Forest Dependency in Rural Azerbaijan

Based on the Case Study in Zagatala district

Baku, October 2014
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EXECUTIVE SUMMARY

Introduction

In the Republic of Azerbaijan forested areas cover 1,021 hectares of the land, which is 11.8% of the country’s territory. In the 18th-19th centuries however, this figure stood at 30-35%. The per capita forest area is 0.12 hectares, which is 4 times less (0.48 hectares) than the average international indicator.

Forests are distributed unevenly throughout the territory of Azerbaijan. Thus, almost 85% of all forests are located in the mountainous region of the country, while only 15% of the forests are in the lowland. It should be noted that 261 thousand hectares of the country’s forest fund are located in an area occupied by Armenia.

Although the amount of forested area of Azerbaijan is not large, because of its rich soil and favorable climatic conditions, the forest supports rich species composition. 450 species of trees and shrubs grow in the country’s forests, 70 of which are endemic. The main species that make up the forest are beech (Fagus orientalis), oak (Quercus iberica) and hornbeam (Carpinus). These species make up 85.5 % of the entire forest cover.

Because of their importance, the forests of Azerbaijan are ranked Group 1 (based on an old Soviet system of ranking) and carry out water protection, soil protection and climate regulating functions.

The state forest code of Azerbaijan is directed at forest conservation and sustainable forest management, which includes the efficient and rational utilization of land and forest resources.

The priorities of the country’s forest sector strategic objectives are reforestation, increase in forest cover, and forest conservation and protection.

Activities in the forestry sector are based on the conservation and protection of forests, and include sanitation cutting, forest sanitation, afforestation, and forest crop tending.

One of the main forest use indicators is felling. As mentioned above, the forests of Azerbaijan are included in Group 1 and, thus, the main forest activities involve conservation, protection and reforestation.

The country’s forest fund, water resources and other natural resources are owned by the state and have been transferred for permanent use to forestry enterprises according to their intended purposes – for the development of the forest sector.

Methodology

The questionnaire used for the study was adapted to local conditions and considered various national and religious features of the region. A total of 150 households were interviewed from mid-May to late July (50 households in each village) in three villages: Danachi, Yukhary Chardaglar and Yukhary Tala.

In the selection of communities, the following characteristics were taken into account:

• Infrastructure and distance to market
• Village location (mountain or lowland)
• Standard of living

During meetings with local officials from the municipalities of the selected villages, data was collected about the communities, the forest fund, social institutions, key agricultural activities, etc.
Each village was divided into several sectors, with several households interviewed in each sector. In cases where household members were absent or there was a refusal to take part in the survey, a random sampling method was used. The most informed member of each household was interviewed.

It should be noted that the credibility of the information obtained varied. The credibility of the information provided by poor households is estimated at 80%, while that from rich ones may be estimated at not more than 60%. This is explained by the fact that the rich were afraid to speak about their incomes because of potential illegalities related to how they earn their income.

Study area

Zagatala district, in which two thirds of the land is covered by forests, was selected for the survey. Zagatala district is situated in the northwest of Azerbaijan on the southern slope of the Greater Caucasus Mountains at a distance of 445 from Baku, the country’s capital. The area of the district is 1.35 thousand sq.km and consists of two regions: mountain and lowland.

The key agricultural products are: grain, tobacco, fruits, vegetables, nuts and livestock breeding.

The main agricultural crops are: wheat, corn, hazelnut, walnut, chestnut, tobacco, sunflower, fruit, berries, vegetables and melon crops.

In the city, there are several nut-processing factories, a cannery, a butter and cheese factory, an essential oil factory, an asphalt plant and furniture and tea factories.

Following a meeting and consultations with the chief forester of Zagatala district, 3 villages were selected for the study:

Danachi, situated in the Alazani Valley, in the wooded foothills of the southern slopes of the Greater Caucasus Mountain Range, 25 km southwest of the district capital; Yukhary Chardaglar, situated in the mountainous part of the district, 15 km from the district capital; and Yukhary Tala, situated in close proximity to the city of Zagatala on the one side and bordering on a forest on the other side.

All markets – of consumer goods, agricultural products, non-timber forest products, etc. – are located in the district capital. The distance of Yukhary Tala to all markets is 2 km, of Danachi – 25 km and of Yukhary Chardaglar – 15 km.

Results and Discussion

Income share by source

34.40% of the population’s income comes from agriculture. The main crops in this region are hazelnuts, corn, vegetables, fruit (apples, pears, peaches, persimmon, grapes, cherries, apricots, sour cherries and plums) and melon. Although hazelnuts grow in forests, the bulk of these nuts are grown on agricultural land.

“Other income” is the second largest – 26.12%. This source comes from pensions and remittances (in some families, the head of the household leaves to work, usually in Russia and sends money to his family. The high percentage of the “other income” is explained by a considerable increase of pensions in Azerbaijan in recent years as compared with the past.

23.92% comes from Animal income. Although keeping livestock requires sizeable inputs, most of the interviewed households kept birds, mainly, chickens, and livestock (cows, sheep and goats). Villagers explain that from a safety point of view, products
produced on their own are a more reliable source of food. Key livestock products: meat, cheese, milk, gatig (sour milk), milk, eggs, shor (a local sour milk product) and sour cream. The villagers use these products for both sale and subsistence.

6.17 % of the income comes from Forest products. The most important forest products are firewood, nuts, chestnuts, berries, wild fruit, medicinal plants, fish, etc.

4.92% of the income comes from wages. The local population is engaged in the following types of economic activity: trade, the service industry, the processing industry and construction.

Business income is the second to last source, making up 3.57%. This is due to corruption in the business sector. However, in recent years, the government has taken active anti-corruption measures that are leading to a better business environment.

0.89% of incomes come from Livestock. Despite the fact that income from keeping animals is very low, it is compensated by the benefits the villagers receive from this source in the form of fresh animal products that are used, mainly, for their own consumption.

**Frequency and value of forest products**

The cornelian cheery is the most frequently collected forest product. It is used for making jam, is stewed into syrup, marinated, mashed with sugar and taken as a cold remedy. Second are various berries that are eaten raw, used for making jams, and are stewed into syrup. A high percentage of forest fruits and berries are collected because it is customary to send a portion of the collected and processed products (in the form of jams and fruit and berry syrups) to relatives (mainly children and grandchildren) living in cities.

Villagers also catch fish in forest water bodies.

Nuts and chestnuts are collected, mainly, for sale, because they are expensive products. However, most hazelnuts are grown on agricultural land.

Cattle grazing in the forest may be considered the same as feed collection.

**Fuelwood**

Because of limited access to gas in two of the three studied villages, residents use wood from the forest on a large scale. All forests in Azerbaijan are rated as Group 1 and, thus, the law prohibits any type of felling, except for sanitation and thinning purposes. The amount of firewood harvested by the state is not enough to serve the population, and, thus, to heat their homes, (most of it distributed to schools, kindergartens, hospitals, etc.), so villagers are compelled to either cut trees without authorization or to buy illegally cut wood from third parties. On the average for the winter 8-9 m³ requires for one family.

According to the survey results, firewood accounts for only 4% of the main forest products. In reality, much larger quantities are felled, but since it is illegal, not all respondents were ready to openly acknowledge this fact, fearing fines. Some respondents said that they use tree branches for both heating and cooking in special clay stoves – tendirs – instead of firewood, because the law does not prohibit this.

However, some respondents, mainly from the poor category, spoke openly about illegal felling, and explained that it was due to the lack of money needed for buying alternative sources of heating. The second reason of the low percentage of the use of firewood is that part of the villagers use pressed nutshell as an alternative source of heating, though there is not enough of this resource to satisfy the heating needs of these communities.

In recent years, there has been a noticeable reduction in the incidences of illegal felling, thanks to the provision of gas to villages by the government of Azerbaijan. In one of
the two villages studied, work has begun this summer to install infrastructure to provide a supply of gas.

**Cash and subsistence of forest products**

Although cornelian cherry is the most frequently collected forest product, nuts have the greatest value and chestnuts have the second greatest value. This is because of their high cost as compared with the other products.

**RFI over income quintiles**

The RFI (Relative Forest Income) curve decreases from poorest to richest families. The richer the villagers, the more forest products they collect for sale and subsistence use. Households located near the forest also actively use forest resources both for subsistence (firewood, nuts, chestnuts, etc.) and cash (sale of chestnuts and nuts raw or processed (jam made of walnuts)). Households located far from the forest, pensioners and households whose members work on permanent but low-paid jobs (teachers, doctors, etc.) use forests to a lesser degree. This category of the population does not have enough free time to collect products from the forest.

**RFI over asset groups**

All households were divided into three categories by the standard of living: poor, middle and rich. The following criteria were used: all households, whose value of assets was below 1,000 AZN were ranked as “poor”; those whose value of assets was above 1,000 AZN, but less than 5,000 AZN were ranked as “middle”. Households, whose value of assets was above 5,000 AZN, were ranked as “rich”.

The curve across the three groups of people ranked by wealth, decreases from poorest to richest, meaning the poorest people are the most dependent on the forest products.

**Most Important Products**

During the focus group discussion, the most important products for each village were determined as follows:

**Danachi:**
1) Hazelnut, harvest season – August-October. Hazelnuts grow in the forest as well as on agricultural land. Over the past several years, this product has increased because local residents began planting more hazelnut trees. According to villagers, the most important reasons for the increase of income from hazelnuts are the following: better access to equipment/processing technology, better access to loans/capital and equipment/technology and investment into tree planting.
2) Potatoes, harvest season - June-October. The amount of this product has not changed in the past 5 years.

**Yukhary Chardaglar:**
1) Chestnuts, harvest season - September, October. A decline in this product has been observed in the past 5 years for the following reasons:

- Tectonic changes. During the past year, earthquakes have become more frequent in this region. As a result of the most recent earthquake, which occurred in June 2014, there
has been a redistribution of watercourses in the forests. Many springs have changed the directions of their streams and, thus, trees stopped receiving required moisture.

- Tree diseases. During the past two years, diseases have affected chestnut trees and their numbers are subsequently declining.
- Climate change. For example, drought or rain reduction. This year, more prolonged periods of dry weather have taken place.

2) Walnuts, harvest season – September, October. There has been no decline in this product in the past 5 years.

3) Firewood. Respondents named illegal felling as the main reason of the decline of this product.

Yukhary Tala:
1) Hazelnut, harvest season – August-October. Hazelnuts grow in the forest as well as on agricultural land. During the past several years this product has increased because local residents began planting more hazelnut trees. According to villagers, the most important reasons for the increase of income from hazelnuts are the following: better access to equipment/processing technology, better access to loans/capital and equipment/technology and investment in tree planting.
2) Corn, harvest season – May-October. The amount of corn has not changed in the past 5 years.

Conclusions

For centuries, rural communities have been dependent on forests, which has provided them with subsistence. Timber still remains the most important product. Firewood is used for both heating and cooking in tendirs (clay stoves), which are installed in almost every yard in rural communities. During interviews, we noticed that most of the villagers were providing understated estimates of wood collected in the forest, while an analysis of their responses to the question about the amount of annual firewood consumption has revealed that actual consumption was several times higher than the initially indicated figure.

As mentioned above, there has been a trend toward a decrease in illegal logging practices due to the improved gas supply work carried out by the government of Azerbaijan. This will certainly contribute to the forest rehabilitation in the future.

Forests are a source of food and resources for rural communities. Despite an improvement of their wellbeing, local residents still depend on forest resources to supplement their reserves and budgets. To increase awareness about sustainable forest use among the local population, the community should be involved in the process of forest resource management through cooperation with local forestry enterprises.

Forest resources have contributed tremendously to the development of the country’s economy, regions and local forest-dependent communities. An effective use of the economic, ecological and social potential of the forest is a key element of sustainable forest management.

1. Introduction

1.1 Forests and forest use in Azerbaijan
The Republic of Azerbaijan occupies an area of 86,000 sq.km. Forests grow on 1,021 hectares, which is 11.8% of the country’s territory. However, in the 18th-19th centuries,
this figure stood at 30-35%. The country’s forest resources are distributed as follows: 49% - the Greater Caucasus region; 34% - the Lesser Caucasus region; 15% - Talysh Region; and 2% - Aran Region (including Nakhichevan AR). The per capita forest area is 0.12 hectares, which is 4 times less (0.48 hectares) than the average international indicator.

Forests are distributed unevenly on the territory of Azerbaijan. Thus, almost 85% of all forests are located in the mountainous part of the country, while only 15% are in lowland. Wooded areas make up 18% to 40% of the mountainous regions and 0.5% to 2% of lowland regions. It should be noted that 261 thousand hectares of the country’s forest fund are located on an area occupied by Armenia.

Although the amount of forested area of Azerbaijan forests is not large, because of rich soil and climatic conditions, the forest supports a rich species composition. 450 species of trees and shrubs grow in the country’s forests, 70 of which are endemic. Hard-wooded broad-leaf species are the dominant tree species in the state forest fund of the country.

The main species that make up the forest are beech (Fagus orientalis), oak (Quercus iberica) and hornbeam (Carpinus), which comprise 85.5% of the entire forest cover. Apart from these, other trees that grow in Azerbaijan forests include maple, lime, alder, poplar, willow, elm and other broad-leaf species. Conifer (needle-leaved) trees account for 1.7% of all forests in the country. In Azerbaijan, 107 tree species grow naturally, of these 7 are coniferous (needle-leaved).

Rare relic trees and bushes such as black lime, Eldar pine, ironwood, Lyankaran acacia, chestnut-leafed oak, date plum, boxwood, Hirkan fig tree, and Hirkan maple are found in Azerbaijan as well.

In terms of the age structure of the forests, average-age trees prevail, making up 63.3% while young forests comprise 11.2% of the forest cover. Trees that are still growing make up 13.4% and mature and old forests make up 12.1%. The ages of forests in the country is quite diverse: in the mountainous region, the average age is 86 years, while in the lowland it is 40-60 years.

By their importance, the forests of Azerbaijan are ranked Group 1 and carry out water protection, soil protection and climate regulating functions.

The state policy of Azerbaijan is directed toward forest conservation and sustainable forest management, which includes the efficient and rational utilization of land and forest resources.

The priority strategic objectives of the country’s forest sector are reforestation, increase of the forest cover, and forest conservation and protection.

Activities in the forest sector are based on the conservation and protection of forests, and include sanitation cutting, forest sanitation, afforestation, and forest crop tending.

One of the main forest use indicators is felling. As it was mentioned above, the forests of Azerbaijan are included in Group 1 and, thus, the main forest activities involve conservation, protection and reforestation.

The country’s forest fund, water resources and other natural resources are owned by the state and have been transferred for permanent use to forestry enterprises according to intended purposes – for the development of the forest sector.

Forests and areas of the state Forest Fund cannot be privatized. Business related to the rules of use from the lands of the State Forest Fund is being carried out according to the forest legislation of Azerbaijan.

In the forest sector, land use is appropriated through a lease system, which is regulated by the Republic of Azerbaijan Forest Code passed in 1998. Leases on forestland use are based on official agreements and are valid for 1 (short-term use) to 10 years (long-
term use), provided that wood species be planted on 20% of the leased land. Leased forest areas are used for recreation and tourism. Areas that are not covered by the forest can be leased on the basis of the agreement between the respective executive authority (Industrial Union Azerforest) for short and long periods.

Since the country’s forests have a high tourism potential, most of the lease agreements are for recreational activities. They bring income both to the lessees and forestry enterprises. The practice of legal utilization of forest products includes the harvest of small forest products. An important aspect of forestry activities is forest improvement to control gullies, protect land from erosion and dry out wetlands.

Reforestation activities are carried out annually on an area of around 10,000 hectares with the goal of expanding forests. To mark the Year of the Environment that was announced in Azerbaijan in 2010, large-scale greening activities were carried out throughout the country.

1.2 Rationale

Data obtained over the course of the survey may in the future serve as an important foundation for implementing projects aimed at increasing awareness about sustainable forest, youth environmental education, etc. among rural residents
2. Methodology

2.1 Study area

Following a set of meetings with the National Coordinator and representatives of the Forestry Department of the Azerbaijan Ministry of Ecology and Natural Resources, Zagatala district, two thirds of which is occupied by forests, was selected for the survey as a pilot area.

Zagatala district is situated in the northwest of Azerbaijan on the southern slope of the Greater Caucasus Mountains at a distance of 445 kilometers from Baku, the country’s capital. The area of the district is 1.35 thousand sq.km and consists of two types of landscape: mountain and lowland. Zagatala Reserve, located in this district, has over 800 plant species, 32 mammal species, and nearly 90 species of migratory and non-migratory birds. Many rivers flow across Zagatala district, such as, Alazan, Talachai, Katakhchai, Mukhakhchay, Bakmazchay and Tsilbanchay among others.

District area – 1,348 sq.km
Population – 117.9 thousand (as of January 1, 2009)
Women – 52%, men – 48 %
Age groups: children (8%); under 18 years old (38%); 18-60 years old (42%); pensioners (10%).
According to the Azerbaijan State Committee for Statistics, in 2009 the national ethnic composition of this district was the following:

- Azerbaijanis - 80,476 (59.5 %)
- Avarians — 25,578 (21.63 %)
- Tsakhurians — 11,203 (9.48 %)
- Georgians — 2.87 %
- Turks — 303 (0.26 %)
- Russians — 233 (0.20 %)
- Georgians — 59 (0.05 %)
- Lezgins — 50 (0.04 %)
- Tatars — 11 (0.01 %)
- Other — 315 (0.27 %)

Key branches of agricultural are grain, tobacco, fruit, vegetable and nut growing and livestock breeding.

The main agricultural crops are wheat, corn, hazelnut, walnut, chestnut, tobacco, sunflower, fruit, berries, vegetables and melon crops.

In the city, there are several nut-processing factories, a cannery, a butter and cheese factory, an essential oil factory, an asphalt plant and furniture and tea factories.

### 2.2 Method of sampling

During the selection of communities, the following characteristics were taken into account:

- Infrastructure and distance to market
- Village location (mountain or lowland)
- Standard of living

Following a meeting and consultations with the chief forester of Zagatala district, 3 villages were selected for the study:

- Danachi, situated in the Alazani Valley, on the wooded foothills of the southern slopes of the Greater Caucasus Mountain Range, 25 km southwest of the district capital.
- Yukhary Chardaglar, situated in the mountainous part of the district, 15 km from the district capital.
- Yukhary Tala, situated in close proximity to the city of Zagatala on the one side and bordering on a forest on the other side.

During meetings with local officials from the municipalities of the selected villages, data was collected about these communities, the forest fund, social institutions, key agricultural activities, etc. In each village, activities were selected and focus groups were formed. Following focus-group meetings, questionnaires for each village were completed.

Following a recommendation of the national coordinator Azer Garayev, in order to better educate youth about forest functionality and sustainable management of forest resources, participants in the School of Young Foresters organized in Azerbaijan in 2011 under the educational component of the FLEG Program and were involved in the process of interviewing households. Trainings were conducted for these volunteers and the study began with their involvement.

### 2.3 Number of households

A total of 150 households were interviewed from mid-May to late July (50 households in each village)

- Danachi village – 16
- Yukhary Chardaglar - 38
- Yukhary Tala - 39
2.4 Timeline
The survey was conducted from mid-May to late July.
Danachi: 12.05.2014 – 01.06.2014
Yukhary Chardaglar: 02.06.2014 – 27.06.2014

2.5 Field implementation and problems
Survey methodology
Each village was divided into several sectors, with several households interviewed in each sector. In the case of an absence of household members or a refusal to take part in the survey, we used the random sampling method. We interviewed the most informed member of each household.

It should be noted that the degrees of credibility of the information obtained differed. Thus, the credibility of information provided by poor households is estimated at 80%, while that from rich households may be estimated at not more than 60%. This is explained by the fact that the rich were afraid to speak about their incomes and would sometimes ask whether the surveyors were from the tax authority.

Problems, encountered during the survey
- Lack of interest on the part of villagers to participate in the study. Villagers displayed different degrees of interest in the interviews. Quite often, they agreed halfheartedly. One of the reasons for this lack of enthusiasm was because they were busy with the harvest season. To motivate participants to respond, we handed out sweets as gifts, which is a local tradition.
- Respondents were not ready to openly answer certain questions. They reluctantly answered some questions, specifically related to household assets and income. Even after the importance of these questions had been explained to them, they reacted with indignation. Thus, we began leaving these questions for the end. People also tried to avoid forest use questions because they do not know their rights and are afraid of fines.
- Difficulty to receive substantive responses. Due to the low education level of the villagers, many of their answers were superfluous and only after additional explanations were given, were they able to provide more detailed information.

2.6 Local unit conversion
All financial indicators and data analysis have been made in the national currency (Azerbaijanian manat).
3. Study area characteristics

3.1 Brief history of village

Danachi - situated in the Alazani Valley on the woody foothills of the southern slopes of the Greater Caucasus Mountain Range and to the southwest of the district capital, the city of Zagatala.
Coordinates: 41°32’56” n.l. 46°24’55” e.l.
Distance to district capital – 25 km
Village area – 5,225 hectares
Population - 7,200; 1,660 houses.
Ethnic composition - Avarians
Land per capita – 0.25 hectares
Social institutions: 4 schools, 1 kindergarten and 1 outpatient clinic.
Key agricultural branches: nut production, livestock breeding, tobacco production, fishing, grain production (corn), vegetable production and melon crop production.

Yukhary Chardaglar – situated in the mountainous part of the district and to the northeast of the district capital, the city of Zagatala.
Coordinates: 41°35’20” n.l. 46°44’50” w.l.
Distance to district capital – 15 km
Village area – 1,370 hectares
Per capita land – 0.25 hectares
Population – 2,350
National composition - Avarians
Social institutions: 1 school, 1 kindergarten, 1 outpatient clinic, 1 community center, 1 library, 1 post office, 1 ATS and 1 vet service.
Key agricultural branches: livestock breeding, nut and chestnut production.

Yukhary Tala – situated near Zagatala on one side and bordering on a forest on the other side.
Coordinates: 41°36’30” n.l. 46°39’20” e.l.
Distance to district capital - 2 km
Area – 3,155 hectares
Per capita land – 0.25 hectares (former collective farm land) and 0. 39 hectares (former state farm land)
Population: 7,393
National composition: Azerbaijanis
Social institutions; 4 schools, 2 kindergartens, 1 outpatient clinic, 11 cultural facilities and 2 post offices.
Key agricultural branches: livestock breeding, nut production (hazelnuts), grain production (corn) and vegetable and fruit production.

3.2 Demographics

The female-to-male ratio in all the three villages is approximately the same, with a 1.5-2% discrepancy.

Over the past ten years, an outflow of the young able-bodied male population has been observed, especially from villages located far from the district capital, to large cities of Azerbaijan and to the “near abroad” (Russia, Ukraine).
3.3 Infrastructure availability

The villages have differently developed infrastructures. There is electricity in all three, but only in one there is pipeline water and gas supply.

Yukhary Tala has a better-developed infrastructure as compared with the other two villages. It has electricity and a water pipeline system. 5 years ago, a gas-supply system was installed and the roads function year-round.

The infrastructure in Danachi is less developed: there is electricity, but there are problems with water and gas. The process of installing a gas pipeline in the village has only begun this summer. The villagers use water from artesian wells in the absence of a water pipeline system. Only last year, year-round use of the road leading to the district capital became possible after renovations and asphalt pavement of the roads.

In Yukhary Chardaglar, there are also problems with water and gas. There is no gas supply in the village and the villagers use firewood and pressed nutshells to heat their homes. The situation with water is no better. According to an official from the municipality, before the earthquake of June 2014, the community used spring water that ran from the mountains through a pipeline built by the villagers. After the earthquake, the water stopped coming through the pipeline and the village was left without a source of drinking water. They are now compelled to buy drinking water delivered to the villages by tank trucks. The road connecting the village and the main road leading to the district capital is unfit for motor traffic in the winter. During rain and snow, only crossover vehicles can withstand these conditions.

3.4 Economic data

Official data of Azerbaijan states that percent unemployment is 5% and the poverty level is 5.3%. But these data are inaccurate; the figures are higher in actuality.

The selected villages differ considerably by their levels of wellbeing, which become lower in relation to the distance from the district capital (i.e. the farther the village from the district capital, the lower the standard of living). This is because most of the jobs are concentrated in the district capital, where there are many stores, hotels, medical centers, educational institutions, bank branches, credit organizations, etc. Thus, residents of Yukhary Tala, which is located at a distance of 2 km from the district capital, are able to travel to the city every day for work, which is impossible for those living in Danachi (25 km from the district capital) or Yukhary Chardaglar (15 km from the district capital) since the roads from these centers cannot be used in winter. Yukhary Tala has the highest standard of living, followed by Danachi and the lowest standard of living is in Yukhary Chardaglar.

3.5 Major economic activities

Agriculture is developed in all three villages in the following sectors: livestock breeding, vegetable, fruit and nut production, melon crops and grain (corn) production.

Since one of the main agricultural branches in this region is nut production, there is a large number of nut procurement centres in the district, as well as several large nut processing factories and small shops. These facilities put out cleaned and processed nuts and the pressed nutshells are used for heating. Nut oil is also produced from the nuts.
### 3.6 Seasonal calendar

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| **Fruit** |     |     |     |     |     |     |     |     |     |     |     |     |
| Apples    |     |     |     |     |     |     |     |     |     |     |     | x   |
| Pears     |     |     |     |     |     |     |     |     |     |     |     | x   |
| Grapes    |     |     |     |     |     |     |     |     |     |     |     | x   |
| Apricots  |     |     |     |     |     |     |     |     |     |     |     | x   |
| Peaches   |     |     |     |     |     |     |     |     |     |     |     | x   |
| Mulberries |     |     |     |     |     |     |     |     |     |     |     | x   |
| Blackberries |     |     |     |     |     |     |     |     |     |     |     | x   |
| Cherries  |     |     |     |     |     |     |     |     |     |     |     | x   |
| Raspberries |     |     |     |     |     |     |     |     |     |     |     | x   |
| Strawberries |     |     |     |     |     |     |     |     |     |     |     | x   |
3.7 **Major markets and market access**

All markets for consumer goods, agricultural products, non-timber forest products, etc. are located in the district capital. The distance from Yukhary Tala to all markets is 2 km, from Danachi – 25 km and from Yukhary Chardaglar – 15 km.

3.8 **Major land cover and land uses**

The Zagatala district is located on the southern slope of the Greater Caucasus Mountains and includes mountainous and lowland regions. Two-thirds of the district is covered with forests. The area of the district is 1,348 sq.km, of which fertile land makes up 734.80 sq.km and barren land makes up 600 sq.km.

3.9 **Description of conservation areas**

Zagatala Reserve, located in this district on the southern slopes of the Greater Caucasus Mountain Range, was founded in 1929. Of the total 25,200 hectares, forest stands occupy 15,772 hectares and meadows cover 5,830 hectares. Water areas cover 48 hectares. The area is mountainous with high relief. Altitude differences on this protected area are around 3 km and range from 630 m to 3,368 m above sea level.

Over 800 plant species grow in the reserve. Rare plants include common yew and Caucasian rhododendron. Three zones represent the flora of Zagatala Reserve: forests, subalpine open woodland and the alpine and subalpine meadow zone. In the forests, the most common trees are Georgian oak, hornbeam, oriental beech and Caucasian oak. In the subalpine belt (1,850-2,300 m above sea level), there is a vast diversity of grasses. The alpine belt (2,400-3,200 m above sea level) is represented by picturesque alpine meadows.

The diversity of the animal species in the reserve is extremely rich and includes, the East Caucasian tur, Mideastern red deer, chamois, roe, wild boar, bear, badger, fox, marten, lynx and jerboa, among others. As many as 86 bird species inhabit the reserve, including rare species, such as Caucasian snowcock, Caucasian grouse, griffon vulture, booted eagle, chukar, quail, northern goshawk, bearded vulture, sparrow hawk, eagle owl and black vulture.

The following is prohibited in the reserve:

- Wood harvesting, harvesting of secondary forest resources, additional use of the forest and use of the forest for hunting purposes;
- Use of the forest’s biodiversity, pastures and meadows for commercial purposes;
- Hunting and fishing (and the use of the animals that cannot be hunted or fished) for commercial purposes;
- Entrance into the reserve without special permission.
3.10 Tenure and governance
The Azerbaijan Ministry of Ecology and Natural Resources, which was founded on May 23, 2001, is responsible for regulating activities related to the environment, conservation and the use of the country’s natural resources. The relevant local regional departments, forestry enterprises and local self-governing authorities carry out the tasks of the Ministry.

3.11 Government and other development/conservation projects
In addition to the general economic growth in Azerbaijan in recent years, regional development has also been observed. The regions are developing at a rapid pace: infrastructure is being improved, gas supply is being provided to villages and new roads are being built.

3.12 Calamities
During the past several years, there has been an increase in seismic activity in this region. During an earthquake that occurred three years ago, many houses were seriously damaged. Though the government has been taking measures to rectify the consequences, some families are still living in houses unfit to live in.
4. Results and discussion

4.1 Income share by source

Figure 1 below shows the income shares by source in the communities Danachi, Yukhary Tala and Yukhary Chardaglar. 34.40% comes from agriculture. The main crops in this region are hazelnuts, corn, vegetables, fruit (apples, pears, peaches, persimmon, grapes, cherries, apricots, sour cherries and plums) and melon. Although hazelnuts grow in forests, the bulk of the nuts that are used in this region are grown on agricultural land.

“Other income” is the second largest – 26.12%. This source comes from pensions and remittances (in some families, the head of the household leaves to work, in Russia mostly, and sends money home). The high percentage of the “other income” is explained by a considerable increase of pensions in Azerbaijan in recent years as compared to the past).

23.92% of the total income comes from Animal income. Although keeping livestock requires sizeable inputs, most of the interviewed households kept birds, mainly, chickens, and livestock (cows, sheep and goats). Villagers explain that from the safety point of view, products produced on their own are a more reliable source of food. Key livestock products include: meat, cheese, milk, gatig (sour milk), milk, eggs, shor and sour cream. The villagers use these products for both sale and subsistence.

6.17% comes from Forest income. The most important forest products: firewood, nuts, chestnuts, berries, wild fruit, medicinal plants, fish, etc.

4.92% comes from Wage income. The local population is engaged in the following types of economic activities: trade, the service industry, the processing industry and construction.

Business income is the second to last sources, making up 3.57%. This is because of corruption in the business sector. However, in recent years, the government has taken active anti-corruption measures that are leading to a better business environment.

0.89% of the income comes from Livestock. Despite the fact that income from keeping animals is very low, it is compensated by the benefits the villagers receive from this
source in the form of fresh animal products that are used, mainly, for household consumption.

### 4.2 Frequency and value of forest products

The above graph shows that cornelian cheery is the most frequently collected forest product. It is used for making jam, is stewed into syrup, marinated, mashed with sugar and taken as a cold remedy. The second most frequently collected, are various berries that are eaten raw, are used for making jams, and are stewed into syrup. A high percentage of forest fruits and berries are collected because it is customary to send a portion of the collected and processed products (in the form of jams and fruit and berry syrups) to relatives (mainly to children and grandchildren) living in cities.

Villagers also catch fish in forest water bodies.

The general group “nuts” includes walnuts and hazelnuts, because when referring to nut collection some respondents meant these two types of nuts. Chestnuts were not included in this category because they are a very different type of forest product and cannot be categorized as “nuts”. Nuts and chestnuts are collected mainly for sale because they are profitable. However, most of the hazelnuts are grown on agricultural land.

The collection of animal feed is not represented in the graph, although cattle graze in the forest, which may be considered the same as feed collection.

### 4.3 Firewood

Because of the lack of access to gas in two of the three villages studied, residents use wood from the forest on a large scale. All forests in Azerbaijan are rated as Group 1 and, thus, the law prohibits any type of felling, except for sanitation and thinning purposes. The amount of firewood harvested by the state is not enough as most of it is distributed among schools, kindergartens, hospitals, etc., and, thus, villagers are compelled to either cut trees without authorization or buy illegally cut wood from third parties to heat their homes.
During the survey, it was revealed that every family needs 8-9 m³ of timber in wintertime. The diagram shows that firewood accounts for only 4% of the total frequency of forest product collection. In reality, much larger quantities are felled, but because this additional felling is illegal, not all respondents were ready to openly acknowledge this fact, as they feared fines. Some respondents said that they use tree branches for both heating and cooking in special clay stoves – tendirs – instead of firewood, because the law does not prohibit this.

However, some respondents, mainly from the poor category, spoke openly about illegal felling, explaining that it is driven by the lack of money needed for buying alternative sources of fuel. The second reason of the low percentage of the firewood use is that a portion of the villagers use pressed nutshells as an alternative source of heating, however there is not enough of this resource to satisfy the community heating needs.

During recent years, there has been a noticeable reduction in illegal felling, thanks to the provision of gas by the government of Azerbaijan to the villages and the installment of a gas supply has begun in one of the two studied villages this summer.

Although cornelian cherry is the most frequently collected forest product, nuts have the greatest value and chestnuts have the second greatest value and are the most profitable compared to the other products.
4.4 Cash and subsistence of forest products

The graph above shows that of all the forest products, nuts and chetsnuts are sold because they are the most profitable forest products. Forest products of low value are usually collected for household consumption.

4.5 RFI over income quintiles

The graph shows that households included in Quintile one (least wealthy) use timber the least. After analysis of the data it was revealed that Quintile one mainly includes households that are located far from the forest, households with small children and households that are run by the people who have a permanent but low paid jobs (teachers, physicians, service sector employees and others). These factors explain why this category of the population has no time to actively use the forest. The graph shows that the wealthier the villagers, the more forest products they collect for sale and for personal use. The trend
of households in Quintile 4 is a deviation from the general picture. After analyzing this data, it became evident that these are either pensioners or households located at a relatively far distance from the forest. Quintile 5 consists of households located near the forest, which is why they actively use forest resources both for subsistence (firewood, nuts, chestnuts, etc.) and sale (sale of chestnuts and nuts raw or processed (jam made of walnuts).

4.6 RFI over asset groups

All households were divided into three categories based on the standard of living: poor, middle and rich. The following criteria were used: all households, whose value of assets was below 1,000 AZN were ranked as “poor”; those whose value of assets was above 1,000 AZN, but less than 5,000 AZN were ranked as “middle” and households whose value of assets was above 5,000 AZN, were ranked as “rich”. The diagram shows that the lower the level of the population’s wellbeing, the more they depend on forest resources and the more forest resources are collected for the sale.
4.7 Most Important Product

During the focus group discussion, the most important products for each village were determined as follows:

- **Chestnut**
  - Disease of trees
  - Tectonic changes
  - Climatic changes, e.g., drought and less rainfall

- **Hazelnut**
  - Tree planting

During the focus group discussion, the most important products for each village were determined as follows:
Danachi:
1) Hazelnut, harvest season – August-October. Hazelnuts grow in the forest as well as on agricultural land. Over the past several years, this product has increased because local residents began planting more hazelnut trees. According to villagers, the most important reasons for the increase of income from hazelnuts are the following:
   1. Better access to equipment/processing technology
   2. Better access to loans/capital and equipment/technology
   3. Investment into tree planting

2) Potatoes, harvest season - June-October. The amount of this product has not changed in the past 5 years.

Yukhary Chardaglar:
1) Chestnuts, harvest season - September, October. A decline in this product has been observed in the past 5 years for the following reasons:
   1. Tectonic changes. During the past year, earthquakes have become more frequent in this region. As a result of the most recent earthquake, which occurred in June 2014, there has been a redistribution of watercourses in the forests. Many springs have changed the directions of their streams and, thus, trees have stopped receiving required moisture.
   2. Tree diseases. During the past two years, diseases have affected chestnut trees and their numbers are subsequently declining.
   3. Climate change. For example, drought or rain reduction. This year, more prolonged periods of dry weather have taken place.

2) Walnuts, harvest season – September, October. There has been no decline in this product in the past 5 years.
3) Firewood. Respondents named illegal felling as the main reason of the decline of this product.

Yukhary Tala:
1) Hazelnut, harvest season – August-October. Hazelnuts grow in the forest as well as on agricultural land. Over the past several years this product has increased because local residents began planting more hazelnut trees. According to villagers, the most important reasons for the increase of income from hazelnuts are the following:
   1. Better access to equipment/processing technology
   2. Better access to loans/capital and equipment/technology
   3. Investment into tree planting

2) Corn, harvest season – May-October. The amount of corn has not changed in the past 5 years.
Young hazelnut trees. Yukhari Tala. Photo L. Mekhtiyeva.

5. Conclusion

1. Trends in forest resource use

One of the main factors affecting forest dependency is the social-economic wellbeing of the population. The less wealthy stratum of the population depends on the forest the most because they rely on the sale of the forest products as a source of income. The wealthier segment of the population use forest products as an additional source of income, which does not affect their wellbeing. Another important factor affecting dependency is the distance of the households from the forest. The closer the households to the forests, the more forest resources are used.

Forests are a source of food and resources for rural communities. Despite improvements in wellbeing, local residents still have a need for forest resources that supplement their reserves and budgets.

Among the main factors affecting the use of forest resources the most important is access to forest resources, socio-economic status of the population, proximity to the market, the custom of forest use, and the economic factor. Residents of villages located in the direct vicinity to the forest traditionally use forest resources more intensively than those living in the villages located farther from the forest. Despite their proximity to the forest, some households prefer to buy forest products at the nearby market rather than collect them in the forest because of time constraints. Education also affects the degree of forest resource use; people who are less engaged in physical labor use the forest because their occupations demand more of their time. Another factor is age. Older people use less forest resources than middle-aged and young people because they are physical constrained.

2. Livelihoods

A main factor that determines a choice of livelihood strategy is socio-economic status. The rural population with higher education or a vocational education makes a living from their knowledge and skills. Most of the rural population has a secondary school education, therefore, the sale of agricultural and livestock products, bee products, collection and sale of forest products, and other products are a way to earn income. The hazelnut is an important agricultural product in the region. Many villagers are engaged in the cultivation of hazelnuts, because they are very profitable. The area also has nut-refining factories and nut processing plants.

Another means of livelihood of the rural population is tourism. Zagatala region has great prospects in terms of tourism development. Infrastructure for tourism is still underdeveloped, however the villagers can earn a living by renting out their rooms to tourists during the summer. Future development of tourism and the establishment of resort and recreational areas will create new jobs for the rural population.

3. Sustainability

For centuries, rural communities in Azerbaijan have been attached to the forests, which provide subsistence. Timber still remains the most important forest product today. Firewood is used for both heating and cooking in tendirs, which are installed in almost every rural yard. These clay stoves, in which firewood is burned on the bottom, are used for
making bread and to make the national dish Levengi (fish and chicken stuffed with walnuts and dried plums).

During interviews, we noticed that most of the villagers understated their estimates of the amount of wood collected in the forest, while an analysis of their responses to the question about the amount of annual firewood consumption has revealed that actual consumption is several times higher than the initial figure. As previously mentioned, the ongoing state-sponsored gasification has lead to decreases in illegal logging, which will contribute to forest rehabilitation in the future. During our visits to the villages for the survey, we often noticed the livestock of local residents grazing in the forest. Cattle grazing on forestland inflicts irreparable damage to the forest environment. Seedling growth is ruined and the animals eat young trees and the undergrowth of valuable species. Cattle also trample the undergrowth. As a result, natural reforestation ceases, the forest becomes thinner and its area decreases. During the survey, it was found that local residents do not realize the extent to which they are harming the forest by allowing their cattle to graze in the forest. Thus, there is an essential need for public education efforts to disseminate knowledge about sustainable forest use among such communities.

To increase awareness of the local population about sustainable forest use, residents should be involved in the process of forest resource management through cooperation with local forestry enterprises.

Improving the system of forest management and taking effective measures to protect the forests is crucial. The first priority should be to eradicate illegal logging, overgrazing, and minimize the negative impact of tourist activities in the forests.

Forest resources contribute significantly to the development of the state economy, as well as to the development of the regions and local communities that depend on forests.

Effective use of economic, environmental and social potential of the forests is an important factor for ensuring sustainable forest management.

Nut orchard (hazelnut) in Danachi village. Photo L.Mekhtiyeva
Zagatala district. Photo L.Mekhtiyeva

Beehives in the forest. Yukhary Tala village. Photo L.Mekhtiyeva
Interview in the village of Yukhary Chardaglar. Photo made by the local young forester volunteer.
6. References

1) http://www.eco.gov.az/
2) http://www.azerbaijans.az/
3) http://www.new.enpi-fleg.az/

Cover Photo Reference: Leyla Mehtiyeva, Zagatala State Nature Reserve