

AT THE CROSSROADS BETWEEN EAST AND WEST

IN THREE HOSPITABLE COUNTRIES

AGRICULTURE AND BREEDING HAVE BEEN DEVELOPED SINCE THE NEOLITHIC
COPING WITH THE RHYTHMS OF THE SEASON

A TREASURY OF GENETIC RESOURCES IS MAINTAINED IN GARDENS
TO MAKE BREAD, CHEESE AND WINE

PASTORALISTS AND FARMERS MANAGE THE LANDSCAPES
RURAL PEOPLE KNOW AND USE WILD PLANTS AND ANIMALS

COMBINING BIODIVERSITY, HEALTHY ECOSYSTEMS AND SMALLHOLDERS' DEDICATION:
A PATHWAY INTO THE FUTURE

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INTRODUCTION

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IT WOULD BE IMPOSSIBLE TO SYNTHESIZE THE MILLENNIA OF CULTURE, KNOWLEDGE AND HUMAN ACTIVITIES OF ARMENIA, AZERBAIJAN AND GEORGIA IN A FEW PAGES, AND THEREFORE ONLY SOME CHARACTERISTICS OF EACH COUNTRY ARE HIGHLIGHTED. THE THREE COUNTRIES HAVE NATURAL SCENARIOS (LARGE FORESTS, STEEP MOUNTAINS, GLACIERS, GENTLE VALLEYS AND WIDE STEPPE), EVIDENCE OF ANCIENT CIVILIZATIONS, AND THEY ARE RICH IN ANCIENT AND MODERN ARCHITECTURE, LITERATURE AND CRAFTS.

Each country has its own peculiarities, such as the language and even the alphabet, the religion and the culture: the biodiversity in the Southern Caucasus also originates from the specific ethnocultural differences of the region. This chapter is also about people who have contributed to maintaining local traditions in their countries through their daily work and diligence.

These people are examples of the millions who, in their daily lives, contribute another piece of the puzzle that is the social and cultural structure of the Southern Caucasus. Although they might have spent all their lives acting inside their local communities without great recognition, the power of the commitment of these people, their knowledge and their cultural values are inextricably linked to sustainable agriculture.



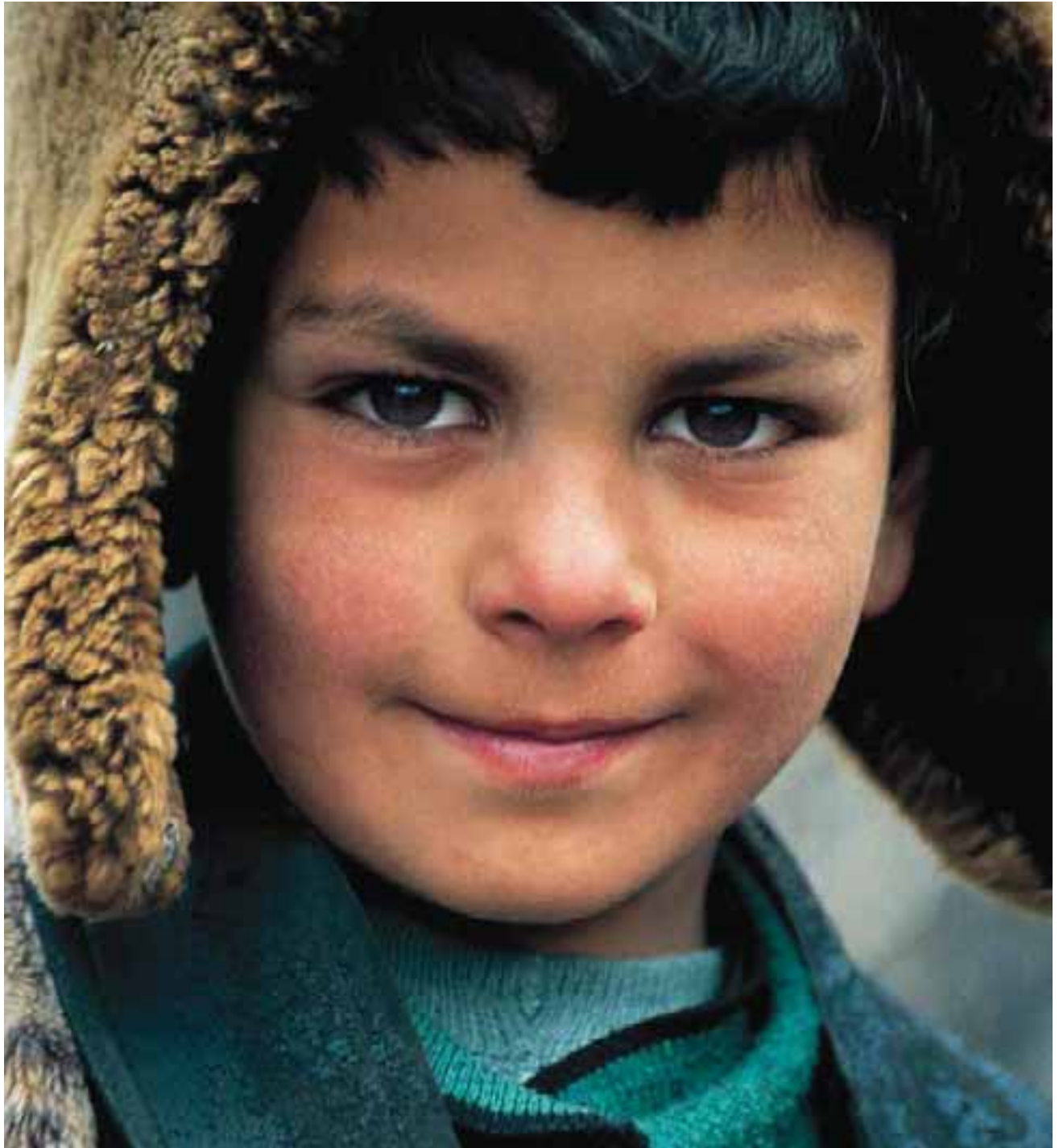


The high level of education of people in the Southern Caucasus plays a fundamental role in the maintenance of the rich heritage of genetic resources

CULTURAL HERITAGE AND HOSPITALITY

The Southern Caucasus is an area of ancient civilization, testified by the many important archaeological sites that can be found in the region, with strong links to Mesopotamia, the Near East and the Mediterranean basin. At the same time, it is crossed by one of the main historic communication routes between Europe and Asia, used by travellers and

merchants for many centuries. These two factors, together with the rich biodiversity of the environment, explain why Armenia, Azerbaijan and Georgia can offer today a powerful combination of cultural heritage, an innate sense of hospitality and a wealth of genetic resources.





Yerevan, the capital city of Armenia, is a lively city located at the edge of the Ararat Valley. It was founded in the eighth century BC. Today's Yerevan is the result of an urban development scheme devised by the architect Alexander Tumanyan in 1924

ARMENIA

GEOGRAPHY

The Republic of Armenia (Hayastan in Armenian) covers a total area of 29 800 km² and lies between 41°18' and 38°5' latitude north and between 43°29' and 46°37' longitude east. It borders Georgia in the north, Azerbaijan in the northeast, east and southwest, the Islamic Republic of Iran in the south and Turkey in the west. Armenia is landlocked and is located at about 145 km from the Black Sea, 175 km from the Caspian Sea, 750 km from the Mediterranean Sea and 960 km from the Persian Gulf. Its capital city is Yerevan. The territory of Armenia is mainly comprised of the Armenian plateau, with an average altitude of 1 500–1 800 m above sea level and by

the Lesser Caucasus range, with peaks ranging from 2 500 to 4 000 m. The plateau is dotted with ancient volcanoes, the tallest of which is the Aragats (4 095 m). The average altitude of the country is 1 800 m.

Over 70 percent of the territory is situated above 1 500 m, and only 10 percent below 1 000 m (the minimum altitude of the country, in the northeast, is 380 m, in the valley of the River Debed). Only 29 percent is flat or has slopes of three degrees or less.



Lake Sevan, located at an altitude of over 1 900 m and, in the background, the Greater Caucasus range

The landform in the centre and north of the country comprises rocky high mountain ranges separating narrow fertile valleys. Towards the south is the broad, flat and fertile Ararat Valley along the left bank of the River Araks.

The eastern region is characterized by the large water basin of Lake Sevan (1 250 km²), located at an altitude of 1 925 m. In the southeast, a few small irregular-shaped valleys are surrounded by high mountain ranges. The main rivers are the Hrazdan, which is the main emissary of Lake Sevan, the Debed that crosses the northern region of the country from west to east and flows into the Mtkvari in Georgia, and the Araz.

ARMENIA – HUMAN DEVELOPMENT INDEXES		
Index	Value	World rank
Human development index	0.798	84
Adult literacy rate (%)	99.5	12
Per capita GDP (USD PPP)	5 693	90

Source: UNDP, 2009

ARMENIA – AGRICULTURAL PROFILE	
Population	3 238 000
Rural/total population ratio	36%
Economically active population	1 192 500
Agricultural labour force	493 500
Agricultural labour force/economically active population ratio	41%

Source: National Statistical Service of the Republic of Armenia, 2009



A mountain slope in Kotayk Marz. Armenian landscapes are characterized by the ever alternating mountains and valleys

ARMENIA – AGRICULTURAL PRODUCTION		
Cereals	tonnes	409 182
Pulses	tonnes	6 171
Fruits and vegetables	tonnes	1 511 229
Roots and tubers	tonnes	648 562
Meat	tonnes	70 900
Milk	tonnes	661 900
Eggs	tonnes	32 220
Cattle and buffaloes	head	629 643
Sheep and goats	head	637 101
Wood fuel	m ³	40 000
Fish	tonnes	4 566
Agricultural imports	million USD	543
Agricultural exports	million USD	167
Fishery imports	million USD	4.3
Fishery exports	million USD	4.7
Forestry imports	million USD	59
Forestry exports	million USD	0.5

Source: FAO, 2010. Data refer to 2007–08

LANDSCAPE AND AGRICULTURE

Landscape types in Armenia are mainly determined by altitude and the characteristics of the reliefs. At altitudes between 600 and 1 000 m, limited precipitation and relatively high temperatures create semi-desert conditions.

The natural vegetation is mainly represented by xerophytes (*Hordeum crinitum*, *Kochia*, *Euphorbia marschalliana* Boiss., etc.), and ephemerals and ephemeroïds (*Bromus tectorum*, *Poa bulbosa*, etc.). In summer, high temperature and low humidity result in significant evaporation of soil moisture which, in turn, leads to salt accumulation; in areas of intense salinization the vegetation is dominated by *Salsola* spp. Natural zones are mainly used for pasture for cattle and small ruminants.

ARMENIA – USE OF LAND				SURFACE							
				1 000 ha	%	1 000 ha	%	1 000 ha	%	1 000 ha	%
Total country area	Land area	Agricultural area	Arable land and permanent crops	460	28	1 615	57	2 820	95	2 974	100
			Permanent meadows and pastures	1 155	72						
		Forest area			274	10					
		Other land			931	33					
	Inland waters					154	5				

Source: FAO, 2010. Data refer to 2007

Where irrigation has been introduced, e.g. in the Ararat Valley, these natural environmental conditions (heat, light and ground salt) have favoured the development of horticulture (onions, cucumbers, radishes, garlic, cabbages, spinach, tomatoes, peppers, eggplants, cauliflowers, turnips, cress, parsley, dill, coriander, basil, mint, okra, marrows, pumpkins and horseradish) and fruit growing (such as grapes, apricots and peaches), with very high yields.

At altitudes between 1 000 and 2 200 m, the continental dry climate creates steppe and steppe-meadow conditions. The main crops in this zone are cereals (wheat, barley and oats). Crops are both irrigated (mainly at lower altitudes) and rainfed. Steep land is used for pastures and fodder production. At altitudes between 2 300 and 2 800 m, subalpine meadows are widespread. As a result of severe climatic conditions, farming of field crops is not possible. Meadows are mown for fodder production; areas on very steep and stony slopes are used as pastures. Above 2 800 m, only alpine meadows are found. Environmental conditions are extreme, with night frosts that can occur even in summer months. Farming in this zone is impossible, and mowing of natural vegetation is not practicable because grasses are very low. Alpine meadows serve as a natural fodder base for livestock breeding in the summer months. Forests cover only 10 percent of the land, and are concentrated mainly in two regions, in the northeast and in the south. The composition of forests is diverse and rich. The most common species are *Quercus*, *Fagus*, *Carpinus*, *Tilia*, *Acer* and *Ulmus*.

They typically cover mountains and steep valleys. The tree limit is normally at 2 300 m, although in some regions trees can be found even at an altitude of 2 600 m. In the past, incorrect forest felling and overexploitation have radically reduced the forest area, especially on plains and mild slopes. Cleared forest land is either abandoned or used as grasslands and pastures. In southern Armenia, where the climate is arid and the relief is highly rugged, cleared forest areas have turned into steppe and mountain grasslands, but not into meadows. Historically, different branches of agriculture were established and subsequently improved and concentrated in different areas of Armenia, corresponding to economic, land and climate conditions.

In the post-Soviet era, various structural changes took place in agriculture. Former large state collective farms were transformed into smallholdings, which suffered from problems such as those connected with investment in intensive technologies and mechanical cultivation. Nevertheless, these difficulties should gradually be overcome through state support and technical assistance.

Armenian flora comprises about 3 600 species of vascular plants, making up about 50 percent of Caucasian flora. The Poaceae L. family, one of the most important for human use, is present with 336 species and 106 genera. Cereal groups include 13 species and about 360 varieties of wheat, nine species of *Aegilops*, eight of wild barley, seven of oats, lentils, wild chickpeas and peas.



In Armenia, many species of wild plants are used for a variety of purposes, such as medicines, condiments, herbal teas and food

WISE USE OF PLANT BIODIVERSITY

Armenians traditionally use plant biodiversity (approximately 2 000 species of wild plants) for a variety of purposes such as medicine, food and dyeing. This tradition still persists although it is reduced to a limited assortment of plants that are used in a fairly intensive way. Recently, the population intensively harvested and sold 28 species of wild edible plants; various industries process 52 species of medicinal plants. These data are confirmed by a survey in a major market in Yerevan, where 15 species of wild edible plants totalling 18.5 tonnes and 14 species of wild fruits and berries totalling 9.5 tonnes were commercialized in 1995. Unfortunately, neither past research programmes nor current research activities have information on sustainable harvesting rates.

The risk is that excessive or destructive harvesting of these species may threaten their long-term survival. To overcome this problem, harvesting regulations could be developed specifically for each species. At the same time, the cultivation of some of the overharvested species could be encouraged on a small scale, in house gardens and smallholdings. Research studies are already available on the development of planting methods for some edible and medicinal plants, such as sickleweed (*Falcaria vulgaris*), horse fennel (*Hippomarathrum microcarpum*), foxtail lily (*Eremurus spectabilis*) and valerian (*Valeriana officinalis*). These studies indicate that there is potential to protect the diversity of useful plants by encouraging local production methods.





The *khachkar* (holy cross carved in stone) is a very common decoration on Armenian churches

LANGUAGE AND CULTURE

Armenian architecture, urban construction and constructive art, mediaeval miniature painting, carpets, poetry, music and painting have an important place in world culture. Of the eight million native Armenians around the world, only three million live in Armenia (the others live in some 60 different countries, notably in the Russian Federation, the United States of America, France, Georgia and the Islamic Republic of Iran).

Armenian belongs to the family of Indo-European languages. It is one of the separate branches of the family and has similarities with the Iranian, Baltic, Slavonic and Greek languages.

It became the language of the Armenian ethnos as a result of its close relationship with some of the Indo-European, Caucasian and Uartian languages. After the fall of the Uartian state (sixth century BC), it spread throughout Armenia. During the Hellenic epoch, it served both as the

vernacular, and as a language for religious ceremonies, oral folk art, theatrical performances and the court. The written form of the language originated in the fifth century AD after the creation of the Armenian alphabet by Mesrop Mashtots. This alphabet, which perfectly suits Armenian language phonology, consists of 36 characters.

The fifth century AD was the golden age of Armenian literature. The written language of the period is called Classical Armenian or *grabar* ("written language"). Besides translations from Greek and Syriac religious scripts, Armenian ancient literature also includes translations of philosophical works and an original literary production, related above all to the history of the country.

In the twelfth century, some changes took place in the Armenian language and the period is therefore regarded as the beginning of Middle Armenian.



An impressive monument in Aragatsotn region, celebrating the Armenian alphabet created by Mesrop Mashtots in the fifth century AD

By the seventeenth century the language evolved into modern Armenian, divided into two primary dialects: western and eastern Armenian. The language currently spoken in Armenia is based on the eastern dialect, even if over 40 Armenian dialects exist.

In pre-Christian times, Armenians built many temples dedicated to the gods, which were very much like Hellenistic temples or pantheons. Most of these pagan temples were destroyed when Christianity became the state religion. The only pagan temple to withstand historical change is the Garni

temple (first century BC). Since then, Armenian architecture is essentially that of its churches, simply because few other types of buildings have survived.

Thousands of Armenian churches, both small and large, were built in the period from the fourth to the seventeenth century. Some churches were intended to stand alone, while others belonged to monasteries. Various styles were developed, for both interiors and exteriors. Armenian folk songs are quite diverse. Ancient and mediaeval songs have been retained in written form by historians and in song books. The sung parts of the national



The Hellenistic temple of Garni, built in the first century BC, is the only pagan temple that survives today in Armenia

epic poem *Sasounci Davit* were first performed orally and then recorded at the end of the nineteenth century. Of country and labour songs, the most remarkable are the *horovels* (ploughing songs) and the threshing songs of Lori and other regions.

Some of the most famous wedding, ritual, social and everyday songs are *Tsirani tsar* (Apricot tree), *Sirts nman e* (My heart looks like ...), *Krunk* (Crane), *Garun a* (Spring) and *Alagyaz sarn ampel a* (Mount Alagyaz is shrouded in clouds). Each Armenian *marz* (province) has its own characteristic folk songs reflecting everyday country life.

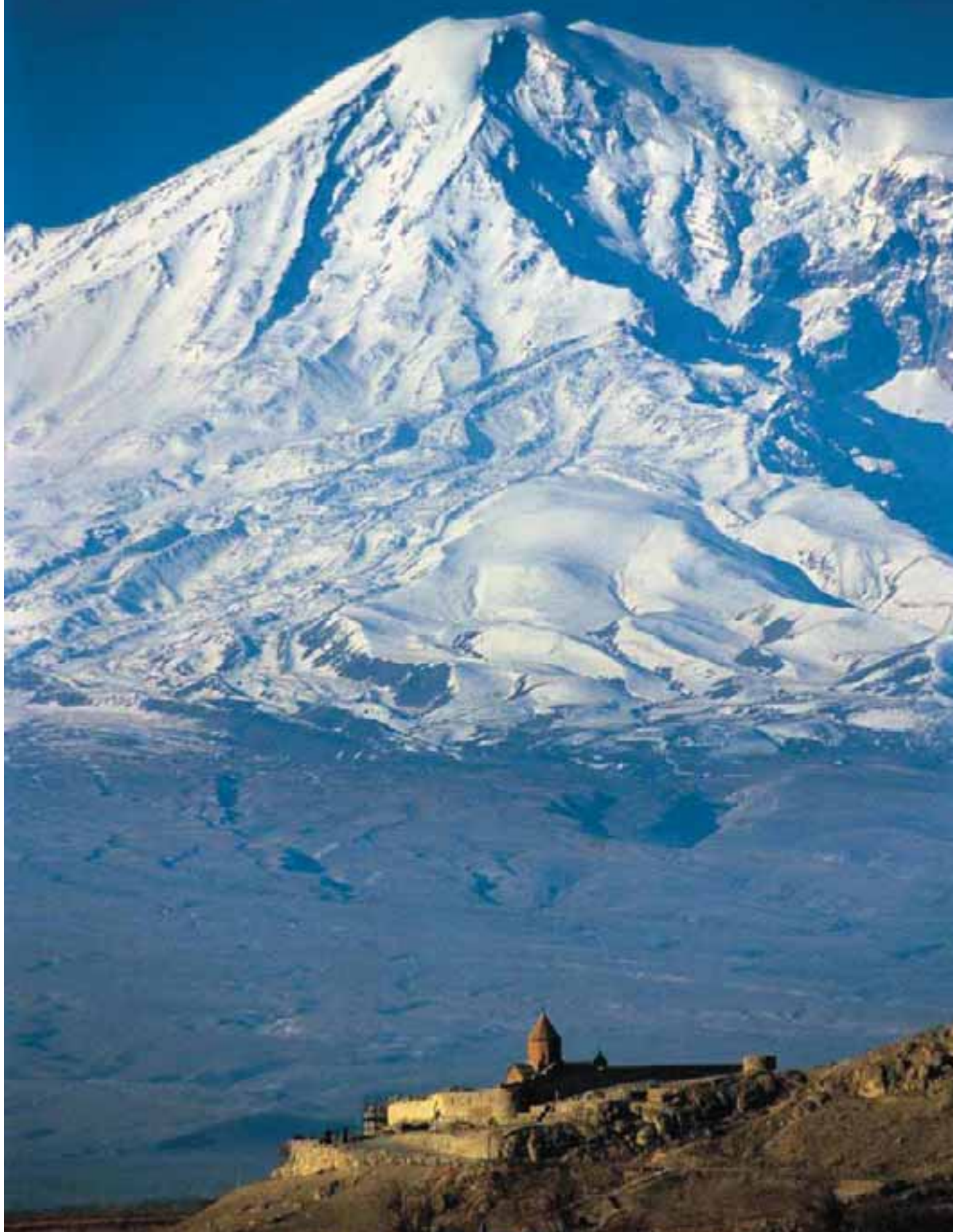
National tunes were recorded by special note marks (*khaz*) and widely used in religious music (*sharakan*). Many scenes of national folk dances and musical instruments are depicted in early miniatures.

At the end of the nineteenth and beginning of the twentieth centuries, Armenian national songs were recorded by the composers N. Tigranyan, K. Kara-Murza, M. Yekmalyan and Komitas. There are also many Armenian musical instruments (such as the *kjamancha*, *tsiranaphogh* – pipe, the *duduk* made from apricot wood, and bagpipes) that are still widely in use today.



Thousands of churches were built in Armenia between the fourth and the seventeenth centuries AD. The Monastery of Geghard, Kotayk Marz. Below: music in Armenia has always played an important role, both in religious and in secular ceremonies. >>Right: the church of Khor Virap with the impressive silhouette of Mount Ararat in the background







PROFESSOR PAPIN GHANDILYAN AND HIS WIFE

Papin Ghandilyan, a member of the Academy of Armenian Agricultural Sciences, was born in 1929 to a rural family in the village of Hacavan (now the town Gavar) in the Gegharkunik region. He studied at one of the village schools, which is now named after him.

In 1947, Papin Ghandilyan left for Yerevan and entered the Faculty of Agronomy at the Armenian Agricultural Institute where he graduated with honours in 1952. It was the beginning of the young scientist's commitment to his mission. The object of his first research was the cultivated species of wheat; after that, until the end of his creative life, he devoted himself to researching the genetic resources of wild Gramineae (*Triticum* L., *Aegilops* L., *Hordeum* L., *Secale* L.), in which Armenia is extremely rich.

Professor Ghandilyan's floristic investigations are outstanding.



In Armenia, he discovered the ancestor of cultivated barley: *H. spontaneum* C. Koch., *Amblyopyrum muticum* (Boiss.) and eight subspecies of wild wheat. As a result of his detailed research in Armenia, Professor Ghandilyan discovered some interesting species of *Aegilops* and barley: *A. crassa* Boiss., *A. umbellulata* Zhuk., *H. marinum* Huds. and *H. bulbosum f. segetale*. Professor Ghandilyan described the new tetraploid species of barley, *H. hrasdanicum* Gandil. and also *Agropyron semiaristatum* Gandil. His studies on interspecies are of

great significance. Eight groups (convarietas) of cereals and more than 70 new varieties have been described by him.

The professor's efforts have helped to create a solid gene fund of cereal plants that are used as the foundation for the selection of new highly productive varieties. His work has been continued by his students in the Laboratory of Research on Wild Varieties of Plants founded and led by him for 20 years.

Professor Ghandilyan was a heartfelt fighter in conserving

wild crop relatives in Armenia and worldwide. Through his personal efforts, the Erebuni Nature Reserve was set up in 1981, which is the only world reserve to conserve wild wheat (three out of the four wild wheat species in the world grow here).

After his death, his wife (Estella Nazarova) continued his work and contributed to maintaining his seed collections and his scientific reports. She silently dedicated her life to increase and diffuse his world fame and findings with commitment, scientific competence and love.

THE TEACHER FRUNZIK

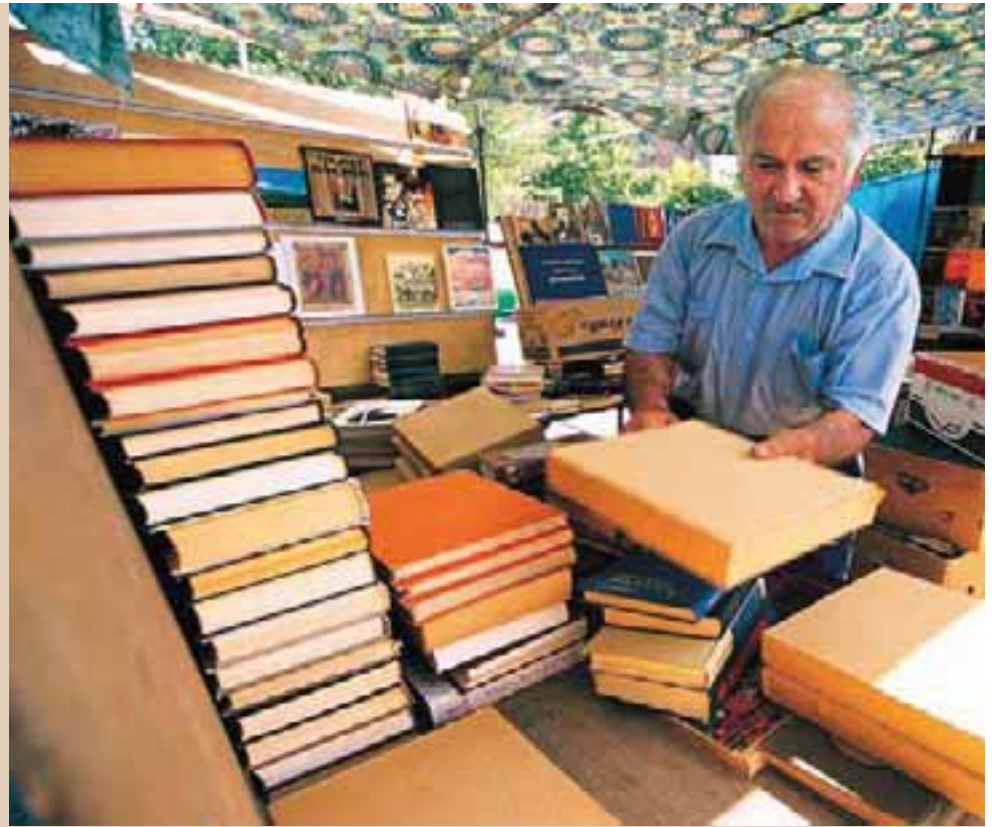
by Syuzanna Hovsepyan

Since his youth Frunzik has loved books. He says that reading gives him heart, soul and ideas.

After school graduation, he began to work and two years later he went to the Pedagogical University to study English. When he was in the third course, he began to work in the Artashat and Gugark regions, then in Yerevan.

One of Frunzik's characteristics is that, apart from books, he is extremely fond of children, a trait inherited from his grandfather. He worked as a pedagogue with enormous pleasure and spared no efforts to transmit his love of books and literature to children. Each day, after finishing work, Frunzik would buy a book and felt himself one of the richest of men. Day by day, his bookshelf expanded until at length he had to stack books on the floor.

With the fall of the former Soviet Union, life became more difficult in Armenia and this affected Frunzik's family as well. His salary was so low that it did not even pay the work; however, Frunzik could not leave school: "Who's going to teach the children?" he asked.



Frunzik's daughter went to university and his son went to serve in the army. At that time, his family needed his work more than ever. "I couldn't do anything else except teaching and I haven't anything else but books. So one day my wife said to me: What are we going to do with these books, sell them."

This idea did not appeal to him at all, but there was no other solution. He began to part one by one from his friends – his books – by giving them to second-hand booksellers. They took the books and sold them but did not give him any money.

So Frunzik had to sell his books on his own after classes but, once he spread the books out and remembered the history of each purchase, he just had to take them back again.

Life became more and more difficult and after 27 years of teaching, and without receiving an adequate salary during the last years, he reluctantly left the school and for ten years has been selling books at "Vernisaj", the most important market in Yerevan, where people gather who love books. He says: "I am happy to show my books to people who love them".

Frunzik has worked hard to make each visitor, especially foreign visitors, understand the power of Armenian culture that, even without government or church, unites the nation.

Frunzik says: "We haven't been translated over time, which is why other nations could not know and appreciate our culture and art. We love our culture and that of other nations. If a man likes his family, he can like other people's families".

He also says to us: "Please stay with us, please come to your home country".





Photo by A. Mamadov

Baku, the capital city of Azerbaijan, is the largest city in the Southern Caucasus and is at the heart of Azerbaijan's rapidly growing economy. Baku, though maintaining its local traditions, is rapidly changing. The new glass and steel skyscrapers emerging in the midst of ancient buildings bear witness to the prosperity and energy of this country

AZERBAIJAN

GEOGRAPHY

The Republic of Azerbaijan covers a total area of 86 600 km² and lies between 41°54' and 38°24' latitude north and between 44°46' and 50°51' longitude east. It borders five countries (the Dagestan Republic of the Russian Federation in the north; Georgia, Armenia and Turkey in the west; and the Islamic Republic of Iran in the south) and has approximately 800 km of coastline along the Caspian Sea in the east. Its capital city is Baku (Baki), located on the southern side of the Apsheron peninsula on the Caspian Sea.

Azerbaijan is bordered by imposing mountain ranges: the Greater Caucasus range in the north, the Lesser Caucasus range in the west and the Talish Mountains in the south. The central part of the country is mainly composed of the broad basin of the River Kür and of its tributary Araz, flowing into the Caspian Sea. The average height is 650 m, although 18 percent of the country is below sea level; the highest peak is Mount Bazarduzu (4 466 m), in the Greater Caucasus range.



The Caspian Sea near the shores of Baku. Below: Lake Goygöl (the “blue lake” in Azeri), a site rich in plant and animal biodiversity
>>Right: the town of Sheki is famous for its Juma mosque, which was built in the tenth century



Courtesy of Z. Agparov

The Caspian shore is mainly flat and uniform, with the only exceptions being the Apsheron peninsula and the bay of Baku, as well as the deeply set bay of Gizilaghaj, to the south of the mouth of the River Kür.

The country is rich in surface water: there are thousands of rivers and over 300 natural lakes (such as Goygöl, Maralgöl, Sarisu and Aghgöl), besides a few artificial ones (the one at Mingacevir on the River Kür is the largest, with a surface area of 605 km²). The water, however, is not evenly distributed, since there are areas with water shortages, such as Garabagh and Shirvan.

AZERBAIJAN – HUMAN DEVELOPMENT INDEXES		
Index	Value	World rank
Human development index	0.787	86
Adult literacy rate (%)	99.5	12
Per capita GDP (USD PPP)	7 851	76

Source: UNDP, 2009

AZERBAIJAN – AGRICULTURAL PROFILE	
Population	8 629 900
Rural/total population ratio	48%
Economically active population	4 318 200
Agricultural labour force	1 557 400
Agricultural labour force/labour force ratio	36%

Source: The State Statistical Committee of the Republic of Azerbaijan, 2009

AZERBAIJAN – AGRICULTURAL PRODUCTION		
Cereals	tonnes	2 419 908
Pulses	tonnes	27 336
Fruits and vegetables	tonnes	2 412 173
Roots and tubers	tonnes	1 077 110
Meat	tonnes	175 724
Milk	tonnes	1 381 623
Eggs	tonnes	60 956
Cattle and buffaloes	head	2 511 775
Sheep and goats	head	8 109 713
Wood fuel	m ³	3 200
Fish	tonnes	3 056
Agricultural imports	million USD	915
Agricultural exports	million USD	536
Fishery imports	million USD	5.8
Fishery exports	million USD	5.9
Forestry imports	million USD	103
Forestry exports	million USD	1

Source: FAO, 2010. Data refer to 2007–08

Lake Goygöl (literally, the “blue lake”, in Azeri) is particularly fascinating. It covers an area of 0.79 km², is 96 m deep and is situated at a height of 1 556 m, in a state reserve founded in 1925. Over 400 kinds of plants grow here, and many kinds of mammals, birds and fish are to be found. Two water layers coexist: the upper layer, oxygen and lower layer, hydrogen sulphide. Insufficient





oxygen is typical for a lake with such depth. There is no oxygen below 30 m. Saturation by hydrogen sulphide increases with depth. For many centuries, the levels of oxygen and hydrogen sulphide in the lake have been relatively stable. These processes on a larger scale are characteristic of the Black Sea. In this respect, Lake Goygöl is its natural model. These water basins have been explored, but they still have many secrets. Consequently, studying and preserving such territories as monuments of natural architecture represent important tasks.

LANDSCAPE AND AGRICULTURE

Landscapes in Azerbaijan are diversified, ranging from high mountains to hills, plains and lowlands, with different climatic patterns from desert to subtropical. In the Greater and Lesser Caucasus ranges and in the Talish Mountains, at altitudes varying from 1 600 to 3 500 m, mainly alpine and subalpine meadows are found. Vegetation is dominated by perennial grasses (such as *Festuca* spp., *Bromus* spp. and *Poa* spp.), forming

AZERBAIJAN – USE OF LAND				SURFACE							
				1 000 ha	%	1 000 ha	%	1 000 ha	%	1 000 ha	%
Total country area	Land area	Agricultural area	Arable land and permanent crops	2 079	44	4 757	58	8 263	95	8 660	100
			Permanent meadows and pastures	2 678	56						
		Forest area		936		11					
		Other land		2 570		31					
	Inland waters				397	5					

Source: FAO, 2010. Data refer to 2007



The highlands at the foot of Mount Shahdagh in Azerbaijan have a subtropical climate with adequate rainfall that favours agriculture

rather thick turf. These areas are an important resource for summer pastures. Each year, more than three million sheep, goats and young cattle are taken to summer pastures where they graze from May through September.

The lower mountains and foothills in northern and central Azerbaijan have a subtropical climate with adequate rainfall (500–800 mm), which supports many types of natural vegetation. Agriculture is widespread, partly irrigated and partly rainfed, and produces cereals, legumes, fruits, fodder and other crops such as cotton. The production of cotton, which was significant until the 1980s, is now much reduced. Improper irrigation management has caused degradation of soils: almost half a million ha of land have been affected by salinization.

The plains and lowlands are located in the central and western parts and cover 40 percent of the surface of the country. The climate is mostly dry and subtropical. Natural vegetation includes *fringo* (*Artemisia fragrans*) and *fringo*-thistle formations (*Artemisia fragrans*-*Salsola nodulosa*); this vegetation is an

important and inexpensive fodder resource for nomadic cattle and sheep in the cold season. Agriculture is widely practised, but depends mostly on irrigation. Products include cereals, potatoes, tobacco, vegetables and fruits.

The area around Lankaran in southern Azerbaijan, at the foot of the Talish Mountains, has a wet subtropical climate, which enables cultivation of many crops, including tea and lemons.

Azerbaijan has the most pastureland within the Southern Caucasus region, totalling 3.8 million ha (1.5 million ha of winter pastures, 0.6 million ha of summer pastures and 1.7 million ha around villages). Despite such large areas of natural pastures, in 2002 only 43 percent of winter pastures and 29 percent of summer pastures were used by sheep, with high grazing densities. Intensive use of fragile grasslands has led to erosion, changes in the structure of pastoral communities and an increase in invasive species, with a consequent decrease in pasture productivity. Today, 70 percent of pastures are threatened by erosion, and 16–20 percent have suffered from salinization.



The creation and proper management of natural reserves are fundamental for the preservation of endangered species, such as the Persian gazelle (*Gazella subgutturosa*) protected in the Şirvan Milli Park

IN SITU AND EX SITU COLLECTIONS OF GENETIC RESOURCES

Azerbaijan's environment is represented by 4 300 species of flora, more than 600 species of vertebrates and more than 14 000 insects, and it has a considerable level of endemism.

Of the total number of flora and fauna species, more than 37 species of flora and 180 species of fauna, including 14 species of mammals, 36 species of birds, 13 species of amphibians and reptiles, five species of fish and 40 species of insects, are endangered.

There are ten species of barley, five species of rye and 400 species of leguminous crops. Over 13 900 plant accessions are available in 34 *ex situ* collections in 12 institutes in Azerbaijan.

Mainly as a result of the establishment of state reserves, the Persian gazelle (*Gazella subgutturosa*), leopard, moufflon, *Francolinus francolinus*, *Tetraogallus* and falcons have been preserved, as well as the yew, box tree, iron tree, Lankaran persimmon and many other species of plants. In order to prevent endangered species from disappearance, both *in situ* and *ex situ* methods must be applied. Large natural reserves and protected areas must be managed to maintain species in their natural habitats.

Seed collection and the creation of seed banks must be encouraged. However, all these activities are expensive and require commitment both nationally and internationally.



Photo by E. Cattaneo



Photo by E. Cattaneo

Azerbaijan is rich in culture, history and traditions, as testified by its many monuments, beautiful fountains and gardens

LANGUAGE AND CULTURE

The official language of Azerbaijan is Azerbaijani or Azeri, which belongs to the Altaic family. Azerbaijani is spoken not only in Azerbaijan but also in the northwest Islamic Republic of Iran, northern Iraq, eastern Turkey, eastern Georgia and in the Russian Federation. In Iran, the Azeri people are some 28–30 million. Spoken Azerbaijani has several dialects.

In the ancient Azeri states of Manna and Atropatena, mainly cuneiform, Greek and Parfiya calligraphy systems were adopted. In the Albanian period, there was a local Albanian alphabet. When the country became an Arab state, Azerbaijani was written in Arabic letters but, in 1926, there was a gradual introduction of the Roman alphabet. In 1940, the alphabet changed again through the influence of Russian, and Azerbaijani began to be written in Cyrillic letters.

Finally, in 1991, when Azerbaijan became an independent republic, the Roman alphabet was officially chosen, but some new letters were added to represent particular Azerbaijani language sounds.

Azerbaijan is a country with an ancient history, culture and traditions. The Azikh cave, one of the earliest human dwellings, is to be found here. Azeri literature also had early beginnings. One of the greatest works of the literature, *The book of Dede Korkut*, which recounts epic tales of the Oghuz Turks, was written around the seventh to ninth century. It is a brilliant testimony to the language, way of life and traditions of Azerbaijan. Creating great classics in the Middle Ages were poets and philosophers such as Nizami Ganjavi, Nasimi, Fuzuli, Bahmanyar, Nasraddin Tusi and Shah Ismail Khatai.



In the sixteenth century, Azeri literature flourished. Epic tales such as *Ashig Garib*, *Asli* and *Karam*, *Shah Ismail* and *Koroglu* were famous throughout Azerbaijan and eastern countries. In the nineteenth century, both comic and tragic plays held an important place in Azeri literature. Comedies in particular were written by Mirza Fatali Akhundzade, who drew on those of Molière. In the eighteenth to nineteenth centuries, the able poets and writers Vagif, Seyid Azim Shirvani and Bakikhanov were well known in the east. The golden era of natural literature was in the early twentieth century, a national renaissance period.

Azeri architecture went through many different stages over the centuries but the lasting legacies belong to mediaeval times, especially the Maiden Tower in the Old Town and the Shirvanshah palace in Baku. Well-known architectural monuments and gems include ancient Albanian buildings, the Momina Khatun tomb in Nakhchivan, the Palace of Khan in Sheki and other early remains, mainly in mountainous areas.

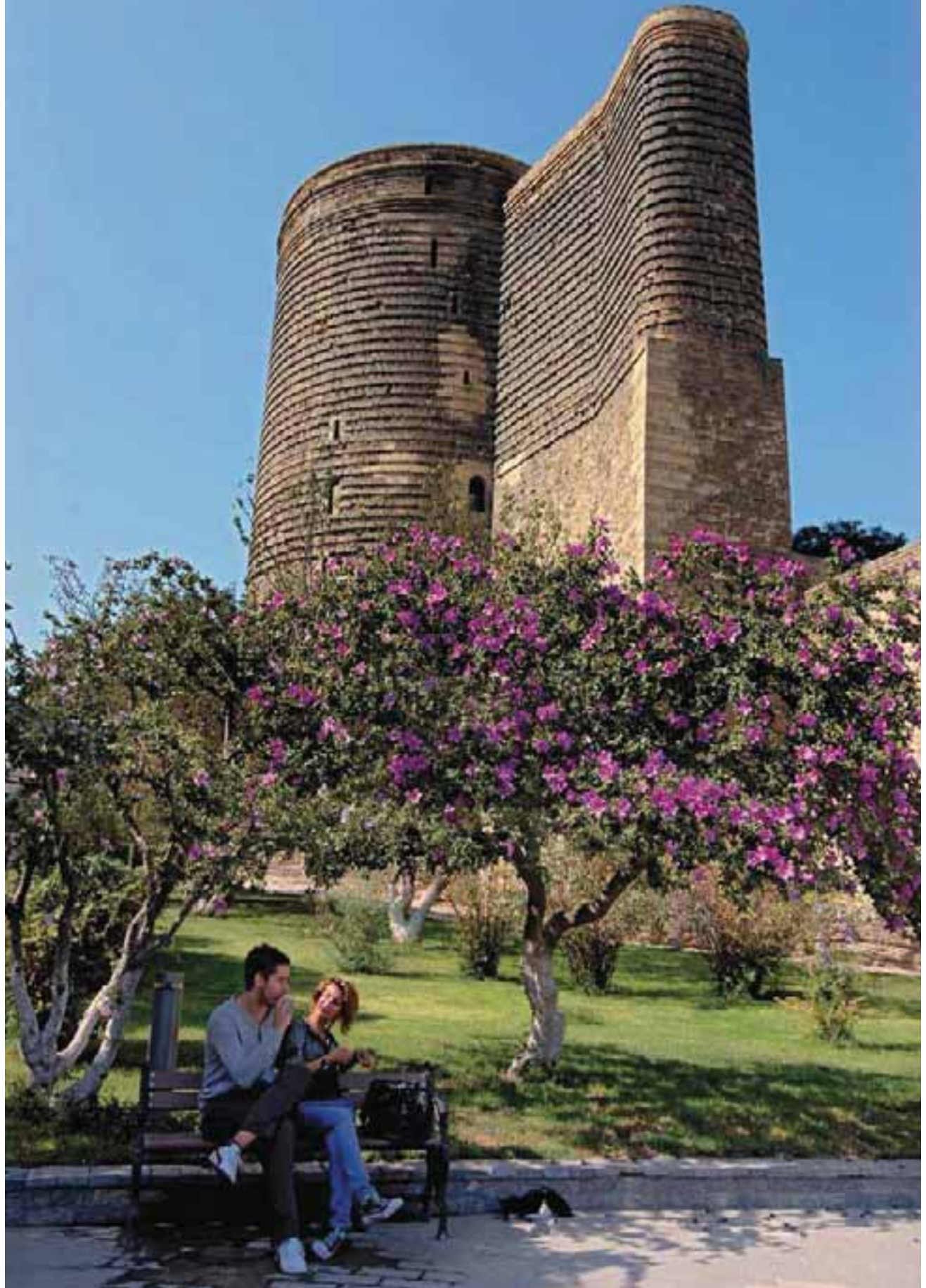
The capitals that ornately decorate the subway stations are the most recent architectural marvels.

Azerbaijan is famous for its carpets, but also for its embroidered textiles. Artisans use colourful threads (sometimes of gold or silver) and beads to create geometric patterns on a thin woollen fabric called *tirme*. The country's many brightly plumed birds, its animals and plants have also featured in designs. Popular Azerbaijani textiles include rugs, veils, shawls and towels. Today, the music of Uzeyir Hajibayov, Gara Garayev and Fikrat Amirov, and paintings by Sattar Bahlulzade, Tahir Salahov and Togrul Narimanbekov are known throughout the world. The country's musical traditions are preserved by *ashugs*, or minstrels, who often strum the *saz* (a traditional stringed instrument) while singing of the deeds of former heroes. The most popular form of music in Azerbaijan is *mugham*, which is a vocal improvisation, together with wind and stringed instruments (*tar*, *kamancha*), and is often compared to jazz.



The old town in Baku is extremely well preserved and is a UNESCO World Heritage Site. Azerbaijan is famous for its carpets, embroidered textiles and crafts. <<Left: traditional copper making at Lahic village







Both in folklore and literature, natural elements are often used to evoke beauty and passion. Rose petals are likened to girls' lips <<Left: the Maiden Tower is one of the most remarkable monuments in Azerbaijan. Its origin and function are surrounded by legends and mystery

BIODIVERSITY IN FOLKLORE AND LITERATURE

There are many sayings, proverbs, *bayaties* (Azeri folk poems), *oxshamas* (poems showing devotion to people or animals), games, stories and legends concerning plants and animals in particular.

Many folk poems date back some thousand years, and were exclusively dedicated to animal breeding (*sayachi sozler*) and agriculture (*halavar*).

An Azerbaijan folk story, *Debate on plants*, deals entirely with plant characteristics and their usage, including the use of plants in folk medicine. The noted Azeri poet Fizuli (1494-1556) deals with an analogous topic in one of his famous poems entitled *Conversation of fruits*.

Both in folk creative work and sayings, and in the literary

works of poets and writers, beautiful girls' cheeks are likened to apples, lips to rose petals, mouths to almonds, noses to hazelnuts, tongues to fruit drops and a slice of melon, breasts to pomegranates, quince and flower gardens or melon plantations, figures to a cypress tree, while glances and attitude or even the girl herself are likened to a gazelle or deer. Both in the past and in the present,

a number of plants and animal species have been honoured or even considered sacred (for instance, the nettle tree and rue).

There is a belief that even cutting the stems or branches of some plants brings misfortune. According to folk tradition, the wolf and eagle are symbols of heroism and courage, but the horse and dog are those of friendship and fidelity.

**PROFESSOR
JALAL ALIYEV**

Jalal Alirza Aliyev was born on 30 June 1928 in Nakhchivan. He received his Ph.D. in 1955. From 1951 until now, Professor Aliyev has been leading research projects at the Department of Plant Physiology, Azerbaijan Research Institute of Agriculture.

Since 1971, he is also Head of the Department of Molecular-Genetic Bases of Production Processes in the Institute of Botany of the Azerbaijan National Academy of Sciences (ANAS), founded by him.

Professor Aliyev's more than 50 years of dynamic research have been devoted to the study of the theory of photosynthetic activity as fundamental for the productivity of crop plants, particularly wheat.

The overall activity of this research covers physiological, biophysical, biochemical and molecular-genetic bases of plant productivity, and the study of production processes at all levels of the structural-functional organization of plant organisms, from molecular to the whole plant and sowing.

In connection with the development of investigations in the field of physico-chemical

biology, particularly biophysics and biochemistry, Professor Aliyev was the initiator and founder of new directions of research in molecular and cellular biology, molecular genetics and biotechnology, mathematical biology and bioinformatics.

For his outstanding contribution to science in Azerbaijan, Professor Aliyev was honoured with the Order of Independence in 1998 and with the Order of Glory of the Republic of Georgia in 2003.

One of the fundamental directions of the professor's wide scientific activities is to study and organize the preservation and effective utilization of biodiversity in Azerbaijan. He has gathered together an extensive wheat collection, which includes more than 1 000 accessions with high donor characteristics. Many new highly productive varieties have been created through this collection.

Professor Aliyev is the founder of more than 20 varieties of wheat. These varieties constitute more than 50 percent of the areas of wheat sown in the country.



Courtesy of Z. Akparov

The professor has donated his valuable collection to the national gene bank. All the main research activities on biodiversity and agriculture at the Genetic Resources Institute, as well as at other similar institutes in the country, are carried

out under his leadership. He is Head of the National Programme on Plant Genetic Resources, in the framework of which all important crops for Azerbaijan (cereals, legumes, forages, vegetables, fruits, etc.) are studied and maintained.

Photo: <http://jazzdunyasi.az.az>

THE MUSICIAN VAGIF MUSTAFAZADEH

by Marzio Marzot

Classical Azerbaijani music is a precious element of Azeri culture. The most popular Azerbaijani traditional music, called *mugham*, belongs to the wider musical tradition of

the Near East. The Azerbaijani *mugham* follows the *maqam* structure but has developed its own particular features transmitted orally from teachers to their students. *Mugham* has derived its melodies, rhythms and performance techniques from the singing bards of the Caucasian mountains. The bard or *ashik* (from the Arab word *ashiq* "lover") travelled singing historical songs and epic legends called *dastan*, love lyrics, to celebrate the farmers' way of life. The musician accompanied himself with the *saz*, a type of lute. *Mugham* is usually performed by a singer who is accompanied by musicians playing traditional instruments.

The more common instruments used to play *mugham* are the *tar* (a long-necked lute), *kemanche* (a stringed instrument played with a bow) and *daff* or *gaval*, a frame drum.

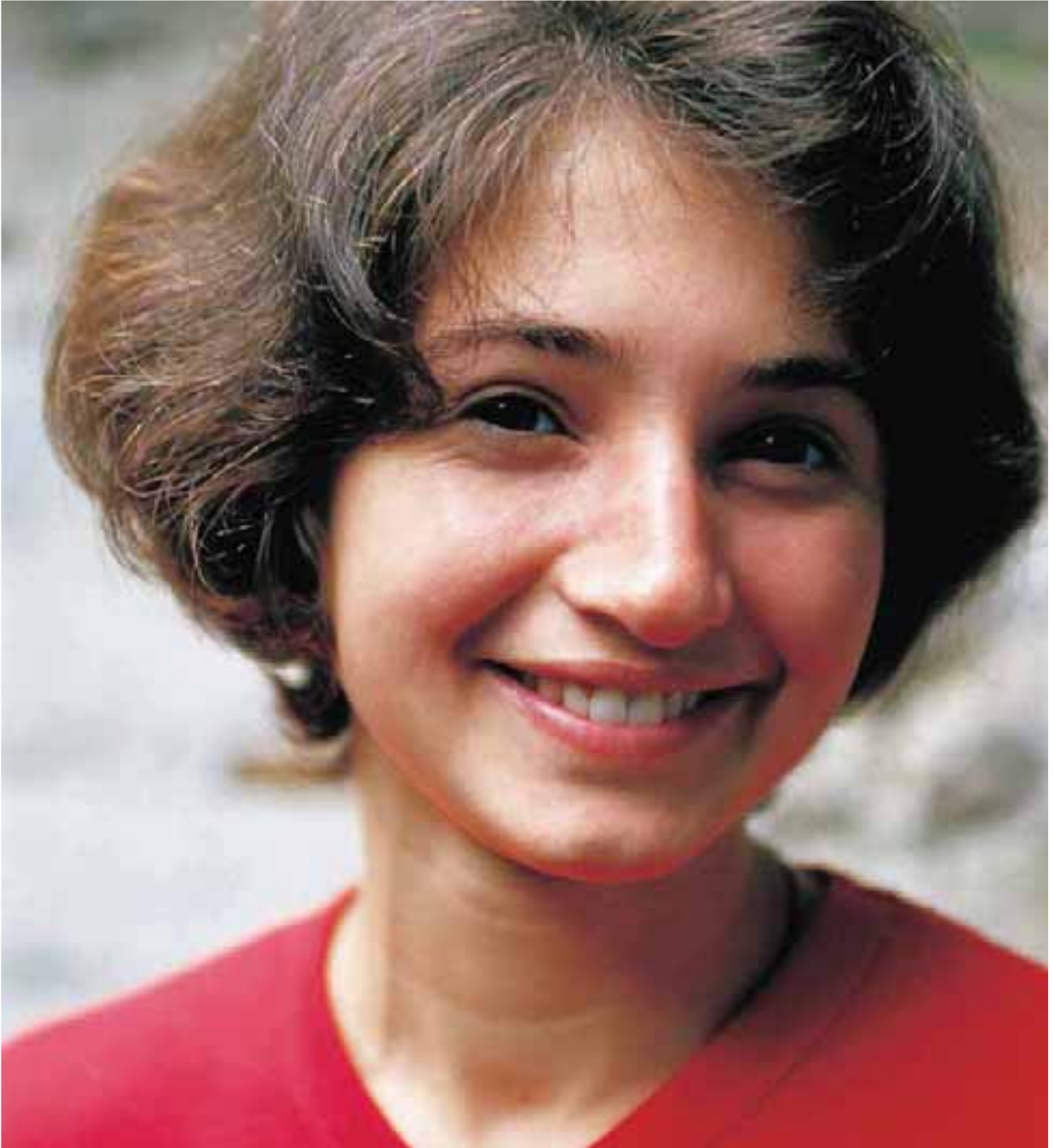
At the end of the 1950s, a brilliant pianist-composer, Vagif Mustafazadeh, known for his smile behind an enormous "gypsy" moustache, was the first to suggest the union of jazz and traditional *mugham* music.

To a certain extent, this union would seem natural since *mugham*, normally played during folk events, is based on improvisation, just like jazz. Improvisation makes every *mugham* performance and

performer unique, and the particular and characteristic tone scale fits nicely in the free phrases so typical of jazz. Vagif followed his idea through with great enthusiasm, facilitated also by his family who supported his initiative with affection.

Vagif's wife, who was born in Georgia, is also a musician and their two daughters have followed in their parents' footsteps.

Vagif's beautiful daughter Aziza Mustafazadeh is a talented pianist, not to mention an acrobatic singer, and is today among the internationally best-known Azeri musicians.





Tbilisi, the capital city of Georgia, lies on the banks of the River Mtkvari with elegant tree-lined avenues. It is rich in history and monuments and has an active cultural and economic life. Narikala fortress and the ancient thermal baths situated in the old city (Maidan) are important tourist attractions

GEORGIA

GEOGRAPHY

The Republic of Georgia (Sakartvelo in Georgian) covers a total area of 69 700 km² and lies between 43°34' and 41°02' latitude north and between 40° and 46°43' longitude east. It borders the Russian Federation to the north, Turkey and Armenia to the south, Azerbaijan to the east, and has approximately 310 km of coastline along the Black Sea in the west. Its capital city, Tbilisi, is located in central Georgia, on the River Mtkvari. Georgia is a mountainous country: 54 percent of the territory is covered by mountains, while hills cover 33 percent and plains and valleys make up the remaining 13 percent.

About 30 percent of the country is situated above 1 700 m. Along the whole of the northern border of the country lies the Greater Caucasus range, the highest peaks of which exceed 5 000 m (Mount Shkhara, 5 201 m), while the Lesser Caucasus range lies in the south, along the border with Armenia.

The western part of the country is occupied by hills and plains, constituting the basin of the Rioni and Inguri Rivers. The eastern part, along the border with Azerbaijan, is constituted by the upper basin of the River Mtkvari.



GEORGIA – HUMAN DEVELOPMENT INDEXES

Index	Value	World rank
Human development index	0.778	89
Adult literacy rate (%)	100	1
Per capita GDP (USD PPP)	4 662	100

Source: UNDP, 2009

GEORGIA – AGRICULTURAL PROFILE

Population	4 382 100
Rural/total population ratio	47%
Economically active population	1 917 800
Agricultural labour force	1 024 100
Agricultural labour force/labour force ratio	53%

Source: Department of Statistics, Georgia, 2008

GEORGIA – AGRICULTURAL PRODUCTION

Cereals	tonnes	408 024
Pulses	tonnes	10 180
Fruits and vegetables	tonnes	673 300
Roots and tubers	tonnes	139 200
Meat	tonnes	44 900
Milk	tonnes	644 200
Eggs	tonnes	24 623
Cattle and buffaloes	head	1 048 500
Sheep and goats	head	706 500
Fish	tonnes	18 377
Agricultural imports	million USD	812
Agricultural exports	million USD	299
Fishery imports	million USD	34.8
Fishery exports	million USD	2.6
Forestry imports	million USD	60
Forestry exports	million USD	22

Source: FAO, 2010. Data refer to 2007–08

The impressive statue of Kartlis Deda (Mother Georgia) was erected in 1958 to celebrate the 1 500th anniversary of the foundation of Tbilisi



LANDSCAPE AND AGRICULTURE

There are many types of landscapes and ecosystems in Georgia. The plains and hills along the Black Sea have a wet subtropical climate with 1 000–2 000 mm per year of rainfall. Natural vegetation includes moor forests and Kolkheti evergreen forests, where the *zalkova* relict tree can also be found. The area is perfect for agriculture and produces a wide range of vegetables, tea, citrus and other fruits, Suhumi tobacco, cotton, maize and sesame. Grapes for extensive wine production are also significant. As the altitude and distance from the Black Sea increase, the climate becomes drier and cooler. At altitudes up to 850 m, the natural vegetation is based mainly on thorny bushes, moor forest and oaks. Agriculture is widely practised and produces vegetables, fruits (such as figs, peaches, apricots and pomegranates) and wheat.

In central and western Georgia, at altitudes of 450–1 500 m, the climate is more continental. Natural vegetation is composed of beech, fir and oak forests.

Agriculture is based on grapes and horticulture. Livestock breeding is also common. In the mountains of the Greater and Lesser Caucasus ranges, at altitudes of 1 500–2 500 m, the climate is subalpine, and natural vegetation comprises beech and fir forests, and meadows. Agriculture is limited to some cereal cultivation. Livestock breeding is still practised. At higher altitudes, up to 3 500 m, alpine meadows can be found and are used for livestock grazing.

Georgia is justly famous for its natural and medicinal water springs. There are approximately 2 300 springs at 730 sites across the country, which together are estimated to yield approximately 130 million litres of mineral water per day. About 4 200 vascular plants have been registered in Georgia. Among them are 317 species of Leguminosae, 332 species of Gramineae and 238 of Rosaceae. More than 2 000 species have direct economic importance for food, timber, edible fruits, nuts, forage and fodder, medicine, colourants, industry and essential oil production.



Almost half of the population of Georgia lives in rural areas and maintains a rich biodiversity of crops and livestock

GEORGIA – USE OF LAND				SURFACE							
				1 000 ha	%	1 000 ha	%	1 000 ha	%	1 000 ha	%
Total country area	Land area	Agricultural area	Arable land and permanent crops	577	23	2 517	36	6 949	99.7	6 970	100
			Permanent meadows and pastures	1 940	77						
		Forest area				2 760	40				
		Other land				1 672	24				
	Inland water						21	0.3			

Source: FAO, 2010. Data refer to 2007



AGRICULTURE INFORMATION FOR FARMERS

Agrarian sector recommendations are made by the Ministry of Agriculture and Food; the Centre of Scientific and Technical Information (Techinform); the Academy of Agricultural Sciences of Georgia; the Georgian State Agrarian University; the industry-wide Georgian Biological Farming Association, Elkana; the Farmers' Union of Georgia; and the House of Georgian Farmers. According to the Georgian agricultural development project, AgVantage, a modern information system has been developed for the agro-industrial market. The system includes magazines, weekly information bulletins in Georgian and Russian and a Web portal. The Farmers' Union produces a monthly newsletter called *My Fatherland*,

highlighting foreign and local achievements and giving advice to farmers. The Union also funds publication of up to 20 books and booklets. The Association for Protection of Landowners' Rights publishes a magazine called *Land Owner*, which discusses legal issues.

The Georgian National Association for Animal Production (GNAAP) is developing an AgroWeb portal in English and Georgian to collect and provide information for farmers on agriculture in Central and Eastern European countries as well as those of the Russian Federation, and a portal on farm animals and gene banks in Georgia and globally.



The mediaeval Sapara Monastery belongs to the greatest period of Georgian architecture, before the Mongolian invasions. The building has been influenced by Roman, Hellenistic and Syrian cultures

LANGUAGE AND CULTURE

The official language of Georgia is Georgian. It is a member of the Kartvelian family, which also includes Mingrelian, Laz and Svan (colloquial language), all spoken in the area between the Black and Caspian Seas. Georgian is written in an original and ancient alphabet, which currently consists of 33 letters.

The first incontrovertible evidence of Georgian writing is an inscription in a church in Bethlehem, dated 430 AD.

Georgia boasts an extremely rich secular and religious literary tradition. Three main periods can be distinguished. The Old Georgian period, which extends from the fifth to about the twelfth century, was rich mainly in religious works.

The Mediaeval Georgian period, which began during the twelfth century and continued to the eighteenth century, can be considered the golden age of Georgian literature. Notable epic works were produced, such as Rustaveli's *Vep'khistaosani* (The knight in the tiger's skin), which became a Georgian national epic poem.

After the Mongol invasion in the 1240s, Georgian literature entered a period of decline but, from the eighteenth century, attempts were made to salvage historical matter that had survived the Mongol conquest and this period constituted a renaissance in Georgian culture. The Modern Georgian period began in the nineteenth century, with the opening of Georgian literature to the influence of Russian and European poetry.



Religion has always played an important role in Georgia, as evidenced by architecture, literature and other figurative arts

Georgian architecture is also significant. Two major forms of ecclesiastical building were developed at the beginning of the Christian age: the basilica and the central domed structure. The basilica came to Georgia primarily through the influence of the Roman and Hellenistic worlds. Its reformulation in Georgia was a blend of Syrian influences as well as of secular buildings, such as markets, country halls and audience chambers.

The second form of building that appeared in Georgia in the early feudal period and evolved into many complex variations was the central domed structure. The substructure acted as a base upon which the drum and, ultimately, the cupola rested.

The transition from the room shape to the circular drum was achieved through the use of squinches, small arches that grow wider as they project in concentric arches across the interior corners of a square or polygonal room. Ninotsminda Cathedral (sixth century) is the earliest large centralized ecclesiastical building that has survived.

The greatest period of Georgian architecture was from the tenth to the thirteenth centuries. Exterior ornamentation reached a supreme level of artistic confidence. Fanciful use of a wide variety of motifs – animal, vegetal and geometric – worked in conjunction with architectonic devices to render a harmonious and powerful organic totality.



Stone carving in the archaeological site of Dmanisi. The site is rich in architectural remains from the Bronze, Early Iron, classical and mediaeval ages. In the 1990s, the remains of hominids, dating back 1.8 million years, were also discovered at the same site. They are the oldest remains ever found outside Africa. >>Right: a party at which three girls are singing traditional *mtiuluru* songs, accompanied by the small guitar called *changuri*

The golden age of Georgian culture came to an abrupt end with the invasion by the Mongols in the thirteenth century. Despite many attempts by Georgia to throw off foreign dominance, the Iranian influence was the strongest new element in Georgian architecture from the end of the fifteenth through the seventeenth century. Brick was preferred to stone for building, and brick patterns are distinctly Islamic, although the Georgians adapted the technique to serve their own Christian iconography. The Gremi citadel and the Ninotsminda bell tower are superb examples of Georgian interpretation of Persian tastes.

With Georgia's incorporation into the Russian Empire in the nineteenth century, Georgian architecture was influenced by Russian neoclassicism: the three-storey bell tower across from Sioni Cathedral, erected in 1812, is the earliest example.

Among the other arts, high levels were achieved by Georgia in sculpture (especially in relief works of facades and decoration of altar screens), in jewellery and in painting.

Georgia has ancient and deep-rooted musical traditions and culture. Sumerian cuneiform inscriptions mention the original





The Cathedral of Alaverdi, erected at the beginning of the eleventh century AD in the Kakheti region (eastern Georgia). Every year this site hosts the “Alaverdoba festival”, to celebrate with music and other artistic features the end of a successful harvesting season

musical rituals of tribes residing in the territory of present-day Georgia. Archaeological excavations have uncovered musical instruments, including pipes and stringed instruments. The importance of music in the lives of the peoples of Colchis and Caucasian Iberia was stressed by the ancient Greek historians Herodotus and Xenophon. Folk music, specifically traditional polyphonic choir performances, has a special place in the cultural values of the Georgian people. Polyphony has been preserved from early times to the present day. Every region of Georgia has its own specific traditional musical dialect and manner of performance, yet all share the same intonation and harmonic characteristics.

Once, upon hearing a recording of the Gurian marching song, *Khasanbegura*, Igor Stravinsky said:

“One of the most impressive recent musical experiences I owe to the tapes of polyphonic singing recorded in mountain villages near Tiflis. The discovery of an active performing tradition of music ranging from tenth century conductus and organum to High Renaissance was a major find, I think, and contributes to performance knowledge being even more valuable than acquisitions of more music. Yodelling, called krimanchuli in Georgian, is the most virile vocal performance I have ever heard.”

Courtesy of Levan Mosiashvili



THE PAINTER LEVAN MOSIASHVILI

by Alison Hodder

Levan Mosiashvili was born in 1971 in Tbilisi, Georgia. He graduated from the Agrarian University in 1993 and, in 1994, from the secondary faculty of art. He is a self-taught artist, working in animalistic and abstract styles, and portraiture. His work is painted in oil on canvas.

A distinctive characteristic of much of Levan's work is the representation of typically Georgian agrarian scenes and figures; thus he has contributed significantly to the recording and preservation of this key aspect of his country's rich cultural heritage.

He has been a member of the Georgian Artists' Union since 1999, and honorary member of the Southern France Young

Artists' Association since 2003. From 1995 to 1997, he worked for the French charity organization "Équilibre" as charity-cultural projects coordinator; in 1996, with the support of the French Embassy, he organized the project "Art for children".

Since 1998, Mosiashvili has had several one-man exhibitions in France, the Russian Federation, Turkey and the Syrian Arab

Republic, as well as in Georgia. His paintings are in private collections, art galleries and museums in numerous countries.

He has received various awards in France and also at international exhibitions and competitions abroad. He currently lives and works in France but returns periodically to Tbilisi to renew the inspiration for his art.



**PROFESSOR
KAMO KARTVELISHVILI**

by Levan Tortladze

In Georgia, rural people have bred livestock for centuries. Livestock-related literature has been written and translated, and specific schools and institutes established for people to study zootechnical, veterinary and animal care issues.

The Georgian Scientific Research Institute of Livestock/ Zootechnical and Veterinary Educational Research

Institute was established at the beginning of the twentieth century and scientific material was gradually added. Zootechnicians raised several highly productive breeds, which spread throughout the Caucasus and Russia. The Institute has produced more than 7 300 zoo-engineers and 5 900 veterinarians. Professor Kamo Kartvelishvili, a corresponding member

of the Science Academy of Agriculture, worked at the Institute from 1956 until his death in 2000. He served as teacher, dean, pro-rector and rector. From 1983, he was the Chairman of the Department of Milk and Beef Production Technology.

Professor Kartvelishvili was an outstanding scientist in the field of animal breeding.

The main direction of his scientific investigations was to increase beef production. In Georgia, he carried out an investigation into the industrial crossing of dairy breeds raised in the country, bearing the world's best beef genetic resources. He also created herds of beef cattle adapted to high-intensity farming conditions. During the civil war (1992–93), the university faced



Professor Tortladze and Tamara, daughter of Professor Kartvelishvili, at the Georgian Zootechnical-Veterinary University. Many of the scientific educational tools have been preserved thanks to the university staff who protected them from vandalism during the civil war

both theft and vandalism. In this period, the rector decided to create a night duty with the help of professors and lecturers. In spite of the danger, four to five unarmed professors protected the building every night and saved the university from further theft and destruction.

Professor Kartvelishvili was among these guardians and during many cold and risky

months protected the important scientific material of the university without thought for his own safety. His dedication to science is continued today by the committed work of his daughter and son, testifying to the important role assigned to education in Georgia.

The university and his children are proud of the example given by Professor Kartvelishvili

and his memory is celebrated through the diffusion of his scientific findings and his dedication to both his family and students.

Nevertheless, the region still hosts wild and domesticated species that can ensure the future of agriculture for the world, and preserves the knowledge and the science base necessary to make a

better use of local genetic resources for sustainable agricultural production. But there is a need to act quickly before these species are lost. The international scientific and political community should engage in preserving *in situ* and *ex situ* this reservoir of genetic material for food security in reserves, gene banks and farmers' gardens in Armenia, Azerbaijan and Georgia.

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EDUCATION TO MAINTAIN LOCAL GENETIC RESOURCES

THE PEOPLE OF THE SOUTHERN CAUCASUS DESERVE RECOGNITION AND RESPECT FOR THEIR CULTURE AND WORK, WHICH HAVE CONTRIBUTED OVER MILLENNIA TO SHAPING AGRICULTURAL SYSTEMS CONCILIATING THE USE AND PROTECTION OF BIODIVERSITY AND GENETIC RESOURCES. THE HIGH LEVEL OF EDUCATION NEEDS TO CONTINUE AND THE MODERN CONCEPT OF ECOSYSTEM MANAGEMENT NEEDS TO BE TRANSFERRED TO YOUNG PEOPLE.

The interdependence between people, plants, animals and their habitats is challenged by the loss of soil health and fertility, inadequate agronomic practices and inefficient use of energy resources, as well as the risks posed by climate change, social and economic changes and food insecurity. Innovative regulations need to be developed as well as mechanisms and connections promoting a better equilibrium for food production based on landscape memory, a locally adapted science focused on dynamic complexity, data and information better connected with specific farmers' knowledge and needs, and capacity building programmes to manage biological processes for crop production.

This transition will require education, knowledge and a careful focus on land and genetic resources, new global and local commitments, new energies and technologies, and will build on the very high level of education that is the foundation of culture in the Southern Caucasus.

There is a need to support the education and training of young people so that they can maintain with pride, imagination, care and humility all the different aspects of their culture, and treasure the biodiversity of genetic resources in Armenia, Azerbaijan and Georgia through efficient agricultural management practices and responsible ecological lifestyles.



