

POLICY BRIEF



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Sustainable Development of the Livestock Sector in Uzbekistan: Status and Policy Recommendations

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This Policy Brief has been carried out within the framework of the joint project "Support to Sustainable Development of Livestock in Uzbekistan" undertaken by the United Nations Development Programme (UNDP), Ministry of Agriculture and Water Resources of the Republic of Uzbekistan and the Center for International Cooperation of Ministry of Foreign Affairs of Israel (MASHAV).

The livestock sector plays an important role in the economy of Uzbekistan, accounting for more than 40% of Uzbekistan's gross agricultural output. The main characteristic of the sector is that most of livestock production originates in small dehkan farms with 1 cow and 0.2 hectares of land on average.² Livestock production in dehkan farms plays a significant social role, because it is an important source of income and food for the rural families. Still, the small size of the overwhelming majority of livestock producers poses significant challenges for the application of modern technologies and limits the potential effects of scale economies, resulting in low milk yields.

The development of the livestock sector is faced with a number of challenges. One of them is shortage of animal feed caused by the reduction of areas sown to feed crops by more than 70% since 1991. The problem has arisen due to redistribution of land in favor of other crops, primarily wheat and cotton. Another important problem is the lack of adequate service infrastructure for the livestock producers.

This Policy Brief mainly focuses on milk production given the project focus on dairy management. However, many of the policy recommendations are applicable for meat production as well. The Policy Brief presents the main conclusions of situation analysis and the policy lessons derived from the farm-level survey.

¹ The author would like to acknowledge the invaluable assistance with the collection of data and background information that he received from Aleksandr Chertovitskii and Odil Akbarov - specialists from TIIM – Tashkent Institute of Irrigation and Melioration and also from the consultants of the Sociological Research Centre "TAHLIL".

² There are two main types of farms in Uzbekistan today: dehkan farms and peasant farms. Dehkan farms – small household farms producing vegetables, fruits, milk, and meat for family consumption and commercial sales. Dehkan farms receive land in lifetime inheritable possession from the state. The average plot varies from 0.1 hectares to 0.4 hectares of arable land. The current law limits the allocation of land to dehkan farms to a maximum of 0.35 hectares of irrigated land or 2 hectares of non-irrigated agricultural land. Peasant farms – family farms specializing in commercial production of crops and livestock. Agricultural land is allocated to peasant farms on the basis of long term lease from the state. Livestock farmers with at least 30 standard head of cattle receive a minimum of 0.30–0.45 hectares per head to grow feed crops. Crop-growing farmers receive a minimum of 10 hectares of arable land for the production of cotton and wheat. The traditional farm enterprises inherited from the soviet period have largely disappeared.

1. Outcomes of Land and Livestock Reforms

The ongoing agricultural reforms in Uzbekistan have produced two tangible outcomes for the rural population. First, the share of the individual farming sector – both the traditional household plots and the new peasant farms that began to emerge in the second phase of reform after 1998 – increased from about 3% to 30% in agricultural land since 1991. The share of individual farms in arable land rose even more dramatically and it now approaches 80%. The shrinking farm enterprises lost their land primarily to peasant farms, and today most of the land in the individual sector is represented by peasant farms, not household plots. Second, alongside the increase in land use, the reform has led to a substantial increase in cattle in individual farms (Figure 1.1).

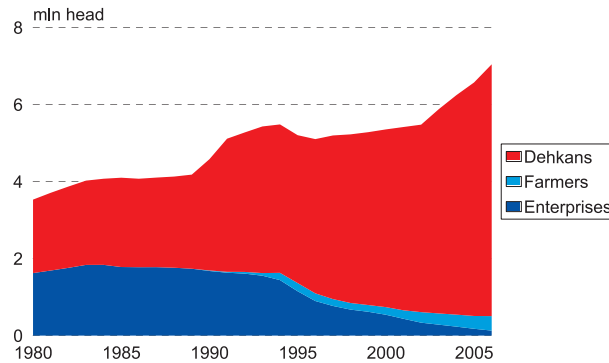


Figure 1.1. Cattle herd in farms of different organizational forms.

The specific pattern of change in livestock differs from the change in land tenure. The livestock sector in Uzbekistan is traditionally dominated by rural families, not large commercial farms that dominated crop production in the past. Back in the soviet period, more than 50% of livestock was in the care of rural households. After 1990, and especially after 1995, the total number of cattle in Uzbekistan rose from 5 million to 7 million head, and the overall increase was entirely due to the increase in the household sector, which more than offset the decline in farm enterprises due to livestock privatization. The peasant farms play a marginal role in livestock: the cattle in peasant farms increased over time, but it does not exceed 5% of the total herd in the country. This is in stark contrast to the share of peasant farms in land use, which reached 65% of arable land and nearly 30% of agricultural land in 2006. The overall share of the individual sector (dehkan farms and peasant farms combined) has reached 98% of cows, 96% of cattle, and 80% of sheep and goats, where most of these numbers are in household plots, not in peasant farms.

While dehkan farms are the dominant force in Uzbekistan's livestock sector, the average dehkan farm has just 1.4 head of cattle and 0.8 cows, compared with 42 head of cattle and 13 cows in livestock-oriented peasant farms. The bulk of cattle in Uzbekistan is thus held in a huge number of very small household farms: 4.5 million households keep more than 6 million head of cattle and 2.7 million cows – more than 90% of Uzbekistan's herd.

The increase of the cattle herd in the process of reform is reflected in an increase of the share of livestock production in Uzbekistan's gross agricultural output (GAO). Livestock production increased from 30%-35% of GAO in the pre-1990 period to 45%-50% since 1997. The increase in the importance of livestock production in Uzbekistan in recent years can be best judged by comparison with the traditional livestock-producing countries, such as Russia, Ukraine, Belarus, Kazakhstan, and Kyrgyzstan. The share of livestock production in these countries dropped from 55%-60% before 1995 to about 45% in recent years, while in Uzbekistan the share of livestock production increased to about the same level.

Feed base and milk yields. The increases in the livestock herd have not been matched by corresponding increases in production of feed crops for animals. On the contrary, the livestock feed base has shrunk dramatically since 1991. After increasing from 0,7 Mln. ha to 1,1 Mln. ha during the last decade of the soviet period, between 1980 and 1991, it dropped to about 0,5 Mln. ha in the late 1990s and continued to decline to less than 0,3 Mln. ha in 2004-05 (Figure 1.2). The land released from feed crops was mainly directed to wheat production as part of the state's strategy to achieve food self-sufficiency in the early years of independence. Cropping patterns in Uzbekistan are determined centrally on the basis of state plans for the production of the two main cash crops – cotton and wheat, and farmers are not free to increase the areas under feed crops to their previous levels without top-level government approval.

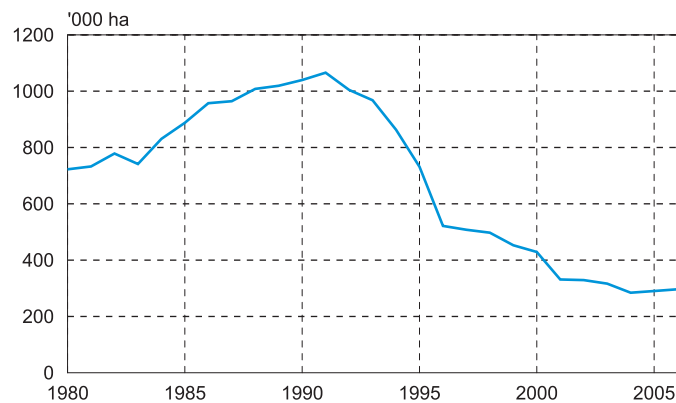


Figure 1.2. Area under feed crops 1980-2006.

The shrinkage of the feed base continued despite the rapid growth in total herd. As a result, the area under feed crops per head of cattle was cut in half from 0.20 ha/head in the 1980s to 0.10 ha/head in the 1990s and it now stands at less than 0.05 ha/head, i.e., 25% of the steady-state level in the 1980s. Paradoxically, the decline in areas cropped to feed did not affect adversely the milk yields, which have remained fairly constant (and very low) at about 1,600 kg per cow per year since 1990. This may be attributable to the fact that the average milk yields in Uzbekistan are predominantly determined by milk production in the dehkan farms, which anyhow do not have much land to allocate to feed crops: they typically send their cows to graze in the open, on harvested fields, along the roads, and near waterways, remaining perversely independent of both feed crop harvests and formal pastures.

The milk yields show a very slight increase over time – from a touch below 1,500 kg per cow per year in the 1980s to slightly more than 1,600 kg per cow year since 2000. These are very low yields in comparison with Europe and the U.S. (8,000 kg per cow per year) or Israel (11,000 kg per cow per year). More troubling than the comparison to Western economies is the fact that the Uzbek milk yields are substantially lower than in other CIS countries (2,000-2,700 kg per cow per year in Belarus, Ukraine, Russia, Moldova, and Kyrgyzstan) and exceed only those in Azerbaijan, Georgia, and Tajikistan (Figure 1.3).

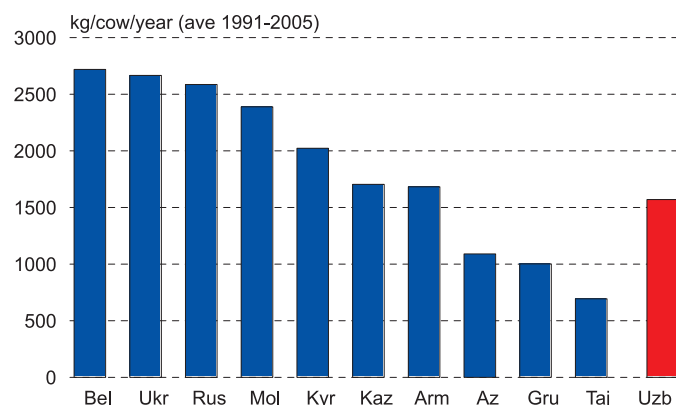


Figure 1.3. Milk yields for Uzbekistan and other CIS countries (Statistical Committee of CIS, Moscow, CD ROM 2006-11)

Agricultural reforms in Uzbekistan have led to a dramatic shift of production (mainly crops) from the traditional agricultural enterprises to the newly created peasant farms. Still, the small dehkan farms maintained their leading role in agricultural production throughout the period, contributing over 60% of gross agricultural output. The role of dehkan farms is particularly prominent in livestock production, where they account for more than 90% of output, but they are also a very significant player in crop production, contributing nearly 40% of crop output in recent years alongside the growing peasant farms.

2. Policy Lessons from the Survey of Dehkan and Peasant Farms

A farm-level rural survey was conducted in August 2007 with the objective of generating micro insights to supplement the official statistics. The survey was organized in 8 of the country's 13 main administrative regions (from East to West: Fergana, Namangan, Tashkent, Syrdarya, Jizak, Kashkadarya, Khorezm, and Karakalpakstan). The regions were selected on the basis of their agricultural profile with the purpose of ensuring a sufficiently representative coverage of the entire country. The survey sample included a total of 1,600 respondents divided into two groups: 797 dehkan farmers and 803 peasant

farmers. The respondents were chosen at random on the basis of local lists provided from local village assemblies.

In this section, we present the policy conclusions that emerge from the analysis of the survey data. The section starts with a brief comparison of the characteristics of dehkan and peasant farms. We then present six policy lessons organized around three issues:

- Improving milk yields through genetics, feed, and animal care. Artificial insemination is discussed in connection with its role as the main tool of breed selection.
- Commercialization of dehkan farms.
- Family income and wellbeing.

Dehkan and peasant farms compared. The rural population covered by the survey consists of groups: dehkans and farmers. Dehkans have only their small household plot, which consists of tomorka – the plot around the house and often also an additional plot somewhere on the periphery of the village. Farmers have a relatively large plot that they received for commercial farming, which is in addition to a household plot similar to that of all other rural residents. Farmers are in turn divided into crop farmers (which have land but no livestock) and livestock farmers (which in addition to land also keep animals). Table 2.1 shows some comparative characteristics of these three groups of rural people.

Table 2.1. Selected characteristics of dehkan households and farmers

	Dehkan households	Crop farmers	Livestock farmers	All farmers
Number of respondents	797	402	399	803
Household plot, ha	0.17	0.19	0.22	0.21
Farm plot, ha	--	31.74	56.21	43.90
Total holdings, ha	0.17	31.9	56.4	44.1
Household livestock, st. head	2.7	4.4	2.9	3.6
Farm livestock, st. head	--	--	56.8	28.2
Total livestock, st. head	2.7	4.4	59.7	31.9
Total income, tsd. soum	267	451	560	505
Per capita income, tsd. soum	47	74	90	82
Family size	6.0	6.6	7.2	6.9

Note: Livestock in this table aggregates all species (cattle, sheep, goats, poultry, etc.), expressed in standard head count.

Dehkans have smaller families, less land, less livestock, and less income (both total and per capita) than farmers. Livestock farmers not only have more livestock than crop farmers (obvious by definition); they also have more land – which is presumably allocated by the state with the purpose of enabling them to grow feed crops for their animals. Livestock farmers earn a higher total income than crop farmers. The difference in per capita income, however, is not significant between these two groups of farmers, mainly because livestock farmers have larger families than crop farmers.

Table 2.2. Structure of cropped area in peasant farms and household plots (percent)

	Peasant farms			Household plots	
	Livestock farmers	Crop farmers	All peasant farms	Dehkans	Farmers
Cotton	24.1	48.2	34.5	0	0
Corn	13.7	1.7	8.6	19.5	15.9
Wheat and other grains	24.2	40.5	31.2	18.5	22.9
All grains	44.2	44.6	44.4	38.0	33.5
Horticulture	2.5	5.9	4.0	47.9	52.6
Feed crops	29.2	1.3	17.1	14.1	13.9
All cropped	100	100	100	100	100
Average cropped area, ha	36.4	26.7	31.5	0.14	0.15

Substantial differences are observed in cropping patterns between livestock farmers and crop farmers. The main difference between the two groups of peasant farms (in addition to the difference in farm size; see Table 2.1) is in the land area under feed crops. Livestock farmers have nearly 30% of their land under grasses and feed roots, plus another 14% under corn, which is also mainly used for animal feed (Table 2.2). Crop farmers, on the other hand, devote only 3% of their sown area to feed crops and corn: they have no livestock and do not need feed – although in principle they could grow feed for sale to livestock farmers and dehkans who do need it. Wheat and cotton are the two other major crops in peasant farms, but livestock farmers allocate to these crops about half the area share allocated in crop farms: livestock farmers have 48% of their land under cotton and wheat (roughly in equal proportions), while in crop farms these crops take up almost 90% of the sown area (slightly more cotton than wheat).

Cotton characterizes the main difference between the use of land in peasant farms and dehkan plots: cotton is only grown on peasant farms, where overall it accounts for more than one-third of the cropped area, whereas dehkan plots have no cotton at all (Table 2.2). Instead of cotton, dehkans concentrate on horticultural crops: potatoes, vegetables, melons, fruits, and grapes are the dominant component in household plots, taking up half the cropped area (compared to a mere 4% in peasant farms, Figure 2.1). Feed crops, corn, and other grains account for the rest of the cropped area in roughly equal proportions (15%-20% in each crop category). The share of land under feed crops and corn is close to that in livestock farms (about 35% in dehkan farms compared to 45% in livestock farms, Figure 2.1). The emphasis on corn at the expense of wheat in dehkan plots probably indicates that this cereal is grown as feed for household animals, while peasant farms – especially crop farms - concentrate on wheat as a cash crop.

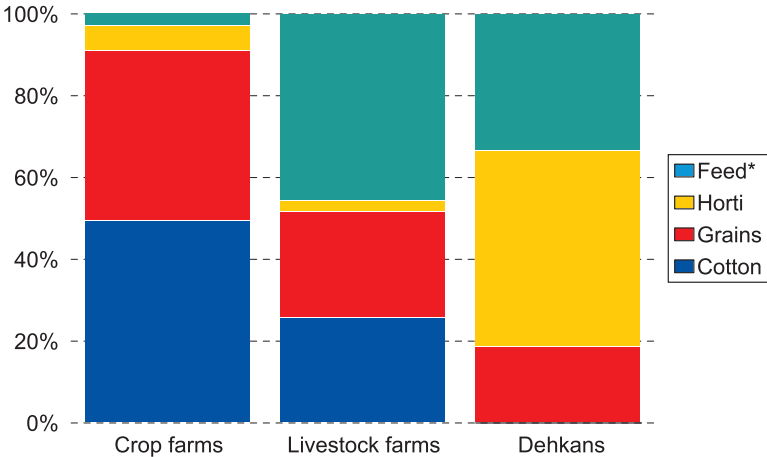


Figure 2.1. Cropping structure for dehkan and peasant farms. *Feed crops include corn.

Issue 1. Improving milk yields through genetics, feed, and animal care

Policy Lesson 1: Artificial insemination as the main tool of breed improvement has a positive effect on milk yields

Careful attention to breed selection and animal genetics is one of the accepted methods for improving milk yields. Use of artificial insemination for breed improvement increases the milk yields by more than 30% in both household cows and livestock farms. Milk yields in household cows increase from 925 kg/cow/year without artificial insemination to 1210 kg/cows/year with artificial insemination; in livestock farms artificial insemination raises milk yields from 1120 kg/cow/year to 1520 kg/cow/year (Table 2.3).

Table 2.3. The effect of artificial insemination on milk yields

	Cows			Livestock farms (n=352)
	Dehkans (n=560)	Farmers (n=476)	All sample	
Without artificial insemination	848	1011*	925*	1120*
Using artificial insemination	993	1382*	1210*	1518*

*Differences statistically significant at p=0.01.

Unfortunately, only a small proportion of dehkans (less than 5%) are innovative enough to use artificial insemination. Most dehkans continue with the traditional method of natural insemination, although there are no complaints about the cost or the quality of the service. The practice of artificial insemination is more widespread in application to “commercial” cattle in livestock farms (as opposed to household cattle). Fully 12% of livestock farmers use artificial insemination for their “commercial” herd (while only about 4% of farmers bother with artificial insemination for their household cattle; see Figure 2.2).

Peasant farmers are completely satisfied with the quality of artificial insemination services (almost 90%) and generally have no complaints about the cost or the accessibility. Those who do not use artificial insemination either have a bull of their own on the farm (53%) or, like dehkans, find it easier to resort to traditional insemination methods (40%). Judging by the difference in milk yields, the semen from the bulls used for “natural” insemination is far inferior to the genetic material used for artificial insemination. However, there is room for significant improvement even of the genetic material available for artificial insemination in Uzbekistan. Given the significant impact of artificial insemination on milk yields, policies should encourage public awareness campaigns in favor of artificial insemination and should focus on making artificial insemination broadly available to both dehkans and farmers. Directed efforts should be made to improve as much as possible the quality of semen used for artificial insemination by organizing purchases from reputable sources.

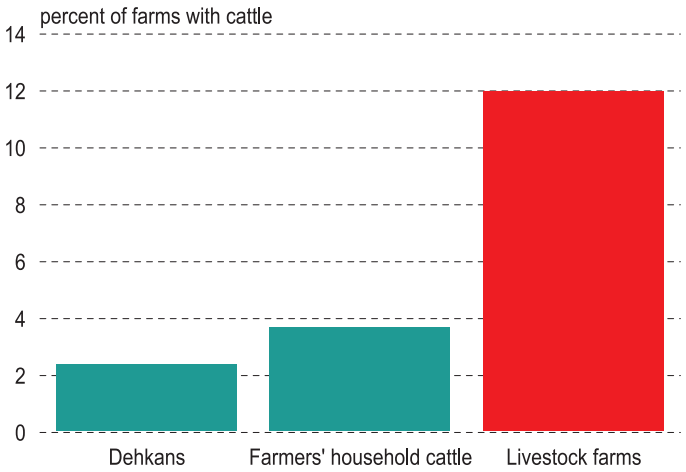


Figure 2.2. Frequency of artificial insemination for household cattle (dehkans and farmers) and for cattle in livestock farms.

Policy Lesson 2: Feed sufficiency and animal care increase milk yields

Milk yields achieved by dehkan households increase with the level of feed sufficiency. This fact was elicited in responses to a strictly qualitative question, which asked for the dehkans subjective evaluation of feed sufficiency for their animals. The dehkans characterized feed sufficiency on a three-level scale: insufficient feed, feed just sufficient for the existing livestock, and feed available in optimal quantities. A statistically significant increase of milk yields is observed as the quantity of feed available to the household increases from insufficient to just sufficient and finally to optimal. Milk yields increase from 730 kg/cow/year in households that suffer from insufficient availability of feed to 840 kg/cow/year in household where feed quantities are “just sufficient” and nearly 930 kg/cow/year in households that indicate availability of “optimal” quantities of feed for their cattle (Figure 2.3).

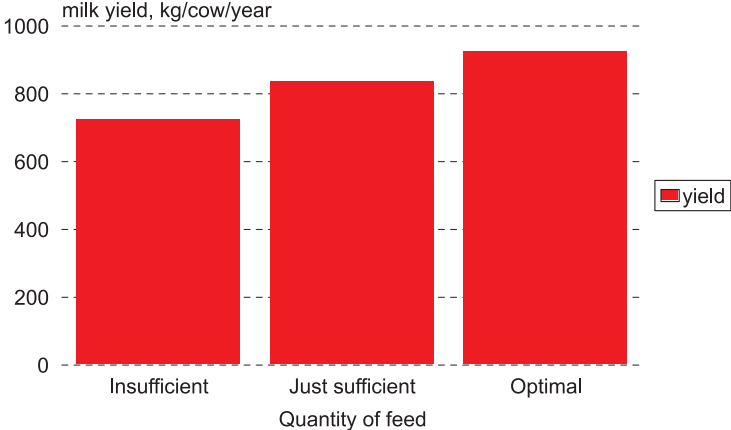


Figure 2.3. The effect of feed sufficiency on milk yields in dehkan farmers.

The dependence of milk yields on feed sufficiency and a range of other factors was explored more rigorously by regression analysis for dehkans and livestock farmers separately. The results are presented in a qualitative form in Table 2.4, where “+” indicates that the corresponding factor has a statistically significant positive effect on milk yields: milk yields increase with the increase of that factor.

The main finding for our purposes is the positive effect of feed sufficiency on milk yields. Feed sufficiency was estimated by calculating, in tons per cow, the quantity of purchased feed and feed grown on the farm as reported in the survey. This represents use of high-quality feed, as distinct from low-quality feed obtained by grazing on pastures. Indeed, while sufficiency of high-quality feed has a positive effect on milk yield, reported sufficiency of grazing pastures does not have a statistically significant effect. This may be an outcome of the general tendency among dehkans to graze their cattle on the grass verges along the roads, where feed quality is notoriously low. Thus, fully 52% of dehkans resort to this grazing strategy, compared with just 11% for livestock farmers, which may account among other things for the farmers’ higher yields.

Table 2.4. Factors determining milk yields for livestock farmers and dehkans

	Livestock farmers	Dehkans
Use of artificial insemination (yes/no)	+	+
Sufficiency of purchased and farm-grown feed (tons per cow)	+	+
Sufficiency of pasture for grazing (yes/no)	Not signif.	Not signif.
Human capital (experience)	+	+
“Age” of farm (years since creation of peasant farm)	(+)	(+)
Experience in agriculture (years)	(+)	(+)
Farmer’s previous experience (managerial/merial position) Dehkan’s educational attainment (highest level of schooling completed)	(+)	(+)

Another interesting factor is the positive effect of human capital on milk yields: milk yields are higher when the farmer or the dehkan is more experienced and has a higher educational attainment. In our view, the human capital variables are proxies for the farmer’s willingness and ability to maintain a comfortable and healthy environment for his livestock: a certain level of education and experience is required before one realizes that animal health and general care are as important as feeding.

Not surprisingly, the use of artificial insemination (a binary yes/no variable) also has a positive effect on milk yields, which increase when artificial insemination is practiced. This finding is consistent with Policy Lesson 1, but here it is obtained in a methodologically different way, looking at artificial insemination in combination with other factors, and not on its own as previously. The regression analysis only strengthens the previous finding related to the effect of artificial insemination.

The government should play an active role in implementing the policies suggested by the results of this analysis. First, the importance of quality feed suggests that the government should strive to improve feed marketing and supply channels, take care of feed quality standards and monitoring, and also encourage scientific research to develop high-yield feed crops. It is only with the assistance of science that Uzbekistan will be able to produce enough feed on its shrinking area of arable land allotted to feed crops. Second, the positive effect of human capital highlights the role that the government should play in providing training, extension, and professional education to farmers and the entire rural population. The cost of these public services will be easily recouped through increased milk yields.

Issue 2. Commercialization of dehkan farms

Policy Lesson 3: Dehkan farms are not merely subsistence farms: despite their small size, they actively engage in sale of milk and meat they produce

Dehkan farms often do not receive sufficient attention, since they are viewed as subsistence-oriented family households that do not really justify being called a farm. There are two ways of looking at commercialization: one is by estimating the percentage of households that sell at least some of their production; the other is by estimating the share of total production sold. By the first measure – the percentage of producers engaged in sales – dehkan plots appear to be a subsistence activity: nearly two-thirds of dehkan households with cows do not sell any milk, consuming everything they produce within the family. Yet the remaining one-third of dehkans do sell, and quite a lot at that: these “commercial” dairy dehkans sell on average 60% of their milk production (Table 2.5). Because of their

high rate of sales, the average level of sales is around 20% of milk production for all dehkan plots with cows – including the two-thirds that do not sell anything. Therefore, by the second measure – the share of output sold – dehkan plots are anything but subsistence operations: they sell a very respectable share of their milk production, even allowing for the large contingent of subsistence oriented households.

Table 2.5. Milk producing households classified into “sellers” and “non-sellers”

	Dehkan households producing milk (n=534)
No milk sales, “non-sellers” in percent of all milk producers	64
Some milk sales, “sellers” in percent of all milk producers	36
Share of output sold by “sellers”	60
Share of output sold by all milk producers (“sellers” and “non-sellers” combined)	21

The dairy orientation is dominant among dehkan farms with cattle: 31% sell milk, while only 6% sell meat (4% sell both). There is a much greater tendency to consume milk inside the household and to channel meat mainly for sales: dehkan households sell only 40% of their milk production but fully 90% of their meat. Sales quantities reach 1600 kg of milk and nearly 400 kg of meat on average for a household that sells these commodities. Milk is selling for 270 soum (\$0.20) per kg, compared with 3,700 soum (\$ 2.90) per kg for meat ³.

Table 2.6. Sales channels for dehkan farms (milk and meat)

	% of those who sell (n=211)
Neighbors, acquaintances	53
Market	36
Intermediaries	33

Note: percentages add to more than 100% because dehkans use more than one sales channel: 26% of those selling to neighbors also sell in the market and 36% also sell through intermediaries. The overlap between sales in the market and sales through intermediaries is negligible (less than 10%).

Neighbors and acquaintances are the main sales channel for milk and meat from dehkan farms (Table 2.6). Other prominent channels are sales in the market (presumably in the nearest town) and sales through intermediaries. Sales to neighbors and acquaintances, which are usually made in the same village and do not involve travel, are reported also by those who sell in the market or through intermediaries. On the other hand, sales through intermediaries and sales in the market are mutually exclusive for all practical purposes: dehkans either deliver their products to an intermediary or make the effort of traveling to the market, not both.

The strong reliance on sales to neighbors and acquaintances provides indirect evidence of difficulties with transport and wholesale arrangements in the markets. In order to tap the large sales potential of dehkans and ensure that their products are available to the urban consumer, the government should implement policies intended to facilitate the access of dehkan producers to markets. This may include establishment of rural integrators, transport operators, and wholesalers that should simplify the dehkans’ access to markets. Intermediaries fulfill an essential function in setting up marketing channels, and their functioning should be encouraged.

Policy Lesson 4: Dehkan milk producers that achieve higher efficiency and have more cows tend to sell a greater share of their output

Commercialization levels of dehkans increase with the increase of milk yields (a measure of production efficiency), the increase of the dairy herd, and hence the increase of total production volumes through a combination of the two factors. In other words, households that produce more milk (because they have more cows and achieve higher yields per cow) sell a higher share of their output. This result is summarized in Figure 2.4, which shows the quantity of milk production for dehkan farms with various commercialization levels (from no sales to sales of over 75% of milk output).

³ Official exchange rate of Central Bank of Uzbekistan in September 2007: 1280 Uzbek soum for one US\$.

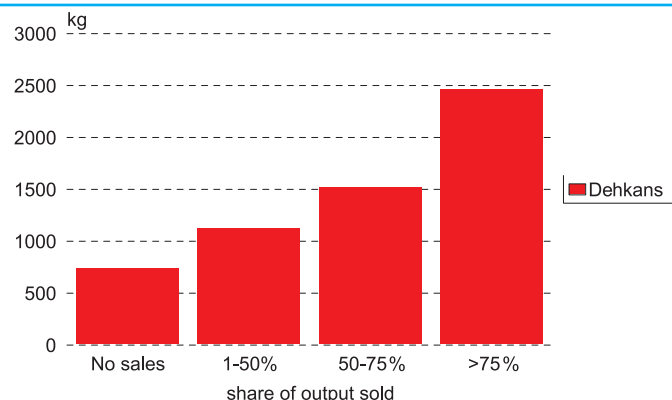


Figure 2.4. Milk production by level of sales for dehkans farms.

A more detailed summary is given in Table 2.7, which presents various characteristics of dehkans households classified by commercialization levels (again from no sales at all to sales reaching 75% of total milk production). The combination of higher yields and more cows results in greater output: more production generates surplus milk, which leads to higher commercialization. Family size naturally increases the needs of the family and reduces the surplus available for sale. We accordingly see a decrease of family size for higher levels of commercialization. Land has no effect on commercialization levels in dairy production, probably because all dehkans have roughly the same small plot and the variability of land holdings across farms is not very pronounced (for 90% of dehkans the plot size falls between 0.1 and 0.4 hectares).

Table 2.7. Farm characteristics by commercialization level for dehkans farms that produce milk

	No sales	Up to 50% of milk production	50-75% ^a of milk production	Over 75% of milk production
Dehkans farms (n=534)	64%	16%	12%	8%
Cows, head	1.1	1.2	1.5	1.9
Milk yield, kg/cow	735	950	1074	1225
Milk production, kg	739	1126	1521	2468
Family size, persons	6.4	6.1	6.0	5.3
Plot size, ha	0.19	0.18	0.22	0.19

The decision to sell has a major impact on total family income and per capita income. Among dehkans, sellers achieve higher total income and higher per capita income than non-sellers (Table 2.8).

Table 2.8. Total family income and income per capita for “sellers” and “non-sellers” among dehkans farms

	“Non-sellers”	“Sellers”
Family income, ‘000 soum/month	231*	250*
Per capita income, ‘000 soum /month	40*	63*

Differences between “sellers” and “non-sellers” statistically significant for $p=0.01$.

Issue 3. Family income and wellbeing

Policy Lesson 5: Per capita family income increases with the increase of land holdings and the size of the cattle herd

The survey shows that both total family income and per capita income steadily grow with land holdings. While the result for total income is intuitively trivial (more land, more production, more income), the result for per capita income is not. Figure 2.5 shows how per capita income increases with land holdings for both dehkans and peasant farms. Family income in our analysis includes cash income from all sources plus value of own products consumed in the household. Figure 2.5 highlights an interesting feature of land distribution in Uzbekistan: the dehkans plots do not exceed 1 hectare; farmers’ land holdings never fall below 1 hectare (this includes both the household plot and the farm plot). There is a sharp differentiation by land between the two groups of dehkans farms and peasant farms, which is reflected in the total separation between the differently colored bars in the two diagrams.

Given the positive effect of land holdings on income, we proceeded to check also the effect of the herd size on income per capita. This was done in a regression framework, modeling income per capita as a function of both land holdings and the number of cattle. The regression results show that per capita income indeed increases with the increase of the herd size, controlling for land holdings. This conclusion holds when dehkhan households are analyzed on their own and also when dehkhan households and peasant farms are analyzed simultaneously, controlling for farm type. The coefficient of farm type implies that, on average, dehkans earn less per capita than farmers, controlling for land and cattle. This result is consistent with the means reported for monthly per capita income: 47,000 soum (\$37.0) for dehkans and 82,000 soum (\$64.0) for farmers (the difference is statistically significant).

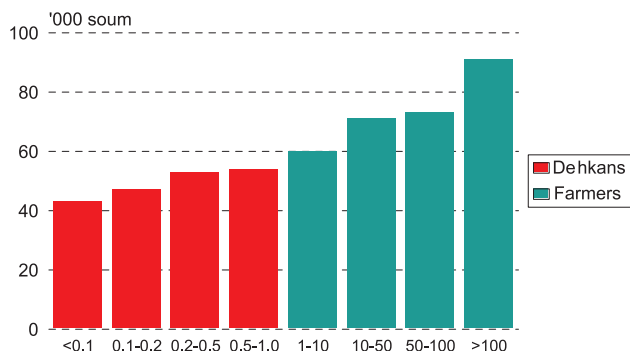


Figure 2.5. Per capita income vs. land holdings for dehkans and peasant farmers.

Policy Lesson 6: Family well being improves with the increase of land holdings and the number of cattle.

In addition to providing quantitative information on per capita income of rural families, the survey also collected qualitative information on subjectively perceived standard of living or wellbeing. Wellbeing was measured on a three-level scale – “low”, “medium”, and “comfortable” – based on the subjective perception of the family’s standard of living (“what the family budget buys”) as articulated by the respondents in the survey. Based on the entire sample, farmers enjoy a generally higher standard of living than dehkans: 17% of farmers perceive their standard of living as “comfortable” compared to only 4% among the dehkans; conversely 38% of dehkans perceive their standard of living as “low” compared to only 11% among the farmers (Table 2.9).

Table 2.9. Subjective perception of well being among dehkans and farmers

	Low	Medium	Comfortable
Dehkans (n=796)	38	58	4
Farmers (n=795)	11	72	17

The generally higher standard of living among farmers compared with dehkans is reflected in higher total income, higher per capita income, larger land holdings, and larger cattle herds (Table 2.10, last line). Moreover, examining the incomes and the endowments for different levels of wellbeing we observe in Table 2.10 that the means increase as we move from the lowest to highest level of wellbeing: more land and more cattle produce a higher total income and a higher income per capita in both dehkhan and farmer households.

Table 2.10. Incomes and endowments for dehkans and farmers by levels of wellbeing

Perceived wellbeing	Total income		Per capita income		Land holding, ha		Cattle, head	
	Dehkan	Farmer	Dehkan	Farmer	Dehkan	Farmer	Dehkan	Farmer
Low	197	451	36	72	0.16	30	2.0	16
Medium	303	458	53	72	0.18	44	2.4	23
Comfortable	429	738	71	129	0.19	53	2.1	51
All sample	267	505	47	82	0.17	44	2.3	28

Note: Means calculated using all observations, including those with zero values. Income and income per capita in thousand soums.

We conclude that rural wellbeing can be improved by focusing on ways to increase the land holdings and the cattle herd of the population, especially the dehkans. Policies to facilitate the increase of land holdings should rely on further development of land markets through simplification and streamlining of leasing transactions. Easier access to land leasing should enable the enterprising dehkans and farmers to increase their holdings and thus achieve higher levels of wellbeing. Land and cattle have an important role in poverty decrease for the rural population.

3. Conclusion and Policy Recommendations

The livestock sector contributes more than 40% of gross agricultural output in Uzbekistan, supplementing cotton and wheat – the country's two main cash crops – as the pillars of the national food-security program. Livestock is an important source of income for rural families, contributing according to the 2007 survey around 10% of family's total income for dehkan households.

Yet the livestock sector in Uzbekistan suffers from an anomalous skewed structure: virtually all the cattle and dairy cows are in small dehkan farms, with 1 or 2 head of cattle per rural family. Milk production does not exceed 5 kg per day – one pail of milk partly consumed within the household and partly sold in the market or to nearby dairies. And yet it is these one-pail-a-day farmers that sustain the dairy market in Uzbekistan: according to informed estimates from the managers of the Nestle Company in Namangan and Tashkent, 85% of milk sales are from such small family producers.

The small dehkan farmers suffer from low milk yields – less than 1,000 kg per cow per year. This is the result of the dehkan's reluctance or inability to resort to advanced veterinary and extension services, including artificial insemination, animal health care, and guidance or advice by livestock extension agents. No less important is the grossly inadequate feed situation: the low quality of animal feed that dehkans can purchase is a serious obstacle to yield improvement.

The main policy recommendation of this study is therefore to improve the infrastructure of the livestock sector, including feed quality, feed distribution, artificial insemination, and animal health. It is not sufficient to create service points for the physical factors of production: it is additionally essential to train and deploy extension agents and livestock specialists that will teach and encourage the dehkans to adopt better production practices in the interest of increasing yields and incomes. Simultaneous creation of two distributed networks – a network of service stations and a network of extension units – must be immediately implemented to produce short term benefits.

Longer-term plans and policies should aim to improve the overall production and marketing efficiency of the livestock sector by correcting its skewed structure. This was basically the idea behind the efforts to create livestock farmers, i.e., operators with 50-100 cows that should be able to produce and market more efficiently than one-cow dehkans. However, livestock farmers today are a tiny minority: 9,000 farmers with about 5% of all cattle. Instead of creating livestock farms with 50-100 cows from scratch, a better policy is to enable the small dehkan households to gradually increase their herd from 1 cow to 5 cows, then perhaps to 10 cows, and so on, until they reach the limits of their managerial capacity and skills. Not every dehkan household will grow in this way, but many will take advantage of the policy so as to improve their well-being.

This policy will require increases in feed production, which can be achieved by increasing the land under feed crops and at the same time raising the crop yields. One way to increase the land under feed crops is by relaxing the current rigid practice of setting the land areas that must be allocated to cotton and wheat. The state procurement contracts should specify only the quantities of cotton and wheat that farmers have to sell to the government, without specifying the area of land to be reserved for these crops. If farmers are given the opportunity to allocate the cropping pattern, they will have a greater incentive to optimize the production of both government procurement crops and feed crops on the given arable land. As a result, significant areas of land would be released for other crops, including feed crops such as corn and alfalfa. Our study has shown that allocating more land to feed crops will raise the family incomes and improve the wellbeing of the rural population.

References:

All data used in Section 1, including Figures 1.1-1.2, are derived from official publications of the State Statistical Committee of Uzbekistan:

Statistical Yearbook of Uzbekistan 2004, Tashkent (2005), in Uzbek and Russian;

Agriculture in Uzbekistan 2006, statistical yearbook, Tashkent (2007);

Uzbekistan in Numbers 2006, statistical yearbook, Tashkent (2007).

All data used in Section 2, including Figures 2.1-2.6 and Tables 2.1-2.10, are based on the farm-level survey carried out for UNDP in August 2007 by Sociological Research Centre «TAHLIL».

