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Ministry of Agriculture

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Country Report

On the State of the

Armenian Animal Genetic

Resources

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ADMINISTRATIVE DIVISIONS



Modified from a map prepared by the
Environmental Research and Management Center, AUA

1. Introducing the Country

1.1 Natural Resources and Brief Description of Agriculture Management

Armenia is a landlocked country with no outlet to the sea and with limited natural resources. Located in the southern part of the Trans-Caucasus, it occupies a total territory of 29,800 square km and borders with Iran in the south, Turkey in the northwest, Georgia in the north and Azerbaijan in the east.

Its territory consists of high mountains and wide valleys, which run parallel to the mountain peaks of the South Caucasian mountain chains. The elevations are between 400, 4,095 meters, and some 70 percent of the surface lies between 1,500 and 3,000 meters above the sea level. Only 0.3 percent of its territory has altitudes lower than 500 meters.

In the majority of mountain areas of the country, the average annual temperatures are 3-4 C, and in the alpine zone even lower. Duration of the vegetation period in lower areas is 250 and in alpine zones 95 days. In lower areas, the climatic conditions allow 230 days of grazing for cattle, and 300 days for sheep, while in high-mountainous pastures the duration varies between 150-180 days from year to year.

The climate is continental. The coldest month is January (-1.2 to -12.8 C); the hottest months are July and August (25.8 C). Annual precipitation varies between 300 mm in the Ararat Valley and 600-800 in other areas of the country. Pastures lie in the alpine zones. The country lies between two water basins, that of the River Arax in the southwest and the River Kur in the northwest. Rich and deep soils prevail in the lower areas, mainly in the Ararat Valley; the so-called weak (surface) soils are in the alpine zones and hillsides.

Factors, which impact climate formation in the country, are numerous. Alongside with the geographic-cal location also mountain systems (Great and Small Caucasian mountain-chains, Armenian Upland), the Black and Caspian Seas, as well as the proximity of Iranian and Asia Minor plateaus have a decisive role in the formation of climate. Particularities, characteristic of horizontal climatic areas, undergo to significant changes because of the impact of alpine zones. According to zonal differences, there are the following types of climate in Armenia.

1. Dry subtropical- it develops in areas lying up to 800 meters above the sea level. This climatic zone is favorable for cultivation of heat-loving plants.
2. Dry, severe continental- it develops in the hollow of Ararat Valley areas lying up to 900 meters above the sea level. Heat-loving plants are also cultivated here.
3. Dry continental climate - it develops in the hallow of Ararat Valley and in Vayk in areas lying between 900 to 1,300 meters above the sea level. Climatic conditions are favorable for growing of grapes, fruits, tobacco and cereals.
4. Temperate continental climate - it develops in the hollow of the Ararat Valley and in Vayk in areas lying between 1,500 and 1,700 meters above the sea level. This kind of climate is favorable for growing of crops, potato, beet and stone-fruits.
5. Temperate hot climate- it develops in the northeastern and southeastern parts of the country, lying between 900 and 1,300 meters above the sea level.

6. Moderate climate- it develops on mountain slopes and plateaus, lying up to 2,004 meters above the sea level. Cereals, beet and fruits are cultivated here.

7. Cold mountain climate- it develops in the high mountain areas, lying up to 3,500 meters above the sea level. This is the climate of sub-alpine and alpine pastures.

8. Snow-proximity climate -it develops in areas lying 3,500 above the sea level.

The above-mentioned climatic zones, their ecological conditions, as well as the level of economic development of separate regions are compulsorily taken into consideration in the process of planning national economy development.

Frequent earthquakes are usual for the region. The 1998 earthquake with epicenter in the town of Spitak razed to ground the northern areas of the country sustaining huge damages to industrial potential and causing thousands of human losses.

Armenia was the first of former Soviet Republics that privatized land by distributing it to separate households. In 1991 when Armenia was subjected to transport blockade, privatization and denationalization of land was instrumental in ensuring the population to meet the minimum basic foodstuff needs. The land was divided among rural households on equal terms depending on the number of households' families. But along with it land plots allotted to households in separate village communities were different from one another in their size as the distribution was conducted on the mapping data of community's boundaries, established back in 1938.

As of 2001, January 1, there were already 332, 608 rural households occupying a total area of 460,111 hectares. Each household had an average of 1,38 hectares of land. The average land plot of a household varies in size from 0.61 hectares in the Ararat Valley, where intensive irrigation and cultivation of high profit-bringing plants is applied and 3 hectares in the southern province of Syunik with low productivity of plant growing and cattle breeding.

The share of Agriculture in the overall GDP rose from 19 percent in 1988 to 40 percent in 1994. Being now stabilized, it contributes to some 30 percent of the GDP.

Armenian Agriculture consists of two main sub-branches: Agriculture (plant growing) and livestock breeding, which in their turn are divided into various smaller sub-groups. Agriculture includes crops, cereals, fodder, vegetables, potato, fruits, grapes and technical crops growing. Livestock includes cattle, pig, sheep (including goats), breeding, poultry farming, apiculture and fish growing. Main plants are wheat, oats and potato, which are used both as food and as a source of income. Vegetable, fruit and grape growing are considered as important income bringing plants.

Though the volumes of imported chemicals and availability of irrigation water have significantly declined over the last decade, main productivity indices have been maintained on the level of 1980-s.

Average crop capacity of wheat in 1998 was 17 metric centners (1700 kg) from one hectare against 21 metric centners (2100 kg) in 1980. Potato crop capacity was 130 metric centners (13000 kg) from a hectare against 135 hectares in 1980. But the total number of livestock has been constantly declining from 1985, partly as a result of getting adapted to market relations and

partly because of replacing production of fodder by the production of cereals. As of 1999, the general picture of stock in the country was the following: there were 452,000 heads of livestock, 488,100 heads of sheep and goats and 49,200 heads of pigs.

According to 2002 data, the share of plant growing in the aggregate Agricultural GDP was an average of 45-50 percent and that of cattle breeding 50-55 percent. As of today the share of Agriculture in the overall GDP stands at 22.5 percent against 12.6 in 1990.

1.2 Population number and its growing tendencies.

Total population is officially 3.8 million, but due to the economic hardships of the 1990-s, there followed a mass exodus of population from the republic, however, the official statistics does not consider this. The actual population figure probably stands at around 3.0 or 3.3 million.

There were absent members only in 574 out of 3,400 (17 percent) surveyed families. The number of absent members was 755 persons or 4.6 percent of all surveyed persons (Appendix 6). The number of absent persons per one household, which has an absent person at all, is 1.32. This figure is significantly high for Yerevan (1.67), Tavush (1.57), Vayots Dzor (1.47), Ararat (1.43) and is relatively low in Armavir (1.07), Shirak (1.14), Aragatzotn (1.26).

The average number of household members in the rural areas of the Republic of Armenia, on the basis of the Survey results, was 4.76 persons. The minimum household members were registered in Lori province (4.18 persons), and the maximum number of household members was registered in Kotayk province (5.24 persons). In 6 out of 10 provinces of the Republic of Armenia (excluding the capital Yerevan) the average number of household members was from 4.64 to 4.9 persons.

1.3 Labor Force and Employment

As of 2002 July the overall rural population was 1269400. Rural communities are fully secured by human resources. According to several calculations, the number of people engaged in livestock raising is 252000. However, their number has not displayed any significant indications towards decline in the recent five years.

In 1996 the rural population of Armenia accounted for 32.7 percent of all population, and the labor force engaged in rural areas accounted for 41 percent of all labor force.

The Agricultural production has a pronounced seasonal nature, so the employment in Agriculture also has seasonal nature. According to the Survey, on average, only 36.1 percent of employed persons work the whole year, 39.8 percent is employed only 7-9 months, 19.4 percent are employed only 3-6 months and 4 percent are employed only 3 months. Thus, the main shares of employed persons (more than 63 percent) work only less than 9 months.

	less than 3 months	3-6 months	7-9 months	whole year	not employed
Aragatzotn	12.6	18.6	29.4	38.3	1.1
Ararat	0.6	13.8	47.3	38.3	0
Armavir	4.1	12.9	56.0	25.9	1.1
Gegharkunik	2.0	33.2	30.5	33.5	0.8
Lori	7.8	22.8	35.4	33.7	0.3
Kotayk	2.8	23.4	32.2	40.6	0.9
Syunik	0	10	47.5	42.1	0.4
Vayots Dzor	7.1	31.4	45.0	15.7	0.7
Tavush	3.8	18.5	45.0	32.3	0.4
Yerevan	4.0	19.4	39.8	36.1	0.7

The Structure of Income of Rural Households is characterized as Follows:

Wage and salary - 20.5

Budget Transfers - 7.1

Income from entrepreneurial activities - 39.0

Including from Agricultural activity - 26.1

Transfers from relatives - 8.3

Income from sale of real estate and privatization certificates - 5.1

Loans and other - 20.5

Obviously hired labor and entrepreneurial activity (including income from sale of real estate and privatization certificates) provides about 64.6 percent of the total income of a rural household.

So, employment provided about 2/3 of the rural population's income, including only entrepreneurial activity in Agriculture (sale of self-produced goods and livestock, income from auxiliary production and sale of other goods) provided 26.1 percent of income.

Of particular interest is the structure of employment in livestock breeding. Currently some 186,000 rural households across the country own livestock.

Some 38,500 households own pigs, 83,500 households own sheep, 119,000 households own 10 and more fowls, and some 13,200 households own beehives.

It should be mentioned that the number of families, owing only one kind of cattle is insignificant. More than 84 percent of the latter households keep at least two kinds of animals (cows and sheep, pigs and fowls, cows and pigs and so on). This is also proved by the fact that almost all big farms own both cowherds and sheep flocks. Managers of both big and small farms explain this by the low income received from animal husbandry production, as well as by dangerous and hopeless fluctuation of prices for certain kinds of products.

1.4 Poverty

According to a 2000 household survey, on the average 45 percent of the country's population was poor. Poverty level was higher in frontier and mountainous rural areas than the average poverty level among overall rural households. More pronounced was the difference in poverty level between provinces. The results of a recurrent survey conducted by GZMH in 1999 October showed that the poverty level in three northwestern provinces, included in its assistance program was 72 percent.

The program in question, (Assistance to North-Eastern Rural Households) has designed policies for other sectors as well to promote reduction of poverty. These policies include encouragement of wage employment and self-occupation through small enterprises development and development of mechanisms for loans availability, population's accessibility to educational and health services, improvement-oriented reforms and revision of social assistance program through shifting the emphasis from humanitarian assistance to social security mechanisms.

Under the current conditions when the share of Agriculture makes some 40 percent of the overall GDP against 17 percent in 1990, Agricultural development is of paramount importance for reduction of poverty in rural communities. The emphasis in the Agricultural sector should be put on special utilization of land and irrigation water and raising the productivity of livestock breeding.

The results of the accomplished Program for Assistance to the North-Western Regions have shown that the level of households' income has grown by 122 percent. This rise became possible due to the utilization of plant growing and cattle-breeding supplies, as well as to application of leased Agricultural machines, which promoted the rise of the productivity. The crop capacity of irrigated plants rose by 20-25 percent. Thanks to the availability of loans, made available within the framework of the program, the total number of livestock has grown in beneficiary households. Loans borrowers also exhibit more activity in the land market through leasing and purchasing of land (on average 0.5 hectares of land were leased), as a result the average size of a household-owned land has grown by 25 percent, making 2.45 hectares.

The threat of poverty is relatively lower for rural households conditioned on the availability of capacities and facilities for production of basic foodstuff. But the living standards of rural population are also dependent on a range of other factors, mainly on region's geographic location, especially with regard to its altitude above the sea level. The poorest segments of population in Armenia live in mountainous regions. The share of population living below the margin of poverty in settlements, located up to 1,300 meters above the sea level constitutes 42.4

percent, whereas the share of poorest population living in communities, lying up to 1,700 meters above the sea level constitutes 58 percent. Very poor segments of population are concentrated in the earthquake zone and frontier regions or in settlements with low level of economic activity.

1.5 Rural Households Sizes

Land resources in Armenia were privatized in 1991-1992 and 70 percents of it went to private ownership. As a result, 321,000 rural households were formed, which now produce some 98 percent of Agricultural products. Actually, the entire Agricultural production is in the hands of the private sector.

The proportion of orchards, irrigated and arable land plots, allotted to rural households in the process of land privatization has led to running mixed Agriculture. This kind of Agriculture running secures farmers them against risks and guarantees meeting family's basic needs.

However, not all land was privatized. In every community, 25 percent of land is kept as a "state reserve fund" with the purpose of meeting the needs of landless households and securing future development. In addition, pastures, some 695,000 hectares in total, were not privatized. Some 400 rural economies having each 200 hectares of land have remained as state-owned. They were intended for conducting research works, livestock breeding and seeds growing. However, part of this land is being now privatized under the new Land Code. Within the Framework of the European Union's Food Security Program, the Armenian Agriculture Ministry agreed to privatize 3,500 hectares in 1999 and another 3,500 hectares in 2000.

The average size of a rural household is 2.2 hectares, consisting of 3-4 both irrigated and arable land plots. This is in line with a strategy, according to which, an equal approach should be exhibited towards cultivation of orchards, vegetables and cereals. Some 15 percent of rural population also cultivates leased lands, making the average of their land plots 3.2 hectares. Leasing contracts are signed under the supervision of the community council for the period of 1 to 3 years. The subject of the contract is pastures and lands under hey.

Some 30 percent of rural households cultivate only part of their land, the share of idle land standing between 15-20 percent. There is a number of reasons to explain this, but low quality of land, difficulties in paying bills for some supplies and shortage of irrigation water are the main ones.

A large-scale migration from rural communities may cause serious complications as the land was initially distributed to families (but not to individuals). Small households, as it appears, are not inefficient. Low level of production is rather the result of a non-appropriate Agricultural policy of the previous system, when state-run economies enjoyed high-level state assistance with researches and consultations being placed on bigger and specialized farms and management systems and when the emphasis was on genetic improvement instead of promoting plant growing and cattle breeding. That system had serious constraints for the development of small rural economies. Individual manufacturers, because of small seize of their economies, cannot afford acquisition of Agricultural machines, they do not either meet the requirements, set for loans beneficiaries because of their limited possibilities to return the money and their little impact on the market. Consultation services are not available either. Now, setting up manufacturers associations seems to be more than vital. These associations may serve as a kind of catalyst for

making loans available to associated group of borrowers, enlargement of goods sale capacities and more purposeful use of consultation services.

1.6 Foodstuff Self-Securing

Approximately some 20 percent of rural population is engaged in small volume Agricultural food processing and in supplies and sale services. It should be noted that formation of this kind of employment is encouraging. About 80 percent of manufacturers sell their products on the spot after meeting their own needs. Naturally, the share of extra products is bigger in areas with irrigation.

Share of Production for Meeting Own Needs and for Sale in Selective Households

Animal husbandry products						
	Prod. Amount	Crops per producer (Kg)	consumption (%)	storage (%)	sale (%)	for other purpose
Beef	522	139	23	4	1	72
Pork	158	1000	23	1	2	73
Mutton	356	61	53	3	3	73
Poultry	306	7	95	0	3	2
Eggs	731	832	82	0	31	5
Milk	1,049	2,075	76	3	2	19
Wool	465	14	47	17	9	27
Honey	42	70	38	7	11	43

Products are sold directly to consumers or private merchants. Agricultural production has a pronounced seasonal nature, as a result, markets are saturated and prices are rather low.

Under the current conditions Armenia is still far from securing its own needs for foodstuff, as only less than 30 percent of food bread and only 3/4 of the necessary animal husbandry products are manufactured here. Half of food production makes fruits and vegetables. Regarding the latter, Armenia cannot only satisfy its domestic needs for these products but also export them as fresh and processed goods. As consumption per capita for all products, besides potato, has declined, consequently has declined the volume of imported foodstuff. Until recent ten years domestic production of milk and dairy products was enough to meet less than half of local demand, domestic production of meat and meat products met 2/3 of local demand.

Beginning from 1991 because of transport blockade of Armenia, fall in consumers' incomes, price rise and out emigration, and the real demand for animal husbandry products has

significantly fallen. The demand for meat and eggs makes now 60 percent and that for dairy products only 30 percent if compared with 1980.

Over the last decade, the population, having adapted to high prices and income decline, was compensating the foodstuff needs at the expense of crops, potato, fruits and vegetables. Beginning from 1998 the situation started showing improvement indications; to a certain degree, due to the increase in the production volumes of domestic animal husbandry products. The quality of domestic products has also improved. In the process of full satisfaction of the population's demand for animal husbandry products the maintenance of animals' genetic resources and quality improvement are of vital importance, as "high" genetic fund secures high yield under normal conditions of maintenance.

1.7 Population's Food Security

One of the main objectives of Agricultural development is maintenance of a proper level of food security for urban and rural population. According to some estimation, some 60-70 percent of households' consumption budget is meant for purchase of foodstuff. This index is higher, about 80 percent, for the poorest segments of the population, whereas in more or less well-off families it stands at 57 percent. In order to ensure the population's proper food security level, taking into account the big share of foodstuff in households' consumption budget it is necessary to guarantee food availability at stable and reasonable prices.

Having in mind that prices for Agricultural products are rather low on the level of manufacturers and that they do not bring appropriate income for households, the improvement of population's food security is possible through the improvement of mechanisms for processing and sale of Agricultural products and foodstuff. More can ensure development in this direction efficient organization of markets, encouragement of competition between processors and sellers and improvement of the sold products quality. Investments in market infrastructures should be well supported to avoid retail sale prices rise.

1.8 Constraints and Risk Factors

Current constraints and obstacles for the Agricultural sector stem from the previously conducted ineffective Agricultural policy, in which stimuli for raising the productivity were expressed weakly and an inefficient system for production and sale was formed. Livestock breeding system was ruled from the center and was strictly proceeding from previously fixed production plans with less attention being paid to production expenses. The state system could not provide those fundamental technical knowledge and the skills for decision-making, which are now necessary for private owners.

Maintenance of inefficient Agricultural production and sale sectors required financial assistance, which caused the emergence of current macro-economic problems. Overall, this all frustrated the rural population having affected their entrepreneurial capacities, whereas it is necessary now to make stronger the ability to come up with fresh initiatives with the aim of making use of opportunities unfolding for private businesspersons. Liberalization of markets has created additional problems for private manufacturers, particularly, because of high level of production

expenditures, stoppage of subsidies and reduction of income. The current situation demands a serious assessment and a tangible financial and technical support.

The policy of the recent years encourages development of private rural households and liberalization of state-owned economies and processing enterprises. However, the lack of specialized expertise in management of small and medium-sized enterprises, commercial management and production systems is a serious obstacle for implementation of this policy. Knowledge about management of rural economies is insufficient. Researches on Agricultural marketing and policy analysis are on a low level. As a result, auxiliary services cannot respond properly to the destruction of the state-run system of supplies, centralized prices regulation, trade restrictions and toughening of requirements for receiving loans, which altogether are components of the reformation process.

Significant investments are required for the resolution of these problems within the framework of a long-term Agricultural development strategy. In the short-run, private Agriculture can be strengthened through restructuring of infrastructures. This will make state-provided services more customers friendly; will promote development of private services and so on. Tangible results can be achieved in a short period through relatively little changes, having in mind that in separate cases, however, big and long-term investments will be required.

Risk factors in different livestock systems do not vary significantly. Characteristic factors mainly are draughts, diseases, lack of finances and new technologies, as well as stable fodder supplies.

The above-mentioned factors affect also Animal Genetic Resources (AnGR). For example, shortage of fodder does not allow to fully disclosing the animals' genetic capacities. Lack of finances hinders import of best ANGR, ensuring reproduction and fodder security.

Appendix 1.

Table 1.1 Importance of livestock to the gross domestic product in agriculture (millions of \$US)

Activity	\$US (millions)	Data from Year
Livestock production (official statistics)	156,50	1998-2000
Other agricultural production (official statistics)	245,60	
Best estimate of additional value of livestock		

Comments:

- Best estimate of additional value includes the value of all perceived contributions of livestock to agricultural services, other than food production, e.g. value of fertilizer from animal production, draught and transportation, forage production, etc., which usually are not costed in standard calculations.
- Livestock includes domestic ruminants, non-ruminants, and birds used for food and agriculture.

Table 1.2 Land use and current trends (1000 ha)

Category	1990	1999 (1997)	
Arable land	498,6	494,2	-
Permanent crops	79,6	64,2	-
Permanent pastures	804,1	832,5	+
Agricultural area	1382,3	1390,9	+
Land area	2809,1	2809,1	0
Total Area	2974,3	2974	

Comments:

- Arable land: land under temporary crops (double-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category. Data for "Arable land" are not meant to indicate the amount of land that is potentially cultivable.
- Permanent crops: land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest, such as cocoa, coffee and rubber; this category includes land under flowering shrubs, fruit trees, nut trees and vines, but excludes land under trees grown for wood or timber.
- Permanent pasture: land used permanently (five years or more) for herbaceous forage crops, either cultivated or growing wild (wild prairie or grazing land).
- Land area: total area excluding area under inland water. The definition of inland water generally includes major rivers and lakes.
- Total area: the total area of the country, including area under inland water.
- Indicate current trends in relation to the latest available year (-- = strongly decreasing, - = decreasing, 0 = stable, + = increasing, ++ = strongly increasing).

Table 1.3 Land use for livestock and current trends

Category	1990	1999 (1997)	
Cropping for food	232,6	232,8	-
Cropping for feed	158,8	93,7	--
Cropping for food and feed	391,4	326,5	-
Natural pasture	804,1	832,5	+
Improved pasture			
Fallow			
Forest	377,3	378,9	0
Non-agricultural	1592,0	1583,4	-
Total	2974,3	2974,3	

Comments:

- Natural pastures are the ones grown without any external inputs, while improved pastures may be cultivated, semi-cultivated, fertilized, etc.
- Fallow is a non-cultivated cropping land put on rest.
- Indicate current trends in relation to the latest available year (-- = strongly decreasing, - = decreasing, 0 = stable, + = increasing, ++ = strongly increasing).

Table 1.6 Livestock population, number of owners/house-holders and employment by species

	Livestock population (1000)	Number of owners / householders	Number of persons additionally employed	
Species			Fully	Partially
Cattle	514,2	201000	7	4
Buffalo	0,5	225	0	0
Sheep	592,1	41000	2	4
Goats	45,3	9000	0	0
Camels	0	0	0	0
Lamas and Alpaca	0	0	0	0
Horses	12,0	5700	0	0
Donkeys	7,8	4600	0	0
Pigs	97,9	38400	3	0
Chicken	4800,0	250 / 250000	1	0
Turkey	41,5	13200	0	0
Ducks	30,2	10000	0	0
Geese	76,6	15600	0	0
Rabbits	150,0	7000	2	0

Table 1.7 Human population in the country

Year	Total (millions)	Rural or Farming (%)	Urban or Non Farming (%)	Total
1990	3574,5	27,7	72,3	100
1999	3798,2	33,3	66,7	100
Average annual growth rate	24,8	0,6	-0,6	

Comments:

- Rural/Urban and Farming/Non Farming populations will be defined depending on the commonly used terminology for demography. For example in developed countries it is meaningful to consider farming and non-farming populations and in the developing world, rural and urban populations.

Table 1.8 Major livestock primary production (1000 tonnes/numbers)

Species	Meat (t)		Milk (t)		Eggs (t)		Fiber (t)		Skin (No.)	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Cattle	34,5	32,0	461,2	455,94					210,0	232,0
Buffalo	NI	NI	NI	NI					NI	NI
Sheep	9,2	4,3	0,45	0,21			2,8	1,3	603,0	295,0
Goats	0,1	0,2	0,08	0,05			NI	NI	41,0	80,0
Camels	NA	NA	NA	NA			NA	NA	NA	NA
Lamas	NA	NA	NA	NA			NA	NA	NA	NA
Horses	NI	NI	NI	NI					NI	NI
Donkeys	NI	NI	NI	NI					NI	NI
Pigs	15,2	8,3							16,0	NI
Chicken	33,6	4,3			5179,0	3259,0	NA	NA	NA	NA
Turkey	0,5	0,7			285,0	405,0	NA	NA	NA	NA
Ducks	0,3	0,4			323,0	430,0	NA	NA	NA	NA
Geese	0,9	1,2			420,0	630,0	NA	NA	NA	NA
Rabbits	1,3	1,0					NI	NI	980,0	670,0

Table 1.9 Major livestock primary product imports (1000 tonnes/numbers)

Species	Meat (t)		Milk (t)		Eggs (t)		Fiber (t)		Skin (No.)		Animals (No.)	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Cattle	NI	7602,0	NI	23,5					NI	NI	50,0	NI
Buffalo	NI	NI	NI	NI					NI	NI	NI	NI
Sheep	NI	NI	NI	NI			NI	NI	NI	NI	25,0	NI
Goats	NI	NI	NI	NI			NI	NI	NI	NI	NI	NI
Camels	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA
Lamas and Alpaca	NA	NA	NA	NA			NA	NA	NA	NA	NA	NA
Horses	NI	NI	NI	NI					NI	NI	NI	NI
Donkeys	NI	NI	NI	NI					NI	NI	NI	NI
Pigs	NI	697,7							NI	NI	5,0	NI
Chicken	NI	14676,0			NI	3235,0	NA	NA	NA	NA	20000,0	NI
Turkey	NI	NI			NI	NI	NA	NA	NA	NA	NI	NI
Ducks	NI	NI			NI	NI	NA	NA	NA	NA	NI	NI
Geese	NI	NI			NI	NI	NI	NI	NI	NI	NI	NI
Rabbits	NI	NI					NI	NI	NI	NI	10,0	NI

Table 1.10 Major livestock primary product exports (1000 tonnes/numbers)

Species	Meat (t)		Milk (t)		Eggs (t)		Fiber (t)		Skin (No.)		Animals (No.)	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Cattle	0	0	0	0					0	0	0,2	0,3
Buffalo	0	0	0	0					0	0	0	0
Sheep	0	0	0	0			0	0	0	0	0	0
Goats	0	0	0	0			0	0	0	0	0	0
Camels	0	0	0	0			0	0	0	0	0	0
Lamas and Alpaca	0	0	0	0			0	0	0	0	0	0
Horses	0	0	0	0					0	0	0	0
Donkeys	0	0	0	0					0	0	0	0
Pigs	0	0							0	0	0	0
Chicken	10,0	0			60000,0	0	0	0	0	0	0	0
Turkey	0	0			0	0	0	0	0	0	0	0
Ducks	0	0			0	0	0	0	0	0	0	0
Geese	0	0			0	0	0	0	0	0	0	0
Rabbits	0	0							0	0	0	0

2. The State of Production Systems

2.1 Livestock farms forms

Under the new economic conditions formerly operating collective economies, inter-economy enterprises, as well as meat, rural farms, rural collective farms, and commercial/state organizations replaced milk and eggs producing complexes and poultry farms. Auxiliary enterprises have been maintained. On the basis of around 1,000 former state-run collective farms some 330,000 new rural households and rural collective farms have been built.

It should be noted that the number of rural households increased by 78,000 in comparison with 1993. Collective farms, on the contrary, have reduced by 1,700 and according to 2000 July data; there remained only 10 of them. The number of farms with state-owned status also declined. Now the share of private farms in the overall number of rural farms is 94.1 percent. Collective farms and state-run farms make only 0.2 percent, the other part, about 5.86 percent, represents auxiliary enterprises.

Rural economies, rural collective farms and others are relatively self-sufficient irrespective of the system. However, these types of economies are vulnerable in terms of veterinary services. Big economies are dependent on supplies, being secure at the same time against lack of veterinary services. In turn, veterinary services are in private hands and are dependent on the supplies of medications.

Currently different levels of external supplies have a significant impact on the utilization of AnGR. It is particularly observed in pig breeding and poultry farming, where raising of highly productive crosses has sharply raised the productivity and efficiency.

The big portion of livestock carried out in the republic based on extensive method, except certain portions of poultry farming and pig breeding, which run based on intensive methods.

In small rural farms the main types of animals raised are the local Caucasian gray cattle, 6 local sheep breeds, Yerevanian hen, big white pig and Armenian meet-pig breeds.

Cattle and sheep-breeding technology based on pasture grazing and manger type. Cattle and sheep kept 5-6 months a year in mountainous pastures and 6-7 months in mangers. In big cooperative and private farms the local gray Caucasian cattle is crossbred with Holstein breed with the purpose of raising milk productivity. In sheep breeding, the so-called "in-self" way of breeding is realized. In big farms, pig's exotic types are raised based on intensive and in small rural economies on extensive management. Purebred breeding carried out in big pedigree farms.

Specialized poultry farms raise exotic types of hens. The local Yerevanian breed is raised based on extensive method. Poultry farms use Ross, Brown, Tetra Cl meat hen's and High-Line, Loman Brown egg production types.

About 80 percent of rural households are engaged in livestock, mainly in cattle breeding, (on average each household has three heads of stock) sometimes two pigs or 10-20 fowls. One third of households are engaged in sheep and goat breeding. Efficiency and productivity levels are rather low, mainly because of low protein and high fiber percentage in the fodder.

Land areas under fodder plants in 1980 were around 260,000 hectares or 60 percent of all arable land. But lands areas declined in 1992 going down to 156,000 hectares and 69,000 hectares in 1998. Perennial fodder plants constituted 2/3 in the overall fodder volume in 1992; annual fodder plants 28 percent, silo plants (mainly maize) 5.5 percent and the rest constituted 0.5 percent. Crop capacity constituted only 25 percent of the potential.

Thus in 1992 perennial plants grew on 103,500 hectares against 140,000 in 1980. Due to avoiding of buying expensive seeds on part of farmer's production volumes of perennial fodder has reduced. It shows now some indications of growing thanks to the increase in the demand for fodder on part of enterprises specialized in dairy product manufacturing.

2.2 Number of Households in Province and Economy Types.

Households Number in Each Province and Economy Type as of 2000, January 1

Provinces	Priv. Farms	Coll. Farms	Com. Org.	Backyard Farms	Total Number	Percent
Aragatzotn	33481	8	0	0	33489	8,5
Armavir	59061	4	2	335	59402	15,1
Ararat	62401	13	9	0	62423	15,8
Gegharkunik	57407	4	0	1774	59185	15,0
Lori	33865	4	4	7233	41106	10,4
Kotayk	33663	7	7	293	33970	8,6
Shirak	30763	0	8	2691	33462	8,5
Syunik	12686	18	13	7774	20491	5,2
Vayots Dzor	15381	1	1	265	15648	4,0
Tavush	30731	4	4	1828	32567	8,3
Yerevan	1450	0	7	880	2337	0,6
Total	370889	63	55	23073	394080	100

Actually, instead of the increase in the number of farms and their consolidation some undesired processes emerged following the privatization, resulting in the increase in the number of divided and small farms. This circumstance makes more important the process of uniting of and cooperation among small farms.

One of the main important questions in terms of regulation of animal husbandry products manufacturing is getting the exact numbers of the livestock, sheep and goats. Since the privatization years, hundreds of thousands of farms were created across the country, and unfortunately, instead of consolidation the process of emergence of new small farms is going on.

Over the recent three years a set of undesired tendencies have been registered in livestock breeding, especially, concerning the distribution of heads and formation of optimum-sized farms.

Distribution of Farms with Livestock (%)						
Number	Cattle	Pigs	Sheep	Poultry	Rabbits	Beehives
Not having	28.5	93.3	69.1	35.2	97.1	95.9
1 head	17.8	4.6	0.8	0.2	0.3	0.4
2 heads	24.7	1.5	3.4	1.4	0.9	0.6
3 heads	11.0	0.4	2.9	2.5	0.2	0.6
4 heads	7.6	0.2	3.4	3.1	0.5	0.3
5 heads	4.6	0	4.8	8.5	0.3	0.5
6 heads	2.3	0	2.6	3.6	0.1	0.3
7 heads	1.2	0	1.4	2.7	0	0.1
8 heads	0.8	0	2.0	4.4	0	0.1
9 heads	0.5	0	0.6	1.3	0.3	0.1
10 and more	1.0	0	9.0	37.1	0.3	0.1

Figures in the table are the result of a survey, conducted by the national statistical service in 1997 in 170 villages among 3,400 households. According to this data, in 1997, some 91,500 farms (28.5 percent) out of all 321,000 did not have livestock; one head of cattle had 57000 (17.8%) households, two heads -79000 (24.7%) households and so on.

The troubling outcome was that out of 321000 households in 1997 only 3210 had 10 and more heads of cattle, or only 1%.

Actually, the total number of big farms possessing ten and more livestock heads with high-level production constituted an insignificant percentage. To immediately improve that situation through implementation of relevant programs is urgent. For that purpose, in the first place, it is

necessary to calculate and set optimum norms for keeping cattle's herds and sheep and goats flocks.

2.3 Distribution of Livestock to Private and State-run Sectors

Over the last nine years, the total number of livestock dynamic in private and state owned sectors bore a decisive change towards privatization trend. Actually, the share of total livestock number in the private sector has been growing year by year, and according to the animal types, it constituted, as of 2000 1, January 96.2-99.5 percent, meantime the total livestock number in state sector has been reducing and stands now at 0.5-3.7 percent. It is noteworthy that the state sector has completely lost its previous role in this sector. At the same time, it should be mentioned that privatization of the remaining livestock in the state-run sector is going on.

Livestock Dynamic in State-Run and Private Sectors

Animal	ownership kind	1992	1993	1994	1995	1996	1997	1998	1999	2000
Cattle	Private	88.3	95.8	97.2	98.3	98.8	98.8	98.9	99.1	99.1
	State	11.7	4.2	2.8	2.2	1.7	1.2	1.1	0.9	0.9
A/T Cow	Private	92.1	97.0	97.8	98.2	98.7	99.1	99.2	99.3	99.3
	State	7.9	3.0	2.2	1.8	1.3	0.9	0.8	0.7	0.7
Pigs	Private	57.6	47.2	67.7	82.0	90.7	96.9	97.9	97.7	96.3
	State	42.4	52.8	32.3	18.0	9.3	3.1	2.1	2.3	3.7
Sheep	Private	88.7	96.2	98.2	98.6	98.7	99.3	99.5	99.5	99.5
	State	11.3	3.8	1.8	1.4	1.3	0.7	0.5	0.5	0.5
Poultry	Private	27.3	86.8	86.6	93.3	96.8	97.9	98.2	98.4	98.6
	State	72.7	13.2	13.4	6.7	3.2	2.1	1.8	1.6	1.4

Actually, the entire livestock number has been privatized and with small exception is owned by rural farms. As regards commercial/state organizations, four pedigrees, 2 research-experimental and several economies represent them with highly productive small seeds growing and cattle-breeding farms.

2.4 Most Important Animal Husbandry Products and Their Consumption

Main animal husbandry products manufactured in the republic are milk, meat, eggs and honey. Wool and leather are regarded as important raw material. These products have different significance for different social segments. Population in the alpine zones is engaged in livestock (cattle and sheep breeding), in lower zones pig and rabbit breeding and apiculture are added to them. Fowls are raised mainly in areas located in the proximity to urban areas, where poultry farms, equipped with modern facilities are being built and restructured.

Production of meat, wool and milk are supported by local conditions and well adjusted breeds, while production of eggs and poultry is based on highly productive breeds of fowls, intended for giving chicken meat and eggs.

Under the conditions of market relation's requirements the variety of manufactured meat products has increased recently. Besides traditional products, also on sale are yogurt prepared of sheep and buffalo milk, quail meat and eggs and others.

Liquidation of big state-run economies has led to emergence of small and medium-sized rural farms, which, due to a set of objective and subjective reasons, failed to maintain the previous livestock number of several types (pigs, fowl, sheep) and productivity level, this in turn has significantly affected ANGR maintenance and improvement.

Despite the fall of productivity, kinds of manufactured products and assortment have not changed.

Appendix 2

Table 2.3 Type of livestock farm by production system for cattle (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	80	20	0	100
Smallholder	60	40	0	100
Small-scale-commercial	30	60	10	100
Large-scale-commercial	0	70	30	100

Comments:

- **Subsistence:** less than 50% of production is marketed.
- **Smallholder:** small family farms with more than 50% of production marketed
- **Small-scale-commercial:** medium family farms with more than 50% of production marketed
- **Large-scale-commercial:** large farms or companies with all production marketed
- Definitions of production systems are given at the bottom of Table 2.1.

Table 2.4 Type of livestock farm by production system for buffalo (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	NA	NA	NA	0
Smallholder	NA	NA	NA	0
Small-scale-commercial	NA	NA	NA	0
Large-scale-commercial				0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.5 Type of livestock farm by production system for sheep (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	60	40	0	100
Smallholder	50	50	0	100
Small-scale-commercial	40	60	0	100
Large-scale-commercial	0	80	20	100

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.6 Type of livestock farm by production system for goats (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	70	30	0	100
Smallholder	60	40	0	100
Small-scale-commercial	30	40	30	100
Large-scale-commercial	0	40	60	100

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.7 Type of livestock farm by production system for camels (%)

Type of operation	Low input	Medium input	High input	Total
Subsistence	NA	NA	NA	0
Smallholder	NA	NA	NA	0
Small-scale-commercial	NA	NA	NA	0
Large-scale-commercial	NA	NA	NA	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.8 Type of livestock farm by production system for llamas and alpaca (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	NA	NA	NA	0
Smallholder	NA	NA	NA	0
Small-scale-commercial	NA	NA	NA	0
Large-scale-commercial	NA	NA	NA	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.9 Type of livestock farm by production system for horses (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	70	30	0	100
Smallholder	60	40	0	100
Small-scale-commercial	50	50	0	100
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.10 Type of livestock farm by production system for donkeys (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	100	0	0	100
Smallholder	0	0	0	0
Small-scale-commercial	0	0	0	0
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.11 Type of livestock farm by production system for pigs (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	80	20	0	100
Smallholder	50	50	0	100
Small-scale-commercial	30	40	30	100
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.12 Type of livestock farm by production system for chicken (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	60	40	0	100
Smallholder	50	50	0	100
Small-scale-commercial	30	60	10	100
Large-scale-commercial	0	40	60	100

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.13 Type of livestock farm by production system for turkey (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	100	0	0	100
Smallholder	0	0	0	0
Small-scale-commercial	0	0	0	0
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.14 Type of livestock farm by production system for ducks (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	100	0	0	100
Smallholder	0	0	0	0
Small-scale-commercial	0	0	0	0
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.15 Type of livestock farm by production system for geese (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	100	0	0	100
Smallholder	0	0	0	0
Small-scale-commercial	0	0	0	0
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

Table 2.16 Type of livestock farm by production system for rabbits (%)

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	80	20	0	100
Smallholder	60	40	0	100
Small-scale-commercial	0	0	0	0
Large-scale-commercial	0	0	0	0

Comments:

- Definitions of production systems are given at the bottom of Table 2.1.
- Definition of farm type given at the bottom of Table 2.3

**Table 2.17 Type of livestock farm by production system for other species (%)
Trout (forel)**

	Production systems			
Type of operation	Low input	Medium input	High input	Total
Subsistence	70	30	0	100
Smallholder	50	50	0	100
Small-scale-commercial	40	40	20	100
Large-scale-commercial	0	0	0	0

3. The State of Genetic Diversity

3.1 State of Knowledge on AnGR

Some 10-12 years ago, significant researches were conducted in Armenia with regard to the improvement of ANGR and a huge information database was collected and stored. All pedigree animal types were registered, identified and assessed in complex. A big team of scientists and researches was working in that direction (Livestock scientific center, Agricultural Academy). Regarding identification of several types of animals, blood groups were explained and parents were tracked down. At one time multilateral comparative studies were conducted among well-adjusted native and imported breeds. Researches were conducted among both purebred animals and those developed because of cross-breeding. Animals' entire lives' cycle's studies were conducted. The results of all these studies are published (books, magazines, newspapers, research articles and others) and are available at the Armenian National and Agricultural Academy's Libraries. AnGR molecular studies on the level of introduction were not carried out. Beginning from 1990, due to hard social-economic situation, AnGR-related pedigree researches have nearly been halted.

Currently several scientists and few interested farmers who have developed them carry out pedigree registration with a very small number of cattle, sheep and pigs. The small volume information received from these studies is not accumulated and neither is processed by the government and due to it, this information cannot present a correct and full picture for the republic.

Because of the same reason this information is not put on DAD-is. No researches and studies on ANGR situation are carried out either, which has led to the fact that the structures of the locally bred Caucasian gray cow and Yerevan hen breeds are not known today. There are apprehensions that these unique types may be spoiled. One of the main factors hindering collection and accumulation of related information is that under current production conditions the obligations of farmers and those of the state with regard to maintenance, development and registration of ANGR are not clarified. No monitoring is conducted to reveal the conditions of separate breeds and changes they may have undergone.

In connection with each animal type and priority production systems, only information on the quantity and quality of productivity is available now. Data on animals' reproductive capacity, draught force, resistance to diseases and parasites, fodder's efficiency, life expectancy are very limited, due to this it is hard to give a full picture of how things stand across the country.

3.2 Genetic Diversities of Locally Adjusted Breeds

Cattle Breeds

Some 70-80 years ago the small Caucasian breed of cows was raised, which had several types depending on the climatic zones. It had low productivity with average live weight of 225-250 kg. The annual milk capacity, not counting the milk sucked by heifers, was between 800-1,200 kg. There were, of course, animals with higher and lower indices. The average weight of bulls was 350-400 kg. The fat percentage of the milk was relatively high 4,0-4,2 percent. Male animals were used as draught force after being castrated. These breed was excellently adjusted to local

conditions, especially to mountainous pastures. They did not give much meat, but it was very delicious.

Caucasian Grey Breed.



Small-sized Caucasian breed could not meet the demands of the developing republic with its low productivity. Beginning from 1930, first in Lori and then in all other regions they were crossbred with Swiss Schwitz breed bulls, the new generation heifers were then mated with local bulls with the aim of achieving radical breed changes.

The Swiss breed was chosen as a type because of being developed in the mountainous region in Switzerland, where climatic conditions are similar to those in Armenia. Mass crossbreeding that was accompanied by improved feeding of animals of different types and better care conditions, had led to the increase of their live weight and milk productivity. In 1960 big masses of transformed animals were fixed as a new breed under the name of Grey Caucasian Cattle.

The word Caucasian was given to this breed because similar work had been done in other Caucasian republics and Dagestan. It should, however, be said that most precious species of this breed were developed in Armenia, first in Lori plateaus and then in other regions. Thus, beginning from 1960 Armenia had a new cow breed. It is a combined breed, aimed to produce both milk and meat, but with the emphasis on milk. It is now raised in all Armenian regions without exception and some 80 percent of the entire herd belongs to this breed. In best farms, engaged in raising of this type, the average weight of cows in the first calve reaches 400 kg, milk yield is 2,400 kg, second calves cows reach 450 kg with 2,700 kg of milk yield, the third calve cows are 490 kg with 3,100 kg of milk yield. Percentage of milk fat is 3.7. Reproductive bulls weigh 630 kg at the age of 3 years, 750 kg at the forth year and 780 kg in the fifth year.

In order to step up further improvement of this breed it is necessary, along with purebred raising, also to mate them with bulls of high pedigree productivity. Semen received from US selection of Schwitz bulls is widely used in Armenia. Mixed breeds are developed with maintenance of from

25 to 50 percent of Caucasian Grey cattle' blood, especially those which have been improved from 50 to 75 percent of blood of American selection.

A recorded Caucasian Gray cow, called Knar, developed from American selection of Schwitz breed, yielded 9,426 kg milk with 4 percent of fat; its live weight was 560 kg and the volume of milk butter (F+P) was 377 kg.

In several farms Holstein and Jersey breeds are used for crossbreeding to raise the Caucasian Grey cattle's productivity and technical fitness. Milk productivity of such three-breed cows makes 4,500 kg, fat percentage is 4.0-4.1 and protein is 3.4 percent.

Black-and-white breed

Import of this breed was dictated by the necessity of moving livestock to stationary conditions, which occurred, particularly, in regions, lying close to urban areas. Beginning from 1970 many female species of this type were brought in to Armenia and many herds were founded, but they, however, had different productivity indices. Under favorable conditions of feeding and care their milk productivity made between 4,000 and 5,000 kg, but it went down under unfavorable conditions.

Therefore raising this breed is not expedient. Now this breed is considered second important cow type in the country. They do not adjust well to mountainous pastures' conditions. Rural farmers wishing to acquire this type of cow should have in mind that they should be kept in stationary conditions or in pastures close to households. Only female heifers can be taken to mountainous pastures given they are not stony. Their average live weight in Armenia is 480 kg in the first calve, 520 in the second, 550 in the third. Milk yield for 305 days is 3,250 kg 3,600 and 4,000 kg respectively. Fat % is 3.6 proteins are 3.2 percent. Semen of bulls can be obtained from pedigree farms in Russia or stations specialized in artificial insemination.

In order to raise the efficiency of this type of cows they are crossbred with Holstein breed bulls. The new breed is noteworthy for its increased live weight, high milk yield and productivity in conditions of industrial raising. But the use of semen of Holstein bulls cannot be efficient if the developed generation is not kept with care and in favorable conditions. Holstein breeds have big potential capacities and can yield from 5,000 to 6,000 kg milk with 3.6 percent of fat.

Sheep breeds

Semi-fine, semi-rough and rough wool breeds of sheep are raised now in Armenia. They all are well adjusted to local conditions.

Armenian semi-rough wool breed.

This breed, yielding milk, meat and wool, was developed through inter-breed crossing (1931-1984) and had two inter-breed types; Aragats and Martuni. The first stage of developing this breed (1931-1952) was conducted in Alagyaz farm in Talin region. Ewes of local rough-wool breed, called Balbas, were cross-bred with American Rambulie and English Lincoln rams. The developed mixed breed later re-developed into semi-fine wool breed. Its further improvement resulted in appearance of Aragats inter-breed seep with semi-rough wool. This breed has a strong

carcass composition, with white, semi-rough wool cover of medium size. Rams' live weight is 80-90 kg ewes weigh 52-58 kg. Meat productivity is high slaughter weight is 48-65 percent. Rams yield 5-6 kg wool and ewes 3-4 kg. Pure outcome of wool is 60-70 percent. Wool length varies 15 to 20 cm. Milk yield is 100-110 kg annually reproductive capacity is 110-120 percent.

Inter-breeding work for developing Martuni type began in 1952-1956, where local ewes of Balbas breed were crossbred with Aragats fine-wool rams. As a result of improved breeding, semi-rough wool breed was developed, which was later used for improvement of Balbas breed in Martuni, Yeghegnadzor, Vayk and Ararat regions. As a result of selective breeding Martuni inter-breed was developed. This breed has retained exterior features of Balbas breed and their reproductivity particularities. This type has strong carcass composition with spots of different colors on different parts of body.

This type of sheep is of average size, with white wool. The live weight of rams varies between 70-80 kg that of ewes is 50-55 kg slaughter weight is 46-52 percent. Wool yield of rams is 4-5 kg and that of ewes is 2.3-2.7 kg. Wool length is between 13-18 cm. Pure wool yield is 60-75 percent and the milk productivity is 110-120 kg annually, Reproductive capacity is 110-115 percent. This breed is well adjusted to local high mountainous conditions having worthy biological and economic features, which are passed to next generations.

Armenian Semi-Fine Wool Sheep (Koridel)

Armenian sheep of Koridel breed were developed through crossbreeding of fine-wool, rough-wool rams with mixed ewes of South Caucasian, Koridel, Lincoln and other breeds.



Due to the application of various crossbreeding technologies the semi-fine wool breed with high meat yield was developed which is characterized by strong carcass composition, big size, high milk and meat productivity and is well adjusted to mountainous conditions.

The live weight of Koridel breed is 80-90 kg that of ewes is 52-55 kg; wool yield is 3.6, 3.9 and 2.4, 2.7 kg respectively. Wool length is between 12-14 cm. Pure wool yield is 58-65 percent. Under current economic conditions its further improvement should be carried out "in itself" way. This type can be raised in all regions, except those where semi-rough breed is raised.

Balbas breed (Rough-wool sheep)



It is one of the oldest local breeds in Armenia and Azerbaijan. They have relatively short body, deep and broad carcass and straight spine. Reproductive rams weigh between 75-80 kg, the best species 100-110 kg, ewes weigh respectively 55-60 kg and 75-80 kg. Slaughter weight is 55 percent. Pure wool yield of rams is 3-4 kg and that of ewes is 2-2.8 kg. Pure wool yield is 55-65 percent. The shining wool is of white color. Areas around their eyes, bottom of legs and ears are black. Its wool is an important material for carpet making. This breed is noted by high milk productivity, yielding from 65 to 75 kg of milk. It served as the basis for developing Armenian semi-rough breed sheep.

Mazegh breed (Rough-wool sheep)

This breed is raised in Armenia. In other Trans-Caucasian republics, areas of its spread are limited.



By its external look and tail they do not differ from Balbas breed. Wool is usually of brown color with different tints. Also species with gray wool occur. The wool is rather rough and often contains died hair. Annual wool yield is 2-2.5 kg. By its size this type yields only to Balbas breed. Rams weigh 70-75 kg and ewes 45-55 kg.

Bozagh breed

It is raised in Armenia, Azerbaijan and Georgia. This breed was improved by crossbreeding with Merinos sheep. It is smaller in size than Mazegh and Balbas types. Rams' live weight is 65-75 kg, lambs weigh 3-3.5 kg and 20 kg when stopping milk sucking. Wool is rough and the main color is white. There are also gray and black species. Annual wool yield is 1.8-2 kg and milk productivity is not high, about 40-50 kg during the lactation period. This type is raised in the north and northeastern regions of Armenia.

Karabakh breed

It is mainly raised in Nagorno Karabakh and the Armenian south (Zangezour). Sheep are of medium size, extremities are thin, dry, reproductive rams' live weight is 70-80 kg, that of ewes is 50-55 kg. Wool yield is 3-3.6 and 2.4 and 2.8 kg respectively. Pure wool yield is 70-75 percent.

Pig breeds

Armenian meet breed

The main breeds cultivated in Armenia are local meat, big white, exotic Welsh, Landras, Duroc and Ukrainian species. Populations in northeastern regions have developed a local breed well adapted to local conditions.



Armenian meet breed is a new type of pig and was developed through crossbreeding. In the initial stage big females were crossbred with Welsh and Duroc boars. White breed pigs inseminated the developed two-breed type. The second generation of pigs developed through reciprocal crossbreeding, later developed as a separate breed. Selection was conducted based on meat productivity and external features. This breed is spread in Armavir, Tavush, Kotayk and Aragatsotn regions and in Nagorno Karabakh Askeran region. Features common to meat pigs characterize it, by long body; well developed lower extremities and strong carcass composition and is well adjusted to local conditions. Live weight of full-grown males is 280-320 and that of females is 220-280 kg. Length of body is 170-180 and 160-170- cm respectively. One female gives birth to 9-12 piglets. Under intensive feeding it reaches one hundred kilogram weight in 180-195 days, average daily weight growth making 620-650 grams. Armenian meat pigs are used for the improvement of the breed through crossbreeding. Good results were achieved by crossbreeding it with Landras breed. Fifty percent of pigs in Armenia belong to this breed.

Big white breed was brought to Armenia in 1930. At the initial stage they were used for the improvement of local pigs' characteristics and later for pure breeding and crossbreeding. This breed is adjusted to Armenian conditions and is raised in specialized farms, individual farms and collective economies.

Mountain-Forest breed is also well adjusted to local conditions; it is raised, particularly, in the northeastern regions. This breed was developed through cross breeding of local pigs with big

white breed. Nine months a year they are kept in forests and three winter months in stationary conditions. This is an extensive breed and causes ecological damages by digging holes under trees roots.

Landras, Welsh, Duroc and Ukrainian breeds are exotic in Armenia. They are often used by collective farms for improvement of local breeds.

Poultry.

Yerevanian Hen Breed

It was regarded as one of the leading branches some 10-12 years ago. Armenia was fully secured by locally manufactured chicken meat and eggs from different poultry farms. The local Yerevanian breed of hen has maintained its importance. The recently founded poultry farms raise world-famous Loman Brown, High Line, High-Line Brown and other breeds. The egg capacity of these breeds is 320 pieces annually. Armenia is fully secured by locally produced chicken meat and eggs.



Yerevanian breed was developed by cross breeding of local fowls with Rhode Island, New Hemisphere and other breeds. Yerevanian hens of black color were developed for increasing meat and eggs productivity. Annual eggs production of this breed makes 165-190; in separate cases it is 210-230 eggs. Egg weight is 57 grams. Roosters weigh 3.5 kg, hens 2.3 kg. Raising of this breed will be effective having in mind its resistance to a set of diseases and its modest fodder demands. It is noted by its high reproductive capacities exceeding all other crosses. There is only one pedigree farm in Armenia now specialized in poultry, but it is in lamentable state. One can state that this breed is threatened to completely disappear.

Goats.

Though goats have always been raised in Armenia, the breeding of goats has been introduced only recently. Though the native goat population is well adjusted to the local environment, it does not have big productivity (ca 150 kg of milk). The goat population has increased by three times since privatization and been followed up by means and at the initiative of the USDA Marketing Assistance Project (MAP), which has started breeding activities. MAP has introduced several dairy goat breeds in Armenia (Alpine, Zaanen and Toggenburg). The objective of the cross

breeding program of native goats is to improve milk yield (500-600 kg). The Arid Goat Breeding Center in Yeghegnadzor region operates the breeding program.

Horses.

Purebred horses are rare in Armenia. The farms use cold-blood horses as draught power or transport services. The local horses in rural areas are not recognized as any breed.

Rabbit breeds.

Shinshilla, Californian, New Zealand, Butterfly and Vienna breeds of rabbits are raised in Armenia. They are of exotic nature here, but there is a native breed, Armenian Marder, which is spread throughout the country and there is one pedigree farm specialized in its breeding.

Armenian Marder



Armenian Marder is grown for meat. It was developed through a complicated crossbreeding. First Chinchilla type was crossbred with Russian rabbit, eight rabbits received, were later mated with Chinchilla and local breeds. Fifty percent of new generation had a different color. A selection was conducted among them to develop more improved breed. As a new breed it was established in 1940. Grown up males weight is 4-4.5 kg, body length is 50-55 cm, reproductive capacity is 7-8 rabbits.

Fish.

Lake Sevan accounts for about 90 percent of the fishing capacity in Armenia. Within the recent 5-6 years fish breeding has been added to fishing in Lake Sevan basin. There are hatcheries mainly in the Marz of Gegharkunik and some in the Marz of Tavush. Ishkhan (trout) is the major

species being bred in the hatcheries. Other species of whitefish and Khrami karp are bred here as well.

Common fish varieties of Sevan such as trout, Varicorkhinis capoeta, and Barbus Lacerta have been largely replaced by Coregomes Lavaretus, partly by Cobitiodae and Narrow fingered crab. Eighty percent of current fish production in Lake Sevan is given by the Coregomes Lavaretus. Yields have reduced remarkably and fish resources in Sevan are at risk because of violations of fishing rules and especially because of the deterioration of the biological status of Sevan.

Honey bee production.

Apiculture was not much affected by privatization and reforms. The number of bee-hives (130,000-135,000) has not declined. However, the local varieties are at risk, in particular, the threat of diseases is very high.

The Valley Caucasian Yellow Bee Breed

There are many points of similarity between The Yellow Persian Bee on the one hand and The Valley Caucasian Yellow Bee on the other. Obviously, The Yellow Persian Bee is the crossbreed of The Caucasian and The Persian Bees which inhabits the territory of Armenia. It has adapted itself to summer heat, does not survive long wintering and needs often-cleansing flights.

These bees are bigger and more prolific than the Gray Mountain Caucasian Bee, proboscises are 6.6-6.7 mm long, and the second and third tergites are bright yellow. These bees aren't aggressive; they are very swarming and sensitive to nosematosis. These bees are found in Armenia, Georgia, Azerbaijan and North Caucasus, but The Grey Caucasian Bee forces them out of the area actively.

Appendix 3.

Chapter 3. The State of Genetic Diversity

Table 3.1 Breed Diversity (Number of Breeds)

	Number of breeds									
	Current Total		At risk		Widely used		Others		Lost (last 50 yr)	
	L	E	L	E	L	E	L	E	L	E
Species										
Cattle	1	3	0	0	1	1	0	2	0	0
Buffalo	1	0	1	0	0	0	0	0	1	0
Sheep	6	0	0	0	3	0	3	0	0	0
Goats	1	4	0	0	1	0	0	4	0	0
Camels	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lamas and Alpaca	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Horses	1	0	0	0	0	0	1	0	1	0
Donkeys	1	0	0	0	0	0	1	0	0	0
Pigs	2	3	0	0	2	0	0	3	1	0
Chicken	1	5	1	0	1	5	0	0	1	0
Turkey	1	0	0	0	0	0	1	0	0	0
Ducks	1	0	0	0	0	0	1	0	0	0
Geese	1	0	0	0	0	0	1	0	0	0
Rabbits	1	5	1	0	1	5	0	0	0	0

Comments:

- L = Locally Adapted or Native; E = Exotic (Recently Introduced and Continually Imported).
- Breeds at risk are those with total number of breeding females and males are less than 1,000 and 20, respectively; or if the population size is less than 1,200 and is decreasing.

**Table 3.2 Number of breeds for which characterization has been carried out
(Number of breeds)**

At population level				At individual level		
Baseline survey	Genetic distance	Breeds and crosses evaluation	Valuation	Performance recording	Genetic evaluation	Molecular evaluation
+	1	2	3	+	+	-
-	-	-	-	-	-	-
+	-	3	3	-	-	-
+	-	-	-	-	-	-
NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
+	-	-	-	-	-	-
-	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-
+	-	-	-	-	-	-

4. The State of Utilization of AnGR

AnGR utilization is now viewed mainly, as well as in future, for restoration and improvement of locally adjusted breeds' structure, which in turn will lead to the rise of their productivity. Exotic and imported breeds with higher productivity, for example, Holstein cow, for production of 5000 kg of milk, needs rich and diverse fodder with well-balanced share of proteins and energy.

Armenian livestock farms cannot keep to such feeding regime on the short and long run. In general, locally adjusted breeds are more steadfast to the local environment and severe climatic conditions, are in a better physical shape and reproductive characteristics, in general, are more profitable for local farmers than the imported breeds. This does not relate to big poultry farms, which are able to maintain the necessary climatic conditions.

In the process of increasing food and animals' productivity in the strategy of the state, a great role reserved for ANGR development. Utilization of improved ANGR, along with other, non-genetic approaches (fodder, care and health improvement) is of key importance. All types of animals are used only in the domestic market and are not exported. Products and raw material received from certain animal types also have cultural-consumption importance. For example, rough-wool and feather is used for making blankets and pillows, sheep milk for making Brinza type cheese, rams and roosters for religious rites. This in turn promotes utilization of this type of AnGR.

Some 95 percent of cattle's and sheep's meat and milk received from locally adjusted breeds, while imported breeds produce 60-70 percent of poultry meat and eggs. Fifty percent of pork received from pigs developed through crossbreeding of native types with exotic imported ones. All local and imported breeds participate in production of foodstuff. The Yerevanian breed of hen and Armenian Marder rabbit has appeared on the brink of disappearance. The reasons are common- reduction in total number and absence of pedigree work.

In the process of raising new types of animals, pure breeding and crossbreeding are applied. Choice of breeding method is conditioned on the direction and capacities of each farm (pedigree, food and financial). Over the last years, stockbreeding has stabilized. This relates to total number of livestock. American selection Schwitz and partly Holstein bulls mainly used for reproductive purposes.

There is a growing tendency for increasing the total number of pigs, sheep and fowl. In these, except sheep breeding, the main breeding systems linked to import of exotic male and female species. The developed generation excels parents' characteristics. Previously, good results were obtained from crossbreeding of Caucasian Gray cattle with Sharole breed. F1 generation, received from them, weighed after 18 months, 450 kg. Now because of smaller sizes of farms and shortage of fodder this program not implemented.

Out of all modern reproductive methods, applied in Armenia, artificial insemination of cows applied in small quantities (7.5 percent of all number of cows or 15500 heads). This technology quickens quality improvement of the herd. Acquisition of pedigree animals implemented by the Pedigree Animal Breeding Department of the Agricultural Academy, to some extent by the National Association of Farmers and some International organizations. Relevant chairs of the Agricultural Academy, the Pedigree Department of the Agriculture Ministry, Animal Breeding Research Center and Extension's program experts provide consultation services.

No tangible changes have been reported in the area of animal breeding over the last decade. Farmers have replaced neither animal type. Technological and methodological progress can have a big role in the utilization and development of AnGR, as well as marketing and global policies tendencies. Thus, sanitary and ecological requirements, as well as growing demand for quality foodstuff affect the quality of locally manufactured goods.

Selection researches generalized in research institutions and introduced in farms. Complex assessments of animals was taken into consideration in this studies, which include the following characteristics-productivity, quantity and quality, origin of the animal, its exterior and carcass composition, reproductive characteristics, resistance to diseases and parasites, life expectancy, whole life reproductive capacity. Cross breeding is now applied in stock raising.

Crossbreeding in livestock.

Caucasian gray breed is crossbred with American selection Holstein bull, with the aim of raising milk productivity. In small quantities, also three-bred cross breeding is applied (Caucasian-Holstein and Jersey with the aim of receiving milk type animals with high fat percentage.

Cross breeding yields good results in pig breeding. Local breed is cross bred with Duroc, Welsh, Landras and Ukrainian breeds, as a result new generation of pigs is developed with the best features of parents (heterosis).

Pure breeding carried out in local sheep and hen breeding.

Pure breeding and crossbreeding is carried out in rabbit raising.

Appendix 4.

Chapter 4. The State of Utilization of AnGR (Use and Development)

Table 4.1 Relative importance of livestock products and services within species (%)

Species	Milk	Meat	Eggs	Fiber	Skin	Risk management	Fertiliser	manure	Draught	Culture	Recreation	Fuel	Feather	Environmental management
Cattle	46	44			8	0	1	0	0	0	1		0	100
Buffalo	NI	NI			NI	NI	NI	NI	NI	NI	NI		NI	####
Sheep	15	70		6	6	0	2		0	0	1		0	100
Goats	30	60		2	6	0	1		0	0	1		0	100
Camels	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA		NA	####
Lamas and Alpaca	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA		NA	####
Horses	NI	NI		NI	NI	NI	NI	NI	NI	NI	NI		NI	####
Donkeys	NI	NI		NI	NI	NI	NI	NI	NI	NI	NI		NI	####
Pigs		80		20		0	0		0	0				100
Chicken		15	80			0	1		0	0		4	0	100
Turkey		NI	NI			NI	NI		NI	NI		NI	NI	####
Ducks		NI	NI			NI	NI		NI	NI		NI	NI	####
Geese		NI	NI			NI	NI		NI	NI		NI	NI	####
Rabbits		65		0	35	0	0		0				0	100
														0

Comments:

- Think of the food and agricultural outputs as products that have a relative contribution to national production. Therefore, assign relative contributions for the important products listed below, based on a thorough analyses and valuation of data available in the country (sum of each species = 100).

Table 4.2 Relative importance of species within livestock products and services (%)

Species	Milk	Meat	Eggs	Fiber	Skin	Risk management	Fertiliser	manure	Draught	Culture	Recreation	Fuel	Feather	Environmental management
Cattle	95,0	55,8			NI	NI	NI	NI	NI	NI	NI		NI	
Buffalo	0,0	0,0			NI	NI	NI	NI	NI	NI	NI		NI	
Sheep	3,8	5,8		100,0	NI	NI	NI		NI	NI	NI		NI	
Goats	1,2	0,4		0,0	NI	NI	NI		NI	NI	NI		NI	
Camels	NA	NA		NA	NA	NA	NA		NA	NA	NA		NA	
Lamas and Alpaca	NA	NA		NA	NA	NA	NA		NA	NA	NA		NA	
Horses	0,0	0,0		0,0	NI	NI	NI	NI	NI	NI	NI		NA	
Donkeys	0,0	0,0		0,0	NI	NI	NI	NI	NI	NI	NI		NA	
Pigs		26,1		0,0		NI	NI		NI	NI				
Chicken		12,0	100,0			NI	NI		NI	NI		NA	NA	
Turkey		0,0	0,0			NI	NI		NI	NI		NA	NA	
Ducks		0,0	0,0			NI	NI		NI	NI		NA	NA	
Geese		0,0	0,0			NI	NI		NI	NI		NA	NA	
Rabbits		0,1		0	NI	NI	NI		NI				NA	
Total	100	100	100	100	####	0	0	####	0	0	0	0	0	0

Comments:

- Assign relative contribution values for each product as a % of total output of that product, based on a thorough analyses of data available in the country (sum of each column = 100).

**Table 4.3 Number of widely used breeds with breeding strategies
(No. of breeds)**

Species	Total number of breeds	Breeding strategies		
		Purebred selection	Cross-breeding	Both
Cattle	2	2	0	0
Buffalo	1	1	0	0
Sheep	3	3	0	0
Goats	4	1	3	0
Camels	NA	NA	NA	NA
Lamas and Alpaca	NA	NA	NA	NA
Horses	1	1	0	0
Donkeys	1	1	0	0
Pigs	3	3	3	3
Chicken	5	5	0	0
Turkey	1	1	0	0
Ducks	1	1	0	0
Geese	1	1	0	0
Rabbits	6	6	0	0

**Table 4.4 Number of breeds with current breeding strategies and tools being used
(No. of breeds)**

Species	Breeding goals	Breeding strategies		Tools				
		Designed	Designed and implemented	Individual identification	Recording	AI	ET	Genetic evaluation
Cattle				2,00%	2,00%	+	-	-
Buffalo				0,00%	0,00%	-	-	-
Sheep				7,00%	7,00%	-	-	-
Goats				20,00%	20,00%	-	-	-
Camels				NA	NA	NA	NA	NA
Lamas				NA	NA	NA	NA	NA
Horses				0,00%	0,00%	-	-	-
Donkeys				0,00%	0,00%	-	-	-
Pigs				15,00%	15,00%	-	-	-
Chicken				0,00%	0,00%	-	-	-
Turkey				0,00%	0,00%	-	-	-
Ducks				0,00%	0,00%	-	-	-
Geese				0,00%	0,00%	-	-	-
Rabbits				2,00%	2,00%	-	-	-

Comments: AI = Artificial Insemination; ET = Embryo Transfer.

Table 4.6 Role of stakeholders in the implementation of tools for the development of AnGR

Stakeholders	Breeding goals	Individual identification	Recording	Artificial insemination	Genetic evaluation
Federal Government	1	3	3	3	1
State Government	1	2	2	1	1
Local Government	1	1	1	1	1
Breeder's associations	1	1	2	2	1
Private companies	1	2	2	2	1
Research	1	2	2	2	1
NGO's	1	2	2	1	1

Comments: Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) based on thorough analyses of data available, to indicate the role of involvement of each stakeholder on the implementation of tools that support the development of AnGR.

Table 4.7 Involvement of stakeholders in activities related to the development of AnGR

Stakeholders	Legislation	Breeding strategies	Infrastructure	Human resources	Farmer's organization
Federal Government	3	3	1	1	1
State Government	3	1	1	1	1
Local Government	1	1	1	1	1
Breeder's associations	2	2	1	1	1
Private companies	2	2	1	1	1
Research	2	2	1	1	1
NGO's	2	2	1	1	1

Comments: Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) based on thorough analyses of data available, to indicate the degree of involvement of each stakeholder on activities that support the development of AnGR.

Table 4.8 Stakeholders preference for animal genetic resources

Federal Government	4	1	2
State Government	4	1	2
Local Government	4	1	2
Breeder's associations	3	1	3
Private companies	3	1	3
Research	4	1	4
NGO's	2	1	4

Comments: Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) based on a thorough analyses of data available, to indicate the degree of preference of the various types of AnGR by stakeholders.

Table 4.9 Priority of needs for utilization of technologies for the development of AnGR

Technology	Knowledge	Training	Financial resources	Breeder's organization
Recording	4	2	2	1
Genetic evaluation	2	1	1	1
AI / ET	3	3	2	2
Molecular techniques	1	1	1	1
Breed organisation techniques	2	2	1	1

Comments:

- AI= Artificial Insemination; ET= Embryo Transfer
- Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) to indicate the priority of solving specific needs in order to use technologies to support the development of AnGR.

5. The State of the Conservations of AnGR

Armenia always been noted by its attitude towards science and maintenance of scientific research traditions. A special attention was attached to maintenance of AnGR, realizing its role and importance. A special evaluation was given to local breeds of high value. The importance of AnGR development realized now as well, which, however, is being constrained by current unfavorable conditions and market-oriented tendencies. There is activity aimed at specification of private and state-owned sectors' obligations with this regard.

Maintenance of AnGR now viewed in situ and ex situ methods. Without running into particular technical and special difficulties, the in situ method was and being applied currently.

As regards ex situ method, previously was applied to 90 percent of entire livestock for artificial insemination. However, due to current financial, economic and organizational constraints only 7 percent of cows undergo artificial insemination.

Formerly, as an experiment, the so-called zygote transplantation and artificial insemination of hens were performed. Now due to the lack of appropriate material and technical basis, as well as absence of qualified experts, this method is not applied any longer.

Risk factors for the maintenance of AnGR are common for all breeds. They are social and economic instability, animals' diseases and the market for local breeds.

Such factors as culture or religious traditions have virtually no impact on the AnGR maintenance. Previously developed cultural breeds of cattle, sheep, pigs, poultry and rabbits raised by rural farms in pure conditions and being, at the same time, crossbred with exotic breeds. Out of local breeds the Yerevanian breed of hen is now on the verge of danger, which, being a unique combined breed is popular with farmers. This breed of hen is now being raised in pure conditions by in situ method in a state-run experimental farm, which, however, cannot satisfy the demand. The state does not take any measures for the protection and maintenance of this type.

As regards cattle breeding, the situation here is comparatively good. There is a central station for artificial insemination of cows with operating branches in regions. Ex situ, semen of Caucasian Gray cattle and that of imported exotic breeds is kept there for further artificial insemination of cows. Besides, there are also 10 small and big private pedigree cattle-breeding farms.

Pig-breeding branch has now five pedigree farms, where mating is performed by natural ways.

Sheep and rabbit breeding branches has each one pedigree farm, where mating is also performed by natural way. They both privatized and the information and reports on the conducted work are available at the Pedigree Department at the Agriculture Ministry. A certain progress is reported in milk goat rising. This process is implemented with the assistance of the US Department of Agriculture that has brought to Armenia 4 breeds of milk goats, which are raised both as purebred and as are being also crossbred with native breeds. The results are very encouraging. Cheese prepared of goat milk has great demand both in the local market and outside it.

The state assistance to pedigree farms is limited to only helping to perform artificial insemination providing half of the necessary funds; farmers raise the other half.

No perspective programs, aimed at the maintenance of pedigree selection work and AnGR development have been designed since 1990. Under current social and economic conditions with almost 45 percent of population being poor the government has no possibilities, due to the shortage of funds, to design and apply an AnGR maintenance strategy. Armenia also lacks modern facilities for registration and identification of animals, but it has teams of skilled experts to do that work.

Registration of animals' productivity and identification applied to only 1-2 percent of heads in private sector. The main constraints in the AnGR maintenance are absence of comprehensive plans, technical and technological capacities and finances.

The policy aimed at personnel training and re-training, expansion of research work, improvement of institutional basis and state governance, consolidation of financial means, introduction of new technologies and infrastructure improvement is of key importance for designing and implementation of AnGR program. Also important is restoration of inter-state councils, which used to deal with Agricultural animals rising, particularly, the one on Caucasian Gray cattle.

Appendix 5.

Chapter 5. The State of Conservation of AnGR

Justification and Use

The purpose of this chapter is to identify activities in in-situ and ex-situ conservation programmes, the degree of involvement of stakeholders and future needs for such programmes.

Table 5.1 Current number of breeds in managed conservation programmes

Species	Number of locally adapted breeds at risk			
	Total	Managed <i>in situ</i>	Managed <i>ex situ</i>	Both (<i>in</i> and <i>ex situ</i>)
Cattle	0	0	0	0
Buffalo	0	0	0	0
Sheep	0	0	0	0
Goats	0	0	0	0
Camels	NA	NA	NA	NA
Lamas and Alpaca	NA	NA	NA	NA
Horses	0	0	0	0
Donkeys	0	0	0	0
Pigs	0	0	0	0
Chicken	1	0	0	0
Turkey	0	0	0	0
Ducks	0	0	0	0
Geese	0	0	0	0
Rabbits	1	0	0	0

Comments:

- *In situ* conservation: includes all measures to maintain live animal breeding populations, including those involved in active breeding strategies in the agro-ecosystem where they either developed or are now normally found, together with husbandry activities that are undertaken to ensure the continued contribution of these resources to sustainable food and agricultural production, now and in the future.
- *Ex situ* conservation: genetic material within living animals but out of the environment in which it developed (*Ex situ in vivo*), or external to the living animal in an artificial environment, usually under cryogenic conditions including, *inter alia*, the cryoconservation of semen, oocytes, embryos, cells or tissues (*Ex situ in vitro*). Note that *ex situ* conservation and *ex situ* preservation are considered here to be synonymous.

Table 5.4 Stakeholders involvement in the management of conservation programmes

Government	2	1
Breeder's associations	1	1
Private companies	2	1
Research institutions/universities	4	1
NGO's	3	1

Comments: Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) based on thorough analyses of data available, to indicate the degree of involvement of each stakeholder on conservation programmes.

Table 5.5 Priority of needs for utilization of technologies for *in situ* conservation programmes

Technology	Knowledge	Training	Financial resources	Technology
Recording	4	4	1	1
Genetic evaluation	2	2	1	1
AI / ET	4	4	1	1
Molecular techniques	1	1	1	1
Breeder improvement techniques	1	1	1	1

Comments:

- AI= Artificial Insemination; ET= Embryo Transfer
- Assign scores (1 = none, 2 = little, 3 = regular, 4 = more, 5 = high) to indicate the priority of solving specific needs in order to use technologies to support conservation programmes.

6. The State of Policy Development and Institutional Arrangements AnGR

At the very beginning of transition from planned to market economy, the Agricultural sector was regarded as one of the most important sectors of economy taking into consideration its influence on the general socioeconomic condition of the Republic of Armenia and the problem of food security. That is why aiming to transform this sector into a stable and productive one based on private property and market relations the economic reforms began in Agriculture,. This established the basis for the principally new economic relations and system. The reform was first of all based on laws adopted by the parliament of the Republic of Armenia: the laws "On Property," (1990), "On Rural and Rural Collective Farms," (1991), "Land Code," (1991), "On Enterprises and Entrepreneurial Activity," (1992), regulatory acts and many government resolutions.

Bills on Livestock Breeding, Livestock Veterinary as well as on State Agricultural Inspections are being now designed. Some approaches towards AnGR maintenance are reflected in the Strategic for Sustainable Agricultural Development (2002). Besides above mentioned, the Agricultural Ministry is designing new systems for running pedigree activity, linked to currently operating forms of farms.

A special policy with regard to maintenance of AnGR has not been yet developed in the country but researchers and farmers are showing a genuine interest in it, as their researches and developments cannot be introduced due to the absence of appropriate institutional basis and finances.

Factors impacting on the maintenance and development of AnGR are different. For instance, some farmers having necessary finances, import exotic breeds with high productivity. This, to a certain degree, promotes maintenance and development of these breeds' AnGR.

However, lack of finances on part of the state and many farmers, insufficient feeding of animals, low quality of veterinary services restricts AnGR maintenance and development.

Now previously designed veterinary-sanitary standards and normative acts are effective by which relocation of AnGR of local and imported breeds is supervised and regulated. Standards and normative acts, applied to foodstuff, effective in the country, are not yet linked to the maintenance and development of AnGR.

As priority directions for AnGR management are proposed evaluation of breeds, methods for their maintenance, geographic information system (GIS), management of vital population database, animal raising and training of experts and students in genetics and molecular genetics.

The state strategic policy in the field of animal husbandry consists in restoration of a system of artificial insemination, farm animals registration and calculation. This policy promotes preservation of genetic resources of farm animals. Further it is planned using blood tests to carry out some analyses confirming an origin of animals, for implementation of these activities the development and financing of the separate project is necessary. Planned measures will help finally to specify an origin of animal species and breeds and to make real conception about gene pool of farm animals in the republic.

We propose, for the purpose of maintenance and development of AnGR in Armenia, to create a centralized body with the status of a juridical entity that would be closely cooperating with state,

international and local farmers associations, to design and manage an AnGR strategy. A special place should be attached, within this strategy, to international organizations, particularly, to FAO, which having huge experience and highly qualified staff and managing modern technologies and devices as well as funds, can have a decisive impact in designing and implementation of an AnGR maintenance and development program.