0.2	0.6	

* -- Cadastre crop yield is estimated in accordance with the BBP methodology, cadastre crop yield = BBP x 0.4
** -- Planned (target) crop yield is estimated by local (district) government on the basis of crop yield indicators of the previous year
*** -- Actual crop yield – de facto cotton crop yield.
Source: Farmers survey, Syrdarya, 2006 in Chertovitskiy (2007).

Translating findings from analysis of farm union to the national scale should be done carefully. We used findings from group-based estimations to draw on possible changes in the national scale. There

is no data available on land quality on every individual farm in the country. However, data on land quality in cotton fields in 12 regions of Uzbekistan is accessible.

Our data suggest that there is one farmer in group 2 with BBP 51-60 with potential to withdraw 1 ha from cotton production. We also know that total land area in group 2 with BBP 51-60 in Istiqlol farm union equals to 234 ha. That means that 0.4 % of land area in group 2 with BBP 51-60 can be freed. In Uzbekistan there are 750 thousand ha of land area that has BBP 51-60. Making extrapolation from Istiqlol farm union to the national scale we will get that 3000 ha in lands with BBP 51-60 in the whole country that could be withdrawn.

Likewise in group 3 with BBP 61-70 we know that there is area of 5 ha that can be potentially freed from cotton production. Total land area with BBP 61-70 in Istiqlol farm union equals to 109.4 ha. That means that 5% of land area with BBP 61-70 can be withdrawn. Extrapolating to the country scale yields that almost 29,8 thousand ha of land with BBP 61-70 can be potentially withdrawn from cotton production.

Further for lands with higher BBP we used 5% as the threshold number for land that can be potentially withdrawn. It turns out that 19,8 thousand ha can be withdrawn from the cotton production.

Overall, 56 thousand ha of land in Uzbekistan can be withdrawn from cotton production with no adverse impact on the levels of state orders for cotton. This figure make 5% of total land area occupied under cotton production in Uzbekistan today.

For better understanding whether farmers continue growing cotton if freedom for land management is granted we looked at the average farm field with 10 ha land area. For this we considered three different cases. Under case A we showed the economics of producing cotton according to the quota. Under cases B.1 and B.2 we showed what additional costs and additional benefits will farmer see if he/she supplies more than the required quota. In case B.1. farmer produces extra cotton and receives the regular state procurement prices. While in case B.2. farmer receives 20% bonus on extra supplied cotton.

Finally, under case C we estimated how much would the farmer it cost to produce the quota on less than required area, i.e. on 9 ha instead of 10 ha. In addition we calculated what would be the costs and revenues from producing alternative crops on freed area of 1 ha. Number of crops in combination with which farmer can financially profitable operate are limited. These were identified as cabbage, potato, and tomato.(See Table 2)[2]

In our analysis we referred to measurements of average rate of returns (ARR) and marginal rate of return (MRR). ARR in the base case was calculated to be equal to 1.34. This translates as following: to every soum spent on farm activity (cotton production) farmer received 1.34 soum back.

While MRR measurement translates as the ratio of marginal revenue over the marginal cost. In case B.1 the MRR equals 1.48, which means that for every additionally invested 1 soum farmer received 1.48 soum back. Note that this figure is greater than the ARR for this case.

Results of our analysis suggest that while it is costly to farmer to switch from mono-cotton scheme to cotton-cabbage, cotton-potato, and cotton-tomato schemes the returns from these schemes will be high enough to cover these costs. The questions then are how many and what kind of farmers will switch, and what are the most likely crops farmers will switch to.

Calculation of ARR and MRR of schemes cotton-onion and cotton-carrot have yielded results lower than in the base case. This leads us to the conclusion that if farmer is profit-seeking and if he has a

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[2] Reason for why we selected these crops is that these were the only crops which in combination with cotton brought positive returns according to calculated ARR and MRR.

choice to follow one of the schemes than it is most likely that he/she will choose between cotton-cabbage, cotton-potato, and cotton-tomato schemes.[3]

Answer to the prior question is – it depends on the budget constraints and land area. Land area plays important role. It is most likely that farmers with greater land area will be able to switch to two-crop schemes, than the others. The budget constraints are also critical to keep in mind. Note that production of cabbage, potato and tomato is very expensive farm activity. Because prices for tomato across the season change dramatically and because this crop is more perishable than the other two crops, adds more cost and risk to it.

Table 2: Farm management schemes

	Area, ha	Average cost, USD/t	Marginal cost, USD/t	Production, t	ARR	MRR
Base case	10	154		29,0	1,34	
Case B.1. – production increase	10	153	140	31,9	1,35	1,48
Case B.2. – production increase with 20% bonus payment	10	153	140	31,9	1,37	1,68
Case C – "cotton-potato" scheme (only cotton)	9	160	210	29,0	1,30	0,99
Sum with potato	10			29,0	1,66	2,57

Source: Farmers survey, Syrdarya, 2006 in Chertovitskiy (2007).

Findings from cotton production schemes allowed us to estimate possible outcomes for producers, consumers and the government.

First we started with determining the effects on society. In order to do this we defined the Net Efficiency (NE) as the difference between the Net Value of product (NV), the Total Cost for producing this product (TC), and the government spending on cotton subsidies (GovSub). (See Table 3)

Further we determined what gains and losses have producers. In the current cotton production system producers have access to low price fuel and fertilizers. However, they also market their cotton on artificially low price. Thus, in order to more realistically calculate the producers gains/losses we had defined the Producer Surplus (PS) as product of quantity of produced good (Q) and the difference between the Domestic producer price (Pd) and the average cost (AC) of this good.

Finding effects on consumers side was somehow complicated in the sense that it is hard to show the price that final consumer pays for 1 kilo of raw cotton. Major consumers of cotton are cotton collection units and gin factories, which charge the same price for the raw cotton that they paid to producers. Thus, in our study consumer price for cotton was equal to producer price. We defined consumer surplus as product of quantity of produced good (Q) and the difference between the domestic consumer price (Pm) and the domestic producer price (Pd) of this good.

Interpreting government gains/losses from cotton production however needs caution. Note that in deriving the net efficiency result from cotton we also referred to the subsidies that government provides to cotton producers. Thus in our estimation of government surplus (GS) we extracted the

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[3] Although it is questionable whether farmer will choose cotton-cabbage scheme as it is costly, while the rate of returns is not different from increased cotton production scheme (case B).

amount of subsidies from the product of quantity of produced cotton and difference between the world and domestic prices.[4]

In the base scenario the net value of produced cotton in Uzbekistan equals 1.2 billion USD. Out of this value the society as the whole enjoys gains in amount of 582 million USD. From this producers share equals to 343 million USD. While government surplus is 238 million USD[5]

In the scenario when control over the land use is relaxed with cotton orders we estimated that up to 56 thousand ha can be withdrawn from cotton production. As result total cost to produce the same quantity of cotton on smaller area will increase to 609 millions USD nationwide, or up to 173 USD/ton in average vs. 154 USD/ton in the base scenario. Net efficiency from producing cotton on smaller areas will decrease on the account of decreased producers surplus. While governments surplus will remain unchanged.

When costs and benefits from producing vegetables on withdrawn land areas taken into account figures change significantly. Producers gain from producing vegetables was estimated to be equal to 84 mil. USD. This in summation with surplus from cotton is higher than the producers surplus under the current situation.

Consumers will gain from lower consumer prices for greater amount of vegetables produced in the country. We estimated that such gain will be equal to 16,8 million USD. (Table 3)

Table 3: Welfare analysis of costs and benefits of possible relaxation over the land use under cotton quota, mill. USD

		Scenario A (Base)	Scenario B		
			Cotton	Vegetables	Sum
Domestic producer price, USD/ton [a]	P_d	252	252	145	
Domestic consumer price, USD/ton	P_m	252	252	160	
World price, USD/ton [b]	P_w	333	333	160	
Output, '000 tons	Q	3,525	3,525	1,456	
Average cost, USD/ton	AC	154	173	70	
Cost per country, '000 USD	TC	543, 803	609,077	78,400	687,477
Government subsidy, USD/ton	S	14	14		14
Total government spending, '000 USD[6]	GovSub	49,35	49,351		49,351
Net value (at World price), '000 USD	NV=PW x Q	1,175,045	1,175,046	179,200	1,354,246
Net efficiency, '000 USD	NE = NV – TC – GovSub	581,892	516,617	100,800	617,417
Producers surplus	PS = (Pd - AC)xQ	343,453	278,205	84,000	362,205

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[4] By definition this is close to the Net transfers in Guadagni et al. (2005). Note that World Bank estimated that total net transfers (cotton taxes minus subsidies) in 2004 were equal to 203 million USD. While in our study we estimated that this figure in 2006 was equal 238 million USD.

[5] Onwards only number of the raw will be stated in the brackets, which all refer to table 13.

[6] For comparison of government subsidy figures we referred to Guadagni et al. (2005). They sum up the subsidies on irrigation, debt write-offs, interest rate credit campaign, oil price differential, fuel, machinery, and fertilizers, which in total made 441 million USD. When only oil price differential, fuel, machinery and fertilizers subsidies counted, as in our case, the total amount of subsidies equals to 65 million USD.

Consumer surplus	CS = (Pm-Pd) x Q	-	0	16,800	16,800
Government surplus (taxes)	GS = ((Pw-Pm) x Q) – GovSub	238,406	238,412	0	238,412

[a] – Domestic cotton price is weighted average for cotton types – for type I $278 (74%); for type II $ 239 (14%); for type III $143 (4%); for type IV $100 (4%); for type V $70 (4%). Source: Syrdarya cotton collection unit.

[b] – World cotton price is weighted average for: type I $360 (74%); type II $365 (14%); type III $183 (4%); type IV $122 (4%); type V $91 (4%). Source: review of Cotton Outlook website

2.3. TENURE SECURITY AND COTTON QUOTA

Government requirements over the cotton production and land use make tenure rights less secure. In order to avoid risk of losing the land plots farmers choose activities allowing to increase cotton yields to meet the government orders. Very often these activities include excessive use of fertilizers.

These also called as short-term activities. On the contrary there exist long-term activities, which result in higher yields in 3rd-4th year after their application.

The relationship is clear. In order to encourage farmers to use long-term activities (which in many studies considered as investment activities) the risks of losing the lands should be reduced (tenure security). One way to do this can be fixing cotton quotas over some period of time. When farmers will know that quotas will not be altered next year they invest into the soil improvement.

According to estimates of Uzbek agronomists returns from using short-term activities are immediate. Marginal cost for these activities equals 41 USD/ha. Marginal returns from these activities are 74 USD/ha. The ratio of marginal return and marginal cost from short-term activity, MRR, thus equals 1,81. These are figures only for one year. For comparing with effects from long-term investment we should consider cumulative effect for three years. MRR remains the same. While total marginal cost over three years equals 122 USD/ha, and total marginal revenue over three years equals 221 USD/ha.

On the other hand long-term activities can be observed on the 3rd-4th years by incremental 0,3 t/ha, and 437 thousand ton nationwide. Marginal cost for conducting these long-term activities equals 22 USD/ha. Marginal revenue from these activities equals 76,2 USD/ha. The MRR thus equals 3,46, which is much higher than under the short-term activities.

In result the average cost for producing 1 ton of cotton after implementing long-term activities will decrease to 145 USD/t. Thus, after three years producers will be able to receive 424 mil. USD of producers surplus, which is by 80 mil. USD greater the current levels. Similar government's surplus will be greater by 83 mil. USD.

Clearly fixing cotton quota over some period of time has far-going positive impact on society, producers, and the government. Though farmers' worries regarding the changes of the cotton quota in the next year disappear, the fear that cotton quota levels for the next three years may exist just as well. Indeed if such worries prevail less farmers would choose to use long-term investment activities.

POLICY RECOMMENDATIONS

Next step for the land refomr in Uzbekistan will be closely associated with solving problem of government order for cotton. The problem is that government is not certain that cotton production levels would alter if land use control relaxed.

Obviously radical reforms can not be expected in the near future. In opposite intermediate steps should be taken. By these we mean steps that would increase tenure security rights and create favorable environment for farmers to invest into soil improvement:

(1) Relaxing control over the land use while keeping the government order for cotton – results indicate that there is potential to produce greater amount of cotton on smaller area.

It is ben estimated that potentially 56 thousand ha can be withdrawn from cotton land areas without significantly altering the levels of cotton output. Alternatively vegetable crops can be produced on these freed lands. We had estimated that producers will gain 84 million USD from free land management on withdrawn land areas. At the same time because of greater amount of vegetables produced and as such lower prices consumers would be able to gain 16,8 million USD. In sum society would be able to gain 101 million USD.

(2) Fixing cotton quotas for three years – results indicate that annualy changing cotton quotas affect farmers decision to invest to soil improvement.

It is been estimated that if producers choose long-term activities under fixed cotton quotas producers will gain additional 80 million USD. At the same time government would also gain 83 million USD. In sum society would gain 163 million USD.

CONCLUSION

Land rights relationship with farmers investment incentives have been well studied before. There is clear evidence in the previous studies supporting that secure land rights lead to not only increase in production but also soil improvement by means of long-term investments. In this study we used this empirically proved evidence as proved fact and calculated the welfare effects from relaxing current cotton quota policy and fixing cotton quotas in Uzbekistan.

Results of our analysis suggest that keeping government control over the land use under cotton production is not economically feasible. We were able to estimate that current requirements of cotton output can be effectively produced on smaller areas. While withdrawn areas can be used for producing alternative crops such as vegetable crops, which in turn would also benefit consumers.

Fixing cotton quota for longer period of time has also positive implications for producers and government. For producers this would mean lower average cost, more secure tenure rights, and higher returns from cotton production.

While this study did not use much of the quantitative techniques, application of simple welfare analysis tools showed interesting results. Next study using larger sample of observations can either verify our results or make our findings more detailed. For example, what will be the welfare effects from withdrawing low-quality lands from cotton production.

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