Ministry of Agriculture and Water Resources of the Republic of Uzbekistan

United Nations Development Programme in Uzbekistan

MASHAV
Israel's Agency for International Development Cooperation

LIVESTOCK PRODUCTION IN UZBEKISTAN:

CURRENT STATE, CHALLENGES AND PROSPECTS

REVIEW IN THE CONTEXT OF AGRICULTURAL SECTOR DEVELOPMENT TRENDS

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The study was conducted within the frameworks of the Support for Sustainable Development of Livestock Sector in Uzbekistan Project (UNDP, Uzbekistan), in cooperation with the Centre for Economic Development (Tashkent) and Israel's Agency for International Development Cooperation - MASHAV. The sociological survey of dehkan and private farms was carried out by the TAHLIL Centre for Social Research (Tashkent).

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FOREWORD

Protein-rich foodstuffs, including dairy and meat products, are important in ensuring food availability. Livestock production is one of the leading agricultural sectors of Uzbekistan. It occupies special place in providing population with food and has 46.3 per cent share in the gross agricultural output.

Considering its importance for the national economy, the Project Support for Sustainable Development of the Livestock Sector in Uzbekistan is being implemented with a focus on broader use of the sector's capacity and its further development. The main objective of the Project, which is implemented in partnership among the Ministry for Agriculture and Water Resources, UNDP in Uzbekistan and Israel's Agency for International Development Cooperation - MASHAV under the Ministry of Foreign Affairs of Israel, is to study current reforms being undertaken in livestock sector and to develop proposals for addressing existing issues, as well as to adopt the best experience of the developed countries and to contribute to better strategy determination on the sector's sustainable development.

This publication, being a product of the Project, presents a review of stage-by-stage reforms, which have been implemented in the livestock sector since gaining the independence. This process has become upscale even more after adoption of the Presidential Resolutions # 308 dated 23 March, 2006 on «Measures for Stimulating of Livestock Expansion in Household Plots, Dehkan and Private Farms» and # 842 dated 21 April, 2008 on «Additional Measures for Strengthening Livestock Expansion in Household Plots, Dehkan and Private Farms and Escalation of Livestock Production».

Taking the opportunity, I express my gratitude to the UNDP in Uzbekistan and to Israel's Agency for International Development Cooperation - MASHAV for their practical assistance in Project implementation and making this publication ready. I hope that readers will find plenty of useful information and advisory in this work.

I wish you all success in this noble work targeted towards development of the livestock sector in Uzbekistan.

Mukhiddin Esanov

First Deputy Minister,
Ministry of Agriculture and Water Resources
of the Republic of Uzbekistan

FOREWORD

Dear reader,

The livestock sector has played a significant role in the socio-economic life of Central Asian communities for centuries. During the transition period, when many sectors of the economy of Uzbekistan experienced production cutbacks along with limited opportunities for income generation, small-scale livestock farming contributed considerably to maintaining the welfare level in rural areas, becoming an important source of food and income for rural population. Today, when mechanisms of the market economy are getting more dynamic, while demand for food products is increasing, another important issue - increasing livestock productivity and its competitiveness is emerging. To address it, UNDP in Uzbekistan is extending support for the development of both smallholder dehkans and private livestock farmers to improve rural livelihoods. This is an important step in supporting Uzbekistan progress towards the Millennium Development Goal to Improve Living Standards by 2015.

The new publication - «Livestock Production in Uzbekistan: Current State, Challenges and Prospects», is a collaborative product between the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, United Nations Development Programme in Uzbekistan and the Israel's Agency for International Development Cooperation - MASHAV. It addresses current development challenges and highlights important factors impeding productivity growth in the livestock sector. It provides insights into efficiency related indicators, such as size of farming plots, arable land available for fodder production, current state of rural service infrastructure and relevant policies of the Government of Uzbekistan.

I hope that this publication provides readers and institutions with useful information on current trends of livestock sector development in Uzbekistan, and can help to initiate a dialogue among decision makers and practitioners for creating an enabling environment for sustainable livestock development, thus promoting rural development and improved wellbeing for rural communities.

Anita Nirody

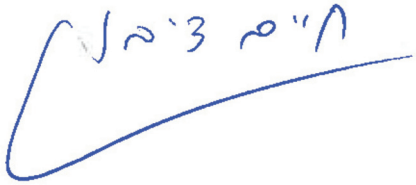
UNDP Resident Representative in Uzbekistan

FOREWORD

Since its inception in 1958, MASHAV, Israel's Agency for International Development Cooperation, has been dealing with issues that lie at the heart of international development efforts. MASHAV's approach to agricultural development is based on the harnessing of proven and tested solutions, applied sciences, modern technology and vast experience, in meeting developing challenges.

Livestock plays an important role in the agricultural sector of the economy of Uzbekistan. Following an in-depth analysis of the livestock sector at a national level, and within the framework of Uzbekistan's National Project on Sustainable Development of the Livestock Sector, a Memorandum of Understanding was signed in November 2007 and fruitful cooperation was initiated between the partners - Uzbekistan's Ministry of Agriculture and Water Resources, the UNDP and MASHAV with the purpose of strengthening the local capacity for sustainable livestock development in the country. It is a pleasure for MASHAV to once more confirm its commitment to the goals of upgrading Uzbekistan's livestock sector, and to transfer Israeli know-how, new technologies and professional training programs that will play an important role in successful implementation of the joint project.

This unique project is, without doubt, a model of successful partnership between Uzbekistan, Israel and the UNDP, contributing to the sustainable development of the livestock sector in Uzbekistan, and the further enhancement of its people's livelihood. We would also like to recognize the contribution of CINADCO and the Israeli Ministry of Agriculture for their ongoing support for this and other projects.



Ambassador Haim Divon

Deputy Director General,
the Ministry for Foreign Affairs of Israel,

Head of Israel's Agency for International
Development Cooperation - MASHAV

FOREWORD

The State of Israel, represented by the Embassy in Tashkent and MASHAV, is proud to be a partner in the project aimed at enhancing the local livestock development capability in Uzbekistan. One of the results of this ongoing cooperation is this book devoted to the topic of Livestock development in Uzbekistan, which includes insights from Israeli experts. This cooperation is further testimony to the importance attributed by Israel to the bilateral relations between Israel and Uzbekistan, as well as to the development of humanity.

Ambassador Hillel Newman

Ambassador Extraordinary and Plenipotentiary
of Israel in Uzbekistan

ABBREVIATIONS

AI - Artificial Insemination

CE - Commodity Exchange

CIS - Commonwealth of Independent States

dd. - dated

FU - Feed Unit

FSU - Former Soviet Union

GDP - Gross Domestic Product

ha - hectare (10,000 m^2)

I&DS - Irrigation and drainage system

MAWR - Ministry of Agriculture and Water Resources

MTP - Machinery-Tractor Park

t - metric tonne (1000 kg)

TIIM - Tashkent Institute of Irrigation and Melioration

UDM - Uzdonmakhsulot

UNDP - United Nations Development Program

UZS - Uzbek Soum

ZVS - Zoo-Vet Station

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INTRODUCTION

The livestock sector is one of dynamically developing agricultural sectors of Uzbekistan, accounting for 46.3%[1] of the gross national agricultural output. The bulk of livestock output is produced by small household *(dehkan)* farms with an average size of 0.15 hectares (ha), which is the key specific feature of the sector. Livestock production in dehkan farms plays a significant social role, because it is the important source of income and food for rural families. However, small size of the overwhelming majority of livestock producers[2] poses significant challenges for application of modern technologies and limits potential economies of scale effects, resulting in relatively low levels of the sector's efficiency[3].

There are some other issues related to livestock sector's development in Uzbekistan. One of the most critical ones is the feed insufficiency due to considerable decrease in the areas under feed crops (since 1991 by more than 70% with concurrent increase in cattle herd number by 45%)[4]. Insufficient development of service infrastructure for rural producers is another vital issue[5].

Realizing importance of ensuring sustainable livestock production development and urgency of the existing problems, the Government of Uzbekistan is undertaking a series of measures on reforming the sector, including implementation of decisions set forth in the Presidential Resolution # 308 dd. 23 March, 2006 on «Measures for Encouragement of Livestock Expansion in Household Plots, Dehkan and Private Farms».

This book is a product of analytical work, completed within the frameworks of a preparatory phase of the Support for Sustainable Development of Livestock Sector in Uzbekistan Project, UNDP. The objective of this book is to describe the current state, development trends and key challenges of the domestic livestock production. The analysis of issues related to the sector status and development has been conducted in the broad context taking into account the following:

a) specifics and trends of the entire agricultural sector's development, considering the fact that common challenges of the sector determine many features and issues of livestock production (a brief overview of the agricultural sector is given in Chapter 1);

b) specifics of two major types of agricultural producers involved in livestock production – dehkan and private farms (brief description of their activity is given in Chapter 2); and

c) social role of the livestock production sector (the research studies influence of livestock production on living standards, primarily of the rural population engaged in animal husbandry).

[1] The State Statistics Commitee data of January 1, 2009.
[2] According to interviews, one dehkan household in average has 2,8 heads of cattle.
[3] For more detailed information see Chapter 3.
[4] See Table 3 and 5 in the Annex.
[5] For more detailed information see Chapter 3.

Chapter 3 makes the core of the publication, in which the major efficiency factors and issues of the sector, as well as the state policy measures for livestock development are reviewed and recommendations are provided.

The baseline data for this study include the following:

- official statistics (the State Statistics Committee, Ministry of Agriculture and Water Resources (MAWR), *Uznaslkhizmat* Association, the Main State Department of Veterinary under the MAWR, State Inspection for Livestock Pedigree Breeding under the MAWR and State Committee for Land, Geodesy and Cadastre *(Goscomcadastre)*;
- statistical data collected from external sources (data provided by the international, intergovernmental and research organizations);
- findings from meetings, in-depth interviews with experts and sector representatives, round table discussions and workshops;
- data available in mass media, the Internet; and
- findings of the dehkan and farmer survey conducted under the Project.

The survey findings and outcomes have been extensively used in this book. Therefore, it is important to provide more detailed description of the survey methodology.

The goal of the survey was to provide extended information on key economic and social factors that impact livestock sector development of private and dehkan farms.

The main objectives of the survey were as following:

- to collect information on socio-economic features of rural households including demographic data, education background data, employment and income sources, family earning and spending profiles, including revenues and consumption from household plots, household resources, etc.;
- to collect general data on rural producers of various types, rural production inputs, which they use, including land and cattle herd;
- to collect data on agricultural production from various farming entities, output structure, including livestock output and information on non-farm income generating activity;
- to collect data on volumes, productivity and distribution of agricultural output (including livestock output) produced by various farming entities; consumption rates and marketability of rural producers;
- to evaluate access to resources and services, including fodder availability, access to vet services and artificial insemination; and
- to evaluate access of various farming entities to credits and banking services.

The survey was conducted in eight regions of Uzbekistan – the Republic of Karakalpakstan, Khorezm Kashkadarya, Djizak, Syrdarya, Tashkent, Namangan

Table 0.1. Regions and districts covered by farm survey

Region	Targeted districts under the State Program	Control districts
Total:	9	11
Djizak	Bakhmal	Dustlik, Arnasay, Zarbdor
Karakalpakstan	Kegeyli	Khojeylik
Kashkadarya	Chirokchin	Mubarek, Guzar
Namangan	Kasansay	Nurakurgan
Syrdarya	Saykhunabad	Mirzaabad
Tashkent	Chinaz	Bostanlyk
Fergana	Fergana, Kuvasay	Furkat
Khorezm	Urgench	Bagat

and Fergana in September, 2007. Selection of administrative regions was based on recommendations of the UNDP technical specialists from the Support for Sustainable Development of Livestock Sector Project and the MAWR, as well as international consultants, and aimed at coverage of the areas with different climatic, social and economic features. In each region, some administrative districts covered by the special measures under the State Livestock Development Program[1] were selected, while the reference or control group was composed of those districts, which were not a part of the Program. In some regions, the survey covered more than two districts, as not so many livestock farmers turned to be formally registered in the originally selected districts (i.e. in such districts all livestock farmers were covered by the survey).

The survey sample consisted of 1600 units. The sample was broken down in two equal sub-samples (800 units each): private farms and dehkan farms. The sample was designed to represent equal number of agricultural producers of both types from the rural areas being covered and not covered by the State Livestock Development Program.

In each surveyed region, 100 private farmers were interviewed (including in equal shares those engaged in livestock production and those engaged in crop production). Selection of the farmers for survey purposes was made by random sampling from the lists of farms presented by the district level Farmer Associations. 803 farmers were eventually surveyed instead of 800 ones initially planned, as three farms turned to be included in the dehkan sub-sampling.

Also, in each surveyed region, 100 dehkan farms were interviewed. The equiprobable sampling of dehkan farms consisted of the following two steps: the first step - rural community assemblies were sampled in the selected ad-

[1] According to the Presidential Resolution on «Measures for Encouragement of Livestock Expansion in Household Plots, Dehkan Farms and Farming Enterprises», # 308 dd. 23 March, 2006, and Resolution of the Cabinet of Ministers, there are 29 targeted districts in the coutnry and 9 of them were covered by the survey.

ministrative districts, and the second step - households were sampled based on complete lists of households provided by the local administrations *(mahalla committees).*

A total of 1600 households participated in the survey, including:

- 797 of them had dehkan land plots only; and
- 803 of them had farm land plots (797 of them had household plots as well).

While describing basic farm features of the surveyed districts (demographic data, employment rates and incomes, access to public utilities) we used statistically distributed sub-sample data of farms (800 units). For description of dehkan farms (plot size and productivity rates, crop patterns, incomes and consumption, livestock breeding, etc.) the data collected from 1594 households were used, including owners of farm plots.

The data in the sample scheme collected from all surveyed regions in each subsample (private and dehkan farms) enabled to ensure 0.95 of data representation. The sample error can be above 10% at the level of administrative regions. It should be noted that assessment of representation and estimation of mean and marginal errors of the sampling was made on the base of the data related to distribution of average per capita household expenditures and could be true for only those indices, which (a) closely correlate with expenditure data; and (b) show normal distribution. As for other indexes, their representation cannot be assured.

1. AGRICULTURAL SECTOR: A BRIEF OVERVIEW

Livestock production development is closely related to the overall agricultural sector status and development. Therefore, we start our analysis with a brief overview of the agricultural sector and agricultural reform progress in Uzbekistan. This Chapter is largely supported by the official statistical data.

1.1. Role of Agriculture in the Economy

Agriculture of Uzbekistan is an important sector of the national economy. The sector's share in GDP accounted for 21.7% in 2007. Its output includes essential food products and inputs for the local industry. Majority of the population (approximately 64%) lives in the rural area. Nearly three million people or 26.3% of the economically active population is employed in agriculture. Both crop production (accounting for 55.1% of the total sector output) and livestock production (44.9%, respectively)[1] are developed. A number of indices characterizing roles and place of agriculture in the national economy is given in Table 1 of the Annex.

To compare such indices of different countries, specialists use so called «agrarian index», which considers several criteria of the country's agrarian profile and is expressed in percentage to each of its components. Two of the most important indices were compared – the share of agriculture in the total employment and in GNP (Table 1.1). Using this approach, the agrarian index of Uzbekistan in 2004 amounted to less than 29%. Similar estimates for all 12 countries of the CIS enabled us to rank those countries by decreasing value of their agrarian indices, starting from Tajikistan being the most agricultural country. Uzbekistan ranks sixth in this rating.

Although the agricultural employment index has increased over the 1990s, it shows a downward trend in recent years (Table 1, the Annex), which is primarily caused by ongoing agricultural reform and reduction of excessive employment, typical for previously existing farming entities.

Therefore, we can conclude that the agricultural sector is crucial for Uzbekistan. Likewise the role of agriculture in the economic and welfare growth is immense.

1.2. Natural Resource Base for Agriculture

Agriculture employs three main production factors: natural resources (land, water for irrigation), capital (fixed assets) and labour (employees of agricultural enterprises). Undoubtedly, land is the most critical resource.

According to the *Goscomcadastre* data, agricultural producers use more than 17

[1] Here and below (unless otherwise stated) the data source is the State Statistics Committee of the Republic of Uzbekistan.

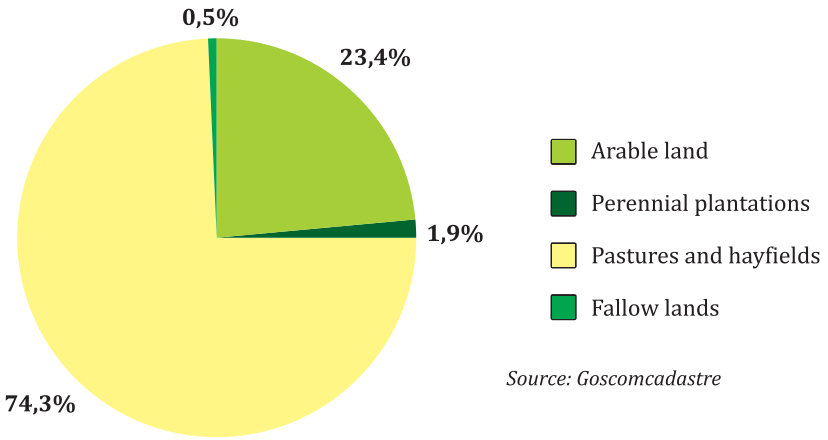
Table 1.1. Agrarian profile of CIS countries
(the most recent actual data, 2005).

Country	Share of Agriculture in Total Employment, %	Share of Agriculture in GDP, %	Agrarian Index, %
Tajikistan	67.5	24.2	45.9
Kyrgyzstan	47.9	34.1	41.0
Georgia	58.6	16.7	37.7
Armenia	45.8*	20.5	33.2
Moldova	40.6	17.0	28.8
Uzbekistan	26.3	30.3	28.3
Azerbaijan	39.2*	10.0	24.6
Kazakhstan	20.0	21.0	20.5
Turkmenistan	32.2**	6.8**	19.5
Ukraine	19.4	10.9	15.2
Belarus	10.5	8.9	9.7
Russia	10.6	5.1	7.9

** Data for 2004*
*** Data for 1997*

Source: The State Statistics Committee of Uzbekistan and State Committee on Statistics of the CIS Countries.

Figure 1.1. Agricultural land distribution in 2006, %



Source: Goscomcadastre

million ha of agricultural land (Table 2, the Annex). Overall, the land is distributed between pastures and arable lands (Figure 1.1).

Figure 1.2 shows land use changes in selected rural areas since 1991. Particularly, the agricultural area has decreased by 33%. This was caused mainly by decrease in pastures (approximately by 40%) as a result of low land productivity and transfer of low-productive and degraded pastures to the State Reserve and Forest Fund. Declining pasture quality was caused by increase in cattle herd number, primarily private one, and unsystematic pasture use and overgrazing, as well as inobservance of pasture rotation. The ratio of arable lands has changed over the period insignificantly.

The arable land is the most valuable national resource. In 2007, the total area under agricultural crops across all types of farms, exceeded 3.5 million ha (Table 3, the Annex). The crop pattern presented in Table 1.2 shows that crop cultivation is dominated by two crops – grain crops and cotton. The area under grain crops in 2007 exceeded 1.5 million ha, including nearly 1.4 million ha under wheat. Cotton was produced on the area of 1.45 million ha, while feed crops occupied less than 300,000 ha.

Table 3 in the Annex and Figure 1.3 show some changes in the crop pattern from 1991 to 2007. The Figure clearly illustrates that over the years of independence, the areas under grain crops increased (by more than 1.5 times) as well as those under potato and vegetables. At the same time, the areas under cotton, melons and feed crops decreased. The areas under feed crops decreased to the greatest extent (by more than 70%).

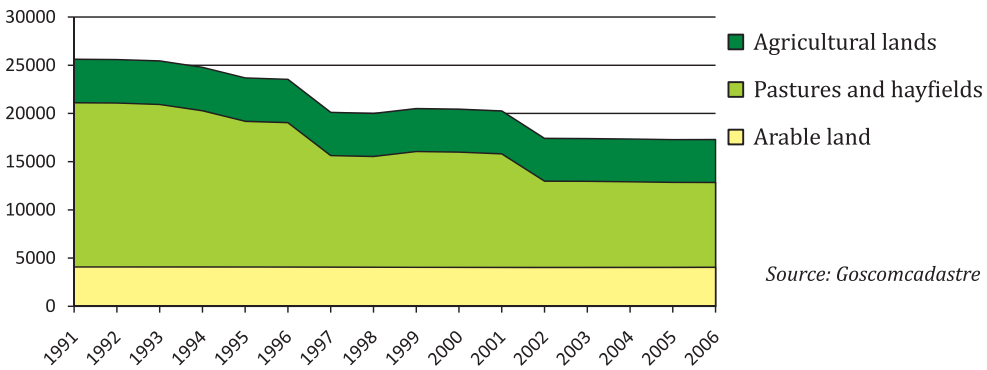
The agricultural sector of Uzbekistan is distinctive for its dependence on irrigation. Rapid population growth in the second half

Table 1.2. Crop pattern in Uzbekistan, 2007, %

Wheat	43.2%
Cotton	40.8%
Potato	1.6%
Vegetables	4.5%
Melons	1.1%
Feed crops	8.2%

Source: State Statistics Committee

Figure 1.2. Dynamics of agricultural land distribution in Uzbekistan, thousand ha



Source: Goscomcadastre

of the XX century required continuous expansion of irrigated lands. Therefore, the total area of the irrigated lands increased from 2.2 million ha in 1953 to approximately 4 million ha in 1985, thus the long-term growth rate was nearly 2% a year. Development of new irrigated lands during Soviet period enabled to increase the irrigated area ratio per agricultural employee from 1.5 ha in 1950 to 2.2 ha in the end of the 1980s. Land development considerably retarded after 1985 and especially after 1990 due to reduction of the state budget support and depletion of the objective need for irrigated land expansion, as newly developed lands had low productivity.

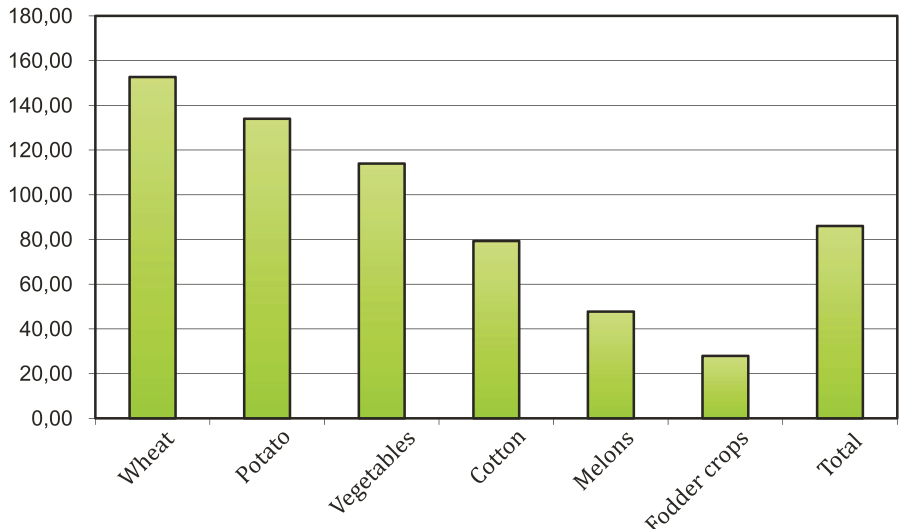
At present, crop production output and the bulk of livestock sector output (excluding karakul sheep breeding in the deserts) is being largely produced in the irrigated areas. The share of rainfed *(boghara)* lands accounts for nearly 20% of the total arable area. Cotton, one of the staple crops, is grown under irrigation exclusively. Wheat is also largely produced in the irrigated areas.

Water has always been considered as the strategic national resource in Uzbekistan. The irrigation system is administered by the state. In addition, the state is responsible for water distribution and irrigation network maintenance.

The principal value of land being the agricultural resource is its **fertility**. In this respect, the situation however is less satisfactory.

Prior to the 1990s, cotton-alfalfa crop rotation was practiced in cotton growing regions of the country and feed crops accounted for approximately 25% of the arable area. Cleaning of irrigation and drainage networks, as well as land reclamation activities to reduce ground water level and soil salinity were practiced on timely basis. This is evidenced by land quality indices in the irrigated areas (Table 4, the Annex). The country's average land quality score remained at suf-

Figure 1.3. Changes in crop pattern from 1991 to 2007 (1991 = 100)



Source: the State Statistics Committee

ficiently good level of 60 points for a rather long period of time.

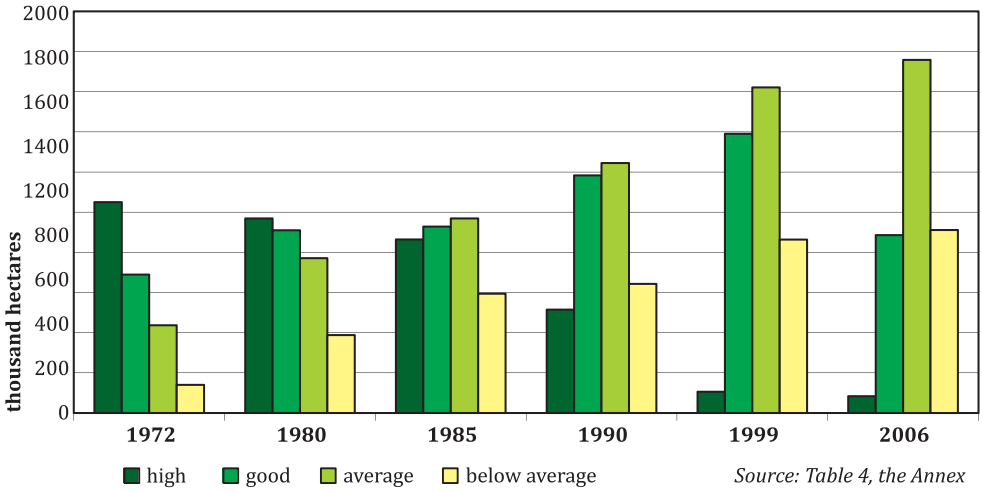
Considerable expansion of winter grain crops on the irrigated land in the 1990s with the aim to achieve the national grain self-sufficiency has basically phased out alfalfa and cotton-alfalfa crop rotations. At present, cotton and wheat producing farms grow their core crops only and production of the third crops has considerably decreased. Financial difficulties of agricultural enterprises impede land improvement process. Ground water level has risen considerably due to neglected drainage network cleaning. Untimely and insufficient land improvement and reclamation are explained by lack of sufficient funding, and appropriate farm machinery and equipment.

The focus on the two major crops (cotton and winter wheat), lack of crop rotation, untimely and insufficient land improvement measures, coupled with the Aral Sea disaster, have adversely affected land productivity and land salinity regimes. Currently, more than a half of the irrigated lands is saline to various extents. The national average land quality score has declined respectively to less than 55 points. The area of high quality lands has also decreased by more than 80% since 1990, which actually implies their complete absence these days (Figure 1.4). The area of good quality lands has also decreased by 25%.

The Government of Uzbekistan undertakes specific measures on enhancement of land reclamation situation. In 2007, the Land Reclamation Fund was established. The Presidential Resolution # 817 dd. 19 March, 2008 «On the State Program for Irrigated Land Reclamation in 2008-2012» envisages clearly defined plans for construction, reconstruction, rehabilitation (cleaning) of drains, reclamation wells, pump stations, as well as rehabilitation of drainage networks and procurement of land reclamation machinery and equipment.

Another feature of the agricultural sector of Uzbekistan related to land use should be mentioned – **the agricultural land is owned solely by the state**.

Figure 1.4. Dynamics of irrigated land quality (1972-2007)



Source: Table 4, the Annex

This principle was included in the new Constitution adopted following the independence in December, 1992, and subsequently restated in the Land Code of 1998.

The agricultural land is distributed by the Government among land users, particularly:

- to legal entities under tenure, usufruct, temporary use or lease terms; and
- to individuals under life-long heritable tenure, usufruct, temporary use or lease terms.

Even those agricultural lands, which are given under life-long heritable tenure terms may not be sold, presented as gift or exchanged. The land leased from the state for agricultural purposes may not be sub-leased as well.

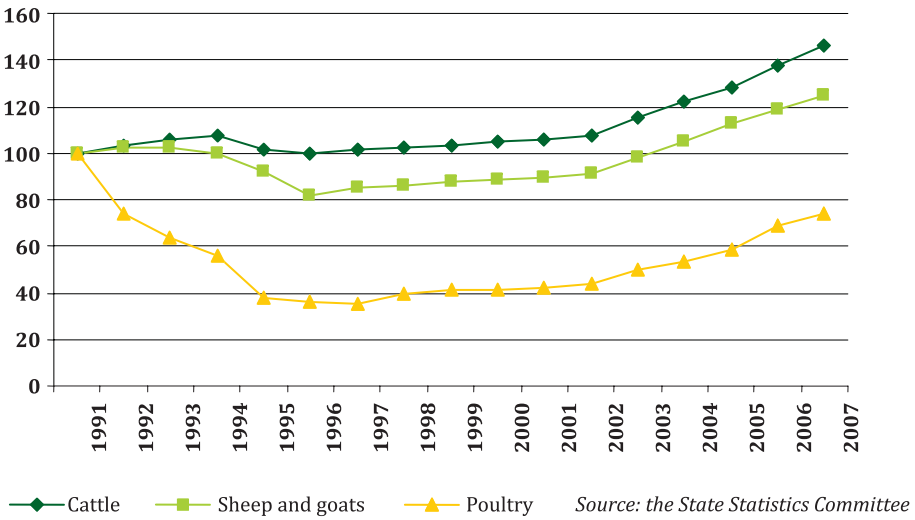
Lack of private ownership on land coupled with restrictions on sub-lease impedes creation of land re-distribution mechanisms among land tenants and users. As a result, land users are unable to change size of their land plots if they wish to do so, i.e. it is hard to get additional land to expand their production. At the same time, some idle or unprofitable users may not sell the land to more successful and efficient users. Besides, the existing land use rules and regula-

Table 1.3. Breakdown of fixed assets of farming entities in 2006, %

Buildings, structures and transmissions	14.3
Farm machinery and equipment	66.9
Transportation means	7.1
Workstock and productive livestock	4.3
Other fixed assets	7.4

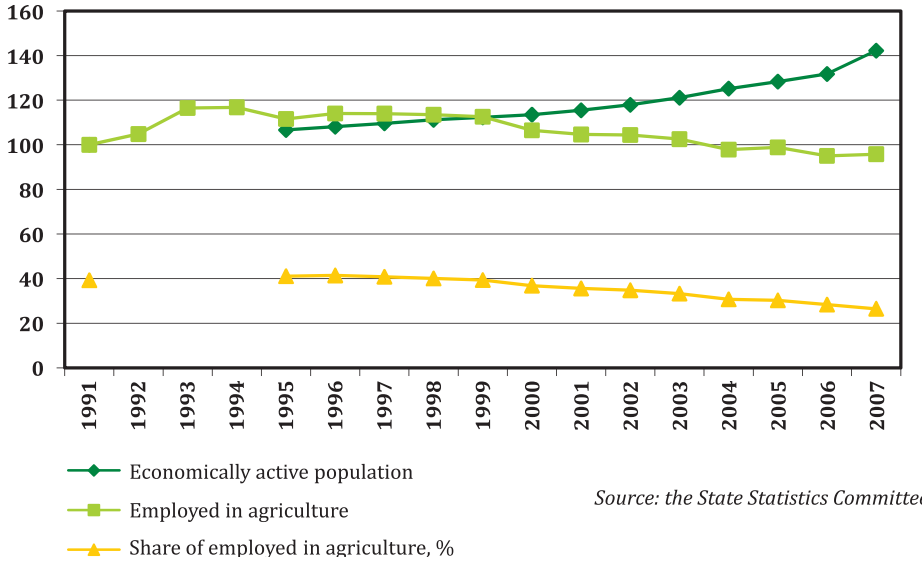
Source: the State Statistics Committee

Figure 1.5. Dynamics in livestock and poultry number (1991 = 100)



Source: the State Statistics Committee

Figure 1.6. Dynamics of agricultural sector and overall economy employment (thousand people, 1991 = 100)



Source: the State Statistics Committee

tions hamper using land as collateral for getting loans that considerably limits financial opportunities of agricultural producers.

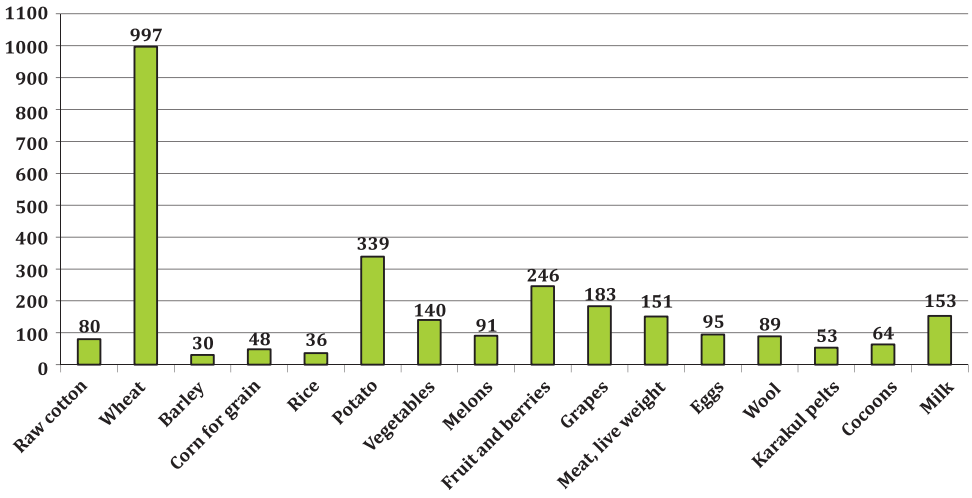
Brief discussion of some other factors of agricultural production (apart from the natural resources) is given below.

A breakdown **of fixed assets of farming entities** is shown in the Table 1.3. Farm machinery and equipment (more than two thirds) account for the bulk of the fixed assets, while buildings and structures – less than 15% of the total.

Livestock is a crucial component of the fixed capital. The latest changes in livestock herd number over 1991-2007 are presented in the Table 5 of the Annex and in Figure 1.5. It is obvious, that since 1991, cattle stock number has significantly increased (by 46%). The number of sheep and goats has increased by 25% as compared to 1991, and by 54% as compared to 1996. In the first half of the 1990s, poultry stock has decreased considerably - by 64%. However, starting since 1997, the poultry stock has been increasing (it more than doubled over the last decade). This growth however has not been sufficient to reach 1991-year level.

As far as **labour resources** are concerned, nearly three million people were employed in agricultural sector in 2007 that accounted for 26.5% of economically active population. As it is seen from Table 1 of the Annex and Figure 1.6, during the period from 1991 to 2007, jobs available in the agricultural sector decreased by 4.2%, and the share of employed in agriculture to the total employment – from 39.3 to 26.5% i.e. approximately by one third. The decrease in the sector employment was caused, *inter alia*, by the ongoing agricultural reform, which led to decreasing of inefficient labour (see Section 1.6 for more detail).

Figure 1.7. Dynamics in output of major agricultural products, 2007 as compared to 1991 (1991 = 100)



Source: the State Statistics Committee

1.3. Agricultural Output

The dynamics in the major agricultural output over 1991-2007 are shown in Table 6-A of the Annex and Figure 1.7.

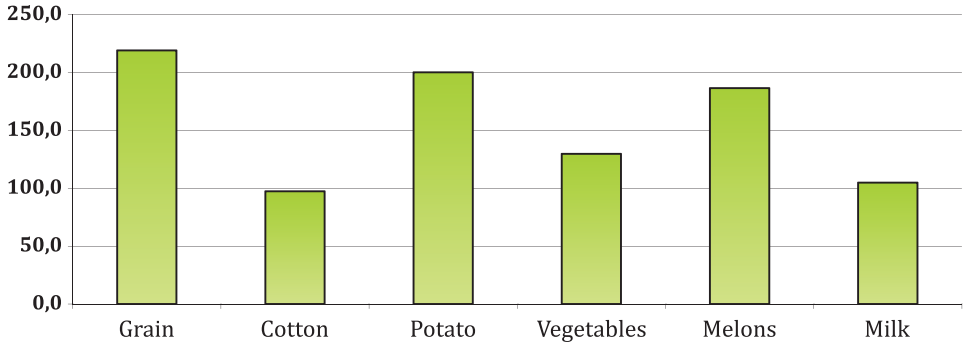
Wheat production output was increasing at the fastest rate in the crop production sub-sector (almost 10 times), followed by potato, fruit and berries, grapes and vegetables. At the same time, the output of cotton, grain crops (except wheat) and melons went down. A meat and dairy sub-sector was developing dynamically and achieved remarkable 1.5-times increase in the output. However, the output of other livestock products, primarily of karakul pelts and silk cocoons declined.

The crop yield and productivity data are presented in Table 6-B of the Annex. Some changes in yields and productivity (from 1995 to 2007) are shown in Figure 1.8. One can see that productivity of the most crops grown in Uzbekistan is increasing (for instance wheat – by 2.5 times as compared to 1991 and by 2.2 times as compared to 1995; potato – by 2.2 and 2 times, respectively). Cotton productivity has decreased in the 1990s (by 22% from 1991 to 1998) and has not reached the level of 1991 yet[1]. Milk yields are increasing at a modest rate[2].

[1] This situation is largely caused by deterioration of irrigated land quality (cotton productivity heavily depends on irrigation), decline in soil fertility (mandatory state cotton quotas often make crop rotation on the allocated lands impossible), lack of farm machinery and equipment, high input prices and low returns from cotton production.

[2] It is possible that milk yield has actually declined, as dehkan farm related statistics arise doubts – see below.

Figure 1.8. Changes in selected yield and productivity indices in agriculture in 1995-2007 (1995 = 100)



Source: the State Statistics Committee

1.4. Major Agricultural Entities and Comparison of their Performance Indices

The legislation of Uzbekistan provides for three types of agricultural entities or three major types of agricultural producers:

1. Agricultural cooperative (shirkat)[1] – an independent legal entity operating on shareholding basis. A family (or collective) contract system is used in shirkats, when the land is allocated to members of a cooperative and their families (or group of families) under land-use contracts for a certain period of time. The shirkats were established through conversion of collective farms (kolkhozes) and distribution of their shares among the former kolkhoz members. Currently, the most of shirkats have been restructured into private farms.

2. Private farm – an independent legal entity. The land tenure form is a long-term lease. At present, livestock breeding farms with at least 30 nominal livestock heads get at least 0.3 ha of land per animal head; while a minimum size of land plot for crop production (cotton and grain crops) is at least 10 ha.

3. Dehkan farm[2] – a small household farm with or without legal entity status, engaged in small production and marketing of agricultural produce using labour of its household members and household land plot. The dehkan farms are life-long leaseholders with inheritable ownership rights. The leaseholds are small, ranging in size from 0.06 ha to 0.12 ha. Now, the size of irrigated plots can be expanded up to 0.5 ha, and size of rain fed plots – to 0.5 ha[3].

Although recently, collective farms were playing important role in the agricultural sector, at present, the sector is dominated by dehkan and private farms, accounting for more than 97% of gross agricultural output (as of the end of 2007).

[1] Resolution of the Cabinet of Ministers # 299 dd. 15.07.1998 «On Measures for Establishment of Agricultural Cooperatives (shirkats) as per Legislation Provisions on Reforming of Agricultural Sector».
[2] Resolution of the Cabinet of Ministers # 300 dd. 15.07.1998 «On Deadlines and Measures for Enforcement of the National Laws: «On Private Farms» and «On Dehkan Farms».
[3] Land Code of the Republic of Uzbekistan (1998).

Each of the above farming entity is regulated by a special law, namely the Law on Shirkats, the Law on Private Farms and the Law on Dehkan Farms.

In addition, the legislation provides for other legal forms of agricultural producers including the following:

- households of non-agricultural enterprises and organizations marketing some part of their agricultural produce;
- test land plots of research institutions;
- state-owned entities;
- other agricultural enterprises, institutions and organizations, including joint-stock companies, limited liability companies, associations and agribusiness entities producing and marketing agricultural output.

Shirkat farms belong to cooperative enterprises, while dehkan and private farms can be described as households and individuals. One of their major distinctions is their size. An average land plot size of a dehkan farm is 0.15 ha, while for farm enterprises this number amounts to approximately 26.7 ha (2007 data). Owners of dehkan farms may also be employed in other agricultural or non-agricultural organizations.

The last but not the least factor determining distinctive boundaries between the groups of the agricultural producers is the active state involvement in crop pattern decision making and setting prices for certain agricultural crops. This intervention in the market mechanisms currently covers only two crops of strategic importance for Uzbekistan – cotton and wheat and is relevant to private farms.

Every year, farmers make contractual agreements with the state for production of cotton and wheat. Cotton and wheat yields are sold to the state at fixed state prices. The state order for cotton production accounts for 70% of the planned yield. The state order for winter wheat production accounts for 50%, respectively[1].

The state supports fulfillment of the production quotas by providing subsidized loans to farmers through commercial banks. Loan proceeds are mainly used for buying inputs through bank transfer. Farmers can also buy additional inputs but at higher prices. Private farms, which operate outside the state procurement system, cannot enjoy such state support.

The state orders are not applied to dehkan farms. They are allocated lands for life-long heritable ownership without any strict obligations, excluding standard requirements on conservation of land quality and adherence to the environmental standards. Thus, dehkans can freely grow any crop and produce and sell any commodity as they wish[2].

The key performance indices of shirkats, private farms and dehkan farms are shown in Tables 7-9 of the Annex.

[1] One should take into consideration that the planned yield may less than the real one.
[2] Law on Dehkan Farms of the Republic of Uzbekistan (1998)

Table 1.4. Description of major agricultural entities

	Dehkan farm	Private farm	Shirkat
Definition	Small scale agricultural production on household plot partially for sale and partially for own needs	Commercial production of agricultural produce. Operates as legal entity	Large scale cooperative enterprise
Labour	Household members	Household members, employed labour	Cooperative members, employed labour
Tenure	Life-long inheritable possession	Long-term lease (10-50 years)	Permanent possession
Owners	Employees of agricultural enterprises, rural civil servants, retired people	Any adult person with adequate agricultural skills or relevant experience	Cooperative members

It should be noted that dehkan farms, while using only 12.9% of the total arable land, produce 62.7% of the total agricultural output in terms of value (data for 2007). This is explained by the following complementary circumstances:

Firstly, quality of lands allocated to dehkan farms is obviously better, as these lands are located nearby towns or villages and are in good condition.

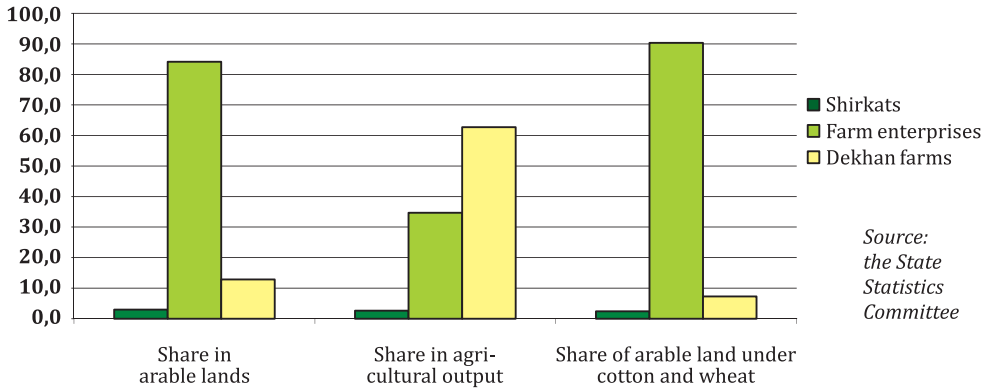
Secondly, household plots are treated better by a dehkan farmer both in terms of labour and fertilizers thus ensuring yields above the national average (Tables 7-9 of the Annex and Figure 1.11).

Thirdly, being not involved in the state production system, dehkan farms can quickly respond to the market demand and produce more profitable commodities, whereas private farms specialized in cotton and/or wheat production have to allocate most of their areas for cotton and wheat (Figure 1.9).

Fourthly, dehkan farms mainly focus on growing fruit and vegetables (including lemons, tomatoes, cucumbers, greens and other crops grown in greenhouses). It is known that production of fruit and vegetables generates higher returns as compared to the other agricultural crops. Besides, dehkan farms manage to grow at least two crops and sometimes even three crops a season.

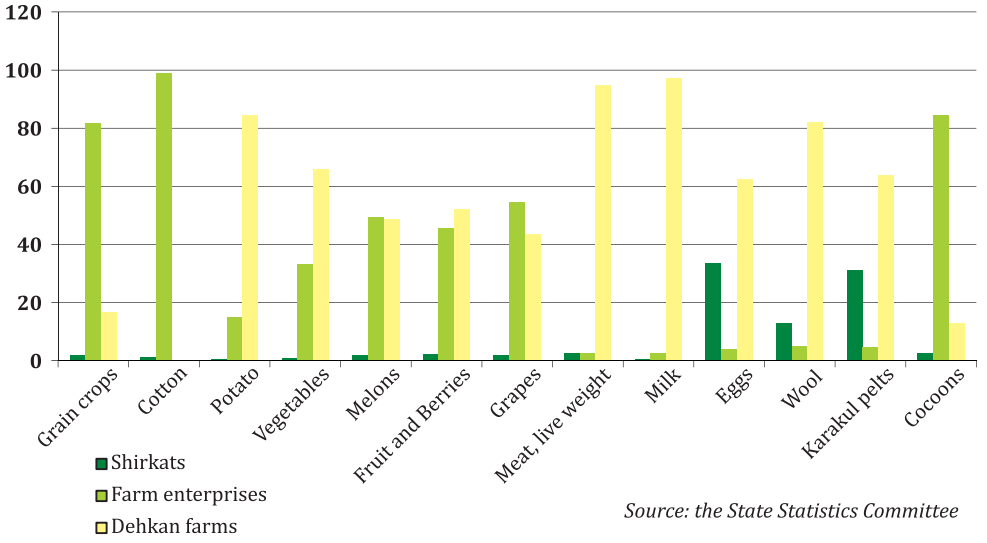
Fifthly, it is probable that the official statistics overestimate performance indices of dehkan farms as a result of imperfect methods of statistical recording. For example, milk yields in dehkan farms turned to be overestimated. This is discussed in more detail below.

Figure 1.9. Arable land use and production of agricultural output by types of farming entities, 2006, %



Source: the State Statistics Committee

Figure 1.10. Output of major agricultural produce by types of farming entities, 2007, %



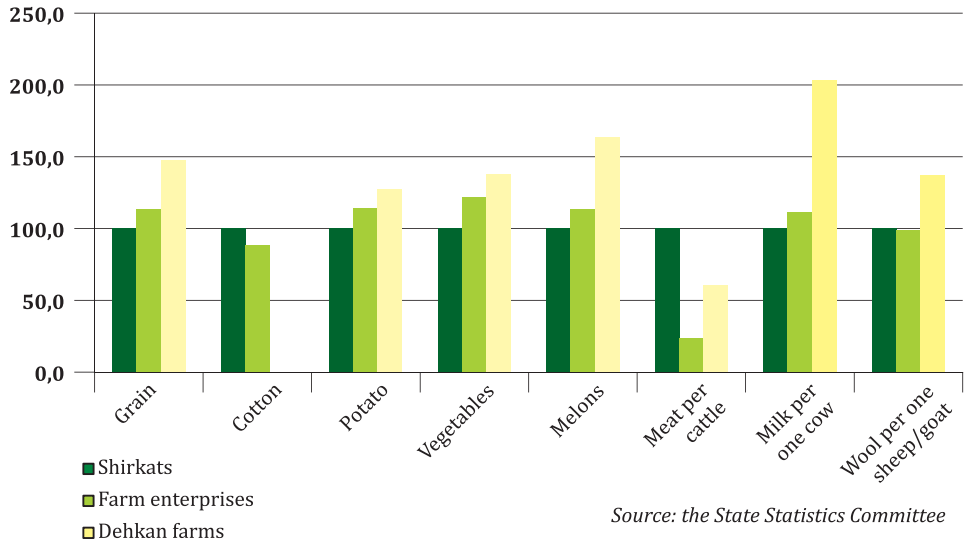
Source: the State Statistics Committee

Shirkats (Figure 1.10) mainly specialize in producing grain, cotton, eggs, wool, and karakul pelts; private farms – in producing grain, cotton, silk cocoons, grapes, potato, vegetables, fruit and berries. Dehkan farms opt for livestock and poultry production (they produce 95% of the total meat output, 97% of milk, 82% of wool, 64% of karakul pelts and 62.5% of eggs, respectively). In addition, they cultivate diverse crops (84.5% of the total potato output, 66% of vegetables, 52% of fruit and berries and 49% of melons, respectively)[1].

Figure 1.11 demonstrates some differences in yield and productivity indices among the three types of farms. Indeed, dehkan farms have better production indices as compared to private farms and shirkats, while the private farms have

[1] See Annex, Tables 7-9.

Figure 1.11. Yield and productivity indices by types of farming entities, 2007 (shirkats = 100, kg)



Source: the State Statistics Committee

better indices as compared to shirkats. The survey of dehkan and private farms conducted under this study, confirms that in general dehkan farms achieve higher yields of agricultural crops (see Chapter 2 for more detail).

Milk yield indices of dehkan farms however arise certain doubts. While among farms this index was equal to 1,031 kg per cow/year, the index for dehkan farms was recorded at the level of 1,736 kg. The study identified quite an opposite picture: milk yields were significantly lower in dehkan farms - 880 kg among dehkans against 1,150 among farmers. This difference in productivity can be logically explained (see Chapter 3). Therefore, the official milk productivity data for dehkan farms should be considered as rather overestimated, and this inevitably distorts the national average index, as the bulk of dairy products is produced in dehkan farms.

1.5. Agriculture of Uzbekistan by Region

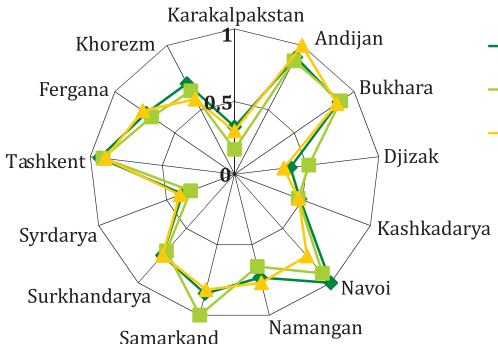
The data on the national agriculture in the regional context are presented in Tables 10-12 of the Annex.

Figure 1.12 shows regional differences in land use efficiency: arable land and irrigated land, in general[1]. The highest returns from land use are observed in Andijan, Tashkent, Samarkand, Navoi and Bukhara regions, while the least ones – in the Republic of Karakalpakstan, Syrdarya, Djizak and Kashkadarya regions.

The major grain producers are Kashkadarya, Samarkand, Fergana, Surkhandarya, Tashkent and Bukhara regions, while Kashkadarya, Bukhara, Surkhandarya, Tashkent and Fergana regions are the major cotton producers.

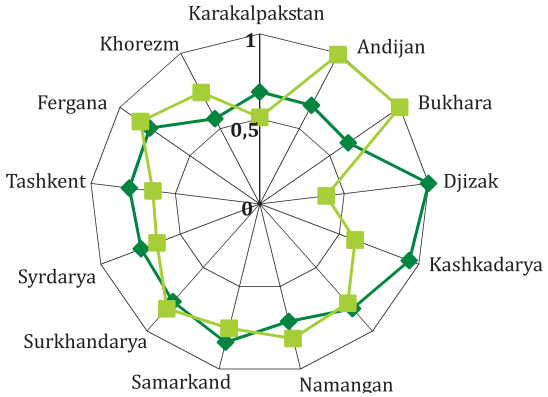
[1] Data from the State Statistics Committee for 2006 are used in this Section.

Figure 1.12. Land use efficiency by region (the highest index = 1)



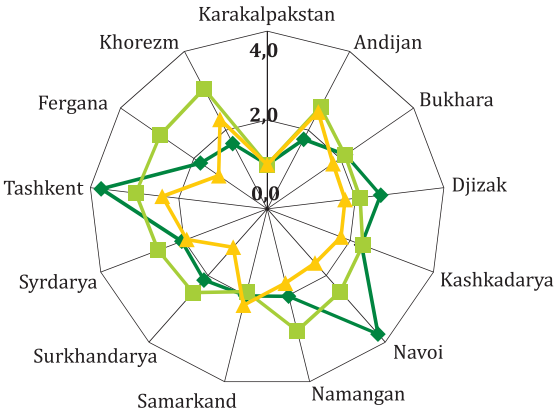
Source: the State Statistics Committee

Figure 1.13. Grain crop production indices by region (the highest index = 1)



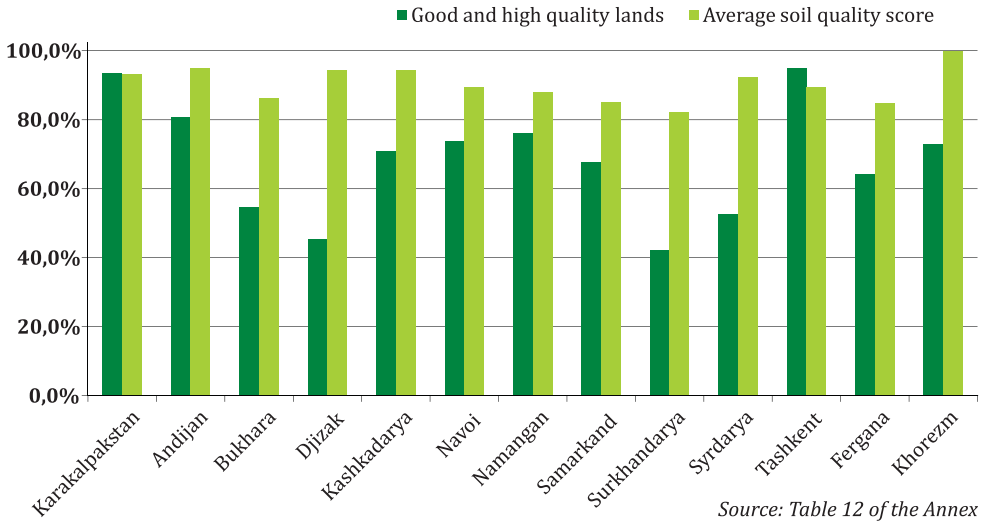
Source: the State Statistics Committee

Figure 1.14. Livestock sector performance indices by region (the lowest index = 1)



Source: the State Statistics Committee

Figure 1.15. Land quality dynamics in percentage by region in 2006 as compared to 1990



Source: Table 12 of the Annex

The system of state orders for these crops is the key specific feature of cotton and wheat production in Uzbekistan. It results in limited producer opportunities to specialize in growing such crops, which would have comparative advantages in the region. Figure 1.13 shows that Djizak region is the leader in the share of arable land under grain crops and at the same time it is the «leader» in low productivity of this crop. Moreover, correlation factor among the regional indices of grain crop share in the total arable land and grain crop productivity is negative - minus 0.55. This means that there is a reverse dependence between crop productivity and size of land under the crop. It seems that regional authorities, while establishing production quotas are trying to compensate low productivity by increasing areas being allocated under strategic crops[1].

The situation is quite opposite for crops outside the quota system: the regions get specialized in those crops, which yield better. Likewise the correlation factor among regional indices of the land under potato in the total arable land area equals plus 0.48, under vegetables – plus 0.42. In other words, the higher crop productivity, the greater area is allocated for it. The only exception relates to melons (correlation factor is minus 0.45). This is most likely owing to the fact that it is appropriate to grow melons on infertile lands, therefore a productivity index is not the key criterion for decision making in case of this crop. There is no significant statistical dependence between regional productivity indices in terms of perennial crops (fruit, berries and grapes) and land area under them, which might be explained by inflexible land redistribution under these crops.

Samarkand, Tashkent and Fergana regions are the leaders in potato production; Tashkent, Samarkand and Andijan regions are advanced in vegetable produc-

[1] There is no such apparently manifested dependence in case of cotton.

tion; Syrdarya and Djizak regions - in melons; Andijan, Samarkand and Fergana regions - in fruit and berries; Samarkand and Bukhara regions - in grapes.

1.6. Agricultural Reform: Stages and Directions, Preliminary Outcomes

Agriculture of Uzbekistan as well as of the other Republics of the Former Soviet Union before independence consisted of two sectors: i) large collective and state farms *(kolkhozez* and *sovkhozes)* and ii) small private households of rural and urban residents. Kolkhozes and sovkhozes used to sell their output to the state whereas private household produce was both consumed by household members and sold in the local food markets *(bazars)*. During the last decade of the Soviet system, households using only 3% of the arable land were able to produce 20-25% of the total national gross agricultural output. It should be noted, though, that household owners took advantage (also informally) of kolkhoz and sovkhoz resources, including land.

High productivity of private households was largely achieved owing to livestock production. Starting since 1970, the households of Uzbekistan have higher number of cattle than both kolkhozes and sovkhozes. At the same time, kolkhozes and sovkhozes supplied households with young stock, feeds, and permitted to access their pastures. In turn, households provided them with surplus livestock products, which were sold to the state under the state plan obligations of kolkhozes and sovkhozes.

Apart from livestock products, households were also engaged in crop cultivation and produced 30% of the total output of potato, 45% of vegetables and 60% of fruit and berries in 1980-1989.

Cotton and grain crops were mainly produced by kolkhozes and sovkhozes. Prior to 1990, households were producing approximately 5% of grain crops (mainly for feeds to be supplied to own animals).

The first stage of agricultural reform provisionally started in 1989[1] with allocation of additional land for households and restructuring of kolkhozes and sovkhozes. Less than in two years, the total area of household sector increased by 60%: from 250,000 to 400,000 ha, and maximum permitted size or irrigated area per household farm increased from 0.16 ha in kolkhozes and from 0.08 ha in sovkhozes to 0.25 ha[2]. By the mid 1990s, the total area of agricultural land in private households reached 600,000 ha. At the sametime, at the initial reform stage, some methods of collective and family contractual relations were introduced envisaging land lease and other major production inputs to be given to groups of employees or selected families. All these measures enabled to mitigate social and economic implications of intensified economic crisis for rural population.

[1] Resolution of the Council of Ministers of Uzbek SSR #258, dd. 15.08.1989 «On Further Ddevelopment of Private Households and Individual Buildings of Kolkhoz Members, Sovkhoz Workers and Other Citizens».
[2] Up to 0.5 ha – on rainfed lands.

From 1992-1994, the state agricultural enterprises (sovkhozes) were transformed into *shirkats*, agrofirms and private farms. Some insignificant number of enterprises remained in state ownership and engaged in production of so called public benefits, i.e. extension and agricultural research, livestock breeding and crop production development[1].

In 1991, the first private farms emerged (mainly orientated to livestock production) as members of large agricultural enterprises gained the right to withdraw their share of land and assets. This new form of farming was legally acknowledged by the Law on Private Farms passed in July, 1992.

The land area for establishment of farm enterprises was allocated on tender basis taking into consideration the level of knowledge and skills as well as financial capacity of bidders, years of residency in the rural area and years of experience in agriculture. During transformation period newly established private farms were allocated with land, which previously had been used by disintegrated collective farms. Currently, given a completion of collective farm transformation, lands are mainly being allocated from the State Land Reserve.

At the initial reform stage, considerable measures for deregulation of rural sector were undertaken, including agenda of staged phasing out the state procurements (state order system) for all types of agricultural commodities, consisting of the two following components:

- cancellation of requirements for farms to sow specific crops on the specific lands; and
- cancellation of requirements for farms to mandatory sell a certain yield volume to the state procurement organizations at stated prices.

By the mid of 1994, the state quotas for all kinds of agricultural produce were abolished, except for wheat and cotton[2].

The Land Code of the Republic of Uzbekistan of 1998 established a legal framework for agricultural reform and regulation of land relations in new market economy environment as well as operation of agricultural producers. The Land Code established that agricultural land belongs to the state. It also set forth rights of legal entities and individuals with regards to the land plots, as well as responsibilities of land users for productive and efficient land use along with state guarantees of land tenure rights, use and lease. The land plot lease procedure, including lease payments, is also established.

The year 1998 could be considered as the beginning of the **second stage of agricultural reform**. In 1998, the process of collective farm transformation into shirkats and private farms got a new impetus. As a result, the number of

[1] The Resolutions of the Cabinet of Ministers # 13 (January 1993); and # 88 (March 1994).

[2] The Resolutions of the Cabinet of Ministers # 13 (January 1993); # 137 (March 1993); # 87, 88 (February-March, 1994) and # 1068 (January, 1995), # 36 (January, 1996), # 121 (March, 1996) and # 441 (December, 1996) were taken as the basis for scheduling of step by step reduction of the state orders for all kinds of agricultural output.

registered farm entities increased from 2,000 in 1990-1991 to 50,000 in 2000-2001[1]. In addition, the average size of a farm increased from less than 10 ha in the beginning of 1990 to approximately 20 ha of arable land in the early 2000s[2]. Procedures and mechanism of private household transformation into dehkan farms with or without establishing a legal entity also came into effect.

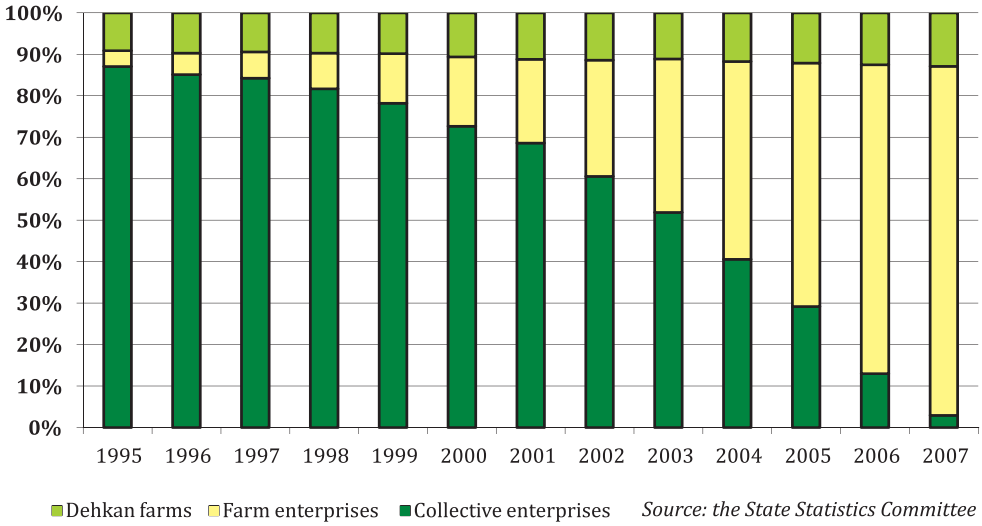
At the first and second stages of the agricultural reform, sovkhozes and kolkhozes were predominantly transformed into cooperatives and private agricultural companies with a view of their commercialization and cost-effectiveness. This strategy stemmed from the traditional perception of economies of scale associated with large agricultural entities and their advantages over small farms and therefore the aim was at «horizontal transformation» of inefficient large enterprises. However, the experience of other former socialist countries as well as own experience of Uzbekistan demonstrated that small and middle private farms are more efficient in transition economies. Section 1.4 contains data supporting that small private farms (both dehkans and farmers) on an average have higher crop and livestock productivity as compared to larger collective farms. Similar dependencies could be observed in other former socialist countries. Likewise, large agricultural companies in Russia account for 85% of the total arable land and produce only 43% of the output. Output per hectare of arable land in private sector exceeds that of public enterprises by 7.5 times[3].

This is predetermined by shortcomings of old socialist relations, lack of private initiative, motivation and involvement in decision making in large farms as compared to small households. Meanwhile, private initiative and personal interest in the ultimate output of the entire farm plays the greater role in agriculture rather than in majority of other sectors. This relates to the specifics of the agricultural sector (high labour intensity; vast areas; seasonal works restricting possibilities for narrow specialization; as well as considerable time lag between labour input and final output; and many other factors beyond control, affecting crop and livestock productivity) and impossibility to implement, with some minor exceptions, industrial production methods and quality monitoring. The only effective mechanism ensuring quality of labour input is personal motivation of farmers in the final result[4], which is achieved in relatively small family households at best.

The **third agricultural reform stage** was initiated in 2002 and focused on «vertical restructuring» of large collective farms into small private farms (in terms of land plot size). Initially loss-making and inefficient agricultural cooperatives, later virtually all shirkats have been restructured into farms. . The rationale for this measure was poor and inefficient performance of the collective farms, which failed to keep pace with the sector's development. Presently, pri-

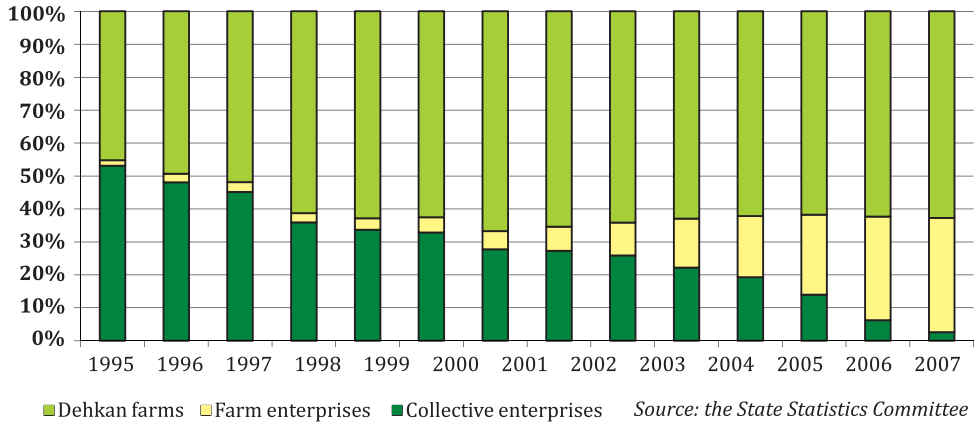
[1] And further up to 200,000 in 2006-2007.
[2] For comparison, an average farm size in Ukraine is 20 ha, in Russia – 40 ha.
[3] I. Stanchin, Z. Lerman. Agricultural Reform in Turkmenistan, 2003, p. 42.
[4] Both in short-term and long-term periods, i.e. a farmer should be interested in getting good yield not only in short but in long term perspective as well taking good care of land and other resources.

Figure 1.16. Specific proportion of cropped land (sown areas) by types of farming entities, %



Source: the State Statistics Committee

Figure 1.17. Agricultural output in value terms by types of farming entities, %



Source: the State Statistics Committee

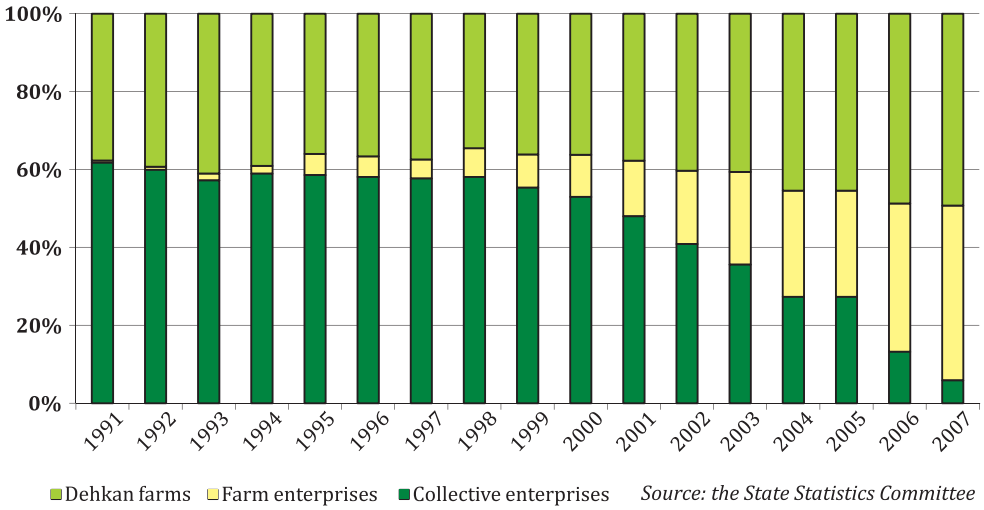
vate farms, whose number in 2007 exceeded 217,000, play the dominating role in production of marketable output.

Concurrently, the state procurement prices for agricultural produce, being sold by agricultural producers under the state orders, were considerably increased. This stemmed from both upward trend of the international cotton prices and devaluation of Uzbek Soum (UZS).

The agricultural reform, specifically its third stage, has made impact on both distribution of land among different types of agricultural producers and performance indices of the agricultural sector.

Figures 1.16-18 show changes in distribution of arable land, agricultural output and employment by farming entities within recent years. The major distinction

Figure 1.18. Employment rate by type of farming entities, %



Source: the State Statistics Committee

of this process isreplacement of collective land use by private land use, which is fully prevailing now.

Currently, private farms cultivate the most part of the country's arable land. At the same time, the share of hayfields and pastures used by private farms accounts for 6% of the total, with the remainder used by remote grazing farms (sheep breeding). According to the Land Fund data, the area of agricultural land used by dehkan farms, including arable lands, has increased only by 1.1 and 1.4%, respectively, over the last 15 years, which is neither matching rural population growth rate nor is being adequate to meet rising demand for feed as a result of the increase in livestock population. Dehkan farms, however, still do not have any formal entitlement to use pastures.

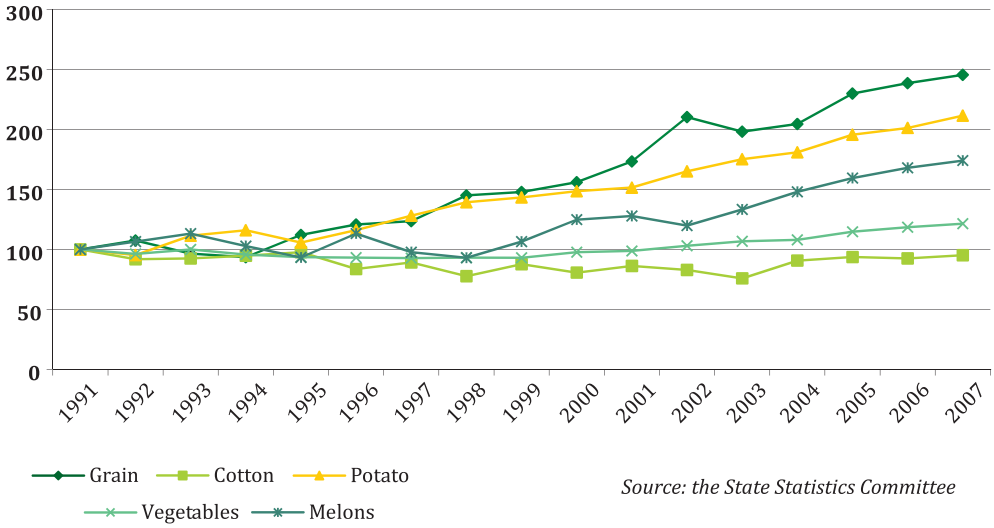
Reorganization of shirkats, increase in state procurement prices, and devaluation of the national currency (enhancing returns from export crops) created additional incentives for agricultural producers to increase growth of agricultural output.

Table 1 of the Annex shows that since 1997, Uzbekistan has experienced sustainable growth in agricultural output in real terms, which accelerated with the beginning of the third stage of the agricultural reform. Moreover, the growth in agricultural output was exclusively driven by the private sector – dehkan and private farms. It should be noted that output growth effect from downsizing of collective farms was pertaining not only to Uzbekistan. The same situation was observed in some other CIS countries, which moved towards private farming[1].

Section 1.3 shows output growth of selected agricultural produce (Figure 1.7), which also occurred following 2002 (Table 6 of the Annex). Given the fact that

[1] Zvi Lerman. «Agricultural revival in Former Soviet Union: review of land reforms and farm restructuring for 15 years» (published in the English language). Post Soviet Economies, Vol. 20, No. 4, pp. 391-412. (December, 2008).

Figure 1.19. Productivity dynamics of selected crops, 1991-2007 (productivity in 1991 = 100)



Source: the State Statistics Committee

this process was accompanied by reduction in arable land areas coupled with declining soil quality and reduction in number of employed population (Figures 1.2, 1.4 and 1.6), we can obviously note some incremental gain in the agricultural sector's efficiency. This is primarily manifested by crop productivity indices, which largely increased during the third stage of the agricultural reform (Figures 1.8 and 1.19).

2. MAJOR AGRICULTURAL PRODUCERS: A BRIEF OVERVIEW

This Chapter briefly describes two major types of agricultural producers – dehkan and private farms. Currently, 94% of rural population engaged in agricultural production is employed in any of these entities, which both produce 97% of the gross agricultural output. This Chapter is built on the data collected during the farm survey and interviews conducted in September, 2007 in eight regions of Uzbekistan (see Introduction for more detail regarding the survey methodology).

2.1. Description of Surveyed Dehkan and Farm Households

The average family size (a household) in the surveyed regions is big – six people that is quite common for rural area. Children below active working age (16 years) compose one third of a dehkan household, and elder people (60 years for men and 55 years for women) – 6.7%. A household (a family), which has a household plot, consists of around seven people with high proportion of able bodied members. (Table 2.1).

The education level of dehkan families does not significantly differ from the average national level. Almost a half of the able bodied population and older has general secondary education. Around 38% have professional education (higher and secondary). Farmers have much better education than dehkans – 45% of farm family members have professional education and more than 18% have higher education.

The able bodied population in surveyed dehkan households is 61.7%, 65% of them are employed. Mostly, they make hired labour (54% of the total working family members). Casual labour makes 11% of the total working people. The explicit unemployment rate is rather high (7% of able bodied population) despite the fact that the survey was conducted in mid season.

Table 2.1. Size and composition of dehkan and farmer households

	Dehkan household	Farmer household
Average family size, persons	6	6.9
Proportion in the household structure, %		
Children under 16	31.6	29.1
Retired people (retired by old age and length of service)	7.9	6.5
including people of retirement age	6.7	6.2

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

More than a half of the hired labour works in non-agricultural sector, mostly in public sector organizations. Less than a half of all working people is engaged in agriculture (42%), and most of them work on their family household plots. Every third person working on the household plot considers himself/herself as unemployed, because rather small sizes of the household plots prevent them from getting effectively employed. Therefore, the unemployment rate including those people considering themselves as unemployed is even higher - 12.5%. Secondary employment is quite common (i.e. a person has more than one job) – 38% of all employed people.

The employment rate in case of farm households is noticeably different. Levels of both explicit and implicit unemployment are low (only 1.3% and 0.4%, respectively). Economic activity among farm family members is much higher due to high employment rate, which is basically built on work load provided to the family in the private farm. Practically, 62% of able bodied family members are working on the farm land plot. Also, the farm family members are almost not engaged in casual and seasonal works and only 13% of them are the employees of non-agricultural sector (mostly women working in public sector organizations). Although the family plot keeps the majority of the family members busy, this employment is not efficient: 42% of them have an extra job.

The cumulative average income of the surveyed dehkan farms (including subsistence consumption of produce harvested on their household plots) was UZS 279,000 (in August 2007) with average per capita income (per family member) – UZS 46,000. Farm households have twice as high incomes – UZS 545,000 and UZS 79.400, respectively. The larger a household plot, the higher the average per capita income, however only in those instances when a plot size exceeds 0.4 ha.

Agricultural activity is the most important factor for income generation, whose share makes 33% in the total family revenue (including earnings of agricultural hired labour) in case of dehkan farms and 73% in case of private farms. (Table 2.2). Also, the household plots are used by these farming entities for growing agricultural produce for their own consumption, and not for sale: less than 30% of families market their produce grown on such plots.

As for dehkan expenditures, in August, 2007 they were UZS 304,000 or UZS 50,500 per capita (at most UZS 60,000 in 75% of families per month). The private farm expenditures were accordingly UZS 500,000 and UZS 72,700.

Food is the most expensive cost item (Table 2.3), though it is not as high as could be expected. This is explained by both significant subsistence production share for own consumption and by high share of in-kind payments in the earning structure (many families receive their wages with grain, which is one hundred percent used for own consumption and makes a sizable share in food pattern). Among others, the costs of family events are note worthily high – as much as a family spends for both education and healthcare. Another important cost item is renovation and construction of houses in both relative and absolute terms.

Table 2.2. Structure of cumulative household income (including subsistence consumption, August, 2007)

Income item	Proportion of incomes in the cumulative household income, %		Proportion of families with this type of income, % of sampling	
	dehkans	farmers	dehkans	farmers
Income earned from sales of agricultural products harvested on dehkan plot	13.8	15.0	30.8	26.8
Consumption of agricultural products from dehkan plot	11.3	8.6	67.2	62.8
Income earned from sales of agricultural produce harvested on farm plot	-	39.6	-	55.4
Consumption of agricultural products from farm plot	-	8.4	-	51.2
Incomes from employment in agricultural sector	7.8	1.1	23.6	4.4
Incomes from employment in non-agricultural sector	30.4	8.0	64.2	34.2
Incomes from non-agricultural entrepreneurial activity	9.6	3.9	20.4	9.2
Incomes from labour migration	7.2	0.9	6.4	2.4
Retirement and disability pensions	10.4	5.5	42.4	37.6
Allowances to disadvantaged families and disadvantaged families with children	2.8	0.9	30	15.2
Other incomes	6.7	8.1	9.8	20.8

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

While being interviewed, the respondents attempted to assess their family standard of living. Some serious differences can be noticed here in terms of answers given by dehkans and farmers. As per own assessment of dehkan families, only 4% of them can afford buying whatever they need, , while in case of farmers, this index is 17% (or higher by more than four times). Around 11% of dehkans and 1.6% of responding farmers ranked themselves as poor income families.

Correlation analysis of the data collected during the survey identified direct correlation between welfare level of dehkan farms (expressed in their revenues per family member, per land unit, and their self assessment rate) and the following factors:

1. Size of irrigated area and crop area.

2. Livestock number, particularly of cattle herd (for other livestock this correlation is not so obvious).

Besides, the self assessment of living standards correlates with availability of farm machinery in dehkan farms; and the revenue index – with the overall size of a dehkan plot.

Thus, the more resources are available to a family (land, livestock, machinery), the more chances it has to improve its economic status..

The same relates to private households, with one variance – the farmers have better access to inputs. Therefore, the following factors are determining a family's revenue level:

1. Private farm size (irrigated area, crop area, number of employees and farm machinery units in use). The larger the family, the better its economic status is.

2. Public utility infrastructure development (gas supply, water pipe system, power supply, telephone, road connection) – its availability and technical condition.

3. Cattle herd number. Number of milk cows makes the most positive impact on family welfare.

Table 2.3. Household cash expenditures in August, 2007

Cost iItem of expenditure	Proportion in the structure of expenses, %		Proportion of families with this type of expenses, % of sampling	
	dehkans	farmers	dehkans	farmers
Foodstuffs	35.5	31.7	100	100
Clothing and footwear	18.4	18.3	73.8	81.6
Livestock procurement	0.4	0.8	1.8	2.2
Repair and house construction, purchase of construction materials	8.8	12.7	16.2	19.2
Transport costs	5.8	6.5	88.4	90.6
Medications and healthcare costs	4.3	3.7	50.6	50
Family events	9.9	9.4	28.4	36.6
Other expenses	3.1	4.7	20.2	24.6

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

2.2. Dehkan Farms

The absolute majority of households in rural areas have household plots. There are several types of them:

- personal plots *(tomorqa)*;
- additional land plots, allocated specifically for agricultural activity, usually located in the outskirts or outside a settlement;
- land plots allocated for construction of a new house (if a family does not construct a house, such plots are often used for agricultural production).

Personal plots represent are the most widespread, which are used by 99.6% of households. (Table 2.4). An average plot size is around 0.15 ha. The size of farmers' personal plots is larger. The agricultural crops usually occupy more than a half of the plot area. The area under crops is irrigated in most cases. The majority of personal plots (73%) were allocated prior to the 1990s, whereas 21% of the households received their plots during 1991-2000, and 6% - after 2000.

Additional dehkan land plots are owned by 13% of households. An average size of such plots is 20-30% greater than the size of personal plots and practically their entire area is irrigated and used for crop cultivation. Around 85% of additional plots were allocated to their owners after 1990, including 26% in 2001-2007.

The plots allocated for construction of houses are owned by 9.4% surveyed households. These plots almost do not differ from the additional plots. The ma-

Table 2.4. Main parameters of dehkan and farmer land plots

Type of plot	Proportion of families, which have a land plot, %	Average plot size, ha	Irrigated area, %	Average crop area, ha
Personal plots	**99.6**	**0.15**	**56.3**	**0.09**
dehkan households	100.0	0.13	56.0	0.08
farm households	99.3	0.17	56.6	0.10
Additional plots	**13.1**	**0.18**	**98.6**	**0.18**
dehkan households	16.3	0.16	99.2	0.16
farm households	9.8	0.21	97.7	0.21
Land plots under construction	**9.4**	**0.18**	**92.4**	**0.16**
dehkan households	10.0	0.16	93.5	0.15
farm households	8.8	0.19	91.1	0.18

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

jority of such plots (89%) were allocated to the households after 1990, but the largest proportion of plots for housing construction was allocated in 2001-2007 (two thirds of such plots).

The households do not have any valuable assets except their land plots. The surveyed households have almost no agricultural equipment. (Table 2.5). Available tractors and combines are mainly concentrated in farms, a few households have trucks and minibuses, 20% of households (54% among farmers) have cars. Nearly 99% of households do not have even basic agricultural inventory and equipment for primary crop processing - ploughs, cultivators, paddy-separators, separators, etc.

The main crops being produced by the majority of households on their personal plots are vegetables, fruit and grapes. In average, in various regions fruit and vegetables occupy 40-90% of the personal plot area. Corn is another popular crop, which is produced by 30% of households on one fifth of such plots. A few households cultivate other crops . The crop pattern on other types of dehkan plots is completely different from the personal plots - tomorqa. Additional dehkan plots are mainly occupied by grain crops (wheat, rice, corn). Only a few

Table 2.5. Availability of farm machinery and equipment, % of sampling (at the time of survey)

Name	Dehkan household	Farmer household
Tractor, mini-tractor	3.2	21.0
Combine	0.2	1.6
Sowing machine	0.2	3.6
Trailer	1.6	13.2
Cultivator	1.2	5.6
Threshing machine	0	2.2
Plough	0.8	7.6
Paddy-separator	0.6	2.0
Separator	2.6	5.2
Truck	2.6	6.6
Car	20.2	54
Minibus	1.6	6.6
Power generator	0.2	2.0
Industrial refrigerator	0.6	1.2
Silage pit	4.4	8
Greenhouse	2.6	3.1

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

households produce fruit and vegetables on their additional plots. As for the plots for housing construction, these are mainly used for growing corn, vegetables and fruit, as well as for hay. Feed crops (mainly grass for hay) are often produced on dehkan household plots – in average, 17% of personal plot owners, 15% of owners of additional plots and 27% of owners of construction plots were growing grass for hay. Feed root crops are quite rare and very few households cultivate them.

In general, the productivity of dehkan farms is rather high as compared to private farms. To a certain extent, the productivity of dehkan farms can be explained by the widespread practice of double crop production per season, especially on additional dehkan plots.

Cash costs to support a dehkan farm are generally low - on an average, around UZS 90,000 per year per average size plot. At the same time, more than 70% of households invest in their plots two times less (around UZS 40,000). Farmer households invest almost 1.5 times more than dehkans. The smaller the plot size – the higher are the costs per unit area. Increasing of the plot size by 20% contributes to 30-50% lowering of per unit specific costs, although this is true only for plots sized up to 0.8 ha..

Profitability of dehkan plots is very high – cash value of harvested yield exceeds invested resources by 5-10 times. However, it is important to pay attention to the fact that while calculating the costs dehkan farming, its labour-intensity is not taken into account, as family members' work on the private household plot are unaccounted and unpaid.

The yield harvested from private plots goes mainly for internal consumption;

Table 2.6. Crop pattern in dehkan farms and crop productivity

Crop	Area, %	Productivity, t/ha
Wheat	10.8	4.28
Corn	20.5	10.24
Rice	5.8	5.88
Other grain	2.2	4.46
Fruit trees and grapes	25.2	9.13
Vegetables	30.3	9.73
Melons	3.1	15.52
Legume	2.3	3.75
Oil seed and industrial	0.3	7.19
Feed roots	1.2	9.73
Grass for hay	15.2	15.70

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

except for only 8%. Average consumption volume per year is not high and is slightly over UZS 300,000 per household or UZS 50,000 per person.

Less than a half of households sell the crop yield grown on household plots. The larger the plot size, the higher is marketability level of dehkan farms. However, the farmers less frequently use their household plots for growing crops for sale, despite the fact that an average size of farmer household plot is much bigger. Revenues from selling the crop yield from dehkan plots is not that high - on an average around UZS 600,000 per year. At the same time, the average cash income from dehkan plots of 80% of households is only UZS 250,000 per year.

Three fourths of the surveyed households keep livestock and poultry. Cattle is very popular – 80% of dehkan farms and 64% of private farms breed cattle; 63% of households have milk cows and 10% - breed bull-calves for fattening. (Table 2.7). In average, one dehkan farm has 2.8 heads of cattle, including 1.3 heads of milk cows. As for farmers, these numbers are 4.4 and 1.8, respectively. The proportion of milk cows in the herd is 37% in case of dehkans and 39% in case of farmers.

Around 30% of households keep sheep. In average, one dehkan household has 6 sheep, one farmer household – 10 sheep. About 11% of surveyed households keep goats, 6-7 heads on an average. Some farmers have donkeys and more rarely horses. Besides, more than a half of households have poultry, around 14 heads.

Dehkan farms are mainly oriented towards production of dairy products - only 13% of cattle owners did not have milk cows within the past 12 months. However, dairy livestock productivity in dehkan farms is rather low - in average, one cow produces around 900 litres of milk per year. Farmers have better milk yield than dehkans that is more probably related to better feed availability in private farms.

Table 2.7. Livestock number in surveyed households (at the time of survey)

	Proportion of families which have livestock, %	Average number of heads	Livestock price per household, UZS thousand	Average price per head, UZS thousand
Cattle	70.8	3.6	1508	420
including milk cows	*60.7*	*1.6*	*792*	*506*
Sheep	29.8	8.6	713	87
Goats	10.9	6.1	239	37
Other livestock	20	1.3	564	338
Poultry	52.6	14.6	64	4.5

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Correlation analysis of the collected data identified a positive correlation of two indices, which determine cattle breeding profitability and dairy livestock efficiency (milk yields).

1. Herd size (so called economies of scale – the larger the cattle herd, the higher is production efficiency).
2. Availability of farm machinery.

In the average, cattle breeding households, produced livestock products for the total amount of UZS 500,000 per year. Milk and dairy products are the main types of livestock products, which are produced by 88% of households. Around 8% of the households were producing meat and meat products. On an average, one household produces 1,300 litres of milk and 315 kg of meat per year, which is worth UZS 0.4 million and UZS 1.1 million, respectively.

Average cash costs per one cattle head is UZS 132,000 per year. Feed costs, which make 77% of the cumulative annual expenditures related to livestock breeding, prevail in the cost structure. Costs related to repair of cattle yards represent another notable expenditure item (10%). Labour costs (mainly remuneration to shepherds) are quite high, but only 14% of households which breed livestock bear them.

Milk and dairy products are consumed internally in most cases, and the major part of meat products goes for sale. Average consumption makes 63% of the total produced volume in those households, which sell their livestock products. Average consumption rate per one household is not that high - around 840 litres of milk and 260 kg of meat per year.

Almost half of households (49%) sell their livestock products: 30% sell milk, 24% - fattened animals for slaughter, 7% - meat and meat products. On an average, a household sells around 1,500 litres of dairy products, 300 kg of meat and 1.7 heads of livestock per year. The livestock related revenues are moderate and amount to approximately UZS 600,000 per year, including UZS 400,000 from selling milk and UZS 720,000 from selling fattened livestock for slaughter. The highest incomes are gained by those who sell meat (UZS 1.1 million), but number of such households is inconsiderable.

2.3. Private Farms

General information. Nearly half of private farms covered by the survey (47%) were established prior to 2001; 28.5% of them started their activity in 2002-2004, and 24.5% - in 2005-2006. Majority of the surveyed farms (61%) were created with farmers' initiative upon their request to the local authorities (hokimiyat) for allocating them with land plots for establishing private farms. The others (39%) were allocated their land plots by competitive bidding, arranged by hokimiyats in the process of restructuring shirkat farms. The size of farmers' plots was not fixed, and 33% of the respondents received additional land after their official registration. In most cases, additional land was allocated to live-

Table 2.8. Property granted to private farms after shirkat restructuring, % of interviewed

Type of household	Production facilities	Farm machinery	Livestock	Crops, orchards and vineyards	Shirkat's debt commitments
Livestock breeders	20.9	11.5	23.7	7.4	7.7
Crop producers	5.6	7.1	1.7	8.8	16.3

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

stock farms, many of which were established prior to 2002. The main sources of additional lands, allocated to to farmers (76%) were lands of agricultural co-operatives (collective farms in the beginning and shirkat farms later) and 14% of the respondents were allocated with the lands of liquidated farms.

In the process of shirkat farm restructuring, apart from land, some private farms received other assets - farm machinery, livestock, production facilities, fields and perennial plantations. At the same time, it was indicated during the interviews that in some cases, along with assets , , private farmers also get debts of closed shirkat farms.

A typical farmer is a man (93%) of quite mature age (46 years old, on an average; 53% of farmers are older than 45), with higher education (44%) or secondary professional education (34%), see Table 2.9. The majority of private farms are registered on behalf of their owners and managed by the owners themselves. However, 10.5% of farmers are not formal private farm owners and their land plot is registered for the name of another family member. Among the farmers whose land plots were registered for the name of another person, the share of women is disproportionately high (11%). It means that men legally registered

Table 2.9. Private farmers' demographic profile, %

Males	**93.1**	Below 25	**2.4**
Females	**6.9**	25-35 years	**19.5**
Higher education	**43.8**	36-45 years	**25.6**
Secondary professional education	**34.4**	46-60 years	**45**
Completed secondary education	**21.1**	Above 60 years	**7.5**
Basic secondary education and below	**0.7**	Average age, years	**45.5**

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 2.10. Proportion of farms with access to public utilities and other infrastructure, % (at the time of survey)

Type of household	Gas supply	Water pipe system	Power supply	Tele-phone	Road
Livestock breeders	21.4	22.5	73	23.5	67.1
Crop producers	7.1	1.5	31.1	13.6	44

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

some private farms, which are actually managed by women. Thus, the proportion of women-farmers actually amounts to 10% rather than 7%.

Almost a half of the respondent farmers- (who actually manage their private farms regardless who is actually registered) have agricultural education: 27% have higher education , and 19% - secondary professional education . Usually, farmers have sufficient experience of service in the agricultural sector: 84% of them have been working in agriculture for more than 5 years and 64% - for more than 10 years. Only 4% of the respondents have been engaged in agriculture for less than 2 years. Most of them have worked in agricultural enterprises before becoming private farmers. Moreover, most of them have some managerial skills because they used to occupy managerial positions in shirkat farms, public agencies or businesses.

Resources and specialization. Private farms, particularly engaged in crop production, do not have sufficient access to public utility infrastructure, farm machinery and production equipment. (Tables 2.10, 2.11).

According to the survey data, farm machinery and equipment, primarily combines, are mostly concentrated in livestock breeding farms. The same relates to transportation, which is mostly owned by private farms. However, both farm machinery and equipment are in most cases outdated, have exhausted their operating life (especially the units received after shirkat restructuring) and require frequent repair. Lack of equipment is also related to unsatisfactory power supply. Even those of farms, which are connected to power supply, sometimes face power cut-offs and voltage drops in the power network.

During one year, in average, about 17-18 people including temporary and seasonal workers are employed in one private farm. Farmers try to provide jobs, first of all, to their family members, whose share makes about 35% of private farms personnel, and hired workers are mainly employed on a temporary basis. It is necessary to note that in some regions private farms cannot provide full-time employment even to their household members.

An average size of crop producing and livestock breeding land plots is 32 ha and 57 ha, respectively. The share of irrigated land reaches 86% of the total land plot area. However, there are some farmers' plots, which are not irrigated at all

Table 2.11. Availability of farm machinery and production equipment, % (at the time of survey)

Name	Livestock breeders	Crop producers
Tractor, mini-tractor	64.3	39.2
Combine	14.5	1
Seeding machine	16.1	6.3
Trailer	51.5	24.1
Cultivator	23.7	18.2
Threshing machine	7.1	0.7
Plough	23.5	11.4
Mill, rice-hulling machine	3.3	0
Separator	6.9	0
Truck	16.8	1.2
Car	5.9	1.7
Minibus	2.8	0.5
Generator	3.6	1
Industrial refrigerator	5.1	0.2
Housing for livestock	79.3	2.2
Silo pit	48	1.2
Greenhouse	2.3	0
Other equipment	7.1	3.2

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

(5% of crop-producing farms and 12% of livestock farms). Private farmers use major part of their land for crop production. Around 9% of private farmers (7% of livestock breeders and 11% of crop producers) unofficially lease some part of their land to other persons, usually to their full-time hired workers as a compensation for their labour. Average size of such land plot is 3-4 ha.

Based on registration certificates, most private farms specialize in cultivating two and more crops. The major specialization of the surveyed farms is cotton and wheat production (60% of the interviewed farmers, including 40% of livestock breeders). A limited number of farms are engaged in horticulture and vegetable growing (around 12% of crop producers). During the survey, only single farms engaged in rice growing, fishery, beekeeping, and silkworm breeding were identified. According to the official statistics, percentage of livestock breeding farms is relatively small - on an average, 3.9% of the total number of private farmers. However, in the course of the survey it was found that 8% of the interviewed farmers, officially registered as livestock breeders do not have any cattle and deal entirely with crop production. Thus, the number of private

Table 2.12. Crop pattern in private farms (% to total land plot area[1] , 2006)

Type of household	Cotton	Wheat	Other grain crops	Feed root crops	Grass for hay	Other crops	Pastures and other lands (not under crops)
Livestock breeders	15.2	15.4	10.5	1.1	17.3	2.1	42
Crop producers	40.5	33.7	3.1	0.3	1	5.4	18.1

Table 2.13. Land pattern being not used under crops in private farms (% to non-cultivated areas, 2006)

Type of household	Household outbuild-ings	Pastures	Fallow land	Barren land	Lack of water for irrigation or soil salinity	I&DS and utility lines	Others
Livestock breeders	2.2	69.5	5.1	13.6	5	2.5	2.1
Crop producers	2.1	19.2	29.2	18.1	14.3	8.2	8.9

Table 2.15. Crop yield in surveyed private farms (t/ha, 2006)

Type of household	Cotton	Wheat	Corn	Other grain crops	Vegetables	Feed roots	Grass for hay
Livestock breeders	2.74	3.22	13.18	4.57	9.17	7.13	120
Crop producers	2.55	3.1	33.46	2.17	6.26	1.68	91

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

[1] The total area is above 100%, since two crops can be grown on the same plot during one season.

Table 2.14. Livestock herd number in livestock breeding private farms (August, 2007)

Type	Proportion of farmers, which have livestock, %	Average number of heads	Average price per head, UZS thousand
Cattle	93.1	54.8	454
including milk cows	89.5	20.5	525
Sheep	49.5	70.9	83
Goats	21.4	20.5	40
Other species of hoofed livestock	44.4	4.4	757
Poultry	18.9	94.2	5

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

livestock breeding farms is actually less than officially registered number.

Major crops grown on farmers' plots are cotton and wheat, which occupy more than 30% of the total land area in case of livestock farms and 74% in case of crop producers. Also, livestock breeders grow some other grain crops (barley, oat, corn, and rice) and feed crops. Grass for hay prevails among feed crops, and areas under feed root crops are negligible. Orchards, vineyards, vegetables, legumes, oil-seed crops and other crops occupy a very small area in all private farms regardless of their specialization (Table 2.12).

Livestock breeders use most of the areas off crop production as pastures (70%); 5% of these areas is allocated for fallow land, and about 5% - occupied by roads, irrigation and drainage systems, and household outbuildings. As for crop producing farms, 29% of their areas , not occupied by crops is left as fallow and 19% is under pastures, 8% - under irrigation and drainage systems and utility lines, and 4% - under household outbuildings and other structures (Table 2.13). Land plots unsuitable for use due to poor soil fertility, soil salinity and lack of water for irrigation make a considerable percentage in the unused land pattern. Crop producing farmers particularly suffer from poor soil quality.

Most of farmers' livestock herd (both cattle and other livestock) is concentrated in the private farms, which have been registered as «livestock breeding farms»; and less than 2% of private farmers engaged in crop production breed livestock. Cattle prevail in the livestock pattern. One private farm keeps 54-55 heads of cattle on an average, including 20 milk cows. Crop producing farmers mainly fatten bull-calves for sale. The average cost of one cattle head is about UZS 450,000, but milk cows are more expensive (about UZS 525,000). Only 1% of crop producing farmers and 50% of livestock breeding farmers breed sheep.

However, not all cattle raising private farmers,have own feed resources – only 70% of the respondents grow feed crops and 50% of them have grazing area on their land plot. Therefore, 91% of the surveyed private farmers need to buy

some feedstuff for their livestock. In addition, 10% of private farmers can graze their livestock on the community pastures; 42% of the respondents are engaged in collecting feeds (mowing grass, collecting food wastes, etc.); and 11% of the respondents graze their livestock along roadsides, irrigation canals and in other places. Mowed grasses and corn prevail in the feed pattern resources that are available in private farms - most of the private farmers grow them, and they compose almost 80% of all feeds grown in private farms.

Yield rates and productivity. Private farm performance rates cannot be considered as high, especially if comparing them with dehkans. A yield rate of the major crops – cotton and wheat was low in all surveyed regions. As for other crops, private farms performance is also inferior to dehkan farms.

Correlation analysis of the data collected in process of the survey identified direct dependence of wheat yield on the following parameters:

1. Farm plot size (number of hired labour, operational costs, including for fertilizers and chemicals).
2. Availability of farm machinery.
3. Agricultural education background of a farm manager.

Table 2.16. Livestock breeding performance factors, positive correlation (data collected from livestock breeding farms and correlation analysis)

Profitability gain from cattle breeding	• Size of farm plot.	
	• Cattle herd number. • Irrigated and sown area. • Pasture area. • Number of farm machinery in use (including mean indices – per one worker, per ha of land). • Investment rate into fixed assets and livestock. • Public utility infrastructure development level (gas supply, water pipe system, power supply, telephone, approach road) – availability and technical condition. • Agricultural education background of a farm manager. • Vet service expenditures. • Application of artificial insemination for cattle.	Milk yields (dairy livestock production efficiency)
	• Period of farm operation. • Number of workers.	

4. Period of farm operation.

5. Poultry farm size (very high correlation in case of farmers-livestock breeders).

Also, positive correlation of wheat yields with a share of crop area used under cotton production has been identified; and a negative one – with a share of crop areas under wheat. Probably here we can see the same phenomenon as discussed in the Section 1.5 – the need to meet state order requirements makes local authorities expand crop areas under low yielding crops at the expence of high yielding crops. In other words, high wheat yielding rate enables allocating smaller areas for its cultivation, thus releasing other areas for cotton. It is obvious, that if resource allocation were done under market conditions, we would have seen opposite situation: farms with higher wheat yields would try to allocate larger areas for its cultivation.

The indices of positive correlation in terms of cotton and wheat yields are almost the same:

1. Farm plot size (number of hired labour, operational costs, including cost of fertilizers and chemicals).

2. Availability of farm machinery.

3. Agricultural education background of a farm manager.

4. Period of farm operation.

Dairy livestock productivity in private farms is rather low, though a bit better than in dehkan farms – around 1,150 litres per cow/year.

Our correlation analysis enabled to identify factors, influencing cattle breeding efficiency and dairy livestock productivity – Table 2.16. It should be mentioned here that meat and dairy production in livestock breeding primarily depend on land plot size and herd number, farm machinery/equipment availability and use of modern technologies. Obviously, it means that large livestock breeding farms have advantages as compared to smaller ones.

Output and marketing. In 2006 private farms produced the gross crop production output in the amount of UZS 15 million. This figure significantly varies from region to region. Sometimes, it does not mean that production volumes are different, but that prices in local markets are different. The main share of the crop output produced by farmers goes for sale – internal consumption makes less than 10%.

The main share of farmers' livestock products (milk, dairy products, meat and slaughter by-products) goes for sale as well, while the proportion of internal consumption is higher - 18% or UZS 860,000 per year. An average sales volume of the interviewed farms' livestock output in 2006 amounted to more than UZS 13 million.

Table 2.17. Agricultural produce marketed by private farms, 2006

Type of product	Proportion of farmers selling the products to state organizations (%)	Problems with sales indicated by respondents (%)			
		Undue payments	Low prices	Problems with transportation	Others
Cotton	96.6	44.8	68.6	18.5	7.4
Wheat	96.3	21.8	70.6	13.7	6.5
Silkworm cocoons	91.7	58.3	75	25	25
Fruit and grapes	35	0	17	51.8	1.8
Vegetables	20.7	0	19.4	9.7	11.1
Melons	10.9	0	8.8	7	3.5
Feed crops	11.1	0	1.1	0.5	0
Grass for hay	6.7	0	0	0.5	0
Cattle	16.3	1.7	10.4	2.9	5.2
Other livestock	17.2	1.2	2.3	4.7	7
Milk	49.2	10.6	23.3	11.8	14.5
Cattle meat	39.1	9.3	21.4	6.4	7.5
Meat of other livestock	36.6	7.7	15.4	5.8	11.5

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Whole milk is the main type of livestock products for sale. An average sales volume is 22 tons per year equivalent to a bit less than UZS 5 million. Only 5% of livestock breeding farmers- sell processed dairy products. Almost half of the interviewed farmers were selling livestock and meat. The sales of livestock in live weight make 9 tons per year; the sales volume of meat is 1.5-2.0 times less.

Most of the surveyed private farms are involved exclusively in producing agricultural output. Only 8.3 % of farmers are engaged in processing of crops and livestock products, including 7.2% of farmers who process own crop production and 1.1% of farmers who buy some agricultural produce for further processing. All together, 15.3% of livestock breeding farmers- and 1.7% of crop producing farmers- are engaged in processing both own agricultural output and bought one. In general, the following kinds of agricultural products are subject to processing: milk (86.6%); meat (20.9%); crop production (10.5%); and wool (6%).

Fewer farmers engage in other types of businesses besides processing Leasing out farm machinery is the most common type of activity, as well as provision of field machinery services and transportation services.

State procurement organizations are the main buyers of farm products. Farmers are contractually obliged to sell the major part of cotton, wheat and silkworm cocoons to the state procurement organizations. Farmers can sell grain produced above the state order volume in the market, however, according to the survey results, there are not that many such farmers, as usually grain surpluses are used for family needs. In most cases farmers have the right to sell other crops and livestock products in the free market, however most of them prefer selling their products to the state procurement organizations and budget institutions (schools, hospitals, veteran homes, etc.). A similar situation can be observed in the livestock sector: despite the absolute absence of the state orders, around 20% of farmers-livestock breeders sell their livestock products to the state budget organizations. Market is another important sales channel. Farmers seldom sell their products to wholesale resellers and private procurement firms, which implies underdeveloped marketing infrastructure. Practically, all interviewed farmers face problems with marketing their agricultural produce (See Table 2.17).

Incomes and expenditures. The cumulative income of surveyed farms in 2006 was around UZS 18 million. However, the average incomes of almost 70% of farmers were below this amount. The incomes of livestock farms are 1.6 times higher than those of other farmers (UZS 22 million comparing to UZS 14 million). The survey results demonstrate a closerelationship between farm income levels and agricultural background of farm managers: those who have higher education, have 1.5 times higher income than those who have the secondary one, and 1.7 times higher as compared to those who do not have any agricultural education.

Regardless of their profile, farmers earn their main revenues from growing cotton. At the same time, revenues from selling cotton represent the major part of total revenues even for the specialized livestock farms, where the area under cotton does not exceed 30%. Aside cotton and grain, the main sources of income for livestock farmers are sales of milk, meat and livestock for slaughter, as well as feed crops, primarily hay grass. It is important to note very poor range of agricultural products being sold by farmers. On an average within the sampling, livestock farmers were selling 4.4 items of products, and crop producers –2.2 items only.

The current expenditures of the surveyed farms are quite comparable with their revenues and made UZS 18.4 million in 2006. Average expenditures of livestock farmers are two times as large as the expenditures of other farmers, producing only agricultural crops (UZS 24.4 million and UZS 12.7 million, respectively). Procurement of farm inputs – seeds, fuel and lubricants, fertilizers and chemicals is the most important cost item (35%). Another important cost item is remuneration to hired workers (18%). Taxes make around 10% of the aggregated costs, while almost one third of all taxes go to land and water use. Around 6% goes to machinery rent and maintenance. Livestock breeding farmers spend

Table 2.18. Farm revenues from agricultural production in 2006

Type of product	Proportion of farmers selling their outputs (%)		Average sales volume (tons)		Average sales volume (UZS million)	
	livestock breeders	crop producers	livestock breeders	crop producers	livestock breeders	crop producers
Cotton	49.2	80.8	47.7	40	14.8	12.3
Wheat	56.1	81.3	38.4	35.6	4.6	4.1
Other grains	9.4	5.6	9	6	3.3	4.5
Feed crops	37	10.7	19.5	64.9	2.5	3.6
Grass for hay	42.9	5.1	25.6	32.5	1.8	2.5
Melons	8.2	6.1	15.9	10.2	2.3	1.1
Vegetables	6.6	11.2	11.9	12.8	2.1	2.5
Fruit and grapes	4.6	7.3	8	26	1.3	2.8
Other crops	4.6	5.4	1.4	1.9	1.5	1.3
Milk and dairy products	83.9	0.5	22.6	3.5	4.3	1
Cattle (heads)	44.1	0	9	0	4.9	0
Cattle (meat)	43.4	0.7	5.6	0.6	2.1	2.1
Other livestock (heads)	21.9	0	22.5	0	1.9	0
Meat of other livestock	13.3	0	1.4	0	3.4	0
Processed meat products	0.5	0	1.8	0	8.1	0
Other livestock products	4.1	0	1.5	0	4.1	0
Other agricultural products	2.4	1.5	460	0.5	0.8	0.4

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 2.19. Farm expenditures on livestock breeding (2006)

Item of expenditure	Proportion of farmers who incur expenditures, % to cattle livestock breeders	Proportion in the structure of expenditures, %
Feedstuffs	91.3	53.6
Vet drugs	87.2	3.4
Artificial insemination	12.8	0.4
Refurbishment of livestock yards	50.7	10.1
Payroll*	92.6	26.3
Other expences	33.2	4.5

* Around 7% of farms use either free labour of their family members or unofficially allocate their workers with some land plots as labour remuneration.

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 2.20. Efficiency factors for crop production farms (correlation analysis outcomes)

Return on land (production value and profit return per cropped area)	Labour efficiency (output value and profit return per number of workers and man-hours)
Positive correlation	
• Number of available farm machinery (including average indices per worker/ per ha) • Public utility infrastructure development level (gas supply, water pipe system, power supply, telephone, approach road) – availability and technical condition • Agricultural education background of a farm manager • Fertilizers and chemicals' costs	• Number of available farm machinery (including mean indices per worker/per ha) • Fertilizers and chemicals' costs • Size of a farm plot • Irrigated and sown area • Public utility infrastructure development level (gas supply, water pipe system, power supply, telephone, approach road) – availability and technical condition • Investments in fixed assets and livestock • Period of farm operation
Negative correlation	
1. Period of farm operation 2. Size of farm plot 3. Irrigated and sown area 4. Areas under wheat	• Number of farm workers • Agricultural experience

Table 2.21. Efficiency factors for livestock breeding farms (correlation analysis outcomes)

Return on land (production value and profit return per crop area)	Labour efficiency (output value and profit return per number of workers and man-hours)	Farm profitability rate (costs and benefits)
Positive correlation		
• Herd size, primarily of cattle • Number of available farm machinery (including mean indices per worker/per ha) • Investments in fixed assets and livestock • Public utility infrastructure development level (gas supply, water pipe system, power supply, telephone, approach road) – availability and technical condition • Agricultural education background of a farm manager • Period of farm operation	• Size of farm plot • Herd size, primarily of cattle • Pasture area • Number of available farm machinery (including mean indices per worker/per ha) • Investments in fixed assets and livestock • Public utility infrastructure development level (gas supply, water pipe system, power supply, telephone, approach road) – availability and technical condition • Application of cattle artificial insemination • Period of farm operation	• Size of farm plot • Herd size, primarily of cattle • Pasture area • Agricultural education background of a farm manager • Period of farm operation • Size of poultry farm • Share of crop land under wheat and cotton
Negative correlation		
• Irrigated and sown area	• Number of farm workers • Area under cotton	

most of their funds to buy feeds, livestock, and to refurbish livestock yards.

Average cost of keeping livestock in the surveyed farms amounted to UZS 6.5 million in 2006. The costs of feedstuffs and labour prevail in the structure of expenditures in livestock breeding farms; together they equal to 80% of the total expenditures.

Farmers also make capital investments (31% of the interviewed). Their average amount was slightly less than UZS 6.0 million in 2006. The proportion of investors among livestock farmers is higher than among crop producers (6.6 million comparing to UZS 5.0 million). Crop producing farmers mainly invest in procurement of farm machinery, while livestock farmers invest in construction and reconstruction of barns/yards.

Farm performance factors. Correlation analysis identified a number of factors influencing farm performance, shown in Tables 2.20-2.21. These data confirm importance of machinery/equipment availability and education level of a farm manager, as well as advantages of large livestock-breeding farms over smaller ones.

3. CURRENT STATE AND EFFICIENCY FACTORS OF LIVESTOCK PRODUCTION[1]

This Chapter describes key issues of national livestock production and analyses the main factors of cattle sub-sector efficiency. It also provides recommendations for further livestock production improvement. This Chapter is generally based on the official statistics data and findings of interviews among private and dehkan farms carried out in September, 2007.

3.1. Current State of Livestock Production

Role and specific features. Livestock sector is the leading branch of agriculture of Uzbekistan, producing around 45% of the gross national agricultural output. Its main specific feature is that the most part of livestock production falls on household plots and dehkan farms with 0.15 ha of land holdings. Dehkan farms breed 93% of cattle[2]. As per results of the September 2007 survey among dehkan and private farms, one dehkan farm[3] breeding cattle has 2.8 animals (heads) including 1.1 of cows on an average (in all dehkan farms in general, these numbers were 2.3 and 0.8, respectively). Also, private livestock breeding farms breed around 55 heads of cattle, including 21 cows[4].

Starting since 1991, livestock herd number in the country has increased by almost 1.5 times[5] that accordingly was reflected I n increased livestock output share in the gross national agricultural product. It means that the growth rate was from 30-35% in the 1980s to 45-50% after 1997 (Table 1, the Annex). These indices are particularly illustrative when compared to those of other countries like Russia, Ukraine, Belarus, Kazakhstan and Kyrgyzstan, which are the major producers of livestock output among the CIS countries. During 1990-2006, the share of livestock production in those countries went down from 55-56% to 45%[6].

Production growth of the main livestock output – meat and milk is of high social and economic importance for community development, considering that it is one of the basic food products and also represents a ponderable part of revenues in the rural area and in case of successful sector's development – it could become the export oriented commodity.

The survey results indicated importance of livestock sector, particularly of cattle breeding for **family welfare in the rural area**. The most tangible social effect of livestock production development was observed in families having private

[1] This Chapter is mostly devoted to the cattle sub-sector.
[2] See Table 7-9 of the Statistical Annex.
[3] Data of private farmer households are not accounted.
[4] Results of the survey conducted by the TAHLIL Centre for Social Research, September, 2007.
[5] See Table 5 of the Statistical Annex.
[6] Zvi Lerman. «Agricultural revival in Former Soviet Union: review of land reforms and farm restructuring for 15 years» (published in the English language). Post Soviet Economies, Vol. 20, No. 4, pp. 391-412. (December 2008).

Table 3.1. Correlation between welfare level of dehkan households and performance of livestock production

Level of wellbeing	Crop area of dehkan household plot, ha	Number of cattle herd	Number of rams and lambs	Number of poultry stock	Cattle value, UZS thousand	Total livestock value, UZS thousand	Average milk yield / year, kg	Total cattle production value/year, UZS thousand (as total amount of sales and consumption)	Total livestock production value/year, UZS thousand (as total amount of sales and consumption)
Average meaning	0.11	2.3	1.6	5.0	1203	1640	879	268.5	392.8
Revenue per household member/month									
below UZS 30,000	9.4	2.0	1.2	3.9	900	1198	836	168.2	272.1
UZS 31,000-60,000	11.6	2.1	1.1	5.3	1093	1478	832	238.9	371.0
above UZS 60,000	13.8	2.9	2.9	6.3	1816	2592	1011	474.2	619.7
Self assessment of family welfare									
Low	0.09	2.0	1.7	4.3	981	1325	827	207.4	294.1
Average	0.12	2.4	1.6	5.3	1308	1826	895	304.6	453.9
High	0.14	2.0	1.3	7.1	1659	1939	1122	324.8	445.1

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

household plots and in dehkan farms, which breed majority of cattle. The numbers given in Table 3.1, demonstrate a direct correlation between dehkan family welfare (expressed in both mean incomes per family member and in personal assessment of financial situation given by the respondents) **with the sizes of crop area and number of livestock heads.**

However, livestock productivity is even of higher importance for household revenues. Average stock number bred by representatives of low and average income groups does not differ significantly, while stock quality characteristics are quite evident. Thus, an average cattle herd number bred by households with high per capita income by 1.4 times exceeds the herd number in low income households; the herd value is twice as high and the value of cattle products – by 2.8 times! Milk yields per cow are 1.2 times higher in the households with high income. In other words, welfare of households depends not only on their land plot size and stock number but to greater extent on stock quality and cattle management.

It also should be mentioned that cattle sub-sector is the most developed in dehkan farms: as Table 3.1 shows, they produce around 73% of the total production value.

Finally, it is important to note that livestock breeding in dehkan farms plays a certain role of a family capital saving and accrual. Presently, the population of Uzbekistan does not havewide access to such services as savings accounts and stock. This is more applicable to rural residents having limited access to financial infrastructure. Livestock breeding and raising is the only way to invest and accumulate personal financial resources.

Livestock sector reforms and relevant state policy. During recent years major organizational changes occurred in livestock sector, caused by deep socio-economic reforms targeted towards transition from administrative-command and economy to market economy.

Farm restructuring of inefficient agricultural enterprises – *kolkhozes* and *sovkhozes* – has significantly impacted livestock breeding, as cattle farms were mostly attached to large cotton production farms. After restructuring of kolkhozes and sovkhozes and later of shirkats, new livestock breeding farms emerged, which either owned their private cattle or operated in a form of specialized livestock breeding farms sharing collective property.

The Government provided considerable support to farmer and dehkan engagement in livestock production during the period when new organizational and legal forms of activity in agriculture were emerging. Population was given access to preferential loans to buy cattle, also some land plots were allocated to establish farms and feed production; the state procurement quotas for livestock production were abolished; pedigree stock was supplied from the countries with developed pedigree animal breeding; production of feed compounds was established as well.

The Presidential Resolution # 308 dated 23 March 2006 on «Measures for Encouragement of Livestock Expansion in Household Plots, Dehkan and Private Farms» was of particular importance for livestock sector's development, where special attention was given to the state support for procurement of pedigree stock and intensification of pedigree animal breeding; establishment of veterinary services; provision of micro-loans to buy highly productive livestock; creation of new jobs; increasing income and food security of rural population through their motivation to breed livestock.

The Resolution mentions *inter alia* that despite significant livestock number growth «many reserves and opportunities for development and strengthening of private, dehkan and farm households, breeding and raising cattle and thus increasing employment rate of rural population and household incomes are still remaining underused». It was emphasysed that the issue of giving official employment status and social protection to people dealing with livestock breeding should be addressed. Also, provision of pedigree and highly productive livestock, availability of combined and juicy feeds remains unsatisfactory; zoo-vet and other service infrastructures are immature, as well as the micro credit system for livestock development.

The Resolution approved the Program for Encouragement of Livestock Expansion in Household Plots, Dehkan and Private Farms, primarily of cattle for the period of 2006-2010, with the following objectives:

- increasing the number of dehkan and private farms engaged in livestock production;
- improving livestock productivity;
- expanding opportunities for local population to raise their incomes;

The following measures were envisaged to achieve these objectives:

• Engagement of rural population in livestock production on their household plots and in dehkan farms is now considered by the state as official employment with eligibility to get pensions. This is to be applied regardless of production targets – whether it is marketed or consumed by a household.

• Encouragement of livestock expansion bred on household plots and in dehkan farms, including free of charge provision of cattle to low-income and large families in the rural area. All these should contribute to increasing of cattle herd number in dehkan farms from 6 million heads in 2005 to 8.5 million heads by the end of 2010.

• Encouragement of farms to double their cattle herd from 330,000 heads in 2005 to 660,000 heads in 2010 along with increasing the number of specialized livestock breeding farms from 8,000 in 2005 to 11,000 farms in 2010. The share of farms engaged in cattle breeding should accordingly increase from 5% in 2005 to approximately 7.5% in 2010[1].

[1] The Decree «On Optimization of Cropping Areas and Increasing of Food Crop Production» issued by the President of the Republic of Uzbekistan on 20 October 2008, envisages decreasing of number of livestock breeding farms to be established as planned initially, however their land plots will be increased.

• Improved access to vet services and artificial insemination (AI) through expanding of a vet service station network.

• Arrangement of auctions to sell pedigree livestock to households, dehkan and private farms. The Program envisages selling of 100,000 heads of pedigree cattle during 2006-2010.

• Improvement of access to micro-loans for households and dehkan farms to facilitate cattle procurement. It is planned to allocate UZS 158 billion[1] for this purpose during 1996-2010, while 80% of this amount is to be channeled through commercial banks (under preferential interest rates and simplified access procedures).

• Improvement of access to feed compounds for households and dehkan farms, including through sevenfold increasing of the number of feed compound selling outlets all over the country – from 113 in 2005 to 773 in 2010. It is also envisaged that enterprises dealing with feed production will get the opportunity to buy grain from farmers directly (rather than through the state supply channels).

• Exemption of pedigree livestock breeding farms from customs fees and duties till 2010 (except fees for customs handling) to be paid for pedigree material, technological and auxiliary equipment imported to the country for development of pedigree animal breeding in the livestock sector.

The strategy for livestock development was refined and amended by the Presidential Decree # 842 dd. 21 April 2008 on «Additional Measures for Strengthening Livestock Expansion in Household Plots, Dehkan and Private Farms and Increasing Livestock Production». The Decree stressed importance of the following specific activities:

- promotion of a processes of providing micro-credits by commercial banks to households and dehkan farms to buy cattle;

- introduction and expansion of AI practice;

- adjustment of land use mechanism allocated for feed crops;

- creation of incentives for provision of agricultural farms with feed harvesters under leasing terms;

- upgrading of feed compound production sub-sector and improvement of access to raw materials;

- expansion of the network and rational location of specialized outlets trading livestock feedstuffs;

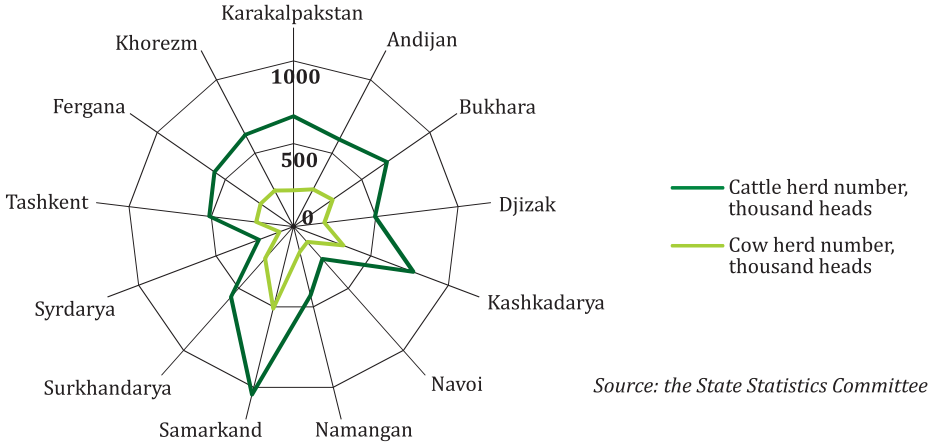
- commercialization of Zoo-Vet Units through their privatization;

- upgrading *Uznaslchilik's* (Uzbek Republican Pedigree Breeding Enterprise) production capacities.

- arrangement of activities for production of deeply frozen bull semen;

[1] The estimated amount of loans was increased to UZS 171 billion, according to the Presidential Resolution # 842 dd. 21 April, 2008.

Figure 3.1. Cattle herd by region, 2007 (all farming entities)



Source: the State Statistics Committee

- improvement of services provided to livestock breeding farms in the area of pedigree animal breeding, marketing of pedigree livestock, introduction of advanced AI technologies.

Moreover, as per the Decree issued by the President, private farms and livestock breeding farms are exempted till 2012 from obligatory contributions to the public trust funds and School Fund supposed to be paid out of their revenue earned from livestock product sales including processed products.

The current state of livestock sector. By the beginning of 2008, there were around 10,000 livestock breeding farms operating in the country and 148 livestock companies with limited liability. Totally, the herd number in all farming entities was 7.5 million heads by the end of 2007, including 3.1 million cows, 12.6 million sheep and goats. 1.2 million tonnes of meat (live weight), 5.1 million tonnes of milk and 22,500 tonnes of wool were produced in 2007[1].

Figures 3.1-3.2 and Table 3.2 demonstrate data on livestock production by region.

Most volumes of meat and milk are produced in Samarkand, Tashkent and Kashkadarya regions that can be explained by high population density and availability of rangelands in those regions. Also, meat and milk sub-sectors are developed in those regions while in the other – only milk sub-sector in most cases.

Sheep and goat breeding is widespread in Kashkadarya, Navoi, Samarkand and Surkhandarya regions (Figure 3.2).

It is difficult to make productivity assessment of livestock sector due to absence of adequate indices, which would include specifics of its development in Uzbekistan. If we take the official data on milk yields, then during independence period they practically have not changed, i.e. formally the productivity rate has

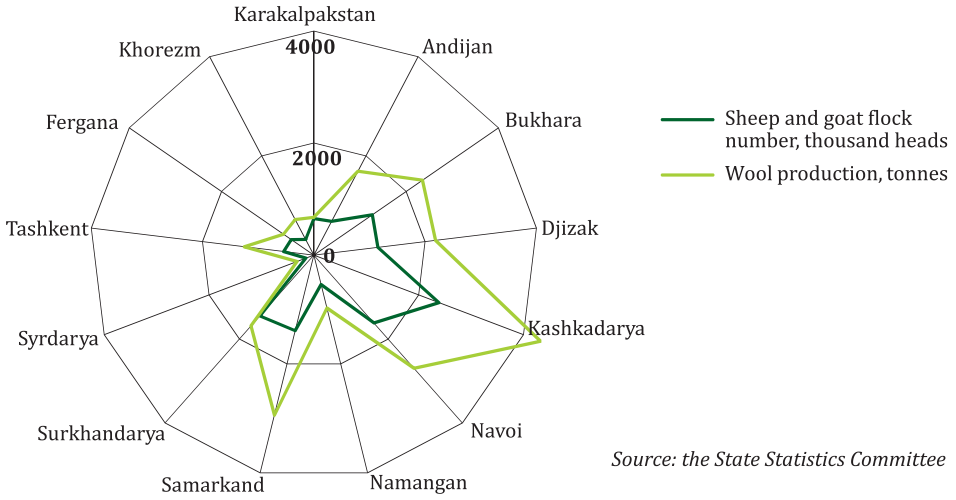
[1] The State Statistics Committee data.

Table 3.2. Meat and milk production (2007, all farming entities)

Region	Meat production (slaughter weight)		Milk production	
	thousand tonnes	%	thousand tonnes	%
Republic of Karakalpakstan	28.4	3.9	146.6	2.9
Andijan	45.3	6.3	446.5	8.8
Bukhara	63.4	8.8	429.2	8.4
Djizak	60.9	8.4	276.1	5.4
Kashkadarya	82.7	11.4	529.6	10.4
Navoi	46.5	6.4	221.2	4.3
Namangan	38.7	5.3	314.3	6.2
Samarkand	94.8	13.1	658.6	12.9
Surkhandarya	57.5	7.9	443.1	8.7
Syrdarya	20.4	2.8	163.3	3.2
Tashkent	88	12.2	464.5	9.1
Fergana	48.9	6.8	477.1	9.4
Khorezm	48.3	6.7	527.4	10.3

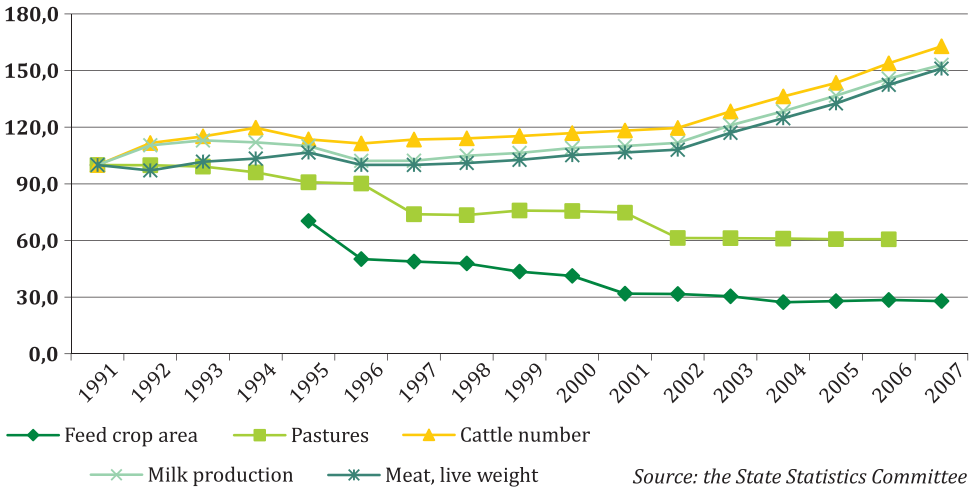
Source: the State Statistics Committee

Figure 3.2. Sheep and goat flock number and wool production by region in 2007 (all farming entities)



Source: the State Statistics Committee

Figure 3.3. Main indices of cattle sub-sector's development, 1991-2007 (1991 = 100)



Source: the State Statistics Committee

Table 3.3. Average milk yields in various countries, 2006

Countries with high milk yields	
Hungary	6026
Germany	6637
Holland	7011
Denmark	8131
Israel	9583
Spain	6469
Italy	5991
Canada	7595
Saudi Arabia	8901
USA	9118
Finland	7570
France	6113
Check Republic	6415
Switzerland	8152
South Korea	9616
Japan	7103

FSU countries	
Azerbaijan	1105
Armenia	1965
Belarus	3639
Georgia	937
Kazakhstan	2045
Kyrgyzstan	2150
Latvia	4361
Lithuania	4343
Moldova	2579
Russia	3221
Tajikistan	769
Turkmenistan	2992
Uzbekistan	**1708**
Ukraine	3308
Estonia	5920

Source: http.faostat.fao.org

remained the same. However, during the same period, the cattle number has increased (by 46%) and lands under pastures have decreased significantly (almost by 40%), as well as areas under feed crops (more than by 70%). Despite decreasing of pasture and feed crop areas, meat and milk production grew proportionally to the cattle number. (Figure 3.3). It means that we can observe considerable increase of land use efficiency under livestock production. However, we should not make decisive conclusions here as long as another problem exists, which relates to livestock productivity assessment – lack of reliable statistical data on milk yields in dehkan farms (see Section 1.4 for more detail). According to the results of farmer and dehkan survey, these indicators are overestimated (almost by two times).

In any case, whether we base our judgment on the official data or on the survey results, the livestock productivity, including cattle sub-sector, is still at the rather low level. This is in particular confirmed by comparing milk yields of Uzbekistan and of other countries (Table 3.3.). At that, Uzbek indices are low as compared to not only the countries-leaders in dairy production but also to majority of the Former Soviet Union (FSU) countries.

Low productivity indices in the livestock sector restrain it from performing its full-fledged social function, not to mention realization of its economic capacity, related to exporting of livestock products. Nationwide, both meat and milk production and consumption per capita rates have remained almost constant by 2006, i.e. at the level of 1995. In 2006, per capita production was 22.9 kg of meat and 181 kg of milk that was considerably below approved nutritional standards (65 and 260 kg, respectively)[1].

What are the reasons behind low cattle sub-sector efficiency? To answer this question it is important to identify the main factors influencing sector productivity and profitability. Expert assessments and statistical data analysis, including analysis of the survey data will help to do so. Understanding of efficiency factors will enable, in its turn, to understand what should be done for the sector's development.

3.2. A Livestock Farm: its Size and Rate of Commercialization

Herd size as efficiency factor. The main index of a farm size is its herd size . The irelationship of cattle herd number and livestock breeding farm efficiency is shown in Table 3.4, based the survey data collected in 2007. One can see that milk yields, livestock product value and farm profitability grow together with herd growth. The same correlation also exists between cattle breeding performance indices and the indices of irrigated and crop areas, farm land plot and number of employed staff[2].

In other words, the larger a livestock breeding farm, the more profitable it is on an average. This correlation can be supported by two factors:

[1] The State Statistics Committee data.
[2] The correlation analysis outcomes of data collected during survey in 2007 (Table 2.16).

Table 3.4. Cattle herd number and farm efficiency indices

Cattle herd number, heads	Number of farms	Average milk yield, kg/year/cow	Average cash value of cattle products, UZS thousand	Average profit from cattle breeding, UZS thousand
Dehkan farms				
1-2	373	843	196.3	-
3-5	208	899	384.5	-
6 and more	51	1 034	1 116.8	-
Private farms				
1-20	97	935	2,386	523
21-50	148	1,131	7,257	1,858
51-100	85	1,246	15,030	4,644
101 and more	41	1,463	55,450	25,915

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

1. The arger the cattle herd, the more resources and inputs are allocated for its breeding and a farm is getting more specialized in livestock sector. Any kind of specialization, as it is known since Adam Smith, contributes to efficiency growth. It enables to progress in the selected area, to apply more effective management and technological approaches.

2. The arger the cattle herd, the more opportunities exist to cut costs due to economies of scale: i.e. payroll costs of cattlemen, shepherds and other workers, facility heating and lighting, buying feed and vet drugs (wholesale discounts), etc. Which is to say: it is much more cost efficient to breed 10 cows together rather than each one separately. The same way, it is much more cost efficient to breed 200 cows in one herd rather than to have 20 farms with 10 cows in each.

Factors influencing increase in cattle herd number. As cattle herd number is important for productivity rates, dehkans and farmers should be encouraged to buy additional cattle stock, to develop cooperation among dehkan farms, as well as between dehkan and private farms. The cooperation (joint procurement of cattle, breeding, procurement of equipment, feedstuffs, services, marketing of output, etc.) enables its participants to enjoy economies of scale and get more specialized while retaining their commercial independence.

The survey of dehkan and private farms helped to identify the main causes restraining increase in cattle herd number, including: (a) insufficient feed resources; (b) lack of land for livestock production; and (c) lack of funds to buy cattle (that is particularly relevant in the case of dehkan farms). (Table 3.5).

Some problems related to feed resources are discussed below (See. Section 3.3).

Table 3.5. The main causes restraining increase in the cattle number, %

Dehkan farm	Private farm
• Lack of pastures, feed resources – 49.4	• Lack of land within farm plot – 54.4
• No funds to buy and breed cattle – 38.2	• Difficulties with feed supply – 50.0
• Lack of land – 32.7	• No funds to buy cattle – 22.1
• Lack of facilities for cattle – 18.3	• Lack of facilities for cattle – 13.0
	• Lack of staff to look after cattle – 6.5

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Further, it is worth to consider lack of land areas and funds (initial and turnover capital) in more detail.

Insufficiency of land, which rural producers would like to allocate for livestock production development, is caused by two major factors:

1. Lack of inter-farm land turnover due to existing restrictions on land sub-lease, discussed above, in Chapter 1. Due to these restrictions, some efficient rural producers cannot easily expand their land plots at the expence of inefficient plots. Accordingly, even those farms, with unique outcomes in cattle breeding, are limited in their growth capacity, as are unable to expand their land areas. It means that market mechanisms providing for replacement of non-efficient management forms and farming methods are not functioning well in agricultural sector of Uzbekistan that, adversely impacting the sector's performance.

2. Existence of administrative limitations on inter-farm land turnover (in case of private farms only), caused by existing norms on mandatory land distribution for cotton and wheat production. As it has been discussed in Chapters 1 and 2, above, a farmer cannot easily use the lands allocated for cotton and wheat production for other purposes, including for cattle breeding. Earlier research confirm[1] that cancellation of the state orders (mandatory assignment of lands for cotton and wheat production) would permit farmers to use their resources more rationally without reducing volumes of mandatory cotton and wheat supply to the state. The cancellation of the state land quotas, even maintaining state crop orders would be beneficial for both producers and the state.

Thus, we can see that livestock production development perspectives in Uzbekistan directly depend on addressing land tenure rights and state control over production of certain strategic agricultural crops.

As for the **lack of credit resources** – in order to mitigate acuteness of the problem, it is important to create maximum incentives for development of micro

[1] The Analytical Note «State production quotas for cotton: opportunities for strengthening of mechanisms», Tashkent 2007. Prepared under support of the Project on Facilitation of Economic Reforms in Uzbekistan, BEARINGPOINT.

Table 3.6. Input availability at farm level (at the time of survey)

Name	Proportion of farmers feeling lack of inputs, %	Proportion of farmers having opportunity to buy inputs from the only one supplier, %
Seeds (sowing material)	7.8	81.8
Mineral fertilizers	24.9	78.7
Fuel and lubricants	29	64.8
Farm machinery and equipment	23.6	26.2
Spare parts	25.8	15.6
Water for irrigation	36.7	81
Farm machinery services	18.1	17.6
Feed compounds	34.9	15.3
Other feedstuffs	25.1	7.8
Young stock, pedigree stock	27.1	14.8
Zoo-vet drugs	13.1	18.3
Vet services	8.2	19.7
AI	2.4	4.3
Storage facility services	20.9	21.5
Agro-lab services	6.3	47.9
Farm machinery repair services	10.2	11.1
Information-advisory services	10.3	14.3

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

finance sector, primarily – to improve access of dehkan and private farms to bank micro-loans, including those with preferential interests rates, as the existing interests rates applied in the free micro finance market are too high for livestock breeders.

Strengthening of legal frameworks would also help to solve the issue of loan availability, particularly concerning land tenure rights and and ther us as the collateral while accessing a loan. The matter is that currently, when the formal market for agricultural lands is not sufficiently developed, rural producers are limited in their abilities to get loans on security of their land plots. However, this form of lending in agricultural sector is fundamental all over the world.

Finally, another aspect of this issue stems from **difficult access to inputs and services**. It is difficult for livestock breeders to buy feedstuffs, primarily feed compounds, and pedigree stock. The most demanded service, which is not fully provided, is storage and processing of agricultural output. The situation is aggravated by lack of competitive input and service supply markets (Table 3.6.).

During recent years, as it has been mentioned above, the Government of Uzbekistan has been creating incentives in every possible way to increase cattle herd number including through enlargement of livestock breeding farms. This is planned to be achieved through the following:

- providing rural residents dealing with livestock breeding in their households and dehkan farms the status of official employees;

- providing low income families and large families with cattle on a free of charge basis;

- improving access to feedstuffs, vet and other services for livestock sector; and

- expanding opportunities for households and dehkan farms to get access to loans for procurement of cattle.

Low marketability of dehkan farms. Commercialization of farms and increasing share of products for sale is one of the most important conditions for turning livestock breeding into highly profitable production. Private farms represent intensive agriculture by their definition, i.e. they are targeted towards marketing the most part of their output. It is not so in case of dehkan farms, which breed the majority of cattle and most of their output goes for internal consumption.

Still, marketability of the livestock sector in dehkan farms is often underestimated. There are two ways to evaluate it. The first is to calculate the ratio of dehkan farms, which sell at least some part of their output. The second is to estimate the ratio of marketed products in the total production volume. If we chose the first way or estimate the ratio of farmers selling milk, we will see that dehkan farms are oriented towards production for own consumption: almost two thirds of dehkans do not sell their milk consuming the whole yield in their households. However, we should not omit that remaining «commercial» dehkans sell 67% of their milk yields on an average. (Table 3.7). Due to this indicator the average milk sales volume makes 37% of the total milk yield produced by all dehkan farms, including those two thirds, which do not sell milk at all.

Therefore, we can see existence of intensive agricultural producers among dehkan farms, which consider meat and milk cattle breeding as source of income. Such farms mainly specialize in dairy production: 30.4% of cattle breeding farms sell milk; 24.3% - cattle for slaughter; and only 16% sell meat and meat products. However, dehkans, specializing in meat livestock breeding are more commercialized – 91% of them sells meat products[1].

[1] Results of the survey conducted by the TAHLIL Centre for Social Research, September, 2007.

Table 3.7. Commercialization of meat and milk sub-sectors in dehkan farms (analysis of data collected from 632 cattle breeding farms)

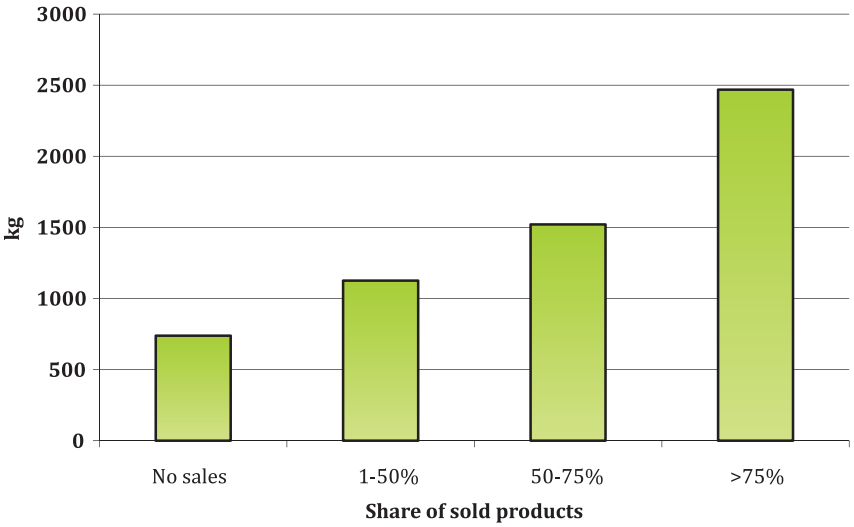
Type of producers	Number of farms	Average cattle number, heads	Average cow number	Average cash value of cattle herd, UZS thousand	Average milk yield per cow	Average cash value of cattle output, UZS thousand	Average crop area, ha
Producers of milk for own consumption	339	2.7	1.1	988	743	243	0.12
Producers of milk for sale	192	3.7	1.4	1864	1056	652	0.14
Producers of meat for sale	40	4.2	1.5	2197	-	2070	0.17

Table 3.8. Correlation between household welfare and commercialization rate

Performance	Total cattle number	Cattle cash value, (UZS thousand)	Total cattle production value/year (UZS thousand) (as amount of sales and consumption)	Total livestock production value/year (UZS thousand) (as amount of sales and consumption)	Revenue from livestock product sale (UZS thousand/ year)	Revenue from milk and dairy product sale (UZS thousand /year)	Revenue from meat and meat product sale (UZS thousand /year)
Mean value	2.3	1203	268.5	392.8	258.5	295.8	1342.5
Revenue per household member/month							
below UZS 30,000	2.0	900	168.2	272.1	160.6	181.3	725.3
UZS 31,000-60,000	2.1	1093	238.9	371.0	225.5	289.3	993.1
above UZS 60,000	2.9	1816	474.2	619.7	465.2	407.3	1864.0

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Figure 3.4. Milk production and sales volume in dehkan farms, kg/year



Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

The data presented in Table 3.7, demonstrate that commercialized livestock breeding dehkan farms are usually large and more efficient. So, the conclusion can be made that commercialization of dehkan farms depends on two main factors: cattle herd number and animal productivity, which both contribute to production volumes. The Figure 3.4, shows the relationship between milk production volumes and commercialization rate.

In addition, it should be mentioned that the commercialization rate significantly influences household welfare. If we compare average per capita income in households selling their dairy products with those which do not sell them, we can see that commercial dehkans have higher revenue per month – UZS 63,000 comparing to UZS 40,000. Table 3.8 presents data for more detailed analysis of correlation between a dehkan farm commercialization rate and its members' prosperity.

Households representing a group with income of more than UZS 60,000 per person sell livestock products 2.9 times more than households with income rate of less than UZS 30,000 per person (the difference in production volume makes 2.3 times). The households with high incomes sell 2.2 times more dairy products (in cash value terms), 2.6 times more of meat products than those in the lower income group. The data below, also confirm that meat-oriented farms are more commercial than milk producing farms: those which sell meat, sell four times more in volume terms than those, which sell milk.

Accordingly, the state should encourage dehkan farm commercialization not only with a view of increasing their marketability and saturation of consumer market but also as the opportunity to improve living standards in the rural area. This can be achieved through assisting dehkan farms and increasing cattle herd

number and, specifically, through enhancement of cattle productivity.

The data of Table 3.8 allow to understand that in order to turn non-commercial dehkan farms into commercial ones not so much efforts are to be applied: namely to increase herd number by 30-60% and productivity – by 40-50%. These numbers demonstrate differences between those who sell and do not sell livestock products. In other words, sometimes the marketability rate of a dehkan farm can be considerably increased just through buying of one more cow or enhancement of milk productivity of the existing cows by 1.5-2.0 times (for instance, through improvement of feed resource availability and cattle management) that is feasible considering rather low actual milk yields. However, the data of Figure 3.4 say that differences between non-commercial (home-consumption oriented) and highly commercialized farms (selling more than 75% of their dairy products) are more significant: the latter produce 3.5 times as much milk as the former. It means that in order to turn into highly intensive producer, one needs to buy not just one but three new cows or to increase the milk productivity that is rather problematic.

Marketing of livestock products. Development of the marketing network for livestock products and addressing many relevant issues is another important area to increase commercialization of livestock production. Lack or underdevelopment of such network makes any effort to commercialize the sector meaningless, because any product must have its buyer to cover costs and to get profit herewith.

Further, we consider the current situation in this area building upon the survey results conducted among dehkan and private farms[1].

Most **dehkans** dealing with marketing of their livestock products, mainly sell them it the market (36%) or to their neighbours and friends (53%) or to resellers (33%). Sometimes they use two channels at once: 26% of those who sell their products to their neighbours sell them in the market as well and 36% to the resellers. Dehkans transport their livestock products to local food markets while the neighbours and resellers usually collect them from the farm gates.

A strong dependence on sales to the neighbours and friends indicates presence of difficulties with transportation and wholesale relations in the food markets. Some specific measures should be taken to facilitate access to market for dehkans in order to realize their market capacity and to supply their products to urban population. These measures could include establishment of reseller networks, transport operators and wholesale traders, which would facilitate dehkan product flow to the market. The resellers play an important role in establishment of market channels and their activities should be supported.

Further we discuss marketing livestock products produced by **private farms**.

The state orders were completely abolished for livestock products, including

[1] Results of the survey conducted by the TAHLIL Centre for Social Research, September, 2007

meat and milk, in 1994[1]. This enabled rural producers to freely sell their products at market prices. However, the survey identified that 50% of farmers sell meat and 40% of them sell milk to public sector institutions (schools, hospitals, kindergartens, veteran homes etc.) (Table 2.17). The food market is another important sales channel. Farmers do not sell their products to wholesalers, as it could be expected and rarely sell to private procurement companies that proves poor market infrastructure development. Low prices on livestock products and difficult transportation are the main issues, regardless of the marketing channels.

Domestic processing of livestock products. It is obvious that development of domestic livestock production processing by farm would expand its assortment and contribute to commercialization and increasing of sale volumes.

According to the survey conducted in 2007[2], a few households (13% of those, which breed livestock) process livestock products, mainly milk. The dairy processing is usually confined to simple operations – production of sour clotted milk, cream, curd, and butter. More complex processing is not practiced due to high cost of processing equipment (49% of respondents); lack of skills (20%) and limited marketing opportunities (25%).

Only 15.3% of livestock farmers process both own and purchased agricultural products. They mostprocess milk (86.6%), meat (20.9%) and wool (6%)

The reasons why the majority of farmers do engage in processing include the following:

- no opportunities to buy processing equipment – 41.3%;
- processing equipment is too expensive – 34%;
- processing is unprofitable – 14.3%;
- lack of specialists experienced in processing of agricultural products – 10.9%
- no opportunities to market the processed products – 10.2%
- interrupted supply of public utilities (electricity, water, gas) hamper processing – 2.8%;
- other reasons – 8.4%.

It should be emphasized that the some efforts are being undertaken to address the issue of insufficient processing development. Presidential Resolution #1047 dd. 26 January 2009 on «Additional Measures for Expanding of Food Production and Domestic Market Saturation» provides additional privileges to the producers engaged in meat and milk processing, including 50% reduction of the single tax value for micro firms and small enterprises.

[1] The Resolutions of the Cabinet of Ministers # 13 (January 1993); # 137 (March 1993); # 87, 88 (February-March, 1994) were taken as the basis for scheduling of step by step reduction of the state quotas for all kinds of agricultural output.

[2] Results of the survey conducted by the TAHLIL Centre for Social Research, September, 2007

Thus, as the analysis shows, to promote enlargement and commercialization of livestock farms the appropriate measures are to be aimed at:

1. Productivity increase and livestock quality.
2. Expanding opportunities for inter-farm and on-farm land reallocation, including through establishment of free land tenure market (sub-lease rights, buying-out of lease rights, and etc.).
3. Strengthening cooperation among dehkan farms and between them and private farms to unite efforts in livestock management, breeding and product marketing.
4. Improving input and product market through development of competition, abolishing of administrative barriers, and development of infrastructure.
5. Creating incentives for micro financing development in the rural area.
6. Encouragement of livestock product processing development.

3.3. Access to Feeds and Quality Issues

Poor feed availability is one of the key issues of livestock production development in Uzbekistan.

As per results of the survey, modest sizes of dehkan plots restrain provision of feeds for livestock, which is bred in dehkan households. Only 57% of households supply (even partially) their livestock with feeds produced on their own plots. The majority (75%) of them have to buy feeds. Moreover, 62% of households deals with collecting feeds for their livestock - mow grass, collect food waste. Grazing livestock along roadsides and ditches is widespread. Grazing livestock on community pastures, including by hired shepherds, is not common due to a lack of rangelands.

Not all cattle breeding farmers have own feed resources – only 70% of them grow feeds and 50% have pastures on their land plots. Therefore, 91% of the interviewed farmers have to buy feeds for their livestock. Besides, 10% of farmers have access to community pastures, 42% of them collect feeds (mow grass, collect food waste, and etc.), 11% - graze their livestock along roadsides, ditches and in other places.

Corn is the most widespread feed crop in dehkan farms, which is produced by 30% of the surveyed households; its proportion in the total volume of own feed resources is 45%. Around 19% of the households grow grass for hay. Other feed crops are very rarely grown on dehkan plots. Few households use straw after threshing grain as feed for livestock.

Grass for hay and corn dominate in the structure of feed resources of private farms – majority of farmers grow them and they make almost 80% of all feeds produced by farmers. Grain crops for feed are cultivated by one third of all private farms, however in small volumes as a rule.

Table 3.9. Different feed supply options for cattle (% of farms breeding cattle)

Type of farming	Cattle is grazed by shepherds	Cattle is grazed on road sides, along ditches, etc.	Cattle is grazed on the household farm field	Cattle is grazed on community pastures	Feeds are grown on own dehkan plots	Feeds are collected*	Feeds and feed com-pounds are purchased
Dehkan	15.5	52	-	13.5	56.8	61.9	73.9
Private	-	10.6	50.4	10.1	69.8	42.2	91

* mowing of grass, collection of food wastes

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 3.10. Feeds for cattle produced on dehkan/farmer plots (% of farms breeding cattle)

Type of feeds	Proportion of households producing feeds, %		Average volume of produced feeds, tonnes		Proportion in the structure of produced feeds, %	
	Dehkans	Farmers	Dehkans	Farmers	Dehkans	Farmers
Grass	18.9	66	1.42	14.9	40.2	40.8
Corn	29.6	63	1.03	14.3	45.4	36.7
Forage wheat	2.8	21.4	8.3	6.4	3.4	5.6
Other grain crops	2.1	11.8	0.68	28.5	2.2	13.1
Feed roots	1.3	8.2	0.86	8.4	1.7	2.8

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 3.11. Reasons restraining dehkan/farm households from producing sufficient feeds (% of households which do not produce feeds)

Type of farming	Lack of land	Lack of water	High initial production cost of feeds	Low productivity of feed crops on available land	It is prohibited to grow feed crops
Dehkan	73.1	11	4.8	27.4	-
Private	56	9.9	14.9	27	16.3

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 3.12. Feed availability for cattle[1] (% of farms breeding cattle)

Farming entity	Not enough feeds to support livestock vitality	Enough feeds to support livestock vitality only	Enough feeds for optimal* livestock nutrition
Dehkan	9	65.2	25.8
Private	10.1	50.4	39.5

* «optimal» does not mean according to the nutrition standards but according to the farmers' point of view. In this context it should be considered as «a quite good nutrition».

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 3.13. Demand and availability of rough and green feeds in private farms and agricultural enterprises in 2006, thousand tonnes

Feed types	Demand*	Actually available	%
Hay	515.0	350.9	68
Straw	487.0	1491.2	306
Haylage	695.0	389.5	56
Silo	949.0	568.9	60
Feeding beet	223.0	0.4	0.18
Green mass	3738.2	1690.5	45
All feedstuffs (thousand tonnes)	6607.2	4491	67
Total Feed Units (thousand tonnes)	1507.0	1011.4	67
FU per 1 nominal cattle head	21.7	14.5	67

* The estimates were made for 695.4 thousand nominal heads.

Source: the Ministry of Agriculture and Water Resources

[1] According to own assessment of respondents.

More than a half of feed producing dehkan farns (54%), suffer from insufficiency of own feeds. The key reasons for insufficient feed production are lack of land and low feed crop productivity. Around 37% of farmers cannot provide own feeds to their livestock produced on their own plots. The main reason highlighted by 56% of farmers – lack of land to cultivate fees crops. Another important factor is administrative restrictions on feed crop cultivation, which are actually pushed out with cotton and wheat. Water deficiency to irrigate feed crops is another pressing issue in some regions.

Many dehkan farms cannot buy sufficient feeds due to their high cost (especially compound feed, cottonseed meal and cake) as well as due to shortage of high quality feeds. Therefore, straw and corn are the main feed ingredients in the animal diet that is not optimal from the point of view of their nutrition value. Moreover, according to the survey, majority of households (65%) can feed their animals in amounts sufficient just to support their vitality and 9% of the households cannot afford livestock feeding even at the minimum required level.

According to the sampling, only 40% of private farmers are able to supply necessary amounts of feeds to their livestock; and the number of such farmers does not exceed 70% even in relatively problem-free Tashkent region. More than a half of farmers supply feeds to their cattle in quantities sufficient to support animal vitality only, and 10% of farmers cannot supply even the minimum required feed quantity.

The survey outcomes are confirmed by the MAWR estimates and by some independent experts. According to the Ministry, in 2006 feed availability in private farms and agricultural enterprises was 67% (in feed units)[1] in general. However, this volume was achieved mainly on account of hay (wheat straw). Provision of straw was at the level of 306% of the required norm, whereas actual haymaking made 68%; provision of haylage – 56%, silage – 60%, feeding beet – 0.18%; and green mass – 45%, respectively.

As per the team of authors' estimates, feed availability in private farms and agricultural enterprises makes 42% against 67% indicated by the MAWR that in many cases means impossibility for many farms to carry on their normal activity. Therefore, there are cases when farmers shift their profile from livestock breeding to crop production.

This issue is even more relevant to dehkan farms where ten times more livestock is bred. . The authors' estimates of feed production in dehkan farms, based on the land area allocated to dehkans for feed production, demonstrate that their feed availability is lower than in private farms – 25%. Feed production on household plots satisfies 5-10% of dehkan farm demand for hay, green feeds, for silo – by 1%, and for straw – by 27%.

Below we discuss some causes of poor feed availability.

1 Specific nutrition standards per 1 nominal cattle head are approved by the MAWR for the country and per region. Approximately 15.5 tonnes of feed are required per 1 nominal cattle head at the national level and from 12.5 to 17.1 tonnes depending on region. Accordingly, this amount will be equal to 4.21 tonnes of Feed Units (FU) at the national level and 3.41-4.64 tonnes by region.

Table 3.14. Feed availability in dehkan and private farms, estimates made by the team of authors, thousand tonnes*

Farming entity	Private farms and agricultural enterprises			Dehkan farms		
Nominal cattle heads (thousand)	694.7			5966.1		
Feed types	**Demand**	**Actual**	**Available (%)**	**Demand**	**Actual**	**Available %**
Hay	837	255	30	7159	184	2,6
Straw**	926	1491.2	161	7756	2590,8	27,0
Haylage**	1323	389.5	29	11336	11,2	1,0
Silo***	1603	765	48	13722	12,3	0,9
Feeding beet	962	61.3	6	7756	45	0,6
Green mass	4497	1531	34	38780	21860	56,4
All feedstuffs (thousand tonnes)	10816	4493	42	86509	23879	27,6
Total Feed Units (thousand tonnes)	2980	1252	42	25595	6369	24,9
FU per 1 nominal cattle head	42,9	18,0	42	42.9	10,7	25,0

* According to the team of authors' estimates based on feed crop pattern.
** Actual availability according to the MAWR.
*** Double cropping is practiced with sowing corn for silo in cotton-wheat producing farms on the 500,000 ha irrigated area after winter wheat (yield = 20 t/ha).

Example of feed production in dehkan farm of Mr. Abdugani Mukumov (Syrdarya region)

The farm is considered to be quite efficient if compared to other farms. One cow gives milk yield of 2,000-2,100 kg per year. There are seven heads of cattle. Feed crops are cultivated on 0.13 ha of the household plot. The whole area is sown with corn for grain and after harvesting corn they get 0.65 t of grain and 3.9 t of rough feeds. Green mass of the second corn harvest is used for cattle feeding till December. All in all, the dehkan farmer produces 7.2 t of feeds on his household plot. Besides, in the neighbouring cotton-wheat producing farm, he collects 12 t of hay and sows 1 ha with corn for grain that both yield 3.5 t of grain and 27 t of rough feeds. So, all together, the farm has 49.7 t of feeds or 7.1 t/per one cattle head that is 50% of the required quantity. Besides, these cattle are insufficiently provided with green feeds and haylage.

Lack of land for cultivation of feed crops. The analysis made in Chapter 1 has demonstrated that during 1991-1997, the indices of cattle herd number and of meat and milk production have grown up to 40-46%. However, feed crop areas shrank by more than 70%. The areas, which used to be under feed crops, were reallocated mostly for wheat production to implement the state strategy on achieving grain self-sufficiency. Hence, the area under feed crops decreased half-way per one cattle head: from 0.2 ha/one cattle in the 1980s to 0.1 ha/one cattle in the 1990s and further by 75% - to 0.05 ha/one cattle after 2000.

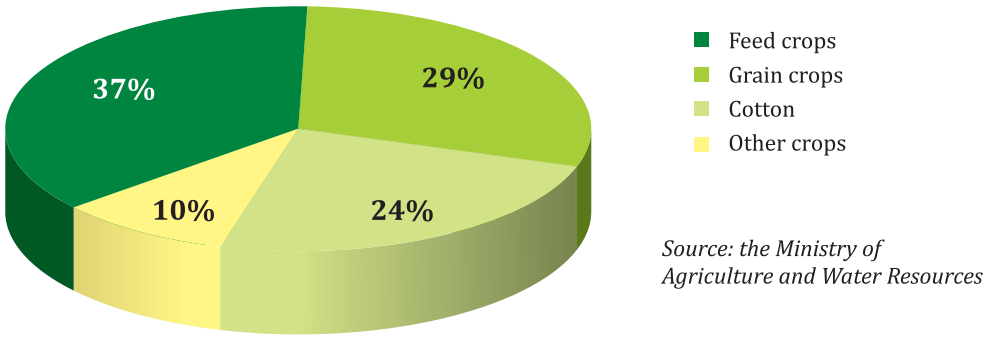
As was mentioned above, land quotation system for cotton and wheat production and setting of the mandatory state production quotas for these crops, restrict easy land reallocation in favour of other crops, including feed crops. Even livestock breeding farms have to sow most of their irrigated arable land with cotton and winter wheat (Figure 3.5) that contradicts the national legislation stipulating targeted land use in livestock breeding farms. Thus, only one third of the available arable land is used for feed production[1].

There are some other regulatory shortcomings in land use legislation restricting possibilities to cultivate feed crops. The Land Code envisages allocation of 0.3-0.45 ha of land per one nominal livestock head that is insufficient to provide enough feeds. Firstly, lack of rough feeds made of natural grass can be compensated only through additional sowing of corn and alfalfa for hay that requires additional land areas. Secondly, feed crop productivity is below the optimal levels due to poor soil quality. Thirdly, adopted cattle nutrition standards are below recommended norms for productive livestock breeding.

To ensure further livestock development and its expansionn in private farms, feed production should be intensified (of both rough and green feeds) that implies expansion of the areas under feed crops. As the irrigated arable land is limited, there is the issue of land sub-leasing, i.e. livestock breeding farms should

[1] 36.6% of arable land is sown with feed crops; herewith 16% of the arable area is not used.

Figure 3.5. Crop pattern in livestock breeding farms in 2006, %



Source: the Ministry of Agriculture and Water Resources

be able to sub-lease land from other farms with different profile.

While considering the issues related to feed production in private farms, it is important to keep in mind that:

- in many cases feed crops are cultivated on poor soils that predetermines their low yields;

- feed crop rotations are not practiced in farms, however they could help to ensure needed crop pattern, crop rotation and soil fertility improvement; and

- seed production of feed crops practically does not exist; there is no customized farm machinery, mineral fertilizers, fuel and lubricants (they are not provided under the state support to livestock breeding farms but only to the cotton and wheat producing farms) that negatively affects feed production.

Dehkan farms, in which the most part of livestock is concentrated, do not have such areas to grow feeds as farmers do. Dehkan household plots of 0.12-0.20 ha are under outbuildings (0.03-0.04 ha), gardens and orchards (0.08-0.10 ha) and actually just 0.03-0.05 ha can be left available for feed crops. According to the State Statistics Committee, the total area under feed crops in dehkan farms is 63,600 ha. Some residues of food crops (shaw) make only a few percent of the needed cattle feeding requirement.

Lack of pastures. The situation with pastures is rather complex. Around 92% of all pastures in the country were under the management of the MAWR in 1991. Gradually, their area shrank by 40% due to intensive and unlimited grazing, abolishment of pasture rotation and lack of their reclamaion practices. Some part of the degraded pastures was transferred to the State Land Reserve, and some part to the Forest Fund.

Nowadays, there are almost 13 million ha of pastures available for the national livestock breeding. Most of them are located in the Republic of Karakalpakstan, Bukhara and Navoi regions, where the most remote grazing livestock breeding is practiced (sheep breeding).

It should also be accounted that haylage provision (natural grass) for cattle is

Figure 3.6. Pasture distribution by region as of 1 January 2007, thousand ha

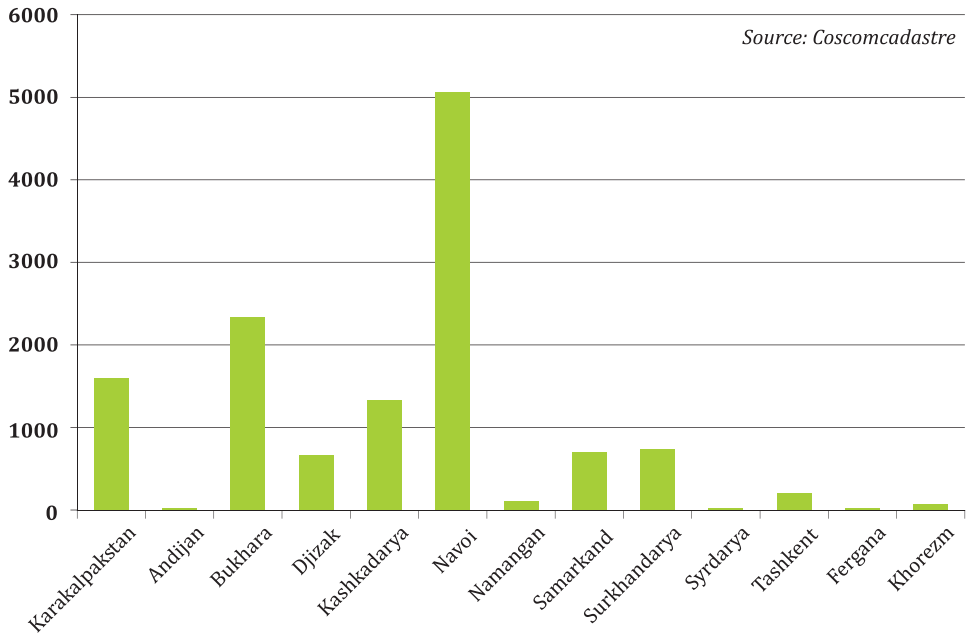


Table 3.15. Grazing land shortage (% to cattle breeding farms)

Type of farming	Proportion of households experiencing lack of pastures	Causes of pasture shortage		
		no areas for pastures	pastures are overgrazed	pastures are water logged/ saline
Dehkan	84.9	20.9	71.7	8.5
Private	61	14.7	54	4.6

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

accompanied with some difficulties. As a rule, the farms specialized in cattle breeding, are located in plain irrigated areas, while haylage collection is to be done in the steppe and foothill regions that supposes travelling, feed collection and its transportation to considerable distances that calls off labour resources; requires transportation; and makes feeds more expensive. Besides, haylage provision made by special feed collecting teams in the steppe and foothill regions is not systematically arranged and does not ensure needed volumes.

All regions, which have been surveyed in 2007, feel acute shortage of pastures. This was mentioned by 85% of the respondent dehkans- and by 62% of the respondent farmers-. The existing pastures are overgrazed, on farmer land plots as well. More than a half of cattle breeding farmers stressed lack of community pastures for grazing. Lack of own feed resources makes cattle breeders buy feeds elsewhere.

Table 3.16. Feeds for cattle bought by dehkan farms during a year (% to farms breeding cattle)

Type of feed	Proportion of households, which buy feeds, %	Average volume of bought feeds, tonnes
Feed compound	69.2	0.91
Grass and hay	34	1.42
Corn	16.5	0.77
Oil meal and cake	4.8	0.57
Bran	4.5	0.35
Feed wheat grain	4.2	0.75
Straw	3	1.85
Other feeds	1.9	0.51

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Lack, poor quality and high cost of feeds in the market. Around 70% of the interviewed cattle breeding dehkans were buying feeds in 2007. (Table 3.16). However, it should be kept in view that under compound feed many dehkans mean various things: cake, bran and any other feed mixtures. Therefore, it was not possible to get exact data about procurement of compound feed. About one third of cattle owners buy hay, 17% - corn (green stems and corn cobs). Other feeds (cottonseed meal, cake, feed roots, grains, bran and hay) are bought more rarely. In most cases, cattle breeders buy feeds from individual sellers.

The surveyed farmers have more often mentioned feed compound (mixed feeds) among other feed resources, which they buy. According to the survey findings for 2006, 81% of the farmers have bought 2.5 tons of feed compounds on an average that exceeds all other feeds taken together (Table 3.17). However, it is necessary to note that buying of feed compound is very difficult considering that this resource is produced and sold under strict state supervision. Factories that are producing feed compound do not have the right to sell their output in the market or directly to farmers. Feed compound is mainly sold through the Commodity Exchange (CE), and its supply is very limited. To have his/her compound feed purchase request considered (but not necesseraly fulfilled) a farmer should submit many different documents to CE. Of course, feed compound can be bought in the market for cash or from other farmers (who managed to buy it at the CE), but its price would be two times higher than the CE's price. At the same time, there are some doubts regarding farmers' answers because both farmers and dehkans refer to any feed mixture as feed compound, and first of all, bran, green mixes as well as mixtures with husks, straws, etc. It is quite possible that due to this reason, farmers never mentioned neither bran nor cake among procured feeds. Thus, it is impossible to consider the collected data on buying feed compound as reliable.

Table 3.17. Feeds for cattle bought by private farms in 2006

Type of feed	Proportion of households, which buy feeds, %	Average volume of bought feeds, tonnes
Feed compound	81,2	0.25
Grass and hay	25,6	0.08
Corn	9,5	0.1
Oil meal	4,1	0.01
Feed wheat grain	3,8	0.02
Straw	2,2	0.04
Feed roots	4,1	0.04
Husks	4,1	0.01

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

In 2006, 26% of the surveyed farmers were buying grass and hay, and 10% - feed corn. These feeds are procured in small volumes and mainly from individuals or other private farms. Other feeds are rarely bought and in very small quantities, as a rule, in the market or from other farmers. In the course of interviews, from 30 to 60% of private farmers mentioned that they could not buy feeds in needed volumes. The main reason is their high prices. In addition, cake and husks are quite often not available for sale.

According to some expert assessments, poor status of feed compound production and marketing is one of the key reasons of inadequate feed availability. Feed compound has low quality with some mechanical admixtures. Cake and husks offered for sale have 16.8% of moisture and volatile matters instead of 9-11% for cake and 14% for husks as required by the state standards. Recommended animal diet for cattle should include 15-20% of feed compound, however this norm is not observed in private farms. Feed compound is mainly sold to poultry farms and collective livestock breeding farms.

The main reason of this situation with feed compound production is that there is only one monopolist operating in this sub-sector – *Uzdonmakhsulot* Joint Stock Company (UDM), which dictates both quality and prices. Besides, according to the Temporary Procedure of the Cabinet of Ministers dd. 11 September 2008, the 15% price increment is established for CE services and 15% price increment for sales outlets. So, the existing system of feed compound marketing (producer – CE – sales outlet – consumer) increases its price by 50-70%. Also, persisting price growth for grain, which continued till autumn 2008, has significantly increased price for this type of feed thus preventing from its wide use and resulting in growing pricesfor livestock products.

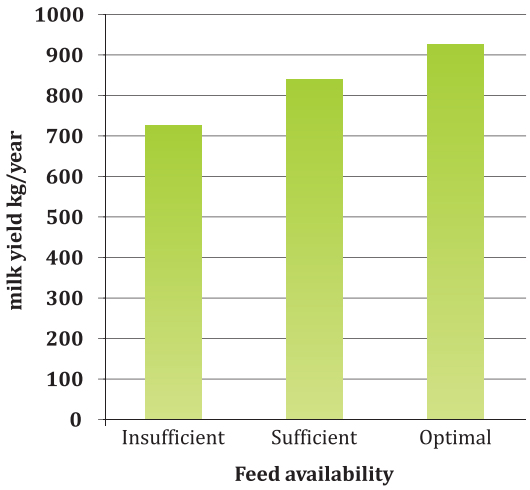
Finally, the feed compound shortage is predetermined by incomplete use of the existing production capacities from one side, and by barriers on the way of

new enterprise establishment in this sub-sector, from the other. There are 40 feed compound producing enterprises in the country, all of which subordinate to the UDM. Their annual production capacity is 812,000 tonnes, however not all of these capacities are engaged. Thus, as of 10 August 2007, they produced 374,000 tonnes. The main reason slowing down expansion of such enterprises is a lack of free markets of raw materials for this sub-sector.

Correlation between feed availability and livestock productivity. The analysis of the survey findings demonstrated that milk yields in dehkan farms increase proportionally to feed availability increase. Statistically valid milk yield growth was observed along with increasing in feed availability from insufficient to sufficient and finally to optimal levels.

Average milk yields in dehkan farms, which were suffering from insufficient feed availability, made 730 kg, whereas in other households where feeds were available to support cattle vitality, they made 840 kg, and in households with good animal nutrition – up to 930 kg. (Figure 3.7). Besides, the survey results enabled to estimate the index of feed sufficiency (of feeds both produced in the household and bought from elsewhere) in tonnes per cow. Furthermore, the statistical analysis indicated existence of a positive correlation between this index and milk yield indices in case of both dehkan and private farms. This proves importance of using high value feeds grown on own plots or bought, unlike low-quality feeds consumed by animals on pastures. Indeed, while good access to high quality feeds makes positive impact on milk yields, pasture availability does not make any particular effect. This can be one of the explanations why dehkans, who graze their cattle along roadsides where grass quality is very poor, have lower milk yields than farmers-livestock producers, who more rarely graze their cattle along roads.

Figure 3.7. Correlation between milk yields and feed availability in dehkan farms



Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

The state policy. In order to improve feed resource availability, the state has adopted a number of resolutions starting since 1991, including:

- Establishment of feed compound reserves for timely provision of privatized livestock farms and private farms with feed compound, husk and cake

according to their applications with strict observance of quality standards (1994).

- Creation of environment for complete satisfaction of livestock sector with feed compound (1997);

- Establishment of high quality feed compound production under the UDM management (1998);

- Establishment of specialized cooperatives on feed compound production with support of the Farmer Association using funds of dehkans, farmers, other individuals on a commission basis, as well as using bank loans (1998).

However, on the background of feed crop area shrinking, these measures have not been able to improve the situation with feed resource availability for breeding livestock.

In 1998 it was decided to allocate 140000 ha of livestock farms' irrigated lands for feed crops, which together with repeated sowing would make 200000 ha. This was meant to facilitate strengthening of feed resource base and increasing in livestock number bred by the population. However, these measures were not fully enforced: 50-60% of the irrigated arable lands targeted for feed crops were occupied with cotton and winter wheat. Thus, land quality worsened and feed crop productivity went down. Other factors including lack of customized feed harvesting machinery, state input supply and access to preferential loans were aggravating the situation.

Apparently, any program for livestock sector's development, if it is result-oriented, should address the issue of feed resource sufficiency. This issue cannot be addressed unless the areas under feed crops are expanded and hence the existing practice of land distribution and land use is changed. Besides, the Government should pay special attention to the issues of feed resource market, its development and institutional strengthening, primarily through demonopolization and deregulation of feed compound production and establishment of free markets for agricultural raw materials. It is also important to monitor quality standards, to encourage research and development for breeding of high-yielding feed crops. Application of research findings in this area could help Uzbekistan to produce sufficient volumes of feed resources on the reducing land areas allocated for feed production.

While realizing the existing issues of livestock production security with feed resources, the Government undertakes a number of steps to address them. The Presidential Resolution dd. 21 April, 2008 on «Additional Measures for Strengthening of Livestock Expansion in Household Plots, Dehkan and Private Farms and Enlargement of Livestock Output Production» prohibits to use «irrigated areas allocated to private farms and other rural enterprises specialised in livestock breeding, including poultry farms … for sowing of cotton and wheat for the state procurement needs»[1]. These lands are targeted exclusively for sow-

[1] The Government plans to increase sown areas under feed crops up to 330,000 ha by 2010 that is by 13.7% more as compared to 2007.

ing of feed crops. It is important now to attain enforcement of this prohibition.

Besides that, the Resolution includes the following:

- Action Plan is adopted on upgrading of feed compound sub-sector and creation of opportunities to buy grain remaining with private farms. This decision is taken to ensure production of quality feed compounds.

- Specific measures are developed to expand the network and to rationally place specialized outlets for selling feeds including feed compounds, cake and cotton husks across regions and districts.

3.4. Accessibility and Quality of Veterinary and Artificial Insemination Services

Vet services. The relations in this sub-sector are regulated by the «Law on Animal Health» of the Republic of Uzbekistan, which determines vet practice and establishes structure and procedure for Vet Service management including its main objectives.

Nowadays the Vet Service of Uzbekistan is the most developed sub-sector of the livestock infrastructure, considering its regional and district branches and set of services provided to dehkan and private farms. There are the Regional Vet Departments in all regions and accordingly District Vet stations in the districts.

At the lower level, the Vet Service is represented by public and private Zoo-Vet stations (ZVS). The state ZVSs practice animal vaccination, treatment and AI services for cattle belonging to dehkan and private farms, while private ZVSs deal with animal health and also, upon agreements with the state Vet Services, make animal vaccination and AI. The private ZVSs operate on the base of licenses, which they obtain from the Regional Vet Departments.

By the mid of August, 2007, there were 2,128 ZVSs in the country and new ones continue to be established under the State Program for Livestock Development for 2006-2010. Their establishment supposes allocation them with buildings and provision with all needed equipment. However, this process is not progressing successfully everywhere. Sometimes, the buildings are not allocated, so the ZVSs are not functioning. Many of ZVSs opened in recent years do not have appropriate buildings and equipment, so their activity is just formal. Apparently, the state budget funds are not sufficient, and not so many private ZVSs are emerging. It is also rather difficult to get access to a bank loan for purchasing equipment supply due to high interest rates and bureaucratic barriers on the way of document processing.

Cattle vaccination as well as of other livestock is made to prevent foot and mouth disease, anthrax, brucellosis, emphysematous carbuncle, bradzot, cattle-plague, hydrophobia and lettostrazm. Special attention is paid to animal vaccination in those farms, which are located along the borderline with other states.

Vaccines are being distributed to the ZVSs on the free of charge basis under the

state budget support, which is targeted to the Regional Vet Departments according to their provisional applications with indication of cattle number. Vaccination can be practiced once or twice a year depending on the disease, and is to cover the entire livestock herd bred in the attached area. Livestock owners pay for syringes and services only.

According to vets, the provided quantity of vaccines is not sufficient for all animals due to their unreliable livestock recording in dehkan farms, which is managed by makhalla committees. As a result, some part of livestock is left without vaccination that weakens animal immune system and cause diseases. Also, according to the experts, the vaccine itself is ineffective in many cases or insufficiently effective – probably due to poor drug packaging.

Most of dehkans and livestock breeding farms covered by the survey of 2007, do not face any difficulties with getting vet services, except for several respondents mentioned lack of needed vet drugs and their high cost.

Commonly, dehkans-cattle breeders visit vets for vaccination or in case of disease. Most interviewed farmers (83%) can easily afford vet services. However, 17% face difficulties with getting vet services. Around 7% of farmers are not satisfied with service quality and 6.5% find them too costly.

Artificial insemination (AI). The AI of cows belonging to population and farmers is practiced by vet specialists of ZVSs to improve cattle breed and increase its number. Bull semen is delivered to ZVSs from Uznaslchilik branch enterprises in the special Dewar vessels, in which it can be conserved for 30-80 days depending on vessel quality and volume. Insemination of one cow is usually made twice (in the morning and in the evening) and if not effective, cattle owners visit the ZVS once again.

Annually, the MAWR assigns the Vet Service to make agreements with Uznasl-Khizmat branch to provide semen to the ZVSs. However, these plans are not fulfilled. For instance, in 2007 the MAWR assignment was for more than 1 million semen doses, whereas actually Uznaslchilik contracted the Vet Service for supply of 258 thousand doses as of 10 August, 2007 that was just 25% of the assignment. Actually, 93,800 doses were sold, i.e. 36% of the contracted amount.

Experience of ZVS establishment (Syrdarya district)

The ZVS is a private entity and carries on private practice also fulfilling the state orders for animal vaccination and AI. It was established in 2003 and its premises were privatized by Mr. Rauf Latipov, a vet attendant. The station has appropriate equipment (for approximate value of UZS 5-6 million) and has good facilities including three main rooms and utility rooms. The ZVS's services cover population of Syrdarya town and two large shirkats. Two vet specialists with specialized secondary education in animal health are working in the ZVS.

Table 3.18. Evaluation of access to vet services (% to cattle breeding farms)

Type of farming	Farmers who do not have problems with accessing to vet services	Problems with accessing to vet services			
		Low service quality	Lack of vets/ livestock specialists	High cost of services	Lack of vet drugs
Dehkan	82	6	5.9	6.5	2
Private	82.8	7.1	4.6	6.5	4.1

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

AI was made for 64,600 cows or 12.7% of the assignment (508,000 cows).

What can explain such unsatisfactory situation with the AI? Firstly, many cattle owners are unable to afford it. Secondly, the population does not fully understand importance of the AI. Thirdly, the Uznasl-Khizmat Association cannot manage even existing required volumes. Fourthly, there is no sufficient number of AI units and vet specialists to make it.

According to the experts, the AI is ineffective in many cases and cow owners have to repeatedly visit ZVSs. It results in both higher ZVS's expenses and negatively impacts their revenue rates, and raise doubts among population about expediency of this practice.

As per the survey, the AI services are poorly demanded – only 2% of dehkans visited ZVSs to get them. Those, who used these services found them to be satisfactory. Considering the survey findings, such low demand for the AI is linked with traditions and not with the limited access to such services – very few cattle owners mentioned remote location of insemination units, high costs, poor service quality, lack of semen and etc.

Only 12.5% of the farmers-cattle breeders use AI services and the absolute majority of them consider quality of these services to be satisfactory. According to the survey, most of the farmers do not see any advantages of the AI and therefore consider that there is no need in such services. More than a half of farmers breeding livestock do not need AI as they have a stud-bull in their herd. Around 39% of the respondents do not want to use this method; 9% of farmers have limited access to such services because of the AI unit is located too far from them; 6% of farmers mentioned lack of semen, and other 5% of the respondents mentioned high cost and low quality of services.

Meanwhile, the interview findings prove that the AI increases milk yields by more than 30%.

Pedigree livestock breeding development. A considerable number of cattle bred in large livestock production farms was sold to private farms and to popu-

Table 3.19. Rate of AI services use

Share of farmers who does not use AI, % of cattle breeding farmers	Reasons, according to which farmers do not use AI, % of those who has cattle but does not use AI				
	Own stud-bull	Farmers do not want to use AI	AI unit is located too far	Lack of semen material	Low quality and high cost of services
87.5	53.6	38.9	9.4	5.9	4.7

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

lation (some part was slaughtered) in the process of farm reorganization and privatization. The «Law on Pedigree Animal Breeding» was adopted in 1995 with subsequent sub-laws regulating establishment of regional pedigree farms, procurement of pedigree livestock from abroad, provision of pedigree livestock to the population, animal breeding, and other related services. The *Uzgosht-sutsanoat* was entitled in 1996 to exchange the national currency to procure pedigree livestock from abroad; in 1998 it was planned to establish 2-3 specialized pedigree breeding farms in each region to breed pedigree young cattle stock. The Farmer Association was assigned to support provision of livestock breeders with pedigree stock; in 1999, the Association of Pedigree Breeding *(Nasl-Khizmat)* was established and the Uzbek Research and Production Centre for Agriculture was assigned in cooperation with the Association to develop activities aimed at reforming pedigree animal breeding at the public pedigree breeding enterprises.

However, a number of objectives set forth by the Law has not been fulfilled, including conservation and rational use of pedigree resources. Also, any reliability of pedigree resource origin used in breeding was not ensured in terms of both type and quality; new animals with better genetic traits have not been obtained. No increase of economic cost efficiency and competitive ability was achieved. The main causes of this situation were poor research support of pedigree breeding; insufficient pedigree stock and frozen semen procurement from abroad; insufficient feed resources and vet services; lack of required hygiene norms in livestock management; and incomplete public awareness about pedigree breeding.

At present, pedigree livestock is available in the state pedigree breeding farms, livestock breeding farms, in collective livestock breeding farms and in some households. The most wide spread breeds in Uzbekistan are Black and White, Schwyz, Red Steppe, Bushuyev, and Santa Gertrude.

One can state that the current status of the national pedigree livestock breeding is not at the due level.

Some breeding research work is carried out by the Uzbek Research Institute of

Livestock Production. Its scientists conserve genepool and improve productivity of Holstein, Red Steppe and Schweiz breeds.

Lack of feeds, substandard cattle management, lack of qualified specialists together with poor animal breeding prove insufficient coordination of research and production linkages, low research level in research institutions, insufficient motivation of scientists and professionals and attention to extension of research developments, lack of extended advisory work among livestock breeding farmers.

In this context, the State Program for Livestock Development (2006-2010) envisages specific measures for strengthening attention to pedigree animal breeding, procurement of pedigree stock from abroad, procurement of frozen semen, vaccines, instruments and equipment with exemption from customs duties. To restore and ensure further development of the pedigree animal breeding, it is planned both to procure pedigree stock from abroad and to continue animal breeding by the national research institutes and pedigree livestock breeding farms.

It was decided by the Government to procure 14,800 heads of pedigree stock from China, Ukraine, Kazakhstan, Holland and other countries. This had to be managed by the regional *Nasl-Khizmat* branches and private farms. In 2006, they brought 632 livestock heads; in 2007 – 3,487 heads, in 2008 – 6,501 heads. However, the following problems have been encountered while importing pedigree livestock:

- lack of financial resources;

- pending administration issues, including difficulties in timely local currency exchange to procure the pedigree livestock.

A practice of buying pedigree livestock from abroad demonstrates that sometimes ill animals are imported due to improper vet screening checks. Besides, not all animals get accommodated to the local environmental and climatic conditions that along with poor management results in disease incidence, lowered productivity and mortality.

Emerging of new cattle pedigree breeding farms in the selected 29 districts of the country also faces some difficulties; arranged activities need constant monitoring by experienced specialists[1].

A number of collective livestock breeding farms conduct certain pedigree breeding activities, for example, «Tashkent Agrosanoat»[2], «Milk Agro» and others. These farms have more than 100 heads of cattle and full-time vet specialists, so vet services and animal breeding are arranged at good level.

Recently, farmers are becoming more interested in buying pedigree livestock. To buy the pedigree livestock, population can participate in auctions being organized in the country. In parallel, the commercial banks and Employment Fund started to lend the population with micro-credits to buy cattle.

[1] 29 districts were selected to implement the State Program for Livestock Development.
[2] One of the largest livestock breeding farms in Uzbekistan with more than 1000 cattle heads.

Key issues and state policy. The analysis has revealed the following issues related to vet service and pedigree animal breeding in the country.

- lack of understanding among population of vet service importance;
- low level of solvent demand for vet services, primarily by farmers;
- low level of equipment availability in ZVSs and lack of premises;
- shortage of vaccines and incomplete animal vaccination;
- low quality of available vet drugs and materials for vaccination and insemination;
- weak development of private entrepreneurship in vet service sub-sector;
- insufficient advocacy among population about necessity of vaccination and AI; and
- lack of qualified specialists and their low motivation.

It should be emphasized that the Presidential Resolution dd. 21 April, 2008 on «Additional Measures for Strengthening of Livestock Expansion in Household Plots, Dehkan and Private Farms and Enlargement of Livestock Output Production» pays specific attention to AI, vet services and pedigree animal breeding development. In particular, the following decisions have been made:

• To establish own AI facility through upgrading of *Uznaslchilik* production capacities and creation of the large-scale service unit network.

• To privatize ZVSs under the Main Department of Veterinary Services (MAWR) with a mandatory requirement to maintain their profile for at least 10 years.

• Recommendations to the Pakhta Bank and other commercial banks to provide support on a priority basis to the enterprises dealing with zoo-vet services and AI to procure needed zoo-technical and lab equipment and transportation through lending them with loans to be charged from preferential credit funds *Uzselkhozmashlizing* Company is assigned to deliver the zoo-technical equipment and lab equipment under leasing terms.

• To exempt (till 1 January, 2012):

  - pedigree animal breeding enterprises and *Uznaslchilik* branches from all taxes and mandatory charges to the targeted state funds and School Fund;

  - pedigree livestock breeding farms, pedigree animal breeding enterprises, poultry farms and feed compound producing enterprises as well as the *Uzzoovettaminotkhizmat* Association from customs duties (except fees for customs handling) on imported pedigree material, technological and auxiliary equipment for zoo-vet service development, feed compound ingredients according to the lists approved by the Cabinet of Ministers of the Republic of Uzbekistan.

  - ZVSs from the state fees for registration and licensing.

Besides that, the National TV and Radio Company of Uzbekistan, Uzbek Agency for Publishing and Information, MAWR, and Farmers Association are assigned to arrange a special mass media campaign to highlight issues of development and dissemination of the best practices in livestock production, the modern methods of livestock management, and livestock output market infrastructure development in the rural area.

Implementation of these measures will contribute to productivity enhancement in livestock sector and in cattle sub-sector, in particular.

3.5. Availability of Farm Machinery and Equipment

Insufficient number of farm machinery and fuel & lubricants represents a serious issue for livestock breeding farms. Some modern farm machinery is being manufactured in the country, however, in inadequate quantities and at rather high costs. Leasing system is weakly developed. Machinery-Tractor Parks (MTP) established to service private farms are not fully equipped with required farm machinery and cannot manage to satisfy requests for machinery services in due times defined by established agricultural practices.

Some livestock breeding farms, especially large collective farms, have their own machinery such as universal tractors and sowing machines as well as trailers. However, not all of them have this machinery and some have to call for MTP services.

Livestock breeding farms use machinery mainly to cultivate feed crops. At the same time, MTPs provide priority services to cotton-wheat producing farms. Sometimes, fall-ploughing is delayed even in cotton production farms due to machinery shortage in MTPs and is practiced in December and even in January, so for livestock breeding farms proughing in due times is practically impossible.

Also, feed harvesters available in livestock breeding farms do not satisfy the needs. As per results of the interviews, only a half of the needed number of Maral-125 combines are available to mow feeds and are expensive and unaffordable to farmers (around USD 130,000); only two thirds of mowing-machines KPI-2 .4A are available (67% of needed) and unsatisfied need in KIPX-1.5 mowing-machines is 27%. Besides, majority of Maral-125 combines is physically obsolete and require serious repair and spare parts. Majority of the feed harvesting machinery is concentrated in collective farms, while private farms also feel lack of automatic loaders and pickup baler machines.

Another issue relates to the lack of equipment to store and process meat and dairy products. According to the survey, 61% of the cattle breeding farmers do not have facilities to store their livestock products; 19% of farmers can store no more than 50 kg of products; only 15.3% of livestock breeding farmers processe own and procured agricultural produce. The main reasons why the farmers do not deal with processing include the following: no opportunities to buy processing equipment – 41.3%; processing equipment is too expensive – 34%.

The correlation and comparative analysis of the survey findings identified high dependence of livestock breeding farm performance indices and their equipment (Table 2.21). The Table 3.20 shows a correlation between livestock breeding farm performance and their equipping with machinery. In particular, milk yields in the well equipped farms are more than 1.5 times higher than in the farms without equipment. A rate of return difference (rate of return to cattle cost) is even higher – 3.5 times.

Obviously, the scale of machinery use depends on a farm size: the larger herd, the more machinery is used. Accordingly, high performance rate of farms with many machinery units can be explained by economies of scale effect, which has been discussed above. However, as the correlation analysis shows, there is some performance rate dependence not only on the absolute machinery number, but also on such relative indices as machinery number per one worker and per one hectare. It means that equipping with machinery itself, regardless of the economies of scale effect is an important factor for livestock production performances.

Moreover, the survey data collected in dehkan farms (Table 3.21) prove that those dehkans-livestock breeders, who use machinery, perform better.

Also, the Table 3.20 data point that investment-active farmers had better performance rates than those, who did not invest into fixed assets of their farm operation during last year.

Table 3.20. Livestock breeding farm performance depending on their equipping and capital investments

Equipment availability	Number of farms	Average cattle number	Average milk yield, kg/year	Average annual revenue from breeding cattle, UZS thousand	Average rate of return from breeding cattle (return rate to cattle cost), %
No farm machinery	101	23.2	821	623	6.8
Minor machinery availability (less than 5 machines)	177	48.2	1089	3321	13.4
Good machinery availability (5 and more machines)	115	80.2	1292	10076	24
No capital investments made last year	241	42.6	1030	3448	17.2
Capital investments were made last year	152	64.5	1156	6395	18.4

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

Table 3.21. Dehkan livestock breeding farm performance depending on equipping rate

Equipment Availability	Number of farms	Average cattle number	Average milk yield, kg/year	Average cattle product cash value, UZS thousand	Average monthly revenue per household member, UZS thousand
Farm machinery unavailable	436	2.6	836	293	64.9
Farm machinery available	196	3.4	970	425	80.9

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

3.6. Level of Human Capital Development

The correlation and comparative analysis of the interview findings identified existence of a pronounced relationship between performance rate of a livestock breeding farm and agricultural education background of its manager. The higher his/her educational level, the bigger livestock herd he/she has, the more milk yields and return on cattle can be received (Table 3.22). It was not identified that experience in agriculture makes effect on livestock production performance. A period of farm operation positively influences milk yields: the farmers operating for more than five years have better productivity (by 17.5%) that those having less years in operation.

Thus, it is possible to conclude that for today, the professional agricultural knowledge and experience of operation in the form of independent farming entity, i.e. the knowledge and skills in farming practice are the main constituents of human capital quality in the livestock sector. This knowledge and experience enable farmers to manage cattle better, to apply modern technologies and behave proactively in the market.

Therefore, capacity building in terms of acquiring new knowledge and skills in agriculture and also in such areas as management, including finance and human resource management, marketing and economy legislation would facilitate livestock sector efficiency increase. Consequently, large-scale introduction of state training programs, training projects with support of non-governmental and international institutions should be encouraged in every possible way. Another area for livestock sector efficiency increase is strengthening human capital capacity – development of advisory services for livestock breeders, including livestock management, modern technology transfer and agricultural businesses.

Table 3.22. Livestock breeding farm performance depending on quality parameters of human capital

Level of education and experience	Number of farms	Average cattle number	Average milk yield, kg/year	Average annual revenue from breeding cattle, UZS thousand	Average rate of return from breeding cattle (return rate to cattle cost), %
No professional agricultural education	207	39.7	1002	2048	11.2
Secondary professional agricultural education	83	53.1	1126	3286	12.2
Higher agricultural education	102	72.5	1198	10811	27
Experience in agriculture less than 10 years	103	52.2	1100	5865	20.5
Experience in agriculture 10 and more years	289	50.7	1071	4136	16.7
Farm operation for less than 5 years	99	52	954	7048	24
Farm operation for 5 and more years	293	50.8	1121	3771	15.3

Source: Results of survey conducted by the TAHLIL Centre for Social Research, September, 2007

CONCLUSIONS

Agriculture is an important sector of economy of Uzbekistan. The sector's share in the GDP accounted for 21.7% in 2007. Nearly 26.5% of the economically active population is employed in agriculture.

The livestock sector accounts for approximately 45% of the gross national agricultural output. Starting since 1991, cattle herd number has increased by almost 1.5 times that subsequently resulted in meat and milk production growth and augmentation of livestock product share in the gross agricultural product of Uzbekistan. Livestock production plays an important social role as well. The main sector outputs – meat and milk are referred to the group of essential food products and considered the important source for income generation in the rural area. The analysis conducted under this study has identified a direct correlation between welfare of dehkan households, cattle herd number and animal productivity.

Still, the livestock productivity is at a rather low level in the country as compared not only to the most advanced meat and milk producing countries, but also to the most number of the FSU states.

Further, it is important to emphasize the most important issues faced by the livestock sector's development of Uzbekistan.

1. Limited feed availability

Insufficient quality of feed resources is the main reason of low animal productivity. As per the authors' estimates, feed availability in private farms and agricultural enterprises makes 42%[1], and in dehkan farms (which breed 93% of cattle) – 25%. These numbers say that without thorough addressing of feed availability issue, it is basically impossible to enhance animal productivity.

The main reason is sharp decreasing in arable lands under feed crops: by more than 70% from 1991 to 2007[2]. Herewith, soil fertility has declined as well[3]. It is impossible to address the issue of arable land shortage under feed crops without flexible on-farm and inter-farm land reallocation. Nowadays, all agricultural enterprises (private farms and shirkats) cannot easily redistribute or reallocate the most part of their lands under agricultural crops, as most land areas are allocated for cotton and wheat production. Also, inter-farm land reallocation is impossible due to absence of market for land tenure rights and sub-leasing.

Poor quality and high costs of feed compound is another aspect of the issue. The main reasons of this situation is insufficient volumes of raw materials for its production (due to inadequate feed crop production) and lack of competition in

[1] According to the MAWR, this number is 67%.
[2] While livestock cattle herd number increased by 46%.
[3] This issue relates to the entire agricultural sector, and not only to the livestock production. High quality irrigated areas have decreased since 1990 by more than 80% that actually means their complete absence these days. Good quality lands have also decreased by 25%.

the feed compound sub-sector.

This issue cannot be addressed unless the areas under feed crops are expanded and hence the existing practice of land distribution and land use is changed. Besides, the Government should pay special attention to the issues of feed market, its development and institutional strengthening, primarily through demonopolization and deregulation of feed compound production sub-sector and establishment of the free market for agricultural raw materials. It is also important to encourage research and development in the area of high productive feed plant breeding. Finally, it is important to consider the issue of providing incentives for establishment of specialized firms to deal with feed production for livestock sector. Obviously, farmers themselves cannot and should not produce all kinds of feeds. It is more expedient to delegate this to the specialized farms.

2. Small sizes and low commercialization of livestock breeding enterprises

The main specific feature of the livestock sector is that overwhelming majority of livestock output is being produced in small households (dehkan) farms[1], which manage 93% of cattle. Accordingly, herd number in such farms is small – in average, 2-3 heads. Meanwhile, the herd number directly defines livestock breeding farm performance: the higher the herd number, the higher the milk yields, cattle product value and revenues from cattle breeding[2].

Small farm sizes predetermine their low commercialization rate: only one third of dehkan farms market their meat and milk products, the rest breed cattle for internal consumption needs. On the other hand, the commercialization rate significantly influences household welfare: those households, which sell their livestock products, have approximately 1.5 times better income as compared to the households, which breed cattle for own consumption. Therefore, the Government should encourage dehkan farm commercialization to saturate consumer market and to improve living standards in the rural areas.

The main reasons restraining increase in cattle herd number and animal productivity as well as commercialization rate of both dehkan and private farms, include the following:

- insufficient feed resources;
- lack of land for livestock production;
- lack of funds to buy cattle;
- poor competition and undeveloped infrastructure for input supply, service and sales markets.

Considering that the commercialization rate of livestock breeding farms is important for the sector's development, dehkans and farmers should be encouraged to buy additional cattle stock, to develop cooperation (joint procurement

[1] An average land size of dehkan farms is 0.15 ha.
[2] This can be explained by economies of scale and specialization effects.

of cattle, animal breeding, procurement of equipment, feedstuffs, services, marketing of products, etc.). In order to mitigate acuteness of the problematic situation with difficult access to loans, it is important to create incentives for development of micro finance sector in the rural area, as well as to develop the legal framework for using land tenure rights as collateral to get loans. It is also important to develop competition and market infrastructure, to eliminate administrative barriers for input markets and livestock production markets and to promote its initial processing.

3. Low level of modern technology transfer, extension, machinery use and lack of human capital

Application of modern technologies is the important factor for the livestock sector's development, including provision of quality vet and research services. For instance, as the analysis shows, application of the AI increases milk yields by more than 30%.

The following are the main issues identified during this study in the area of vet services and pedigree animal breeding:

- low level of equipment availability in ZVSes and lack of premises;

- shortage of vaccines and incomplete animal vaccination;

- low quality of available vet medication and materials for vaccination and insemination;

- weak development of private entrepreneurship in the vet service sub-sector;

- insufficient advocacy among population about necessity of vaccination and AI; and

- lack of qualified vet specialists and their low motivation.

The analysis also identified dependence of livestock breeding farm performance on equipment and machinery availability. In particular, milk yields in the well equipped farms are more than 1.5 times as high as in the farms without equipment. Insufficient number of farm machinery and fuel & lubricants represents a serious issue for livestock breeding farms. The farm machinery that is available in the market is rather expensive, while leasing system is weakly developed. MTPs established to service private farms are not fully equipped with required farm machinery and cannot manage to satisfy requests for machinery services in due times defined by established agricultural practices.

The study also identified existence of a pronounced linkage between performance rate of a livestock breeding farm and agricultural education background of its manager: the higher his/her educational level is and the bigger livestock herd he/she has, the more milk yields and return on cattle are. The length of farm operation also positively influences milk yields. Thus, it is possible to conclude that for today, professional agricultural knowledge and experience of operating an independent farming entity, i.e. the knowledge and skills in farming

practice are the main constituents of human capital quality in the livestock sector. Therefore, capacity building in terms of acquiring new knowledge and skills in agriculture and also in such areas as management, including finance and human resource management, marketing and economy legislation would facilitate increase of livestock sector efficiency.

It should be noted that studying issues of livestock development, and consequently understanding the sector's challenges in order to identify the best ways for their addressing, are hindered by insufficiency of quality statistical information.

During recent years, the Government of Uzbekistan has been paying substantial attention to the livestock sector's development, and to cattle breeding, in particular. It is ready to search for appropriate solutions to address the existing issues, which is confirmed by the planned activities to strengthen environment for the sector's development. Some measures in particular are being implemented to provide state support to procurement of pedigree livestock and intensification of pedigree livestock breeding; arrangement of vet services; provision of microloans to buy productive livestock; termination of non-targeted use of lands allocated for feed crop production; increasing motivations for rural residents to breed livestock.

All these are definitely able to positively impact and contribute to efficiency increase of the sector, and subsequently, to welfare improvement of a significant part of the population. The key issue is implementing the planned activities in practice.

It is also important to keep in view that livestock sector issues are closely interrelated with the general challenges pertaining to the agricultural sector as a whole (this has been discussed in detail in Chapters 1 and 2). Accordingly, the sector's prospects directly depend on further course of agricultural reforms in the country. The following aspects are the most crucial in our opinion:

- achieving free land reallocation for crop production within farms, which will enable farmers to optimize their crop pattern according to the market demand and supply, considering their long-term interests (soil fertility conservation, in particular); and

- improvement of the legal framework for sub-leasing land transfer and possibility to resell land tenure rights, and for using those rights as collateral to get access to bank loans.

These measures will contribute to land use optimization on the inter-farm level and expand opportunities for farmers to access financial resources.

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ANNEX 1.

List of regulatory legal acts in livestock sector adopted since independence of the Republic of Uzbekistan

1. INSTITUTIONAL FRAMEWORKS FOR PUBLIC GOVERNANCE IN LIVESTOCK SECTOR

#	Date	Name of law or sub-law	Content
1.	11.01.1991	Resolution of the Cabinet of Ministers (RCM) under the President of Uzbek SSR # 5 on Strengthening of Agro-Industrial Complex Management Structure of Uzbek SSR	The State Cooperative Committee of Uzbek SSR is transformed into the Ministry of Agriculture of Uzbek SSR (MA). The livestock sector is to be administered at the central level by two departments: feed production and intensification of livestock production development.
2.	18.01.1996	RCM # 30 on Measures for Strengthening of Management and Stabilization of Activities of the Uzbek State Joint Stock Association of Meat and Milk Production (Uzgoshtsutsanoat)	The National Production Association Uzgoshtsutsanoat is transformed into the Public Open Joint Stock Company Uzgoshtsutsanoat in 1996 and withdrawn from the MA supervision. The Joint Stock Company is to be composed of the public shares of JS companies established on the base of former public enterprises, and of shares intended for free market sale, as well some shares of other stakeholders, including foreign entities.
3.	26.11.1996	RCM # 419 on the Issues of Organisation of Activities of the Ministry of Agriculture and Water Resources (MAWR)	The Ministry of Agriculture and the Ministry of Land Development and Water Resources are liquidated and a new public management body is established - the Ministry of Agriculture and Water Resources.
4.	30.04.1999	RCM # 202 on Changes, Amendments and Cancellation of some Governmental Decisions which lose their Effect	The Association Pilla (Silkworm) is withdrawn from the MAWR supervision. The Department for Farm Management is established at the MAWR.
5.	17.01.2001	RCM # 32 on Improving of the MAWR Activity	The MAWR shall be improved: the livestock sector is abolished, and the Department for Farm (livestock breeding) Management is liquidated. The Main Department for Pedigree Animal Breeding and Services in Livestock Sector is established. It is constituted of three units: pedigree animal breeding development, new technologies in feed production; animal health and service provision development in livestock sector.
6.	28.06.2003	RCM # 290 on Strengthening of the MAWR Organization Structure	The organizational structure of the MAWR is modified, including (1) new Councils for special issues including livestock production development are established; (2) the Main Department for Pedigree Animal Breeding and Services in Livestock Sector is transformed into the Main Department for Development of Livestock Production, Poultry Production and Fishery; (3) the Main Department is transferred under the sector of agricultural technologies. There are two units established at the Department: on livestock production development and poultry & fishery development.

2. LEGISLATION ON REFORMING OF LAND RELATIONS IN LIVESTOCK SECTOR

#	Date	Name of law or sub-law	Content
1.	15.08.1989	Resolution of the Council of Ministers of Uzbek SSR # 258 on «Further development of personal households and individual constructions of Kolkhoz and sovkhoz workers and other citizens».	A standard household size is increased to 0.25 ha in the irrigated areas (considering farm feasibility). As many as 1,514 families shall receive new household plots and increase the existing ones. All together 183,200 ha of irrigated land is allocated.
2.	20.06.1990	Law on Land	The Law regulates land relations in the country. Land lease is permitted with minimal lease period till 10 years. The agricultural enterprises have got the right to sublease land (inter-farm level). Land use is introduced in terms of land tax and lease payment. Uzbek citizens living in the rural area and having own livestock can be allocated with land plots for temporary use as hayfields and grazing lands. Those people, who express a desire to manage a dehkan farm can be allocated with land plots under the terms of life-long inheritable possession, usufruct or lease for the period of not less than 10 years.
3.	11.01.1991	Presidential Resolution (PR) # 124 on Additional Measures for Further Development of Private Household Plots of Kolkhoz, Sovkhoz Members and of Other Rural Residents	Land allotments are defined for every farm, settlement, district and region needed in new household plots or expansion of the existing ones. To satisfy requirements in household plots, 108,500 ha area allocated on account of cotton area decrease. An inventory of all household lands allocated in 1989-1990 shall be carried out with withdrawal of abandoned plots and their subsequent transferring to families in need.
4.	29.11.1991	PR # 295 on Further Development and Strengthening of Dehkan (Farmer) Farms and State Support for Entrepreneurship Activity	The inventory of agricultural areas allocated earlier for establishment on dehkan farms (private farms) is completed. Land plots can be leased out for the period of not less than 10 years with a prolongation right, primarily for livestock production.
5.	30.12.1991	RCM # 315 on Measures for Further Development and Strengthening of Dehkan Farms (Private Farms)	The inventory of land use is completed in every kolkhoz, sovkhoz, other agricultural and forest management enterprises and organizations. The Special Land Fund is established of 200,000 ha to distribute lands to dehkan farms (private farms) till 1 March, 1992. An optimal size of a land plot for commodity production by dehkan farms (private farms) of different profile.
6.	23.02.1994	RCM # 87 on Reform Strengthening in Livestock Sector and Interest Protection of Dehkan Farms (Private Farms) and Privatized Livestock Farms	Dehkan farms[1] (private farms) are provided with 0.3 – 0.45 ha per each nominal livestock head in irrigated areas and up to 2 ha in rainfed areas. Only those farms with livestock herd number of not less than 30 nominal heads are eligible for privileged provisions of this Regulation. It is planned to lend privatized livestock farms and dehkan farms (private farms) with unlimited number of bank loans pledged with their property for the period of not less than 10 years to procure cattle and inputs.

[1] Dehkan farms started to be named as livestock farms according to the Law on “Farming entity” adopted in 1998

#	Date	Name of law or sub-law	Content
7.	18.03.1997	PR # 1737 on Measures for State Support of Dehkan and Private Farms and Strengthening of their Role in the National Food Security	A National Commission is established; a continuous land inventory of dehkan and private farms is completed. To encourage the best commodity producers using their land efficiently and rationally, they are permitted to increase their land plots from 0.25 to 0.35 ha in irrigated areas and from 0.5 to 1.0 ha in rainfed areas.
8.	18.03.1998	PR # 1978 on Program for Economic Reform Deepening in Agriculture for 1998-2000	The Program is aimed at the following key objectives: - development and strengthening of property relations in the rural area, primarily of private property; - strengthening of ownership attitude among dehkans, improvement of property relations in the rural area; - enhancement of farming standards, soil fertility improvement; - meeting the modern provisions and requirements of agricultural practices. The State Pedigree Plants, pedigree farms, ponds and natural reservoirs are not eligible for privatization. Two-three specialized pedigree animal breeding farms shall be established in each region to breed cattle young stock on the allocated irrigated lands. Privatized livestock breeding farms and private farms shall produce of not less than 6-7 t/ha of FU in the irrigated areas (140,000 ha first crop and 200,000 ha of double crops).
9.	30.04.1998	Land Code of the Republic of Uzbekistan	The Land Code has established the state property on land and also land rights of legal entities and individuals, as well as their responsibilities for rational and efficient land use, state guarantees on land tenure, usufruct and lease. A procedure for land lease, payments and land use is defined. The Land Code regulates land allocation to agricultural cooperatives (shirkats) private farms and dehkan farms. The land plot sizes of livestock breeding farms are defined basing on availability of not less than 30 nominal livestock heads (0.3-0.45 ha of irrigated lands and not less of 2 ha of rainfed lands) Land allocation procedure for dehkan farms is defined. The land plots are allocated under life-long inheritable possession terms, including areas under outbuildings (0.35 ha in irrigated and up to 0.5 ha in rainfed areas; and up to 1.0 ha in steppe and semi-steppe area).
10.	30.10.2003	RCM # 476 on Measures for Implementation of the Private Farm Development Concept for 2004-2006	A Program of Activities is approved for the Private Farm Development Concept for 2004-2006. A Procedure on land allocation for long-term lease to private farms is developed along with a Standard Contract form for long-term land lease. The Procedure defines that land plots shall be distributed lease on a tender basis; a lease term shall be established according to the legislation, primarily to individuals living in the area of specific agricultural cooperative.

3. LEGISLATION ON REFORMING OF AGRICULTURAL ENTERPRISES; PROPERTY RELATIONS AND LEASE RELATIONS

#	Date	Name of law or sub-law	Content
1.	11.01.1991	PR # 124 on Additional Measures for Further Development of Private Households of Kolkhoz Members, Sovkhoz Workers and Other Citizens Living in the Rural Area	An establishment process of dehkan farm (private farm) specialized in livestock breeding is begun on the base of privatized livestock farms with the purpose to concentrate the main part of livestock production in the private sector.
2.	30.12.1991	RCM # 315 on Measures for Further Development and Strengthening of Dehkan Farms (Private Farms)	Since the moment of signing of land lease contracts, the farms become independent legal entities with the right of opening a bank account. They function on the same level with the other agricultural enterprises and produce commodities mainly by own means and resources.
3.	15.03.1993	RCM # 137 on Program for Deepening Economic Reform in Livestock Sector	An establishment process of collective property in livestock sector has begun. It is envisaged to transform livestock breeding farms to collective property of their employees with redemption of shares and reimbursement of their cost during 10 years and with the first instalment of not less than 10% of the total cost. Specialized dairy factories, highly productive and profitable dairy plants and pedigree farms are not eligible for privatization.
4.	18.03.1998	PR # 1978 on Program for Deepening Economic Reform in Agriculture for 1998-2000	The Program envisages the following activities: To continue privatization of livestock breeding farms. Their selling to private ownership, while the main production part shall be concentrated in private sector. The livestock breeding farms with a herd number of 250 heads shall be privatized, with more than 250 heads – shall be transformed into private farms. The state pedigree plants, pedigree farms, ponds and natural reservoirs are not eligible for privatization. Two-three specialized pedigree animal breeding farms shall be established in each region to breed cattle young stock on the allocated irrigated lands. Livestock number and its productivity increase shall ensure by 2000 as compared to 1997: meat production increase – by 20%; milk production – by 18%, egg production – 2.1 folds; fish – 2.9 folds. Milk yield shall be increased by 15% per cow on an average; and egg output – by 34% per hen. The State Pedigree Plants shall be established, which should increase pedigree young stock sales from 4,100 heads in 1998 to 6.900 heads in 2000. The enterprise Uzparrandasanoat shall increase egg output to 900 million eggs and poultry meat output to 27,000 t or 3.2 and 8.2 folds, respectively by 2000. The enterprise Uzgoshtsutsanoat shall increase fattened and growing cattle stock number to 200,000 heads and pig number to 100,000 heads; and overall meat production and sale to 90,000 t as compared to 60,000 t in 1997.
5.	15.07.1998	RCM # 299 on Measures for Reforming Agricultural Cooperatives (shirkats) According to the Legislation on Reforms in Agriculture	Development of agricultural cooperatives (shirkats), operating on share basis and family contracts are recognized to be the most efficient organizational and legal form of an agricultural enterprise for large-scale commodity production; all collective farms (kolkhozes) shall be transformed into agricultural cooperatives (shirkats) prior to 2001. A schedule of transformation of collective farms (kolkhozes) into agricultural cooperatives (shirkats) is approved. The following procedures are adopted: a procedure for transformation of collective farms (kolkhozes)

#	Date	Name of law or sub-law	Content
			into agricultural cooperatives (shirkats); a standard procedure on the Committee for Agricultural Enterprise Reorganization; a standard procedure on reforming process and use of an agricultural cooperative (shirkat)'s authorized fund; a standard procedure for establishment and use of non-distributable assets belonging to an agricultural cooperative (shirkat); a standard procedure on establishment and asset share distribution, dividend disbursement in the agricultural cooperative (shirkat) and a standard certificate form on asset share; a standard procedure on family (collective) contracting in agricultural production. To undertake appropriate measures for reorganization of the existing collective farms (kolkhozes) into agricultural cooperatives (shirkats) on share basis; establishment of private farms and their associations by 2001.
6.	15.07.1998	RCM # 300 on Times and Measures for Implementation of Laws on Private Farm and Dehkan Farm	Private households are voluntarily transformed into dehkan farms as per decision of household members with or without establishment of a legal entity. A procedure and mechanism are established for transformation of private household plots into dehkan farms.
7.	05.01.2002	RCM # 8 on Measures for Transformation of Agricultural Enterprises into Private Farms	A list of loss-making and low profitable agricultural enterprises is approved for their reorganization into private farms in 2002. It is permitted to increase lands under feed crops, especially under alfalfa in Mehnatobod and Mirzaobod districts of Syrdarya region. A procedure regulating economic relations in water sector is established on the area of reorganized agricultural enterprises; and a procedure for commercial bank lending of newly established private farms. A procedure and selection criteria for tender on private farm organization are approved. The tender shall identify capable and enterprising farm members and other applicants.
8.	27.10.2003	PR # 3342 on Private Farm Development Concept for 2004-2006	The Concept for Private Farm Development for 2004-2005 identifies priority development of private farms, which in the long view shall become the major commodity producers. Marketing of agricultural produce supposes introduction of market mechanism of contractual relations and input procurement by farmers, starting from 2004.
9.	24.12.2004	RCM # 607 on Measures for Intensified Private Farm Development for 2005-2007	The following documents are approved: A Program for transformation of loss-making and low profitable agricultural cooperatives (shirkats) into private farms for 2005-2007. A list of loss-making and low profitable agricultural cooperatives (shirkats) to be reorganized into private farms in 2005 A Program for production and market infrastructure development in the rural area for 2005-2007. A mapping procedure for dislocation of production and market infrastructure facilities to be established in the reorganized agricultural enterprises in 2005. A draft Concept on transformation of loss-making and low profitable agricultural cooperatives (shirkats) specialized in livestock breeding, karakul sheep breeding and fruit and vegetable production into private farms. A draft list of agricultural enterprises to be reorganized in 2006 is proposed for consideration.
10.	21.11.2006	PR # 514 on Measures for Transformation of Agricultural Enterprises into Private Farms in 2007	The approved measures on transformation of agricultural enterprises into private farms in 2007 envisage reorganization of all remaining agricultural cooperatives (shirkats) into private farms. The following documents are approved: - a draft Charter of a private farm; - a Procedure for land lease for long-term lease by a private farm; - a Standard Contract form for long-term land lease by a private farm; - a Standard Contract form for employment of private farm workers; - a Standard Contract form for production; - a Standard Contract form for input supply; - a Standard Contract form for service provision.

4. LEGISLATION ON PEDIGREE ANIMAL BREEDING DEVELOPMENT

#	Date	Name of law or sub-law	Content
1.	21.12.1995	Law on Pedigree Animal Breeding	The main objectives of pedigree animal breeding are identified: development, conservation, reproduction and rational use of pedigree resources to improve pedigree and productive animal traits; provision of reliable recording of animal origin, productivity, type evaluation and other pedigree resource traits used in breeding process; conducting of breeder trials to identify quality of their offspring; receiving new breeds with useful genetic traits; efficient use of the most valuable international genepool; conservation of genepool of indigenous and endangered breeds; increasing of pedigree and productive traits and intensive replication of highly productive animals in commodity herds; increasing of economic efficiency and competitive ability of the livestock sector in general. Also, rights and responsibilities are identified (legal regime) of pedigree animal breeding facilities. The Main Public Inspection for Pedigree Animal Breeding in Livestock Sector under the MAWR is in charge for pedigree breeding sub-sector.
2.	18.01.1996	RCM of the Republic of Uzbekistan # 30 on Measures for Strengthening of Management and Stabilization of Activities of the Uzbek State Joint Stock Association of Meat and Milk Production (Uzgoshtsutsanoat)	To procure required raw materials and livestock from abroad, Uzgoshtsutsanoat is given a right to exchange the national currency into hard currency.
3.	18.03.1998	PR # 1978 on Program for Economic Reform Deepening in Agriculture for 1998-2000	Privatization of livestock breeding farms has continued in 1998-2000. The farms with livestock herd of more than 250 heads shall be transformed into private farms and those with less than 250 heads shall be sold to private property. Two-three specialized pedigree animal breeding farms shall be established in each region to breed cattle young stock on the allocated irrigated lands. The State Pedigree Plants, pedigree farms, ponds and natural reservoirs are not eligible for privatization.
4.	22.04.1998	RCM # 168 on Management of Dehkan and Farm Association (DFA)	The DFA is assigned to provide assistance on the contractual basis and supply small and medium producers with pedigree livestock. A procedure for complete and timely provision of dehkan and private farms and cooperatives with pedigree livestock is established.

#	Date	Name of law or sub-law	Content
5.	25.02.1999	RCM # 82 on Strengthening of pedigree animal breeding and livestock production	Animal productivity increase and increasing of livestock output through strengthening of pedigree animal breeding. Establishment on the base of the National Production Association on Pedigree Animal Breeding in Livestock Sector (Uzplemzhivobedinenie) a new association for pedigree animal breeding Nasl-khizmat under the MAWR, which is assigned with the following objectives: pedigree animal breeding, breeding of highly productive breeds adopted to local natural and climatic environment; production, storage and marketing of deeply frozen semen of highly valuable breeders; provision of services to livestock breeding farms with different legal ownership status in pedigree animal breeding; raising and marketing of pedigree animals; introduction of advanced technologies for animal artificial insemination (AI); arrangement and conducting of exhibitions and auctions for pedigree animals; training and retraining of specialists-inseminators and specialists in recording of animal productivity. The Uzbek Research and Production Centre for Agriculture together with Nasl-khizmat shall develop activities on reforming of pedigree animal breeding at the State Pedigree Plants.
6.	23.03.2006	PR # 308 on Measures for Stimulation of Livestock Expansion in Household Plots, Dehkan and Private Farms	Pedigree animal breeding farms are exempted from customs duties till 2010.

5. LEGISLATION ON ZOO-VET SERVICE AND VET SERVICES

#	Date	Name of law or sub-law	Content
1.	07.04.1993	RCM # 174 on Issues Related to Technical and Zoo-Vet Service Provision to Collective Livestock Farms, Dehkan (Private) Farms and Other Non-Governmental Associations in Agriculture	The National Self-financing Association for Servicing Livestock Breeding Farms is established under the Uzselkhozsnabremont. The main objective of the Association is to provide special equipment for zoo-vet units. Zoo-vet service provision is arranged under the management of the MAWR to livestock herd being in property of collective farms, dehkan and private farms and rural population. For this purpose specialized fee-paying zoo-vet services are established under the District Vet Departments staffed with qualified specialists and under the guidelines of the public vet agencies.
2.	03.09.1993	Law on Animal Health	Animal health is defined including structure and management procedure of the Vet Service including the following objectives: animal health protection; protection of population from invasive zoonosis diseases; protection of the territory of the Republic of Uzbekistan from disease transfer from other states; conducting of unified public vet oversight; addressing of vet-sanitary issues and environment protection issues; training and retraining of vet specialists; advanced research and technology transfer.
3.	23.02.1994	RCM # 87 on Reform Strengthening in Livestock Sector and Interest Protection of Dehkan Farms (Private Farms) and Privatized Livestock Farms	It is decided to provide collective livestock breeding farms, dehkan and private farms with vet drugs, pedigree livestock, to provide support in AI and zoo-vet animal management.
4.	28.04.1997	RCM # 215 on Arrangements for Enforcement of Presidential Resolution on State Support for Household Plots and Dehkan Farms and Strengthening of their Role in the National Food Security	The national budget of the MAWR for 1997 is allocated with financial resources (365 million UZS) to procure vet drugs from abroad largely intended for vaccination of livestock being in private property of population. The imported vet drugs are exempted from customs duties. A reconstruction of Uzbek Bio Plant is completed along with establishment of vet drug production to satisfy local animal husbandry needs.
5.	18.03.1998	PR # 1978 on Program for Economic Reform Deepening in Agriculture for 1998-2000	It is decided to establish 1,585 zoo-vet units and equip them by 2000. The Uzbek Bio Plant shall initiate production of 19 vaccines for livestock and poultry.
6.	23.03.2006	PR # 308 on Measures for Stimulation of Livestock Expansion in Household Plots, Dehkan and Private Farms	The Program for stimulation of livestock production in private households, dehkan and private farms for 2006-2010 primarily of cattle envisages expansion of a zoo-vet unit network to provide zoo-vet services and AI and their equipping with required premises, equipment and tools.

6. LEGISLATION ON FEED PRODUCTION DEVELOPMENT

#	Date	Name of law or sub-law	Content
1.	23.02.1994	RCM # 87 on Reform Strengthening in Livestock Sector and Interest Protection of Dehkan Farms (Private Farms) and Privatized Livestock Farms	Feed Compound Funds are established for timely provision of livestock breeding farms and private farms with feed compounds, husks and oil cake as per their applications with high quality standard monitoring. To allocate (prior to 1 April, 1994) dehkan and private farms with 0.3-0.45 ha of irrigated land and 2 ha of rainfed lands per nominal cattle head. To indicate costs for feed compound procurement in separate budget line for privatized livestock breeding farms and private farms in 1994. Dehkan (private) farms can sell their livestock products on the negotiated basis on account of their farms according to provided feedstuffs.
2.	28.04.1997	RCM # 215 on Arrangements for Enforcement of Presidential Resolution on State Support for Household Plots and Dehkan Farms and Strengthening of their Role in the National Food Security	To fully satisfy livestock sector needs in good quality feed compound: to make bakery enterprises specialized in feed compound production in 1997; to ensure importing of needed raw materials for the specialized enterprises of feed compound sector and 3,000 t of hybrid corn seeds; to identify sources of funding for importing of needed ingredients for the specialized enterprises of feed compound sector and 3,000 t of hybrid corn seeds; to supply dehkan farms with cotton oil cake in approved volumes; to ensure feed compound and cotton oil cake supply to private household plots and dehkan farms as per their requests.
3.	18.03.1998	PR # 1978 on Program for Economic Reform Deepening in Agriculture for 1998-2000	The enterprise Uzdonmahsulot shall establish production of high quality feed compound with complete number of ingredients in amount of 2.0-2.5 million t in Tashkent, Samarkand, Fergana and Khorezm regions, including establishment of feed compound plants for poultry industry in every region.
4.	22.04.1998	RCM # 168 on Management of Dehkan and Farm Association (DFA)	The DFA is assigned to provide assistance in establishment of specialized cooperatives to produce deed compound on farmers, dehkan and other individual account on a commission basis and using bank loans.
5.	26.06.1998	RCM # 268 on Measures for Production Intensification and Quality Improvement of Feed Compound for Livestock, Poultry and Fishery Sectors for 1998-2000	The following decisions are approved: an assignment is given to Uzdonmahsulot and Uzbaliqchilik to produce feed compound in 1998-2000; the enterprises dealing with importing of equipment, raw material and ingredients for feed compound production are exempted from customs duties; volume of supplies is defined for Maslojirtabakprom and Uzgoshtsutsanoat to supply needed ingredients to Uzdonmahsulot and Uzbaliqchilik to produce feed compound; Uzkhimprom and Uzplodovozhvinprom-holding shall insure supply of vine production wastes and by-products (distillery dregs) directly to livestock breeding farms and the entire volume of distillery dregs produced in Production Association Kokand to be supplied to Uzdonmahsulot for feed compound production.
6.	14.02.2000	RCM # 63-f «On approving the balances of production and usage of cottonseed cake and hulls for 2000».	Production balances are approved including use of cotton oil cake and seed husks for 2000.
7.	24.03.2003	PR # 3226 on The Most Important Areas for Reform Strengthening in Agriculture	In order to increase self-governance of agricultural producers and to ensure them with reliable legal protection considering their specialization and their contracts with the state, to establish mechanism, which enables them to independently decide about crop pattern for agricultural crops (sowing pattern).
8.	23.03.2006	PR # 308 on Measures for Stimulation of Livestock Expansion in Household Plots, Dehkan and Private Farms	An access to feed compounds for private household, dehkan and private farm is improved, including feed compound produced of gain procured from farmers through sale outlets.
9.	19.02.2007	RCM # 38 on Additional Measures for Feed Production Sector Development	It is decided to buy two sets of equipment for feed compound production manufactured by Wynveen International (Holland) and to upgrade the existing feed compound production workshops under Production Association Uzdonmakhsulot in 2007-2010. In parallel, Uzdonmakhsulot is exempted from customs duties for imported equipment and for corn and barley seeds till 1 January, 2011.

7. LEGISLATION ON STATE SUPPORT FOR LIVESTOCK SECTOR DEVELOPMENT

#	Date	Name of law or sub-law	Content
1.	18.03.1991	PR # 166 on Financial Support to Dehkans-Private Household Owners to Strengthen Physical Infrastructure of their Association	The Private Household Association (PHA) is given functions of a fund holder for input supply for private sector. It is allocated with 1.0 billion rubles for this purpose.
2.	06.05.1991	RCM # 119 on Establishment of State-Cooperative Committee of Uzbek SSR for Technical Support and Repair of Farm Machinery (Uzselkhozsnabremont)	To improve physical infrastructure and farm machinery repair, the enterprise Uzselkhozsnabremont is established on individual share holding basis and voluntarily participation of cooperative, public, joint, leasing, private and communal organizations, enterprises and individuals.
3.	30.12.1991	RCM # 315 on Measures for Further Development and Strengthening of Dehkan (Private) Farms	Agricultural workers are eligible for provisions of the legislation on labour, social support and social insurance; the owners of private households shall be given cash support in amount of 10,000 rubles per family (as recommended by district and community PHAs) for procurement of livestock, poultry, feedstuffs, and construction materials; cash privileged loans are distributed (up to 50,000 rubles) to dehkan (private) farms under kolkhoz, sovkhoz and other enterprise guarantee to procure livestock.
4.	07.04.1993	RCM # 174 on Technical and Vet Service Issues of Collective Livestock Breeding Farms, Dehkan (Private) Farms and other Non-Governmental Agricultural Associations	To ensure required services in livestock sector, a National Self-Financing Association (NSFA) is established under the Uzselkhozsnabremont to service livestock breeding farms transferred into collective property, as well as dehkan (private) farms. District level SFAa are established on the basis of the existing rental units, special shops and service stations, which repair equipment of livestock breeding farms. The main objectives of the Association are defined including number of equipment units and special equipment for zoo-vet units.
5.	23.02.1994	RCM # 87 on Reform Strengthening in Livestock Sector and Interest Protection of Dehkan Farms (Private Farms) and Privatized Livestock Farms	It is envisaged: to allocate dehkan (private) farms with land per each nominal livestock head; to lend loans charged upon their property to privatized livestock breeding farms and dehkan (private) farms for 10-year period to procure cattle and inputs; to facilitate unhindered procurement of livestock products under negotiated prices produced by privatized livestock breeding farms and dehkan (private) farms; to timely lend required loans to procurement and trade organizations; to supply collective livestock breeding farms and dehkan (private) farms with seeds, fertilizers, drugs, pedigree livestock, to provide assistance in Ai and zoo-vet services; to draft projects of small and medium livestock breeding farms for dehkan (private) farms with use of cheep local construction materials; to ensure construction of production facilities under standard design and their «turn-key» commissioning on the base of contracts with privatized livestock breeding farms and dehkan (private) farms; to supply fuel and lubricants to privatized livestock breeding farms and dehkan (private) farms; to cut down the existing tax and fee rates by 50%; to ensure training of staff working in privatized livestock breeding farms and dehkan (private) farms in market economy and independent business management.

#	Date	Name of law or sub-law	Content
6.	22.08.1994	PR # 937 on Measures for Economic Stimulation of Agricultural Development	The state production quotas are abolished for agricultural produce (except cotton fiber and wheat grain), with permission to transit to free market prices for livestock and milk.
7.	03.04.1996	PR # 1416 on State Support for Agricultural Production	To exempt MTPs from VAT on services provided to agricultural enterprises for three years. This will decrease charge rates for field works. The same exemption is introduced for mineral fertilizers and fuel & lubricants; contacts are made for farm machinery and spare part supply in 1996-1997.
8.	12.04.1996	RCM # 146 on Strengthening of the State Support for Agricultural Commodity Producers	To ensure further state support to the agricultural producers, it is decided to allocate in 1996: a targeted loan to prepay karakul sheep products in amount of 150 million UZS; silk cocoon production – 200 million UZS; procurement of seed potato - 1,2 billion UZS; newly emerged MTP were provided with working capital in amount of 560 million UZS; a targeted privileged loan is allocated to arrange production and supply of farm machinery and spare part; interest rates for loan in amount of 131,5 million UZS are written off; bank loans are rescheduled till 2000 for 250.5 million UZS; also earlier borrowed loans are rescheduled till 2000 for amount of 769.5 million UZS; consulting-advisory services are established at banks to provide practical assistance while contracting farmers for production and input supply.
9.	18.03.1997	PR # 1737 on Measures for State Support of Dehkan and Private Farms and Strengthening of their Role in the National Food Security	Further measures on the state support for farms including the following: land plot increase for the best commodity producers; allocation of 500 million UZS lamp sum to the DFA Fund as financial support; provision of privileged lending to dehkan and private farms; allocation of privileged loans to the DFA to centralized pedigree livestock supply and other resources; establishment of procurement outlets in the towns, district centres, villages and large settlements to buy meat and dairy products and other products from dehkan and private farmers; timely provision of farm machinery services by MTPs; supply dehkan and private farmers with cotton oil cake and feed compound; allocation of 365 million UZS to procure vet drugs for private cattle vaccination from abroad; to exempt these supplies from customs duties.
10.	10.03.1998	RCM # 106 on Further Strengthening of Physical Infrastructure and Expanding of Machinery-Tractor Park (MTP) Services	To ensure further development of MTP network, there shall be not less than two MTPs established in each district, including private ones; they shall be timely supplied with machinery, spare parts and repair materials; to establish in 1998-2000 22 technical support centres for servicing imported farm machinery, and 140 centres for servicing locally manufactured farm machinery.
11.	22.04.1998	RCM # 168 on Management of Dehkan and Farm Association (DFA)	A procedure is developed for complete and timely provision of dehkan and private farms and their accusations with required farm machinery, fuel and lubricants, pedigree livestock, feedstuffs and other inputs, as well as provision of services.
12.	02.11.2000	RCM # 424 on Measures for Farm Machinery Supply on Leasing Terms	It is decided in 2001-2007 to supply farm machinery manufactured by Uzselkhozmashholding to MTPs and private farms on leasing basis for 7-year period of repaying under the following terms: 15% of cost is prepaid and 85% is paid by the Uzselkhozmashlizing Company.
13.	17.03.2006	PR # 304 on Measures for Further State Support for Agricultural Production	It is recommended to exempt enterprises unclouded in the Uzagromashservice Association and alternative MTPs for 2006-2007 from customs duties while importing farm machinery and spare parts till 1 January, 2007, and also from VAT on works and services provided under requests of agricultural producers.

8. LEGISLATION ON CONTRACTING, PRICES, TAXES, LOANS AND INVESTMENTS IN LIVESTOCK SECTOR

#	Date	Name of law or sub-law	Content
1.	30.12.1991	RCM # 315 on Measures for Further Development and Strengthening of Dehkan and Private Farms	The owners of private households shall be given cash support in amount of 10,000 rubles per family (as recommended by district and community PHAs for procurement of livestock, poultry, feedstuffs, and construction materials; cash privileged loans are distributed (up to 50,000 rubles) to dehkan (private) farms under kolkhoz, sovkhoz and other enterprise guarantee to procure livestock.
2.	07.04.1993	RCM # 174 on Issues of Technical and Zoo-Vet Servicing of Collective Livestock Breeding Farms, Dehkan (Private) Farms and other non-governmental Agricultural Associations	The Ministry of Finance and Tax Committee proposed privileged taxation regime to expand range of services to newly established farms.
3.	23.02.1994	RCM # 87 on Reform Strengthening in Livestock Sector and Interest Protection of Dehkan Farms (Private Farms) and Privatized Livestock Farms	Farm performance evaluation is changed: this shall be based on livestock productivity increase and meeting of contractual obligations, rather than on livestock number. to facilitate unhindered procurement of livestock products under negotiated prices produced by privatized livestock breeding farms and dehkan (private) farms; dehkan (private) farms can sell their livestock products on the negotiated basis on account of their farms according to provided feedstuffs. To lend loans to privatized livestock breeding farms and dehkan (private) farms for 10-year period to procure cattle and inputs charged upon their property; to cut down the existing tax and fee rated by 50%;
4.	22.08.1994	PR # 937 on Economic Incentives for Agricultural Development	Transfer to free market procurement prices on livestock and milk.
5.	29.08.1994	RCM # 438 on Approval of Procedure on Contract Signing and Execution on Agricultural Crop Production	The Procedure regulates contractual relationships between procurement organizations, regardless of their ownership status and departmental subordination and dehkan (private) farms. This contract is the main document determining rights and obligations of its parties.
6.	18.01.1996	RCM # 30 on Strengthening of Management and Stabilization of Activities of the State Joint Stock Association Uzgoshtsutsanoat	Amendments are made to management of the State Joint Stock Association Uzgoshtsutsanoat to improve meat and dairy product supply to urban population through making agreements (contracts) for strengthening relationships between meat and milk producers and processing organizations on the base of overall support including financial of livestock breeding farms and farmers.
7.	12.04.1996	RCM # 146 on Strengthening of State Support for Agricultural Commodity Producers	It is decided to establish consulting-advisory services at banks to provide practical assistance while contracting farmers for production and input supply.
8.	18.03.1997	PR # 1737 on Measures for State Support of Dehkan and Private Farms and Strengthening of their Role in the National Food Security	The DFA and Fund for Dehkan and Private Farm Support and their branches providing services to agricultural producers are exempted from income tax for five years since the moment of their state registration.

#	Date	Name of law or sub-law	Content
9.	22.04.1998	RCM # 168 on Management of Dehkan and Farm Association (DFA)	The state production quotas are abolished (except cotton fiber and wheat grain), free market prices are offered for meat and milk. It is recommended to open an additional medium-term credit line of the EBRD in amount of USD 40 million for subsequent sub-lending of loans to dehkan and private farms through authorized banks of Uzbekistan. The main objectives of the DFA include: facilitation and support to product marketing at both domestic and international markets; provision of advisory and methodological support in getting loans and their disbursement, including foreign ones.
10.	5.01.2002	RCM # 8 on Reorganization of Agricultural Enterprises into Private Farms	A procedure for lending of newly established farms by commercial banks is developed. Lending of loans is proceeded under repayment terms, payment of interest, security, maturity and targeted use for the period till three years. Loans are provided to farmers to develop their production: to procure livestock, young stock, poultry, feedstuffs and feed compound; seedlings and seeds, vet drugs, chemical plant protection agents, mineral fertilizers, fuel and lubricants, initial raw material processing, small production line establishment, and other types of entrepreneurship activity.
11.	04.09.2003	RCM # 383 on Strengthening of Contractual Relationships and Increasing of Responsibilities for Execution of Obligations on Agricultural Production	A Procedure for contracting, registration and execution of contracts between producers, procurement organizations and service providers.
12.	27.10.2003	PR # 3342 on Concept for Private Farm Development for 2004-2006	The measures for strengthening of financial-credit mechanism for private farms in 2004-2006 including reimbursement by farmers from own resources of all production costs; transition to direct lending for all private farms in 2004-2005; development of alternative financing forms and lending of private farms. It is envisaged to make contracts to procure fuel and lubricants, mineral fertilizers, feedstuffs, seeds and other inputs by farmers.
13.	30.10.2003	RCM # 476 on Measures for Concept for Private Farm Development for 2004-2006 Implementation	A Standard Contract form is approved for livestock production.
14.	01.03.2004	Resolution of the Central Bank of Uzbekistan # 564-1 «On approving the Statute of the Procedure of Land Mortgage Crediting of Farm Entities by Commercial Banks.	A Procedure on regulation of bank lending by commercial banks of loans to private farms under their land lease tenure right.
15.	23.03.2006	PR # 308 on Measures for Stimulation of Livestock Expansion in Household Plots, Dehkan and Private Farms	Individuals engaged in cattle breeding in private households and dehkan farms are entitled to be considered as employed and have right to receive pensions. Micro-credit lending to private households and dehkan farms is expanded for cattle procurement. A Procedure for lending of privileged targeted loans to individuals for livestock production development in private households and dehkan farms under guarantees of mahalla committees.

9. LEGISLATION ON PRODUCTION, PROCUREMENT, MARKETING AND PROCESSING OF LIVESTOCK PRODUCTS

#	Date	Name of law or sub-law	Content
1.	18.01.1996	RCM # 30 on Measures for Strengthening of Management and Stabilization of Activities of the Uzbek State Joint Stock Association of Meat and Milk Production (Uzgoshtsutsanoat)	To strengthen management and stabilize activity of Uzgoshtsutsanoat the following is envisaged: to roll out a network of company shops and other trade outlets to sell meat and dairy products; to ensure making of ling-term contracts between producers and processors of meat and dairy products considering material, technical and financial support to livestock breeding farms and farmers; to give a right to exchange local currency into hard currency to procure needed raw materials, livestock, feedstuffs, equipment, packaging and other materials from abroad; to allocate a loan for three years without charge for interest to replenish working capital of industrial complexes and processing enterprises in amount of 200 million UZS.
2.	18.03.1998	PR # 1978 on Program for Economic Reform Deepening in Agriculture for 1998-2000	It is envisaged to increase by 2000 production of eggs – to 900 million, poultry meat – to 27,000 t; cattle herd number under fattening and raising – to 200,000 heads and pigs – to 100,000 heads; meat production and marketing – to 90,000 t as compared to 60,000 t in 1997, fish production in 1998 – to 17,600 t; in 1999 – to 20,800 t and in 2000 – to 26,000 t as compared to 8,900 t in 1997. It is also decided to establishment of procurement outlets in the towns, district centres, villages and large settlements to buy meat and dairy products and other agricultural products from dehkan and private farmers; to practice making of future contracts with prepayment of the production to be procured.
3.	10.10.1998	RCM # 434 on Establishment of Mini Processing Lines for Whole Milk Processing	It is envisaged to establish 15 mini production lines to process whole milk in Nukus and Tashkent suburbs as well as near by regional centres and to produce various dairy products on the base of advanced Israeli technology.
4.	26.10.1998	RCM # 452 on Establishment and Development of Wholesale Markets to Trade Agricultural Produce	The Resolution on reforming and development of wholesale markets envisaged establishment of Stock Company «Wholesale Market» per each in Tashkent city and in the regions, and in other large cities if needed.
5.	4.12.1998	RCM # 510 on Enforcement of Rawhide Procurement Mechanisms	A Stock Company Uzbek Charmi is established under Uzyengilsanoat on the base of liquidated Charm Corporation to coordinate activity of market participants; arrange a broad network of rawhide procurement; promote the unified technical and investment policy; attract foreign investments; to conduct marketing research of both domestic and international market; and to increase exported output.

#	Date	Name of law or sub-law	Content
6.	02.07.1999	RCM # 323 on Measures for Continuous Supply of Meat and Dairy Products to Tashkent City	To ensure continuous supply of meat and dairy products to urban population of Tashkent city on the base of further stabilization of financial and production activity of Stock Company Tashkentgusht, Tashkentsut and Uzgoshtsutsanoat Association, increasing of their efficiency, broad attraction of foreign investments and establishment of joint ventures to produce highly competitive and qualitative met and dairy products. 1. Estimated supply volumes of meat and dairy product supply to Tashkent city are approved: by DFA and entrepreneurs to supply in 1999 – 85,391 t; in 2000 – 86,000 t of meat, and of dairy products produced by Uzgoshtsutsanoat Association and its branches in established volume; by Uzparrandasanoat Association – 500 t in 1999 and 1,200 t in 2000 of turkey meat. 2. Uzgoshtsutsanoat Association shall establish in Tashkent city a slaughtering house to provide cattle slaughter services; also to establish joint ventures with foreign investments. 3. In order to reduce prices for finished dairy products at the level of wholesale enterprises selling imported dry milk, chopped meat, sausage skin, spices and other auxiliary materials to Uzgoshtsutsanoat Association, it is permitted to account tax amount on imported goods at their entrance to Uzbekistan while estimating VAT on produced food products. 4. The local authorities shall provide practical assistance to DFA, Tashkentgusht and Tashkentsut, fattening enterprises of Tashkent region and to Uzgoshtsutsanoat Association in making contracts on supply and processing of livestock, meat and milk, marketing of these products to the urban population of Tashkent city.
7.	27.10.2003	PR # 3342 on Concept of Private Farm Development for 2004-2006	A broad infrastructural development is envisaged in the rural area to procure, process and market of agricultural produce and service provision to private farms. A system of information-marketing service is developed to study the market environment including domestic and international markets of agricultural produce, services and inputs, direct contractual relations between farmers and procurement, processing and service providing organizations operating in the rural area.
8.	23.03.2006	PR # 308 on Measures for Stimulation of Livestock Expansion in Household Plots, Dehkan and Private Farms	Pedigree animal breeding enterprises are exempted from customs duties from 2006 to 2010.
9.	21.04.2006	RCM # 67 on Program Implementation for Measures on Stimulation of Livestock (Primarily Cattle) Expansion in Household Plots, Dehkan and Private Farms for 2006-2010	The program implementation includes the following: livestock market inventory and development of activities for its upgrading; development of a mechanism and making of long-term contracts for livestock production procurement, including future contacts; arrangement of feed compound supply to dehkan and private farms; provision of close observance of adopted vet-sanitary norms and regulations at slaughtering houses, meat and dairy product delivery and sale; to establish slaughtering houses nearby dehkan markets amd in rural settlements in convenient for population places A procedure is established for: slaughter of private cattle in specialized slaughtering houses meeting sanitary standards and vet control; sales of meat in dehkan markets and sale outlets are permitted providing availability of documentation confirming vet-sanitary assessment.

ANNEX 2.

Table 1. Role and Position of Agriculture in the Economy of Uzbekistan

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Agricultural production in current prices, billion UZS*					124,4	181	399,9	550,1	891,5	1387,2	2104,8	3255,3	4083,3	4615,8	5978,3	7538,8	8988,9
Share of agriculture in GDP (%)					28,1	22,4	28,3	26,8	29	30,1	30	30,1	28,6	26,8	26,3	24,1	
Growth ratio of agricultural produce in real terms					102,2	94,4	105,8	104,1	105,6	103,1	104,2	106,0	107,3	108,9	105,4	106,7	106,1
Employment rate in agriculture, total, thousand people	3122	3272,5	3636,8	3646,6	3483,7	3560,8	3558,3	3543,6	3515	3324,9	3266,7	3259,3	3201,4	3055,3	3086,5	2967,4	2990,9
Employment rate in agriculture of economically active population (%)	39,3				41,1	41,5	40,9	40,1	39,4	36,9	35,6	34,8	33,3	30,7	30,3	28,4	26,5
Proportion of rural population in total population (%)					61,8	62	62,2	62,4	62,6	62,8	63	63,3	63,5	63,7	63,9	64	64,1
Proportion of livestock output in agricultural production (%)					42,1	40,6	50,5	49,5	46,0	49,8	48,4	49,4	48,5	47,3	44,4	44,1	44,9

* 1995-1999, gross production in million UZS

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 2. Dymanics of agricultural land pattern of agricultural enterprises and MAWR organizations per regions as of 2007, thousand ha

Year	Total agricultural lands, thousand ha	Including											
		arable lands, thousand ha		perennial plantations, thousand ha		fallow lands, thousand ha		pastures, thousand ha		hayfields, thousand ha		Irrigated lands (%)	Arable lands (%)
		total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated		
1991	25619,9	4074,1	3318,5	365,7	358,2	71,6	26,9	20999,5	15	109	24,5	14,6	81,5
1992	25593,2	4073,2	3309,9	367,5	359,5	72,4	28,3	20972,8	15,3	107,3	24,6	14,6	81,3
1993	25447,7	4076,3	3318,8	368,1	359,4	71,3	27,9	20824,6	15,4	107,4	24,8	14,7	81,4
1994	24788,3	4074,7	3320,6	366,8	358	63	30,7	20176,3	16,6	107,5	25,1	15,1	81,5
1995	23689,2	4074	3328,5	361,3	352,5	68,4	35,4	19078,2	17	107,3	25	15,9	81,7
1996	23542,2	4069,9	3328,1	357	348,3	70,8	37,5	18939	17,3	105,5	23,3	15,9	81,8
1997	20119,2	4059,1	3318,8	351,9	342,8	76,9	43,8	15526,3	17,5	105	22,7	18,6	81,8
1998	20000,2	4042,7	3305,2	342,5	334	77	43	15428	16,3	110	22,7	18,6	81,8
1999	20505	4037,9	3302,2	339,4	330,8	79,9	45,6	15938	16,4	110	22,7	18,1	81,8
2000	20442,5	4035,9	3295,5	333,8	323,9	81,9	47,6	15881,2	16,7	109,7	27,6	18,2	81,7
2001	20259,2	4033,4	3296	329,1	319,1	84,6	48	15703,3	16,4	108,8	27,6	18,3	81,7
2002	17418,2	4031,3	3293,4	322,9	314,2	83,4	46,9	12881,1	16,5	99,5	27,1	21,2	81,7
2003	17391	4021,2	3283,9	323,4	314,8	83,2	47,1	12863,8	16,6	99,4	27	21,2	81,7
2004	17346,2	4026,2	3281,1	324,8	316,1	82,5	46,7	12812,9	16,5	99,8	27,1	21,3	81,5
2005	17288	4034	3288	321,7	313,3	82,1	46,9	12750,3	16	99,8	27	21,4	81,5
2006	17294,4	4041,9	3292,7	325,1	316,3	80,9	46,8	12741,8	27	104,7	15,9	21,4	81,5

Source: the State Committee on Land and Cadastre

Table 3. Crop pattern of the Republic of Uzbekistan, thousand ha

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Grain	1008,1	-	-	-	1656,5	1740,5	1837,6	1686,7	1720,5	1614	1393,7	1533,4	1790,9	1667,1	1616,1	1618	1538,9
%	24,4	-	-	-	40,6	44,2	45,3	43	44,4	43,9	41,4	44,2	48,5	46,3	44,9	44,9	43,2
Cotton	1830,1	-	-		1492,8	1487,3	1513,1	1531,6	1517,4	1444,5	1452,1	1421	1393	1456,3	1472,3	1448,2	1451,6
%	44,2	-	-	-	36,6	37,8	37,3	39,1	39,1	39,3	43,2	41	37,7	40,5	40,9	40,1	40,8
Potato	41,8	-	-	-	45,9	44,3	57,6	54,7	48,5	52,2	50,8	48,9	49,2	52,1	49,8	52,6	56
%	1	-	-	-	1,1	1,1	1,4	1,4	1,3	1,4	1,5	1,4	1,3	1,4	1,4	1,5	1,6
Vegetables	140,2	-	-	-	111,2	104,4	103,1	101	95,9	98,1	99,1	97,8	99,6	104,4	137,7	154,4	159,8
%	3,4	-	-	-	2,7	2,7	2,5	2,6	2,5	2,7	2,9	2,8	2,7	2,9	3,8	4,3	4,5
Melons	79,8		-	-	42,7	39,3	38,6	47,5	44,1	36,9	35,6	37,3	41,3	34,7	33,9	37,4	38,1
%	1,9	-	-	-	1	1	1	1,2	1,1	1	1,1	1,1	1,1	1	0,9	1	1,1
Feed crops	1039,7	-	-	-	731,6	521,5	507,8	497,5	452,8	429	331,2	329,1	316,5	284,2	290,3	296,4	290,3
%	25,1	-	-	-	17,9	13,2	12,5	12,7	11,7	11,7	9,8	9,5	8,6	7,9	8,1	8,2	8,2
Total	4139,7	-	-	-	4080,7	3937,3	4057,8	3919	3879,2	3674,7	3362,5	3467,5	3690,5	3598,8	3600,1	3607	3561
%	100	-	-	-	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 4. Dynamics of irrigated land quality for 1970-2006

Classes	Quality score	Land quality	Irrigated arable land area, thousand ha					
			1972 r.	1980 r.	1985 r.	1990 r.	1999 r.	2007 r.
I	81-100	the best	1050	969	864	515	106	84
II	61-80	good	689	910	928	1183	1391	886
III	41-60	medium	437	771	969	1245	1621	1759
IV	21-40	lower than	140	388	594	643	863	911
V	0-20	worse	-	0.6	45	0.3	9,5	9,9
Not covered by survey			179	537	-	-	-	-
Republic of Uzbekistan			2495	3038	3400	3586	3991	3650
Soil quality score for the Republic of Uzbekistan			62	59	58	60	55	< 55

Sources:

1. G. Talipov «Land resources of Uzbekistan and their rational use issues». Tashkent. 1992. (203 p.).

2. E. Kurbanov ae al. «Respublikadagi sug'oriladigan yerlarning holati va ulardan samarali foydalanish bo'yicha Taklif va Tavsiyalar». Tashkent. 2001, Chapter 40.

3. The State Statistics Committee of the Republic of Uzbekistan

4. A. Chertovitsky and A. Bazarov. «Land use system of Uzbekistan» T:, Fan, 2007 (17, 328 pp.).

Table 5-A. Livestock number in all farming entitites, thousand heads

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cattle	5112,6	5275	5430,6	5483,3	5203,5	5102,5	5196,4	5225,2	5281,8
including cows	*2120*	*2217,5*	*2296,6*	*2336,9*	*2286,4*	*2234,2*	*2281,3*	*2290,2*	*2310*
Sheep and goats	10109,5	10328,5	10391,0	10059,0	9322,3	8229,1	8586,7	8697,9	8863,6
Poultry	35200,4	26180,8	22484,8	19619,7	13372,9	12669,2	12279,2	13934,9	14521,3
Horses	112,5	122,5	133,8	144,8	150,0	147,4	148,8	148,5	148,4
Pigs	653,6	528,6	418,6	350,4	207,9	89,1	73,9	80,8	83,0

	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Cattle	5353,4	5416,1	5477,6	5878,8	6242,4	6571,4	7044,6	7458,1	7912,8
including cows	*2343,4*	*2361,8*	*2393,2*	*2556,7*	*2704*	*2821,3*	*2982,5*	*3124,6*	*3283,3*
Sheep and goats	8932,5	9022,6	9233,9	9928,6	10579,9	11351,9	12016,2	12635,6	13064,4
Poultry	14510,0	14828,7	15354,0	17675,7	18833,7	20540,4	24188,4	26118,9	27947,0
Horses	146,3	144,7	143,4	147,5	151,5	158,1	162,4	168,3	
Pigs	85,8	81,6	75,4	89,9	86,7	86,9	93,1	96,2	

* Tentative data

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 5-B. Cattle herd number in all farming entities, thousand heads (by the end of the year)

Regions	Years																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Republic of Karakalpakstan	373,2	401,7	405,5	414,2	403,1	386,5	377,3	390,8	383,7	379,8	382,6	398,9	400,9	422,8	437,7	601	603,4
Andijan	318,2	414	418,7	413,8	426,5	390,5	370,5	381,1	366,1	412,9	441	448,3	450,3	480	494,7	548,4	559,5
Bukhara	357,7	415,5	417,1	429,3	438,7	432,9	424,3	418,2	421,5	424,2	428	429	436,3	467,9	512,7	620,1	657,5
Djizak	243,7	279,5	281,8	285	278,4	286,8	274,7	264,1	279,7	281,1	283	305,6	314,7	369,6	393,1	455,2	492,2
Kashkadarya	452,9	503,5	538	579,4	601,4	573,2	560,4	562,5	575,4	578,3	581,8	582,6	583	609,8	646,6	746,4	771,6
Navoi	168,9	193,9	197,7	184,5	196	178,7	161,9	160,5	168,3	172,6	174,4	181,8	186,4	203,4	218,3	244,5	252,9
Namangan	311	374,5	369,3	368,7	367,4	333,8	333,9	358,4	358,7	348	348,7	348,6	349,4	369,9	372,6	407	414,8
Samarkand	564,6	610,2	642,9	663,5	691,2	708,2	733,1	771,2	781,7	782,1	794	790,2	807,4	876,6	965,5	996,9	1041,3
Surkhandarya	385,2	403,9	418,2	453,8	453,3	391,4	422,5	432,6	438,7	443,5	446,4	454,4	460,9	487,1	508,9	549,2	559,1
Syrdarya	166,5	168,2	177,1	184,9	191,3	188,6	171	174	166,9	170,4	171,1	171,9	172,7	181,2	188,9	212,6	220,5
Tashkent	405,8	420,7	443,3	447,8	438	392,5	367,5	385,5	385,5	383,4	387,5	389,3	394,8	425,4	452,9	496,1	507,7
Fergana	483	537,7	565	582,2	566,7	516,6	463,8	452,6	453,9	457,9	464,9	468,7	472,1	492,8	512.0	558,8	570,3
Khorezm	350,1	389,3	400,4	423,5	431,3	423,8	441,6	444,9	445,1	447,6	450	446,8	448,7	492,3	538,5	606,3	619,4

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 5-C. Cow number in all farming entities (by the end of the year)

Regions	Years																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Republic of Karakalpakstan	145,3	163,3	161,8	168,3	170,9	165,7	162,9	169,5	165,9	162,5	161,3	161,8	163,8	174	182,9	209,3	212,1
Andijan	124,5	165,1	173,6	173,1	174,8	165	157,9	167,1	160,9	178	185,3	186,5	188,9	209,4	216,7	240,7	254,3
Bukhara	145,2	169,2	177,5	179,9	184,6	185,5	183,3	181,4	181,4	182,2	184,7	185,5	187,4	203	217,5	264,7	273,2
Djizak	99,9	112	118,5	123	125,2	125,9	129,8	124,1	126,8	126,1	128,9	133,1	136,5	157,7	166,6	179,7	188
Kashkadarya	194,1	218,3	236	247,9	258,4	252,3	235,3	245,6	249	251,4	254,7	255,8	260,1	262,9	275,3	309	328,5
Navoi	72,3	83,8	85,4	82,8	88,2	86,7	84,5	81,8	86	86,9	89	91,9	92,1	96,7	101,9	118	123
Namangan	120,3	152,3	153,9	154,4	152,4	140,7	138	138,1	138,2	136,7	136,8	135,1	136,1	143,5	144,5	155	159,7
Samarkand	227,1	257,7	271,1	283,9	301,6	314,5	323,1	335,9	343,6	346	383,5	354,3	362,3	403,6	451,1	483,5	497,6
Surkhandarya	171,3	184	192,4	203,9	208,8	199,7	204,3	208,3	211,1	211,4	215,1	218,9	222,1	227,4	237,1	248,9	260,2
Syrdarya	64,7	67,1	70,2	76,3	78	83,2	72,2	73,8	69,8	71	71,5	72,3	73	76	77,5	85,9	89,6
Tashkent	170,5	184,7	196,6	207,1	198	180,7	170	178,1	178,9	178	180,1	180,2	182,1	193,6	203,9	221,7	222,7
Fergana	186,5	213,2	225,7	231,1	228,7	214,6	193,5	194,3	195,1	195,9	196,2	198,2	199,1	206,8	213,2	231,2	237,4
Khorezm	134,7	149,3	154,8	164,9	167,3	171,9	179,4	183,3	183,5	183,9	186,3	188,2	189,7	202,1	215,8	235,1	243

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 6-A. Main types of agricultural produce

Indices	Years								
	1991	1992	1993	1994	1995	1996	1997	1998	1999
Row cotton, thousand t	4646,0	4128,0	4235,0	3938,0	3934,3	3350,1	3645,6	3206,2	3600,0
Grain, after treatment weight, *including*	1908,2	2257,2	2142,4	2466,9	3215,3	3562,0	3775,6	4147,7	4331,2
wheat	*609,5*	*964,0*	*876,0*	*1362,9*	*2346,9*	*2742,2*	*3073,0*	*3555,5*	*3601,8*
barley	*324,0*	*360,5*	*291,8*	*299,8*	*321,3*	*202,5*	*143,5*	*83,3*	*111,5*
corn for grain	*430,6*	*367,2*	*403,6*	*275,9*	*185,5*	*137,2*	*136,7*	*123,8*	*167,9*
rice	*514,9*	*538,9*	*544,6*	*498,3*	*327,6*	*450,0*	*386,0*	*346,4*	*420,8*
Potato, thousand t	351,2	365,3	472,4	567,1	439,9	513,6	691,9	691,4	657,8
Vegetables, thousand t	3348,0	3494,3	3038,7	2975,3	2724,7	2497,4	2384,2	2403,4	2680,0
Melons, thousand t	925,8	883,4	622,3	578,0	472,0	469,7	376,2	469,9	517,5
Fruit and barries, thousand t	516,6	701,5	560,1	555,1	602,3	604,8	547,7	543,5	489,1
Grapes, thousand t	480,4	439,1	381	353,1	621	478,2	511,5	336,1	343,9
Meat, live weight, thousand t	800,2	777,0	814,1	827,2	853,0	800,6	800,7	808,7	821,8
Eggs, million	2347,0	1897,7	1787,8	1573,6	1231,8	1057,1	1075,4	1164,6	1239,6
Wool, t	25337	27462	26586	24917	19514	16590	15415	15531	15702
Karakul pelts, thousand pieces	1475,8	1603,8	1617,1	1540,2	1392,9	1535,4	771,4	803,1	712,0
Cocoons, t	33805	33225	29614	22941	23704	21704	20860	20386	17915
Milk, thousand t	3331,4	3679,2	3764,0	3731,6	3665,4	3403,9	3406,1	3494,9	3543,4

Indices	Years								
	2000	2001	2002	2003	2004	2005	2006	2007	2008*
Row cotton, thousand t	3002,4	3264,6	3122,4	2803,3	3536,8	3728,4	3600,6	3716,3	
Grain, after treatment weight, *including*	3929,4	4072,4	5550,8	6103,1	5868,8	6401,8	6546,7	6643,1	
wheat	*3532,0*	*3689,8*	*4967,4*	*5436,8*	*5377,5*	*5927,8*	*5996,3*	*6076,9*	
barley	*85,8*	*134,1*	*220,9*	*155,3*	*107,9*	*109,5*	*72,5*	*97,2*	
corn for grain	*130,6*	*141,3*	*147,1*	*146,3*	*156,4*	*164,3*	*194,2*	*207,4*	
rice	159,6	83,4	175,1	333,7	181,2	165,8	220,3	186,3	
Potato, thousand t	731,1	744,4	777,2	834,4	895,7	924,2	1021,0	1189,0	
Vegetables, thousand t	2644,7	2777,8	2935,6	3301,4	3336,1	3517,5	4294,1	4691,9	
Melons, thousand t	451,4	466,1	479,1	587,3	572,5	615,3	744,1	840,9	
Fruit and barries, thousand t	790,9	801,3	842,9	765,8	851,7	949,3	1182,2	1270,0	
Grapes, thousand t	624,2	573,1	516,4	401,5	589,1	641,6	803,6	878,9	
Meat, live weight, thousand t	841,8	853,5	865,1	936,7	998,3	1061,2	1139,6	1208,7	1287,6
Eggs, million	1254,4	1287,8	1368,9	1632,4	1860,3	1966,7	2128,1	2220,4	2499,5
Wool, t	15849	15976	16594	17784	18998	20081	21436	22483	23281,1
Karakul pelts, thousand pieces	747,6	728,8	688,1	690,8	674,8	688,8	726,8	781,0	819,4
Cocoons, t	16479	17338	19932	16686	16859	16211	20249	21466,8	
Milk, thousand t	3632,5	3665,2	3721,3	4031,1	4280,5	4554,9	4855,6	5097,5	5420,0

** Tentative data*

Table 6-B. Some indices of yield rates and productivity in agriculture

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Grain, t/ha	1.73	1.86	1.67	1.62	1.94	2.09	2.14	2.51	2.56	2.7	3.0	3.64	3.43	3.54	3.98	4.13	4.25
Cotton, t/ha	2.7	2.48	2.5	2.56	2.64	2.26	2.41	2.1	2.37	2.18	2.33	2.24	2.05	2.45	2.53	2.5	2.57
Potato, t/ha	8.7	8.3	9.7	10.1	9.2	10.11	11.15	12.13	12.48	12.93	13.19	14.37	15.25	15.75	17.03	17.52	18.41
Vegetables, t/ha	18.8	18.1	18.8	18.0	17.6	17.53	17.45	17.52	17.51	18.38	18.57	19.38	20.09	20.31	21.58	22.3	22.84
Melons, t/ha	10.6	11.3	12.0	10.9	9.9	12.01	10.36	9.87	11.3	13.24	13.56	12.71	14.14	15.7	16.91	17.82	18.46
Milk per one cow, kg					1611	1509	1523	1552	1563	1582	1573	1583	1684	1647	1643	1661	1690
Wool per 1 sheep or goat, kg							2,1	2,0	2,0	2,0	2,0	2,0	2,2	2,2	2,2	2,1	2,1

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 7. Main indices of shirkat performance

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number, units	2159				3688	3352	2889	3111	3090	3042	2897	2463	2098	1535	1114	314	
Agricultural lands, thousand ha		25620	25593	25448	24210	23100	22963	19562	19129	19478	19180	18762	15408	14751	13896		
Arable (sown area), thousand ha	4160.7				3626,5	3412,2	3487,7	3291,1	3143	2744,6	2361,4	2145,1	1967	1499,8	1064,9	472	105,5
Share in total arable lands (%)					87,1	85,2	84,2	81,7	78,2	72,6	68,6	60,6	51,9	40,6	29,2	13	3
Arable lands under grain crops, thousand ha												930,8	912,1	661,8	475,9	220,7	47,1
Arable lands under cotton, thousand ha												957,1	820	663,1	456,9	179,8	24,2
Arable lands under feed crops, thousand ha	932,1	-	-	-	595,7	408,3	417,9	401,5	357,8	320,5	219	187,3	160,2	115,3	92,8	53,4	29,5
Hayfields and pastures, thousand ha		21180	21153	21003	20365	19254	19115	15708	15615	16128	16073	15812	12755	12508	12137		
Share in total gross argicultural output (%)				53,1	48,1	45,2	35,9	33,7	32,9	27,8	27,3	25,9	22,2	19,3	14,0	6,3	2,6
Number of employees, thousand people	2246	2184	1994	2099	2086	2059	2029	1932	1807	1726	1537	1251	1100	809	809	388,2	175,6
Sahre of employees in total number of agricultural workers (%)	61,8	59,9	57,2	58,9	58,6	58,1	57,7	58,1	55,3	53	48	40,9	35,6	27,1	27,3	13,2	5,9
Livestock number (thousand heads):																	
Cattle	1633,7	1609,2	1556,3	1441,7	1151,0	898,7	769,7	675,5	619,9	542,0	437,3	336,2	284,2	232,7	177,8	130,4	92,2
including cows	434,9	429,0	427,3	411,6	358,2	300,2	255,7	219,8	204,2	179,3	146,0	111,6	94,4	76,2	59,7	43	28,0
Sheep and goats	5329,1	5274,9	5146,0	4716,3	4169,3	3167,8	2952,0	2867,0	2875,4	2715,4	2474,6	2466,4	2460,8	2451,7	2433,1	2313,8	2159,4
Main types of output (thousand t):																	
Grain crops	1741,7	2046,2	1902,2	2135,3	2732,1	2909	2903,3	3085,7	3113,2	2601,9	2560,9	3197,4	2927,9	2130,4	1732,8	708,6	116,7

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cotton	4646	4127,3	4228,6	3909,7	3833,4	3191,9	3409,8	2854,2	3090,6	2453,4	2555,3	2225,7	1741,8	1711,7	1267,9	490,3	42,6
Potato	183,5	175,3	264	245,9	139,3	161,6	197,9	143,6	101,2	114,8	80,5	59,1	49,7	47,7	27,5	14,6	6,0
Vegetables	1559,7	1543,7	1126,8	1076,7	925,4	729,1	648,9	648,9	773,8	532,6	527,2	487,3	626,0	368,5	321,2	170,7	42,7
Melons	523,4	454,2	178,7	171,8	150	122,3	133,1	176,9	171,9	114,1	119,6	94,2	77,8	47,1	33,1	25,7	14,0
Fruit	200,8	333,3	212,7	225,8	252,2	245,9	202,9	191,1	165,2	291,2	274,9	287,0	231,5	220,6	207,3	95,1	26,1
Grapes	393,8	353,5	298,4	265,6	493,4	308,2	329	157	181,3	388,8	320,7	253,6	160,5	270,0	252,8	62,9	16,4
Cocoons (t)	33805	33216	29609	22922	23692	21560	20767	20206	17685	16229	16929	18988	14933	12589	9294	3800	557,4
Meat (slaughter weight)	201,1	163,8	155,9	129,0	113,1	80,8	50,4	41,5	38,5	36,8	34,2	23,9	24,3	21,9	20,8	21,2	18,7
Milk	965,2	895,0	891,3	834,3	631,4	364,9	262,8	236,9	212,1	176,5	130,8	95,3	81,9	64,1	51,0	35,4	22,4
Eggs (million)	1473,4	966,4	799,5	656,5	419,1	322,3	323,6	406,3	516,9	490,6	470,2	559,3	699,1	782,3	729,3	773,4	748,3
Wool (t)	8233	8257	7625	6734	6482	4640	4142	4211	4375	3901	3479	3814	3914	3934	3495	3236	2879
Karakul pelts (thousand pieces)	1073,3	1058,8	1071,7	923,8	875,5	1055,6	569,7	562,3	505,0	499,3	466,9	427,1	401,9	336,0	273,6	218,5	245,0
Yield and productivity rates:																	
Grain, t/ha	1.74	1.8	1.59	1.54	1.87	1.94	1.89	2.27	2.31	2.5	2.83	3.48	3.27	3.3	3.73	3.56	2.51
Cotton, t/ha	2.7	2.48	2.5	2.56	2.64	2.26	2.43	2.09	2.41	2.26	2.37	2.37	2.16	2.6	2.78	2.74	2.05
Potato, t/ha	8.5	8.12	11.05	11.13	10.02	14.18	12.61	10.64	11.77	11.48	9.69	11.13	11.31	10.37	10.97	13.93	14.44
Vegetables, t/ha	20.07	18.14	19.39	19.37	18.96	20.48	16.81	17.68	17.39	15.55	15.93	16.82	1.75	15.18	16.81	16.96	16.61
Melons, t/ha	8.5	9.04	7.85	7.55	7.29	7.03	6.28	6.45	7.89	9.83	9.94	7.96	10.61	10.06	10.49	13.25	15.19
Milk per one cow, kg	2448	2276	2287	2135	1664	1116	952	1020	1055	974	793	778	734	664	655	688	519
Wool per 1 sheep or goat, kg	1,6	1,6	1,4	1,3	1,5	1,1	1,4	1,5	1,6	1,4	1,5	1,6	1,7	1,7	1,5	1,3	1,3

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 8. Main indices of private farm performance

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number, units	1,9	5,9	7,2	14,2	17,1	18,8	21,4	23	31,1	43,8	55,4	72,4	87,6	103,9	125,7	189,2	217,1
Agricultural lands, thousand ha	13,7	45,1	70,6	193,1	307,7	351,6	413,3	446,5	665,7	889,7	1054,7	1591,7	2148,1	2935,4	3775,3	4953,2	5787,8
Arable (sown area), thousand ha	5,3	14,9	27,3	89,7	159,9	207,4	261,8	346,3	482,5	632,2	696,3	991,6	1401,9	1762,6	2140,7	2710,6	2996,8
Share in total arable lands (%)					3,8	5,2	6,3	8,6	12	16,7	20,2	28	37	47,7	58,7	74,5	
Arable lands under grain crops, thousand ha	1,0	4,6	11,4	35,6	67,8	90,6	109,6	125,4	182,2	255,0	277,3	414,0	680,3	805,3	932	1181,5	1274,0
Arable lands under cotton, thousand ha	0,1	0,4	3,4	12,6	41,9	76,8	105,8	165,1	236,4	299,2	333,9	463,9	573	793,2	1015,4	1268,4	1427,1
Arable lands under feed crops, thousand ha	3,9	8,6	10,7	34,6	39,2	31,7	36,1	40,8	41,7	52,4	58,7	82,8	94,9	104	134,3	179,4	197,4
Hayfields and pastures, thousand ha			13	16	19	18	5	4	28	45	67	114	226	455	776		
Share in total gross argicultural output (%)				1,7	2,6	3,0	2,8	3,5	4,6	5,5	7,3	10,0	14,9	18,6	24,3	31,4	34,7
Number of employees, thousand people	20,9	29,8	62,9	72	192	188	173	247	279	352	458	574	734	810	810	1118	1342,8
Sahre of employees in total number of agricultural workers (%)	0,6	0,8	1,8	2	5,4	5,3	4,9	7,4	8,5	10,8	14,3	18,8	23,8	27,3	27,3	38,1	44,9
Livestock number (thousand heads):																	
Cattle	22,4	44,9	67,9	188,8	214,4	198,4	179,2	171,2	174,8	198,1	220,5	273,4	291,6	311,9	332,3	375,6	421,1
including cows	9,8	18,8	24,4	59,2	67,7	59,7	54,6	50,4	51,0	56,8	64,6	85,6	91,7	97,0	105,4	121,3	137,4
Sheep and goats	8,5	34,0	67,9	199,5	221,2	220,7	181,8	169,2	171,4	195,8	234,0	274,0	309,4	419,5	501,1	649,4	872,3
Main types of output (thousand t):																	
Grain crops	1,8	8,0	17,2	55,4	122,1	166,0	222,4	319,5	435,6	568,9	744,7	1480,0	2201,4	2717,7	3550,5	4662,5	5284,1

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cotton	0,1	0,7	6,4	28,3	100,6	158,1	235,8	352,0	509,4	549,0	709,3	896,7	1061,5	1825,1	2460,5	3110,3	3673,7
Potato		0,5	4,2	6,9	8,9	9,6	16,9	19,8	22,5	30,8	30,6	29,9	33,5	44,5	45,9	108,3	178,6
Vegetables		6,6	9,5	35,0	69,5	52,8	63,9	77,4	148,1	129,4	180,6	218,6	353,5	389,7	480,3	1305,4	1567,8
Melons	2,1	4,4	6,7	24,3	35,9	27,6	26,0	46,0	62,1	50,5	56,2	78,9	177,8	174,1	205,7	325,7	415,6
Fruit		0,5	0,2	2,9	10,9	11,0	14,7	19,3	17,7	33,6	42,4	59,5	56,6	109,9	175,5	487,9	580,8
Grapes	0,2	0,3	1,3	3,1	10,9	6,9	12,6	11,4	15,0	29,6	33,5	34,0	22,5	59,7	84,3	408,3	482,8
Cocoons (t)		9	5	19	12	144	93	180	230	250	409	944	1753	4270	6917	13871	18123,4
Meat (slaughter weight)		1,9	4,5	7,6	12,4	10,8	6,7	6,3	6,2	6,6	7,3	10,2	11,3	13,7	13,8	14,3	17,4
Milk		12,4	18,9	52,6	72,4	56,1	49,2	51,1	51,1	54,1	57,9	81,6	83,5	88,8	94,7	111,1	125,4
Eggs (million)		1,3	2,6	3,3	4,8	4,8	4,1	7,2	7,8	12,0	41,4	46,1	60,2	77,4	71,6	76,7	88,8
Wool (t)		20	98	156	283	183	137	141	161	180	193	259	325	395	601	895	1152
Karakul pelts (thousand pieces)							3,8	4,1	7,0	8,2	11,9	14,1	14,3	16,0	25,0	31,5	36,5
Yield and productivity rates:																	
Grain, t/ha		1.75	1.51	1.55	1.8	1.88	2.11	2.58	2.4	2.52	2.76	3.59	3.26	3.39	3.83	4.03	4.13
Cotton, t/ha		2.07	1.9	2.25	2.4	2.07	2.25	2.14	2.15	1.89	2.18	1.97	1.89	2.33	2.42	2.47	2.36
Potato, t/ha		5.82	14.34	9.83	10.22	9.6	10.54	11.15	12.29	11.2	12.17	12.94	13.54	12.03	13.25	15.86	16.11
Vegetables, t/ha		17.51	12.97	14.23	15.51	15.19	14.69	14.64	15.98	15.68	17.02	18.84	19.06	17.24	18.16	20.62	20.95
Melons, t/ha		6.27	9.04	8.81	8.42	9.11	8.64	9.0	9.32	9.7	10.11	9.74	11.16	12.58	13.4	15.04	16.27
Milk per one cow, kg					1160	845	956	962	1022	1049	1016	1122	975	951	949	978,0	1031
Wool per 1 sheep or goat, kg							0,7	0,3	1,1	1,1	0,9	1,2	1,4	1,4	1,7	1,9	1,9

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 9. Main indices of dehkan farm performance

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number, units	2210	2479	2580	2667	2732	2833	2855	2931	3044	3090	3244		4178	4377	4544	4632	4673,2
Agricultural lands, thousand ha	347.9	406	415,7	428,5	442	434	457	453	463	468	445	480	487	493	497	696,2	695,1
Arable (sown area), thousand ha	292,7	330,7	341,4	362,8	378,6	387,4	391	392,3	394	401,5	386,8	404,1	421,2	433,3	441,9	454,8	458,0
Share in total arable lands (%)					9,1	9,7	9,4	9,7	9,8	10,6	11,2	11,4	11,1	11,7	12,1	12,5	12,9
Arable lands under grain crops, thousand ha	54,1	68,9	73,6	100,8	126,2	151,9	189,5	188,2	192,7	195,4	180,2	188,6	198,5	200	208,2	215,8	217,4
Arable lands under feed crops, thousand ha	103,7	112,1	118,7	98,4	96,7	81,5	53,8	55,2	53,3	56,1	53,5	59	61,4	64,9	63,2	63,6	63,1
Share in total gross argicultural output (%)				45,2	49,3	51,8	61,3	62,8	62,5	66,7	65,4	64,1	63,0	62,1	61,7	62,3	62,7
Number of employees, thousand people	1370	1433	1427	1390	1280	1297	1313	1146	1181	1181	1206	1230	1253	1348	1348,3	1429,7	1472,5
Sahre of employees in total number of agricultural workers (%)	37,7	39,3	41	39	36	36,6	37,4	34,5	36,1	36,2	37,7	40,3	40,6	45,4	45,4	48,7	49,2
Livestock number (thousand heads):																	
Cattle	3456,5	3620,9	3806,4	3852,8	3838,1	4005,4	4247,5	4378,5	4487,1	4613,3	4758,3	4868,0	5303,0	5698,1	6061,3	6538,6	6944,6
including cows	1675,3	1769,7	1844,9	1866,1	1860,5	1874,7	1971,0	2020,0	2054,8	2107,3	2151,2	2196,0	2370,6	2530,8	2656,2	2818,2	2959,5
Sheep and goats	4771,9	5019,6	5177,0	5143,5	4904,8	4840,6	5452,9	5661,7	5816,8	6021,3	6314,0	6493,5	7158,4	7708,7	8417,7	9053	9603,9
Main types of output (thousand t):																	
Grain crops	161,2	203	223	276,2	361,1	487,0	649,9	742,5	782,4	758,6	766,8	873,5	973,8	1020,8	1118,5	1175,6	1242,3
Potato	167,7	189,6	204,2	314,3	291,7	342,4	477,1	526,0	534,1	585,5	633,3	688,2	751,2	803,5	850,8	898,1	1004,4

Indices	Years																
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Vegetables	1832,8	1944,1	1902,4	1863,6	1729,8	1715,5	1671,4	1677,1	1758,1	1982,7	2070,0	2229,7	2321,9	2577,9	2716,0	2818,0	3081,4
Melons	402,4	424,8	436,8	381,9	285,9	319,8	217,1	247,1	283,4	286,8	290,3	306,0	331,7	351,3	376,5	392,7	411,3
Fruit	315,8	367,7	347,2	326,3	339,2	347,9	330,0	333,2	306,2	466,1	484,0	496,4	477,7	521,2	566,5	599,2	663,1
Grapes	86,4	85,36	81,2	84,5	116,6	162,9	169,8	167,6	147,6	205,8	218,9	228,8	218,5	259,4	229,5	332,4	379,7
Cocoons (t)																2543	2786
Meat (slaughter weight)	290,7	303,5	343,2	372,6	383,2	369,4	410,6	428,0	436,3	458,4	466,1	479,0	525,7	562,6	598,0	643,9	687,7
Milk	2366,2	2771,8	2853,8	2844,7	2916,6	2982,9	3094,1	3206,9	3280,2	3401,9	3476,5	3544,4	3865,7	4127,6	4409,2	4709,1	4949,7
Eggs (million)	873,6	930,0	985,7	913,8	807,9	730,0	747,7	751,1	714,9	751,8	776,2	763,5	873,1	1000,6	1165,8	1278	1383,3
Wool (t)	17104	19185	18863	18027	12749	11767	11136	11179	11166	11768	12304	12521	13545	14669	15985	17305	18452
Karakul pelts (thousand pieces)	402,5	545,0	545,4	616,4	517,4	479,8	197,9	236,7	200,0	240,1	250,0	246,9	274,6	322,8	390,2	476,8	499,5
Yield and productivity rates:																	
Grain, t/ha	3.04	2.95	3.03	2.74	2.8	3.2	3.4	3.88	3.94	3.99	4.22	4.52	4.76	4.94	5.22	5.26	5.34
Cotton, t/ha	9.16	8.54	9.59	10.13	9.02	10.15	11.21	12.85	12.95	13.33	13.77	14.77	15.64	16.44	17.52	17.76	18.82
Potato, t/ha	19.41	19.02	19.33	18.19	17.66	17.63	18.35	18.28	18.61	19.62	19.58	20.13	21.14	21.98	23.07	23.36	23.88
Vegetables, t/ha	16.73	16.69	16.08	14.84	13.62	16.66	14.45	15.85	16.52	17.05	17.98	17.49	18.61	20.09	21.34	21.66	21.44
Melons, t/ha																9.84	
Milk per one cow, kg					1609	1602	1627	1630	1627	1649	1650	1648	1760	1714	1699	1708,0	1736
Wool per 1 sheep or goat, kg							2,6	2,3	2,3	2,3	2,3	2,3	2,4	2,4	2,5	2,3	2,4

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 10. Land use pattern of agricultural enterprises and MAWR organizations per regions as of 1.01.2007, thousand ha

Regions	Total area		Arable lands		Perennial plantations		Fallow lands		Pastures		Agricultural lands		Private household plots	
	total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated
Republic of Karakalpakstan	3188,8	489,7	415,7	415,7	8,6	8,6	8,6	8,6	1602,3	26,9	2035,2	459,8	35,5	29,3
Andijan	375,3	265,8	198,9	198,9	27,6	27,6	3	0,6	20,8	0,9	250,3	228	45,9	35,9
Bukhara	3481,9	271,4	199,2	199,2	20,1	20,1	6,5	6,5	2335,5	-	2561,3	225,8	56,9	44,6
Djizak	1431,1	295,3	479,9	261	12,5	12,5	8,4	0,7	665,6	-	1166,4	274,2	27,6	17,2
Kashkadarya	2462,3	505,8	675,9	419,9	32,7	30,9	22,6	5,1	1315,7	0,1	2046,9	456	73,7	45,3
Navoi	5696,4	121,4	109,1	89,3	9,9	9,9	6,8	6,6	5061,6	-	5187,4	105,8	20,1	14,5
Namangan	552,3	272,5	199	199	34,2	34,2	2,6	2,6	91,1	-	326,9	235,8	40,6	33,5
Samarkand	1487,8	368,3	434,5	254,4	53	52,7	5,5	-	706,9	-	1199,9	307,1	80,3	58,7
Surkhandarya	1430,5	320,8	279,4	241,5	31,8	30,5	0,3	-	737,6	-	1049,1	272	57,9	47,2
Syrdarya	383,9	287,9	254,5	254,5	6,3	6,3	10,9	10,9	20,5	-	292,2	271,7	17,3	14,1
Tashkent	790,4	380,2	339,4	302,9	34,4	29	0,8	0,3	198,3	1,4	572,9	333,6	53,7	45
Fergana	571,2	351,1	248,8	248,8	41	41	-	-	19,6	4,2	309,4	294	64,4	49,7
Khorezm	486,4	276,6	207,6	207,6	13	13	4,9	4,9	71	9,4	296,5	234,9	48,6	41,4
Total	22338,3	4206,8	4041,9	3292,7	325,1	316,3	80,9	46,8	12846,5	42,9	17294,4	3698,7	622,5	476,4

Source: the State Committee on Land and Cadastre

Table 11-A. Main indices of agricultural production by regions, 2006-2007

Regions	Sown areas under all agricultural crops		Grain crops (thousand ha)		Cotton (thousand ha)		Potato (thousand ha)		Vegetables (thousand ha)		Melons (thousand ha)		Fruit and berries (thousand ha)		Graipes (thousand ha)		Feed crops (thousand ha)	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Republic of Karakalpakstan	252,8	234,7	94,5	86,7	106,7	106,2	2,1	2,2	7,4	7,4	5,2	5,0	4,6	4,6	0,5	0,5	32,5	24,3
Andijan	231,5	234,4	86	90,9	110,2	113,0	4,3	4,5	14,5	14,0	0,8	0,7	26,4	26,1	4,2	4,5	15,1	10,6
Bukhara	240,1	240,9	86,2	86,6	128,1	127,2	3,4	3,4	8	7,8	2,1	2,0	9,7	9,9	9,3	9,3	12,2	13,6
Djizak	381,6	365,0	216,5	201,5	107,4	106,6	1,6	1,6	10,8	11,7	6,5	7,1	11,5	11,7	4,9	4,9	34,3	32,0
Kashkadarya	464,3	426,1	247,8	205,8	173,2	174,9	3,8	4,1	11,2	12,4	3,3	4,1	10,3	11,2	8,3	7,9	22,5	23,1
Navoi	101,1	100,9	47,2	46,9	39,4	39,4	1,1	1,1	2,8	3,0	0,9	1,0	4,3	4,4	6	6,2	9,5	9,4
Namangan	220,6	223,2	89,1	89,2	101,6	103,3	4,2	4,8	10,5	11,1	1,3	1,4	23,8	25,5	11,9	12,4	13,3	13,2
Samarkand	379,6	370,9	180,6	167,3	103,6	103,8	9,3	8,9	24,4	23,2	2,8	3,1	27,9	30,2	34,4	38,6	48,1	53,1
Surkhandarya	269,4	266,8	117,5	117,0	122,3	122,2	6	6,1	9,3	9,3	1,8	1,8	13,1	13,0	14,8	14,8	11,9	9,7
Syrdarya	240,3	236,6	101,7	98,4	116,9	115,8	1,1	1,3	4,2	4,7	4,9	4,4	5	5,0	1,5	1,4	10,6	11,6
Tashkent	340,6	344,3	149,3	149,7	112,6	112,9	6,4	7,4	29,2	31,3	3	3,0	22,7	22,8	16,3	16,2	35,7	37,7
Fergana	289,2	289,6	128,9	129,9	115,3	115,5	5,8	6,2	12,1	12,3	1,2	1,0	39,4	41,0	4,9	5,0	25,4	24,7
Khorezm	226,3	226,9	72,7	68,6	110,9	110,5	3,5	4,0	10	11,6	3,6	4,4	11,3	11,4	2,1	2,2	25,3	27,0
Total	3637,4	3560,3	1618	1538,5	1448,2	1451,3	52,6	55,6	154,4	159,8	37,4	39,0	210	216,8	119,1	123,9	296,4	290,0

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 11-B. Main indices of agricultural production by regions, 2006-2007

Regions	Agricultural produce output (billion UZS)		Crop production (billion UZS)		Livestock products (billion UZS)		Gross harvest of grain crops (thousand t)		Gross harvest of cotton (thousand t)	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Republic of Karakalpakstan	246,3	301,4	131,8	164,6	114,5	136,8	286,5	287,3	193,7	196,1
Andijan	629,6	823,9	405,9	538,8	223,7	285,1	521,6	539,8	269,1	310,0
Bukhara	628,1	834,3	359,8	482,4	268,3	351,9	555,3	567,8	373,6	385,5
Djizak	442,5	515,5	228,5	252,4	214	263,1	508,7	521,1	252,2	255,4
Kashkadarya	670,6	796,1	384	421,9	286,6	374,2	804	840,7	426,1	460,9
Navoi	302,6	369,4	133,3	147,5	169,3	221,9	215,1	222,2	110,0	111,4
Namangan	484,2	618,1	298	348,6	186,2	269,5	440,4	442,6	249,9	261,0
Samarkand	962,7	1188,8	545,4	639,3	417,3	549,5	676,4	719,2	255,7	268,9
Surkhandarya	602,2	733,7	353	415,1	249,2	318,6	585	586,8	353,0	345,3
Syrdarya	275,7	332,9	169,5	195,1	106,2	137,8	396,4	361,4	256,1	248,0
Tashkent	953,7	1068,0	535,3	532,4	418,4	535,6	566,9	544,5	298,2	275,0
Fergana	639,1	786,3	389,3	495,6	249,8	290,7	660,2	692,2	287,6	323,1
Khorezm	476,9	620,5	231,2	317,3	245,7	303,2	330,2	317,5	275,4	275,0
Total	7314	8988,9	4165	4951,0	3149	4037,9	6546,7	6643,1	3600,6	3715,8

Regions	Gross harvest of potato (thousand t)		Gross harvest of vegetables (thousand t)		Gross harvest of melons (thousand t)		Gross harvest of fruit and berries (thousand t)		Gross harvest of grapes (thousand t)	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Republic of Karakalpakstan	15,5	17,0	90,8	99,6	42,5	50,0	15,7	16,2	2,2	3,0
Andijan	90,9	109,5	569,4	616,4	22,8	34,4	238	254,2	23,5	28,5
Bukhara	67,2	82,5	225,7	261,6	54,7	60,6	96	110,6	120,5	133,6
Djizak	24,8	29,2	163,2	175,3	113,3	126,0	42,3	42,8	18	18,3
Kashkadarya	56,1	64,7	193,4	218,5	49,1	56,5	43,9	50,4	37,7	43,3
Navoi	26,9	29,1	99,9	104,6	27,3	29,6	49,3	49,9	34,4	38,9
Namangan	81,6	103,7	281,7	334,8	30	39,8	86,5	99,2	48,6	59,3
Samarkand	235,4	264,1	814,6	833,8	55,4	58,4	170,6	184,2	271,7	296,3
Surkhandarya	92,4	96,5	322,4	349,7	79,5	83,5	71,4	76,5	89	94,4
Syrdarya	18	19,6	119,1	128,8	123,7	139,4	13,8	14,8	5,9	6,3
Tashkent	160,9	193,7	859,5	939,5	68,2	70,3	104,9	105,1	90,2	84,4
Fergana	108,7	121,8	316,9	357,1	24,1	24,7	165,4	178,1	44,3	53,1
Khorezm	42,6	57,6	237,5	272,2	53,5	67,7	84,4	88,0	17,6	19,5
Total	1021	1189,0	4294,1	4691,9	744,1	840,9	1182,2	1270,0	803,6	878,9

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 11-C. Main indices of agricultural production by regions, 2006-2007

Regions	Grain crop yield (t/ha)		Cotton yield (t/ha)		Potato yield	Vegetable yield	Melon yield	Fruit and berry yield	Grape yield	Average number of constant population (thousand people)		Economically active population (thousand people)		Employed in agriculture (thousand people)	
	2006	2007	2006	2007	2007	2007	2007	2007	2007	2006	2007	2006	2007	2006	2007
Republic of Karakalpakstan	3.04	3.31	1.9	1.92	77,6	121,5	100,5	48,3	69,6	1577,3	1589,0	547,1	592,3	177,4	187,6
Andijan	5.92	5.89	2.44	2.74	208,8	271,3	224,4	114,8	85,7	2392,9	2430,5	986,0	1077,9	335,5	318,5
Bukhara	5.97	5.98	2.9	3.03	208,8	243,2	239,8	120,0	154,7	1535,5	1555,6	689,2	741,3	225,7	238,9
Djizak	2.35	2.59	2.34	2.4	136,7	145,3	175,1	55,2	45,8	1058,1	1072,1	342,5	366,3	128,5	128,7
Kashkadarya	3.58	4.1	2.45	2.64	153,5	174,5	137,3	57,4	68,5	2441,3	2485,8	852,8	925,7	233,2	242,0
Navoi	4.66	4.72	2.8	2.82	224,5	232,9	219,0	128,5	63,4	816,1	824,3	385,8	410,1	91,5	89,3
Namangan	4.87	4.77	2.45	2.53	176,8	240,3	225,8	48,9	53,8	2119	2154,4	718,3	784,7	208,0	210,4
Samarkand	4.5	4.3	2.46	2.59	247,2	298,3	183,3	79,5	95,5	2931,5	2979,4	1085,0	1180,1	332,4	313,1
Surkhandarya	4.92	4.93	2.88	2.83	150,3	241,3	271,9	76,4	75,7	1941,5	1974,9	675,1	731,9	268,7	279,1
Syrdarya	3.86	3.63	2.18	2.15	123,9	209,0	254,5	37,3	54,1	680,6	688,7	288,9	308,9	100,7	108,5
Tashkent	3.78	3.59	2.65	2.44	197,9	227,6	205,9	64,9	66,1	2480,2	2507,4	1043,3	1113,5	287,0	313,7
Fergana	5.09	5.32	2.5	2.8	187,8	252,6	236,3	62,3	131,1	2899,6	2946,3	1207,4	1312,9	334,0	342,8
Khorezm	4.42	4.42	2.51	2.49	141,1	198,2	156,8	102,9	105,2	1465,8	1491,0	541,0	581,7	201,1	215,1
Total	4.13	4.25	2.5	2.57	184,1	228,4	184,6	76,6	85,2	26488,2	26868,0	10492,5	11299,2	2928,8	2990,9

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 11-D. Main indices of agricultural production by regions, 2006-2007

Regions	Cattle number (thousand heads)		Cow number (thousand heads)		Sheep and goat number (thousand heads)		Meat production (slaughter weight, thousand t)		Milk production (thousand t)		Egg production (million)		Wool production (t)		Milk per 1 cow (kg)		Wool per 1 sheep or goat (kg)	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Republic of Karakalpakstan	601	665,7	209,4	219,1	622,3	653,9	27,2	28,4	143,7	146,6	29,5	32,3	635	676	686	697	1,0	1,6
Andijan	550,4	593,1	240,8	254,2	632,8	680,4	44,1	45,3	428,9	446,5	156,7	176,7	1592	1693	1781	1857	2,5	2,4
Bukhara	620,2	685,2	264,7	285,8	1155,8	1269	60,2	63,4	389,1	429,2	120,6	141,5	2122	2356	1470	1621	1,8	2,1
Djizak	455,2	496,1	179,7	188,2	1100,3	1150,1	53	60,9	261,3	276,1	75,3	80	1979	2187	1454	1484	1,8	2,3
Kashkadarya	746,3	773,1	309	322	2303,5	2386,7	76,7	82,7	490,3	529,6	132,1	138,4	4170	4328	1587	1626	1,8	2,3
Navoi	244,5	262,6	118	125	1563,9	1615,9	41,6	46,5	202,2	221,2	95,9	101,6	2590	2695	1714	1837	1,7	1,8
Namangan	407	427,4	155	159	525,3	540,6	37,2	38,7	301,2	314,3	59,2	62,3	920	973	1943	2014	1,8	2,1
Samarkand	996,8	1045,5	483,5	510,7	1294,7	1387,7	90,7	94,8	637,4	658,6	382,9	412,3	2941	2940	1318	1356	2,3	2,3
Surkhandarya	549,2	568,8	248,8	257,4	1388,9	1450,3	53,1	57,5	430,8	443,1	119,8	126,3	1627	1689	1732	1769	1,2	1,6
Syrdarya	212,6	223,7	85,9	90,4	141,6	150,6	19,7	20,4	155,2	163,3	42,9	41,9	279	318	1807	1901	2,0	2,4
Tashkent	496,2	512	221,3	226,7	511,2	543	84,3	88	453,9	464,5	639,3	614,6	1238	1250	2051	2068	2,4	2,9
Fergana	558,9	579,8	231,3	241,6	471,4	490,8	46	48,9	466,2	477,1	113,3	122,8	635	659	2016	2063	1,3	1,4
Khorezm	606,3	624,9	235,1	244,8	304,5	316,6	45,6	48,3	495,4	527,4	160,6	169,7	708	719	2107	2243	2,3	2,4
Total	7044,6	7457,9	2982,5	3124,9	12016,2	12635,6	679,4	723,8	4855,6	5097,5	2128,1	2220,4	21436	22483	1628	1690	1,8	2,1

Source: the State Statistics Committee of the Republic of Uzbekistan

Table 12. Qualitative irrigated land evaluation of the Republic of Uzbekistan for 1990, thousand ha*

Region	Average area			Good quality			High quality			Average soil quality score		
	1990	2006	2006 to 1990 (%)	1990	2006	2006 to 1990 (%)	1990	2006	2006 to 1990 (%)	1990	2006	2006 to 1990 (%)
Republic of Karakalpakstan	178302	116304	65,2	33039	31298	94,7	453		0,0	44	41	93,2
Andijan	75598	84988	112,4	108780	88814	81,6	8728	6050	69,3	60	57	95,0
Bukhara	48420	97364	201,1	95656	60299	63,0	14773	83	0,6	58	50	86,2
Djizak	113366	191794	169,2	81612	37792	46,3	8100	2809	34,7	53	50	94,3
Kashkadarya	266530	286392	107,5	102347	75378	73,6	15574	8177	52,5	54	51	94,4
Navoi	52554	83784	159,4	78044	65936	84,5	37556	19482	51,9	66	59	89,4
Namangan	31188	35868	115,0	38330	33276	86,8	8183	2099	25,7	59	52	88,1
Samarkand	95013	162019	170,5	123721	95508	77,2	43034	17317	40,2	67	57	85,1
Surkhandarya	60543	139155	229,8	115046	71034	61,7	69250	6915	10,0	68	56	82,4
Syrdarya	110525	149782	135,5	84389	45254	53,6	1447		0,0	53	49	92,5
Tashkent	110099	154329	140,2	120695	119765	99,2	21025	14629	69,6	66	59	89,4
Fergana	68977	139728	202,6	89373	100581	112,5	76252	6022	7,9	66	56	84,8
Khorezm	77957	116984	150,1	78589	61139	77,8	5330	102	1,9	54	54	100,0

Sources:

1. E. Kurbanov ae al. «Respublikadagi sug'oriladigan yerlarning holati va ulardan samarali foydalanish bo'yicha Taklif va Tavsiyalar». Tashkent. 2001, Chapter 40.

2. the State Committee on Land and Cadastre data

3. A. Chertovitsky and A. Bazarov. «Land use system of Uzbekistan» T:, Fan, 2007 (17, 328 pp.).

Table 3.7. Agricultural land distribution in livestock breeding enterprises of the Republic of Uzbekistan as of 1.01.2007, ha

Livestock farm association profile	Number		Area		Arable land		Fallow lands		Pastures and Hayfields		Agricultural lands		Private household plots		Land Development
	farms	households	total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated	total	irrigated	
Livestock breeding	55	21433	1514208	61981	69073	44932	950	588	1023349	10380	1095462	57954	5172	3802	4324
Karakul production	68	107426	6758571	51724	261404	38852	9678	1100	5452081	102	5726724	43198	26044	8125	1977
Meat production	21	10172	363351	25792	32886	23814	1824	432	207967	9400	243357	34269	2612	1439	96
Poultry production	25	8811	17559	8735	7491	6951	18	18	1834	383	9725	7714	1183	841	289
Pig breeding	2	321	796	445	397	397	-	-	42	-	439	397	53	48	37
Horse breeding	2	1300	47608	978	3267	613	-	-	31387	-	34846	805	351	173	-
Fattening farms	33	5532	76760	24299	18599	15172	996	899	43010	6185	63692	23343	1082	796	180
Pedigree animal breeding	3	1079	500857	587	8291	238	410	5	415761	-	424652	433	215	152	-
Fish production	2	91	2163	272	147	147	9	-	160	102	319	252	7	6	-
Silk production	4	1227	2276	1271	509	509	-	-	310	-	1435	1125	144	126	5
Beekeeping	31	6719	32140	9637	9587	8037	86	86	9242	-	19380	8565	1389	1059	64
Crop production	12	17872	56043	14363	14223	9105	291	291	25513	-	42683	12052	2969	2176	-
Feed production	1	1252	1381	1004	857	800	-	-	58	-	978	863	148	134	-
Total	259	183235	9373713	201088	426731	149567	14262	3419	7210714	26552	7663692	190970	41369	18877	6972

Authors' estimates based on the State Committee on Land and Cadastre data

Table 3.24. Actual arable land use in livestock breeding private farms, ha

Regions	Number of private farms	Cattle number (nominal heads)	Total land area, ha	Including arable lands, ha			Established norm of land area per 1 nominal animal head, ha	Required land areas as per established standard, ha	Land areas allocated for total cattle number, ha	Allocated land area per 1 nominal cattle head, ha	Actual areas under feed crops, ha	Actual feed sowings in % to arable lands	Actual feed sowings per 1 nominal cattle head, ha
				Total, ha	Irrigated	Rainfed							
Republic of Karakalpakstan	725	30292	68055	24563	24563	-	0,45	13631	24563	0,81	6612	26,9	0,22
Andijan	655	30004	13144	11953	11953	-	0,33	9889	11839	0,39	4570	38,2	0,15
Bukhara	188	9541	20476	5841	5841	-	0,45	4293	5956	0,62	2096	35,9	0,22
Djizak	470	14840	43734	23525	6801	16724	2,22	32946	40241	2,71	3028	12,9	0,2
Kashkadarya	591	34632	69267	29775	14820	14955	0,69	23843	29775	0,86	4895	16,4	0,14
Navoi	644	39610	84647	5126	4666	460	0,3	11880	75649	1,91	2200	42,9	0,06
Namangan	404	16282	20004	11225	11225	-	0,3	4885	4846	0,3	4100	36,5	0,25
Samarkand	574	20347	21914	17548	11947	5601	0,31	6381	6073	0,3	5473	31,2	0,27
Surkhandarya	1154	53646	368319	42901	25237	17664	0,44	23726	5169	0,1	4241	9,9	0,08
Syrdarya	311	11407	13991	11417	11417	-	0,44	5044	13991	1,23	2673	23,4	0,23
Tashkent	911	59621	85116	39911	30050	9861	0,37	22175	21962	0,37	21962	55	0,37
Fergana	703	31411	17778	15352	15352	-	0,3	9423	8481	0,27	8434	54,9	0,3
Khorezm	572	21495	17115	13087	13087	-	0,3	6350	7113	0,33	2527	19,3	0,12
Republic of Uzbekistan	7902	373128	843560	252224	186959	65265		174466	255658	0,68	72811	28,9%	0,2
Per farm		47	106,8	31,9	23,7	8,3		22	32,4		9,2		

** The data of the MAWR of the Republic of Uzbekistan*

Table 3.25. Crop pattern in livestock breeding private farms, ha

Regions	Number of private farms	As of 1 April, 2007 actually allocated lands, ha	Including arable lands, ha			Land use status									
						Crop pattern of 2006, ha					Estimated crop pattern for 2007, ha				
			Total	Including		Total	Including				Total	Including			
				Irri-gated	Rain-fed		Feed crops	Grain crops	Cotton	Others		Feed crops	Grain crops	Cotton	Others
Republic of Karakalpakstan	725	68055	24563	24563	-	18828	6612	2289	4469	5458	24563	13784	2607	4910	3262
Andijan	655	13144	11953	11953	-	10172	5113	3086	1708	265	11953	5384	3566	2268	734
Bukhara	188	20476	5841	5841	-	5596	1689	1466	2338	103	5956	2096	1391	2403	66
Djizak	470	43734	23525	6801	16724	13935	1706	9289	2140	800	15355	3028	7114	1991	3222
Kashkadarya	591	69267	29775	14820	14955	18947	4914	8433	5065	535	18600	5862	8259	3957	522
Navoi	644	84647	5126	4666	460	4192	1235	1542	1223	193	4577	1431	1655	1402	89
Namangan	404	20004	11225	11225	-	10616	3553	3726	2543	794	11247	4166	3140	3450	491
Samarkand	574	21914	17549	11947	5601	14267	5168	4507	2989	1602	14960	6073	4664	2741	1483
Surkhandarya	1154	368319	42901	25237	17664	30075	4149	8066	12176	5683	31888	4193	12232	9506	5958
Syrdarya	311	13991	11417	11417	-	9172	2673	2798	3520	181	10893	4105	2748	3770	270
Tashkent	911	85116	39911	30050	9861	33957	23000	7724	2971	262	36480	21962	8862	3032	2624
Fergana	703	17778	15352	15352	-	14122	7893	3167	2143	919	14986	8381	3252	2451	902
Khorezm	572	17115	13087	13087	-	12900	4404	1915	4531	2050	13087	7113	2172	2971	832
Republic of Uzbekistan	7902	843560	252225	186960	65265	196779	72109	58008	47816	18845	214545	87578	61662	44852	20455
%						**100**	**36,6**	**29,5**	**24,3**	**9,6**	**100**	**40,8**	**28,7**	**20,9**	**9,5**
			100			**78.0**					**85.1**				

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