



FOREST TRANSFORMATION PLAN

AZERBAIJAN

(2012)

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Introduction

Negative impacts of climate change are affecting the people in the South Caucasus, including in Azerbaijan like all over the world and it is expected that consequences of it may be huge in the future.

Some groves arranged through forest planting in the 50-60s of previous century are nowadays partially drained, thinned out and deformed. The reason of such cases is that main and auxiliary species had not been chosen correctly, local forests conditions had not been fully taken into account and preference had been given to introduct species, particularly coniferous trees and mainly monocultures.

All the abovementioned reasons cause gradual drying and thinning out of such groves. Negative impacts of climate change accelerate this process. Therefore, abovementioned artificial forests need to be replaced with more stable, fruitful tracts of forest which are efficient from water and soil protecting point of view and contain local species capable of natural restoration.

Measures provided by this project – replacement of forests established artificially and weakened in 40-50s of previous century, consequently lost resistance to external impacts with new fruitful and stable forest - are new approach in Azerbaijan in relation to forest restoration and transformation issues, as well as in mitigating climate change impacts.

Section I . General part

Chapter 1. Objective and Methodology

1.1 Objectives

Real purpose of the project is to create new forests, more fruitful, stable against impacts of climate changes instead of homogenous monocultural forests which are artificially created, mitigated nowadays and faced degradation. General purpose consists of strengthening and increase of forest ecosystem aiming at developing biodiversity and local population living means against climate change in the South Caucasus, including in Azerbaijan.

However, main purpose includes measures towards mitigation of climate change impacts, strengthening of biodiversity and forest ecosystem having positive impact upon increase of villagers' living means. Such measures contain protection, increase and development of soil, water supply, tree and non-wood forest products.

1.2. Methodology

During implementation of the project forest restoration measures, both previously taken and planned to be taken, by the forest departments of the pilot plot will be carefully studied and the most positive results of such demands will be used as sample.

In the project area after full exploration of local foresting conditions silvicultural activities will be commenced. Selection of tree and bush species, methods of soil preparation, schemes of mixture and restoration of sort contents for foresting issues will be prepared by considering opinions of local specialists.

Key idea intended by the project – process of replacement of monocultural pine forests with tracts of forests, consisting of local species which are durable against climate change – will be realized by stuffing and applying the newest structural and practical technologies in this sphere.

Chapter 2.1. Background information: Ploot #1

2.1.1 Geographic location and status

Pilot plot N 1 involves totally 76.0 ha land and this sections belongs to Aghsu forester of Shamakhi Forest Protection and Restoration. Shamakhi MM and BM are located on the quarter 34 of Aghsu forester according to foresting documents. The mentioned territory wholly belongs to State Forest Fund and is considered as official territory of the Department of Forest Development of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan.

Pilot plot № 1 is located on end of southern slope of the Caucasus Mountains, in Langabiz chain.

Pilot plot dimensions: From North to South – 980 m and from East to West - 840 m. Area of site is located on 500-550m above the sea level.

Pilot plot is located 17 km from Shamakhy town, 3 km away Aghsu town.

Plot is mainly located on southern and partly southeast exposition.

Through the middle part of the plot from north to south there is Baku-Aghsu highway.

2.1.2. Existing Planning Documents (forest structure documents for 10 year)

In Shamakhi MM and BM the last forest structure activities were performed in 2005-2006.

In that forest structure organizational plan of economic measures to be performed until 2016 is specified. In this forest structure only protection measures are intended for the area involving pilot plot № 1. No planting or sowing is planned for this plot in that forest structure.

2.1.3 Realization of silvicultural measures within the previous 5 – 10 years.

In the plot specified in the project there has been carried out foresting in 4 ha land and oak sowing activities within the last 10 years. Forest has been laid in the virgin land, from common ash-tree sort, in 3x2 schemes, by hand method. As a result of poor service measures and nonperformance of irrigation activities, growing level is low. Because, average growing of these sowing carried out in 4 plots is 30-35%. In comparison with foresting, forest sowing is more effective. Total average yield in these forest sowings

prepared with long poled acorns, in 3x2 scheme, in virgin land and through hole method is 65-70 % which can be considered as good indicator for the plot stated. Nowadays, general condition of ash-tree and oak tree grew from the mentioned plant and sowings is better.

Chapter 3. Description of natural environment: Plot #1

3.1.1 Description of existing forest

All the plot of pilot №1 is consisting of artificial pine forest which was developed through foresting between 1970-1975. This forest strip in the project plot is partly or wholly dried and is about to be destroyed. In about 60% of the plot condition of pine forest is moderate and satisfactory. Average stoutness of existing pine forests is 0.5 – 0.6, average height is 8 -10 m, in some plots 12 – 14 m, age class II and umbrella is in connected form. In these forests natural restoration occurs only on thin territories and broad-leaved tree species. Mainly, level of natural restoration in long-poled and ash-trees is too low – approximately 150-200 pcs per ha.

Part of the forest, which are thick and not subjected to natural loss, mainly consist of one layer while in the thinned part consists of 2 layers. Here first layer consists of pine, while second layer consists of young oak and a few ash-trees. Subforest layer mainly consists of paliurus and hawthorn sorts. Forest type of the pilot plot № 1 is oak grain and belongs to the group of dry hygri-top. In such type of forests banking process is fast, therefore natural restoration is not satisfactory. In the plot with thick pine trees and where umbrellas are closely connected, trees left on the surface as a result of wind and snow and forest mattress of several years are observed. In other thin and fully open fields bush banks are observed. Such facts enable us to believe that there is probability of wildfire especially during droughty. Besides, banking makes natural restoration of forest difficult.

3.1.2. Current land use

Pilot are N – 1 is official territory of Shamakhi MMBM and the enterprise is entitled to use the lands.

Along Baku-Aghsu highway passing the plot of project plot of lands in some areas have been leased to some people for recreation purposes. Nowadays the people are offered catering services. Besides, such lands are not permitted to be otherwise.

Despite the enterprise doesn't allow for pasturing within the territories of pilot plot, the people nearby pasture their cattle in that area without permission. According to the latest forest structural documents with respect to quarter enterprise No:34 of the pilot plot (2005 – 2006) the area was listed among the areas which is subject to anthropogenic impacts.

3.1.3 Hydrography and climate

The nearest river to the project plot is Aghsu river which runs from some km distance through ravine.

There is no river, lake or artificial lake running through the project plot. Only at the early spring months there is a river with a little water running through the valley situated in the east part which soon gets dry and is not usable for irrigation purposes. No hydromeliorative activities have been done in the plot.

Climate data

Month	Temperature (Co)			Precipitation , mm	Snow cover, cm	Relative air humidity	Wind		Note
	Multiyear	Absolute					Direction	Speed m/sec	
		Maximum	Mini mum						
January	0.6	16	-16	31	7	75	W	2.0	
February	0.0	17	-14	36	14	74	W	3.0	
March	3.8	25	-12	49	1	72	W	4.0	
April	9.1	30	-5	62	-	67	SW	2.0	
May	15.4	30	1	51	-	59	SW	1.5	
June	19.6	36	5	51	-	49	W	1.0	
July	23.2	36	10	22	-	40	W	2.0	
August	23.2	37	10	19	-	40	W	1.5	
September	17.9	32	2	41	-	52	W	1.5	
October	12.2	26	-4	54	-	70	W	2.0	
November	6.4	24	-10	48	1	73	W	1.5	
December	1.8	19	-15	29	5	75	SW	2.0	
Average annual	11.0	37	-16	493	18	62	W-SW	2.0	

Start and end of vegetation period occur at a time when average daily temperature is +9, 1.

Continuation of annual vegetation period in the plot of project is 210 days. Climate factors having negative impact on trees development include long term dry in the summer, early frost in the spring, late frost in the spring and strong winds.

Generally speaking, such climate is suitable for oak, ash-tree, birch, paliurus, mulberry, pomegranate, apricot. Cherrie, Elaeagnaceae, medlar and Cornel.

3.1.4. Biodiversity

Biodiversity of the territory of pilot plot № 1 is represented by grass, tree and bush species, various sorts of bird, animals and insects which are natural for the zone affected. Such biodiversity mainly involves xerophilous grass, bush and trees. Animal world contains wolf, fox, rabbit, jackal, boar, lizard, snake and so on. There is no information with regard to existence of any plant, animal or bird which are about to be destroyed.

3.1.5. Relief and soil

Project site consists of foothills part for its relief features. In general, the area consists of uneven area located on different slope degrees, south-eastern, southern and south-western expositions. Slope differs from 4 degrees up to 40 degrees in the pilot plot.

The site surrounded by Pilot plot № 1 consists of grey-brown forest soils. Grey-brown forest soils are spread in foothills zone. They are in transitional stage from brown forest soils to dark chestnut soils. For their mechanical composition, they belong to light clayey soils. The amount of the physical clay reaches 68 %, humus composition is 6 %.

These soils are durable against erosion.

3.1.6. Forest diseases and vermins

There was no registered forest diseases infection on a mass scale during the last 20 years in Shamakhi LL and JVC and concretely in the project site. Such diseases were observed only in separate trees or small grove areas, so there was no need for mass combating measures. Although there were several mass forest pests infection cases during these years. These vermins are usually oak-eater long-moustached insect and non-couple silkworm. Besides, during over-rainy spring months there are infection cases of green oak leaf-wrapper worms here and in surrounding forests. In all the vermin infection cases stated here, mass combating measures, as well as spraying with disinfectant by aviation were taken.

3.1.7. Infrastructure

Baku – Agsu highway passes through all along the territory from the north of the pilot plot to its south. This road is very useful and comfortable for traffic and it allows to go almost all points of the plot and the nearest distance.

Forest strips on the side of the highway passing through the area are very useful for the population recreation service.

At the moment these areas are broadly used for recreation.

3.1.8. Local Communities

Communities near the pilot area consist of Agsu City Municipality and Shamakhi Regional Villages Municipalities on the whole. Population of these villages are mainly occupied with cattle-breeding and agriculture. Population of the city of Agsu is mainly occupied with social services, state work and small enterprise.

In order to reduce negative influence of the population living in surrounding villages on project site and surrounding forest following measures must be taken:

- 1) Giving natural snow to surrounding villages,
- 2) Providing population of these villages with alternative work that does not have negative effect or has little negative effect on forests,

- 3) Involve the same population in work of public catering objects in the project site and its surroundings and at the same time on public grounds, to make them partners interested in forest restoration and protection here,
- 4) To use local population as labor force in realization of the project, directly in fencing, forest sowing, cultivation and service jobs,
- 5) To conduct broad enlightening work with ecological problems that this project surrounds as well as in general ecological sphere in surrounding villages.

Chapter 4. Description of environments close to natural forest. Plot #1

4.1. Natural forest vegetation zones

4.1.1. Models of natural forest types

The area where Pilot plot № 1 is situated belongs to medium uplands and down uplands plant zones.

The forests of Shamakhi LLJVC that include Pilot plot № 1 are situated in the bottom of southern slopes of Great Caucasus Mountains. As this forest belt is dry and its climate indicators and soil conditions change vertically from down zone to upwards, its plant cover also changes accordingly.

Atmospheric precipitation, the number of misty days and humidity increase in this zone as the altitude changes. Consequently, important changes happen in species content of the forest. Depending on height above sea level and exposition of the mountain hangs, notwithstanding natural forest cover is different for its content, mainly broad-leaved mountain forests outnumber here.

According to the forest belt regionalization the territory of Shamakhi LLJVC belongs to southern-east of the slopes of Great Caucasus Mountains of Eastern Zagatasia.

Forest areas of the company are divided into different forest types. The territory of the Pilot area № 1 of the project belongs to the grain-covered oak forests type. Such type forest land belongs to dry hydrotop group.

4.1.2. Conformity of tree and bush types in the territories of Pilot plot # 1

Because of hard climate indicators, little amount of rain and its irregular distribution during a year, low fertility indicators of the soil and because the area is mainly located in hard south-sloping south, during forest sowing and sowing here trees and bush species having close features with xerophyte and partly xerophytes plants and which will quickly conform to local circumstances should be preferred.

Concretely for the pilot plot № 1, on the open areas it's expedient to plant forest by 3x3 m and 3x2 m accommodation scheme and taking a main species long-stalked oak 5O5A, 7O2A1B, 6O4E, 6O3E1B, 5O4A1B, 5O5A mixing schemes.

At the same time there should be forest sowing with 10 O, 7 O 2 B 1E species content and by 3x1 m and 3x2 m accommodation scheme with sowing on open and hard sloping

hangs. The same species content should be used in underforest sowing and cultivation. In underforest restoration measures the accommodation scheme is changed according to the density of the trees remained unharmed. In all cases during the sowing and sowing process the species of local oak should be preferred as a main species and simple ash-tree should be preferred as an auxiliary species. Because both the oak and the ash-tree species outnumber with elm during the restoration here and this guarantees successfulness and longevity of the artificial forests planted of them.

In forest restoration measures hawthorn, wild pomegranate, Christ's-thorn, medlar and cornel may be used for the formation of bottom layer.

Unit II Special part

Chapter 5. Planning special transformation steps for 2012-2013 years

5.1. Transformation measures for Plot #1

5.1.1. Distinction of Transformation measures

Forest transformation at pilot plot № 1 shall be carried out by implementing forest planting and forest sowing steps. Therefore, open areas where forest planting, forest sowing intended to be carried out, areas where forest planting and forest sowing intended to be carried out complex, sparse where forest sowing intended to be carried out, as well as areas where natural restoration intended to be carried out should be defined at pilot plot № 1.

Forest planting and forest sowing Project suiting for all kind of area shall be prepared. All forest reconstruction works shall be carried out on this Project. Forest transformation steps at pilot plot № 1 should be carried out in accordance with the below mentioned capacity.

- 1) Forest sowing at open area - 28.0 ha
- 2) forest planting at open area – 15.0 ha
- 3) Under forest sowing – 22.0 ha
- 4) Assistance to natural forest reconstruction - 11.0 ha

All forest reconstruction steps shall be carried out under the supervision of local specialists and participation of communities of surroundings dwelling units on the Agreement.

5.1.2 Selection of tree and bush species for sowing and planting and standard steps at pilot plot #1

Tree types shall be used during forest sowing are different species of long stem oak, oak, common ash-tree, hornbeam and birch trees. At the same time, for the formation of lower layer hawthorn, medlar, cornel tree, jerusalem thorn tree ant etc. shall be used.

All used planting materials must be suitable to forest conditions and shall be taken from the nearest sapling area.

All planting materials shall be corresponding to standards – one or two years-old, completely healthy and without any damages. Types of seeds of above mentioned trees and bushes intended to be used in the area shall be provided from nearest areas or forests corresponding to pilot plot № 1.

All provided seeds shall be undergone laboratory analysis before sowing. All seeds will be sprayed with disinfectant against pests, rodents and diseases. Pre-planting stratification shall be carried out for forest sowing to be qualitative.

5.1.3. Pre-planting land plot preparation and other preparatory works

Pre-planting removal of thorns-and-shrubs and dry waste materials from 50 hectare shall be carried out at pilot plot № 1. All these Works are intended to be carried out hand tools. Differenebt techniques are not intended to be used in preparation of land layer and forest planting. Firstly, thorns-and-shrubs will be cleaned by scythe, axe and other hand tools and gathered by harrow and pitchfork. Under forest dry waste materials, broken trees and etc. will be gathered by hand. Gathered thorns-and-shrubs, trees will be removed from the area by technique and it will provide completely cleaning of the area and avoid forest fires. Cleaning process shall be finished until September 1, 2012.

After the cleaning works preparation process for forest planting and planting will be carried out.

Relief of pilot plot is uneven. Plot preparation for tree planting shall be carried out in accordance with the Schedule mentioned in the Annex -----

Roots of each of the saplings are soaked in manure wash prepared beforehand. Manure is added to the soil of each hole in the amount of ¼. Planted saplings are watered in the following way: 20 l (2 bucket) for one hole.

After irrigation manure and soil mixture is added to the bottom saplings (2-30 sm density). Taking into the consideration that vegetation at plot plot zone begins earlier – in autumn, realization of all planting and planting in spring is expedient. The most optimal time for tree planting in this area is October-November. Trees planted in autumn months have a time for adaptation to soil. In spring planted saplings enter to joining phase and growing process in first vegetation happens.

Until the beginning of summer plants achieve completely stabile root system and stand durable against droughty. Therefore, all works intended will be carried out manually.

5.1.4. Lower layer planting (pine trees planting)

Lower layer planting or under forest planting will be carried out at 25 hectare of plot area. In these areas oak trees and ash-tree saplings will be used. Planting of approximately 700-800 saplings is intended in these areas, because adoption of concrete under forest

planting plan is impossible. Under forest planting will be carried out in under pine forests, especially pine terraces, patches, if necessary in sparse areas between those patches.

Under forest planting preparation will be carried out by digging 0.40x, 0.40 x x 0.40 m holes. Saplings intended to be planted are soaked in manure wash prepared beforehand. Before planting 4/1 portion soil taken out of the holes are mixed with manure. After planting each of saplings are watered in the following way: 20 l (2 bucket) for one hole. Rotten manure and dry soil mixture shall be added bottom of planted saplings after irrigation process (2-5 sm density). It will avoid formation of cracks on irrigated soil and water percolation.

5.1.5. Open area planting

Forests planting in open spaces will be carried out at spaces made free from thorns-and-shrubs. In these spaces exists pine trees planted long ago. But new plants will be planted in terraces and empty spaces between terraces. In general, in open spaces planting will be carried out on 3 x 2 m and 3 x 3 m placement schedule in 0.40 x 0.40 x 0.40 m holes dug by hand. Open space planting is cover 25 hectare space. If necessary, small terraces will be made by hand tools. Depending on inclination, terraces width should be differ between 0.70 m - 1.0 m. Soil erosion risk shall be taken into the consideration, any activity resulted with weathering or erosion must be avoided.

5.1.6 Sowing

Sowing process will be cover 15.0 hectare space. These spaces will be included firm sloping hill-sides and areas not enough convenient for planting. Sowing process will be carried out in spaces intending natural reconstruction. Sowing process will be carried out in holes by using oak, birch and ash-tree seeds. Square sowing is impossible because of sloping and erosion. Not depending on types of seeds, sowing process will be carried out using 3x3 m and 3x2 m placing schedules.

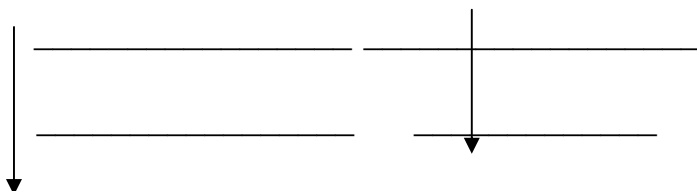
5.1.7. Chopping branches and thinning out

One of steps should be carried out in thick pine woods in the pilot space № 1 are chopping down branches and thinning out. Thus, 4-5m trunk of trees is covered with dry branches. Such dry branches form risk of forest fires, thanks to broken, ill trees, falling leaves and dry waste materials. Therefore, such broken, ill trees, falling leaves and dry waste materials should be removed from the wood territory.

5.1.8 Fencing

Fencing of the space will be carried out along the whole territory of pilot space № 1. Fencing process will be carried out by means of iron pipes and thorny wire. Each of iron pipes will be planted with the distance of 2.0 m with the height of 2.0 m. Each of pipes will be dug into 0.40 m holes with concrete mixtures as posts. Depending on inclination

thorny wire will be laid from 5 rows up to 8 rows. Thus, thorny wire in areas with less inclination and undergoing animal pressure will be laid 7-8 rows, but in areas undergoing animal pressure less than the first one thorny wire will be laid 5-6 rows. Two pieces of 25 sm armature are welded to iron pipes in the bottom part to provide their durability into the concrete solution. To temper thorny wire on the iron pipe thick, a plate (8-10 sm length) is welded on them.



5.1.9 Implementation of natural reconstruction assistance steps

Implementation of natural reconstruction assistance steps will be covered 8.0 hectare of pilot space №1. Intended space will be made free from thorns-and-shrubs, dry trees, waste materials, upper layer of soil will be cleaned from dry grass causing and soil will be loosen in 8-10 sm depth. Taking into the consideration relief, this process may be carried out in parts, in small or big squares. Tree seeds planting to loosen areas and smoothing of the land by rake is necessary. As there are no trees yielding fruit and suiting for natural reconstruction assistance surrounding, seeds will be brought for planting. In natural reconstruction assistance surrounding process oak tree, common ash-tree, Jerusalem thorn, wild birch tree, white acacia, Gleditsia triacanthus and other tree seeds will be used.

5.1.10 Irrigation measures

All planted saplings should be immediately irrigated. After planting until the end of bonding of limb of tree Irrigation of these trees from May up to September is necessary. Although there is no natural irrigation mean in the surroundings, water intended for trees irrigation will be transported by water trucks. Intensity of irrigation will be defined out in accordance of air conditions and general condition of saplings. Additional roads will be laid for convenience of irrigation process and easy movement of water trucks to planting areas,.

5.1.11 Other measures

Small garden areas will be laid in pilot plot located near the catering establishments for the purpose to attract local communities and holders of those catering establishment acting nearby the Site to the project implementation. These gardens will be covered with the fruit trees easily adapting to new catering establishments. Pomegranate trees, apricot trees, mulberry trees, cherry trees, medlar trees and sea-buckthorn trees will be planted there.

Labor and support of these communities and catering establishment employees in the surroundings will be widely used for garden laying.

5.3. Quantification and price calculation for transformation steps

5.3.1. Calculation of sowing materials required for forest planting in Plot No.1

Table 1.3.

Type of planting	Area (ha)	Mixing schemes	Placement schemes	Quantity of planting stock (trees)				Total
				Oak	Ash tree	Birch	Elm tree	
Under forest planting	11.0	6O2A2E	1000/ ha	6600	2200	-	2200	11000
	11.0	6O1A2E 1B	1000/ ha	5500	2200	1100	2200	11000
Open area planting	14.0	6O3A1B	3x2	13860	6930	2310	-	23100
	14.0	6O1A3E	3x2	13860	2310	-	6930	23100
Total		-	-	39820	13640	3410	11330	68200

5.3.2. Planting stock required for gardening at the Plot #1.

Table 1.4.

Tree species	Planting scheme	Area	Quantity	Note
Cherry	4x4	0.40	250	
Apricot	4x4	0.40	250	
Pomegranate	3x3	0.40	440	
Cornel	3x4	0.40	330	
Medlar	3x3	0.40	440	
Total		2.00	1710	

5.3.3. Seeding stock required for forest sowing at the Plot #1

Table 1. 5.

Mixing	Placement	Area	Quantity of seeding stock by species (kg)
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schemes for forest sowing	scheme		Oak	Ash tree	Birch	Total
7 O 2A 1B	2x1	5.0	260.0	1.00	1.50	-
6O 4A	3x1	5.0	150.0	1.50	-	-
10 O	2x1	5.0	375.0	-		
Total		15.0	785.0	2.50	1.50	789.0

5.3.4. Materials required for fencing of the Plot

(Total length of a fence is 3501km)

- 1 Total length of used pipe is 4200m
2. Number of pipe supports is 1750 pc.
3. Barbed wire-21000m
4. Welded armoring for each support (total) 875m
5. Welded rolled wire for each support (total -1050m
6. Concrete solution for digging of support total -6.3m³ (for each support 3.6 litres)
7. Barbed wire for binding to supports -80 kg

5.3.6. Evaluation of materials and technical facilities required for fencing of Pilot plot #1

Table 1.1.

Name of material	Unit of measure	Quantity	Cost per unit	Amount
Iron tube	m	4200.00	4.00	16800.00
Armature	m	875.00	1.50	1312.50
Katinka	m	1050.00	0.30	315.00
Barbed wire	m	21000.00	0.15	3150.00
Concrete	m ³	6.30	100.00	630.00
Simple wire	kg	80.00	1.50	120.00
Electrode box		5	50.00	250.00
Total	-	-	-	22577.50

Calculation cost of works to be performed for fencing of Pilot area #1

Table 1.2.

#	Name of work	Unit of measure	Scope of work	Daywork	Man/day required	Price for one man/day	Salary (manat)
1	2	3	4	5	6	7	8
1.	Digging of holes	unit	1750	50.0	35.00	15.00	525.00
2.	Welding	unit	1750	40	43.75	20.00	875.00
3.	Concrete casting of posts	unit	1750	50	35.00	15.00	525.00
4.	Barbed wire installation	m	21000	80	262.50	15.00	3937.50
5.	Transportation expenses	-	-	-	-	-	1000.00
	Total:						6862.50

5.3.4. Evaluation of saplings and seeds required for Pilot plot #1

Table 1.6.

Name of planting stock	Unit of measure	Quantity	Price per unit (manat)	Amount (manat)
Oak seed	Kg	785.0	0.40	314.00
Ash tree seed	Kg	2.50	25.0	62.50
Birch seed	Kg	1.50	20.0	30.0
Oak saplings	unit	39820	0.40	19910.00
Ash tree saplings	unit	13640	0.30	6820.00
Birch saplings	unit	3410	0.30	1705.00
Elm tree saplings	unit	11330	0.30	3399.00
Cherry tree saplings	unit	250	1.0	250.00
Apricot saplings	unit	250	1.0	250.00
Pomegranate saplings	unit	440	0.50	220.00

Cornel saplings	unit	330	2.0	660.00
Medlar	unit	440	1.0	440.00
Total		-	-	34060.00

5.3.7. Calculation of cost of transformation measures to be performed in Pilot plot No.1

Table 1.7.

№	Name of works performed	Unit of measure	Scope of work	Day-work	Man/day required	Price per unit	Salary (manat)
1	2	3	4	5	6	7	8
1.	Cleaning from shrubs						
1.1	Cleaning of plots from shrubs and their removing away	Ha	50	0.24	208.33	15.00	3124.95
2.	Forest planting						
2.1	Digging of holes with size 0.40 x 0.40 x 0.40 m for forest planting	unit	69910	200	349.55	15.00	5243.25
2.2	Carrying of planting stock to a distance of up to 100 m and bringing them to a planting place	unit	69910	1200	58.26	15.00	873.90
2.3	Sorting of saplings before planting, cutting of roots and sticks, soaking in manure water	unit	69910	4000	17.48	15.00	262.20
2.4	Manure carrying and putting to holes after mixing it with soil	unit	69910	680	102.81	15.00	1542.15
2.5	Planting of planting stocks to prepared holes	unit	69910	530	131.91	15.00	1978.65
2.6	Watering of planted saplings	unit	69910	1250	55.93	15.00	838.95

2.7	Putting of dry manure mixture under saplings after wayering	unit	69910	800	87.39	15.00	1310.85
3.	Forest sowing						
3.1	Digging of holes with size 0.20 x 0.10 x 0.20 m for forest sowing	unit	66500	600	110.83	15.00	1662.45
3.2	Proceeding of seeds with medicine before sowing	kg	788.00	82	9.61	15.00	144.15
3.3	Planting of seeds to prepared holes	unit	6650.00	1000	66.50	15.00	997.50
4.	Purchase of manure	ton	25.00			20.00	500.00
5.	Transportation expenses						1000.00
	Total						19479.00
6.	Other expenses (additional 6 %)						1168.74
	Total amount						20647.74

With aim to increase works on forest planting, works on softening of bottom of plants and sows during 2014-2018 by 15 times, irrigation works by 30 times, cutting of grass and bushes –by 5 times, conducting of inventory works in total by 5 times, forest pathological survey in total by 5 times, thus number of required working hours have been increased correspondingly-gr.6

For forest planting, sowing, service, watering and other works, working standards of acting in the Azerbaijan Republic “Standards of executed manual works in forestry” dated 1995, Baku were taken, as a basis.

Picture 1

Digging of wells in terraces and sowing

Picture 2

Digging of wells and sowing at slopes without terraces.

During digging of wells extracted soil is to be collected along the slopes, in lower part of wells. After sowing, conditions for collection of water in well and preservation for longer period are created.

5.3.8. Working time schedule for undertaking of transformation measures at pilot plot No.1

Table 1.8.

1. Preparation works			
1.1 Purchase of materials and equipment			
1.2. Cleaning of area from shrubs			
2. Fencing			
2.1. Fencing of an plot			
3. Land preparation			
3.1 Repair of terraces and making additional terraces for forest planting			
3.2 Digging of holes for tree planting			
3.3 Digging of holes for seed sowing			
3.4 Carrying of manure to the plot			
3.5 Carrying of planting stock to the plot and temporary planting			
4. Planting and sowing			
4.1. Planting of trees			
4.2. Treating of seeds with medicine			
4.3.Sowing of seeds to the holes			
5. Watering			
5.1. Watering of planted and sowed areas			

Chapter 6.

Planning of post-transformation measures during 2012-2013 and 2014-2018.

6.1. After-transformation measures for plot No.1

6.1.1 After-transformation measures during 2012-2013

Prevailingly at after-transformation measures, monitoring, watering and service work will be carried out in the area of the plot No.1. All measures will be undertaken under management and organizational activities of employees of Shamakhy Forest Protection and Rehabilitation Protection and Rehabilitation Enterprise.

The main inventory on all forest rehabilitation measures will be undertaken during autumn 2013, as a result of this inventory, the average growing percentage both in forest planting and forest sowing will be defined. The same year replacement, replenishment and repair works of not grown plants and seeds by new ones will be executed. Forest planting and sowing replenishment and repair works will be completed by the end of 2013.

6.1.2. Planning of after-transformation measures during 2014-2018

Service and irrigation works will be continuing in forest sowing parts of pilot plot during 2014-2018. During these years service work (cleaning bottom part of trees, irrigation, cleaning from weeds, manure spreading, cutting of grass and bushes between lines etc.) For these years the following works will be executed:

5 times in 2014
4 times in 2015
3 times in 2016
Twice in 2017
Once in 2018

The inoculation of forest sowing is planned during the autumn of 2018.

With purpose of protection of forest from cattle, disease, pests and rodents constant monitoring will be continuing in the territory. All these measures will be undertaken under management, participation and organizational activities of employees of Shamakhy Forest Protection and Rehabilitation Protection and Rehabilitation Enterprise.

6.3. Quantification of required works and materials and calculation of prices for plot No.1

6.3.1 Quantification of post-transformation measures and calculation of prices. (for 2012 – 2013)

Table 1.9.

#	Names of works will be performed	Unit of measure	Scope of work	Daywork	Man/day required	Price for one man/day	Salary (manat)
1.	Service and watering						
1.1	To serve forest plantations with hand tools (5 times)	unit	69910	580	120.53	15.00	9039.75
1.2	Watering of forest plantations and sown areas (5 times)	ha	65.0	1.04	62.50x(5)	15.00	4687.50

2.1	Conducting of inventory works	Ha	76.0	-	10.0	15.00	150.00
3.1	Performing of filling and repair works 10%	unit	69910	210	33.29	15.00	4993.50
3.2	Forest sowing of additional 30 %	unit	1300	1000	13.30	15.00	199.50
4.1	Required planting stock	unit	6990			0.30	2097.00
4.2	Required seeding stock	Kg	300	-		0.40	120.00
5.1	Forest pathological examination (3 times)	Ha	76	15	5.07x(3)	15.00	228.15
T o t a l							21515.40

6.3.2 Calculation of expenses for undertaken after transformation measures at plot No.1 (for 2014 – 2018)

Table 1.10.

#	Names of Works	Unit of measure	Scope of work	Day-work	Man/day required	Price for one man/day	Salary (manat)
1	2	3	4	5	6	7	8
1	To serve forest plantations with hand tools .	unit	136410	780	174.88x(15)	15.00	39348.00
2	Watering of forest plantations	ha	65.0	1.04	62.50x(30)	15.00	28125.00
3	Grass and shrubs mowing at forest plantations and sown areas	ha	50.0	0.30	166.67x(5)	15.00	12500.25
4	Conducting of inventory works (annually)	ha	76.0	-	10 x (5)	15.00	750.00
5.	Forest pathological control	ha	76.0	15	5.07 x (15)	15.00	1140.75
	Total:						81864.00

As it was envisaged to increase service works on forest planting, works on softening of bottom of plants and sows during 2014-2018 increased by 15 times, irrigation works by 30 times, cutting of grass and bushes–by 5 times, conducting of inventory works in total

by 5 times, forest pathological survey in total by 5 times, the number of required working hours has been increased correspondingly-gr.6.

For forest planting, sowing, service, watering and other works, working standards of acting in the Azerbaijan Republic “Standards of executed manual works in forestry” dated 1995, Baku were used, as a basis.

**YEVLAKE F.P.R.E.
(Forest Protection and Rehabilitation Enterprise)**

Background information (area)

2.2.1. Geographical position and status

Pilot plot No. 2 covers the area in total -0.75 ha and this plot belongs completely to Yevlakh Forest Protection and Rehabilitation Enterprise, named Chirdikhan forestry.

Pilot plot is located in administrative area of Yevlakh region.

According to forest planting of division to regions the center of area of Yevlakh FPRE and Eastern Caucasus circle refer to desert and semi-desert belt. The average height above sea level is 400 m. Forest soils of the enterprise is located Kura-Araz plain covering wide area between Greater and Small Caucasus.

Dimensions of the area from North to South is 650 m , from East to West is 2000 m. The Baku – Ganja road highway crossing the center of Pilot plot from East to West divides this area into two equal parts.

The area is located at 2 km distance from city Yevlakh.

**2.2.2 Existing planning documents
(10-year forestry structuring documents)**

The last forest structuring works in Yevlakh FP and RE were conducted in 2007– 2008. The Plan on organization of economic measures at that forest structuring till 2017 has been composed. Only protection measures are envisaged at that forest structuring in the area covering pilot plot No. 2.

None forest planting and/or sowing works are planned at that forest structuring in this area.

2.2.3 Undertaking of measures on silvi-culture during the last 5- 10 years period.

None of silvi-culture measures have been planned for the last 10 (ten) years in the envisaged area.

Chapter 3. Description of natural environment Plot # 2

3.2.1 Description of existing forest

The whole area of pilot plot No. 2 consists on artificial forest belt made of pine trees planted in 1960 – 1965 along the sowing road.

Presently, this forest belt in the project area is dry and barren status partially in some places and completely in other places. Status of indicated pine trees may be considered, as average and satisfactory approximately at 45% of the plot (addition 1, section).

Average density of existing pine trees 0.5 – 0.6 average height is 10-12 m in some places 12 – 14 m, age category II - inoculation is in joined condition. Indicated pine forest consists of 1 species, 1 layered monoculture. 20% of the plot is covered by tamariks bushes in natural form. Natural rehabilitation in the area of pilot plot No.2 is in very poor condition, one may say is none. Natural rehabilitation in the area is presented only by tamariks bushes.

Grass cover of the area is mainly consists of semi-desert steppe specific to bitter wormwood and camel thorn.....

3.2.2 Current application of soil

Area covering pilot plot No. 2 is in service area of Yevlakh FPPE and application of these soils is exclusive right of this enterprise. There are no other soil users and/or renters.

Though the enterprise doesn't allow pasturing of cattle in the pilot plot area, nevertheless cattle, belonging to population of surrounding residential point is grazing carelessly. As generally, quarter where pilot plot is located very close to city Yevlakh and other residential points, it is more subjected to anthropogenic impacts. For forest sows to be planted here undertaking of special protection measures is required.

3.2.3 Hydrography and climate

Kura-Araz plain, relating to pilot plot No. 2, is located in central part of the Azerbaijan Republic. Mountainous ridge of Greater and small Caucasus protects the bigger part of plain from cold Northern and hot Western winds.

Indicators of climatic characteristics of meteorological station

Month	Temperature (Co)			Precipitation, mm	Snow cover, cm	Relative air humidity	Wind		Note
	Multi-year	Absolut					Direction	Speed m/sec	
		Maximum	Minimum						
January	1.8	18	-18	14	1-6	76	N-W		
February	3.8	24	-14	11	1-4	74	“-“		
March	7.8	32	-11	11	1-2	71	NW		

April	13.3	33	-2	24	-	67	“-“		
May	19.7	34	4	41	-	63	S-E		
June	26.2	38	7	31	-	61	“-“		
July	27.1	39	11	20	-	54	S-E		
August	26.2	40	14	14	-	57	S-E		
September	21.6	35	3	25	-	68	NW		
October	15.6	32	-2	28	-	70	“-“		
November	9.0	25	-9	31	-	79	“-“		
December	4.3	22	-15	13	1-2	80	NW		
Average annual	14.5	31	9/-5	263	1-4	68	-	3-5	

Beginning and completion of vegetation period coincides during average 24 hours period with +10* above zero.

Duration of annual vegetation period in area covered by the project is 225 days.

Absolute maximum of temperature is + 42.8, absolute minimum is -18*.

Annual volume of sedimentation ranges within 263-280 mm.

Wind regime of the area is of monsoon nature. The dangerous winds for the area are dry Eastern winds. Such winds increase water evaporation and leads to drying of soil.

Pilot plot is completely located in basin of Kura river. Previously, waters of Kura river were flooding this area. However, in connection with construction of Mingechaur dam, due to change of bed of Kura river water regime is violated in this area and floods do not cover this area. Level of soil waters lowered and presently it is 3.0 – 4.5 m. None of hydro-irrigation measures were conducted in the area. Due to close location of the area of pilot plot to Kura river, it is possible to apply water of that river for forest sowing. To achieve this, electric power water engines are installed in 2 places.

3.2.4 Biodiversity

Biodiversity of the area covering the pilot plot #2 is represented by different grass cover, tree and bush species, different birds and fauna world and insects specific to this zone. Grass, bushes and trees of xerophyllous nature, specific to desert and semi-deserts, corresponding to this biodiversity and mostly to arid zone and relatively severe climatic conditions relates to this area. As the area is very close to city Yevlakh, fauna world of this place is not so abundant. There is no any evidence about any flora, fauna and or birds species under extinction.

3.2.5 Relief and soil

The relief of pilot area is mostly less sloppy, dale area. Only small elements of micro-relief- former water flows and shallowness of small rivers and small slopes are represented. The following soil types are available in the area:

1. Gray - meadows;
2. Gray –strong meadow;
3. Gray – meadow poorly developed;

As for humidity degree, the whole part of soil consists of dry soils. All soils covered by projects are saline soils.

By mechanical composition 51% of these soils are sufficiently clayey and balance is of heavy clayey type.

5.3. Calculation of quantification and prices for transformation measures

5.3.2 Calculation of sowing materials required for forest sowing in plot # 2

Type of planting	Area (ha)	Mixing schemes	Placement schemes	Quantity of planting stock (trees)				Total
				Oak	Ash tree	Birch	Elm tree	
Under forest planting	10	5O5A	5000 unit/ha	4000	4000	-	-	8000
	10	5O5E	5000 unit/ha	2500	-	-	2500	5000
Open area planting	10	10B	3x1	-	-	33000		33000
	4	7O3A	3x1	9240	3960	-		13200
	4	5O5A	3x1	660	6600	-		13200
	5	5O5E	3x1	8250	-		8250	16500
Total				30590	14560	33000	10750	88900

5.3.2 Seed materials required for forest sowing in plot #2

Mixing schemes for forest sowing	Placement scheme	Area	Quantity of seeding stock by species (kg)		
			Oak	Ash tree	Total
10O	3x1	10.0	1000.0	-	1000.0
7O3A	3x1	5.0	350.0	10.0	360.0
-	-	15.0	1350.0	10.0	1360.0

5.3.3. Evaluation of required saplings and seeds for pilot plot # 2

Name of planting stock	Unit of measure	Quantity	Price per unit (manat)	Amount (manat)
Oak seed	kg	1350.0	0.40	540.00
Ash tree seed	kg	10.0	25.0	250.00
Oak seedlings	unit	30590.00	0.50	15295.00
Ash tree seedlings	unit	14560	0.50	7280.00

Elm tree seedlings	unit	10750	0.30	3225.00
Oleaster seedlings	unit	33000.0	0.30	9900.00
Total	-	88900.00	-	36490.00

5.3.4. Materials required for fencing of pilot # 2.
(total length of fence is 6685 km)

1. Total length of applied pipes is 8022 m
2. Number of pipe support is 3342 pc.
3. Barbed wire is 40110 m
4. Armoring welded to each support (total) is 1671 m
5. Rolled wire welded to each support (total) is 2005 m
6. concrete solution for installation of posts (total) is 12.03 m³ (for each support 3.6 liters)
7. Barbed wire for supports is 150 kg

5.3.6. Evaluation of materials and technical equipment required for fencing of the pilot plot #2

Table 1.5.

Name of material	Unit of measure	Quantity	Price per unit	Amount
Iron tube	m	8022.0	4.00	32088.00
Armature	m	1671.0	1.50	2506.50
Katinka	m	2005.0	0.30	6015.00
Barbed wire	m	40110.0	0.15	6015.00
Concrete	m³	12.03m³	100.00	1205.00
Simple wire	kg	150.0	1.50	225.00

Electrode box	unit	8	50.00	400.00
Total	-	-	-	43038.50

Calculation of works to be executed for fencing of pilot plot #2 (Total length of a fence is 3501km)

#	Name of work	Unit of measure	Scope of work	Daywork	Man/day required	Price for one man/day	Salary (manat)
1	2	3	4	5	6	7	8
1.	Digging of holes	unit	3342	50.0	66.84	15.00	1002.60
2.	Welding	unit	3342	40	83.55	20.00	1671.00
3.	Concrete casting of posts	unit	3342	50	66.84	15.00	1002.60
4.	Barbed wire installation	m	40110	80	501.38	15.00	7520.70
5.	Transportation expenses	-	-	-	-	-	1000.00
	Total:						11196.90

5.3.7. Calculation of expenses for transformation works to be conducted in pilot plot # 2

#	Names of Works	Unit of measure	Scope of work	Day-work	Man/day required	Price for one man/day	Salary (manat)
1	2	3	4	5	6	7	8
1.	Cleaning from shrubs						
1.1	Cleaning of areas from shrubs and their removing away	ha	40.0	0.24	166.67	15.00	2500.05
2.	Land preparation	ha	38.0				
2.1	Ploughing of area with DT-75 tractor (first time)	ha	38.0	-	-	30.0	1140.00
2.2	Ploughing of area with DT-75 tractor (second time)	ha	38.0	-	-	20.0	760.00
2.3	Making of channels with tractor in prepared tillage	ha	38.0	-	-	25.0	950.00
3.	Forest planting						
3.1	Digging of holes with size 0.30 x 0.30 x 0.30 m for forest planting in prepared tillage	unit	88900	330	269.39	15.00	4040.85

3.2	Manure carrying and putting to holes after mixing it with soil	unit	88900	700	127.0	15.00	1905.00
3.3	Sorting of saplings before planting, cutting of roots and sticks, soaking in manure water	unit	88900	4000	22.23	15.00	333.45
3.4	Planting of seedlings to prepared holes	unit	88900	720	123.47	15.00	1852.05
4.	Forest sowing						
4.1	Treating of seedlings with medicine	kg	1360	82	16.59	15.00	248.85
4.2	Sowing of seeds in prepared land at depth 6-8 cm	unit	49500	1580	31.33	15.00	436.95
5.	Watering	ha	38.00				
5.1	Watering of planted and sowed areas	ha	60.0	1.04	57.69	15.0	865.35
6.	Purchase of manure	ton	50.0			20.00	1000.0
7.	Water motor	unit	2	-	-	1500.0	3000.0
8.	Transformer	unit	2			1250.0	2500.0
9.	Rubber tube 169	m	2000	-	-	3.0	6000.0
	Total:						27857.70
	Other expenses (additional 6 %)						1392.80
	Total amount						29250.50

6.3. Calculation of quantification and prices for materials and required works at plot #2

6.3.1. Calculation of quantification and prices for after-transformation measures (2012 – 2013)

#	Names of works will be performed	Unit of measure	Scope of work	Daywork	Man/day required	Price for one man/day	Salary (manat)
1.	Service and watering						
1.1	To serve forest plantations and sown areas with hand tools (5 times)	unit	138400	760	182.11 x (5)	15.00	13658.25
1.2	Watering of forest plantations (7 times)	ha	60.0	1.04	57.69 x (8)	15.00	6922.80
2.1	Conducting of inventory works	Ha	75	-	10.0	15.00	150.00
3.1	Performing of filling and repair works 10%	unit	8890	270	32.93	15.00	493.95

	additional planting						
3.2	Forest sowing of additional 30 %	unit	14850	1000	14.85	15.00	222.75
4.1	Required planting stock	unit	8890	-	-	0.30	2667.0
4.2	Required seeding stock	Kg	350	-	-	0.40	140.0
5.1	Forest pathological examination (3 times)	Ha	75	15	5x3	15.00	225.00
T o t a l							24479.50

6.3.2 Calculation of expenses at after-transformation works to be conducted in pilot plot #2 (for 2014 – 2018)

#	Names of works will be performed	Unit of measure	Scope of work	Daywork	Man/day required	Price for one man/day	Salary (manat)
1	2	3	4	5	6	7	8
1	To serve forest plantations and sown areas with hand tools	unit	138400	760	182.11x(15)	15.00	40974.75
2	Watering of forest plantations	ha	60	1.04	57.69 x	15.00	25960.50
3	Grass and shrubs mowing at forest plantations and sown areas	ha	50.0	0.30	166.67x(5)	15.00	12500.75
4	Conducting of inventory works (annually)	ha	50.0	0.30	166.67 x(15)	15.00	12500.75
5.	Forest pathological control	ha	75.0	15	15 x(5)	15.00	1125.00
	Total:						

ote: As it was envisaged to increase service works on forest planting, works on softening of bottom of plants and sows during 2014-2018 increased by 15 times, irrigation works by 30 times, cutting of grass and bushes–by 5 times, conducting of inventory works in total by 5 times, forest pathological survey in total by 5 times, the number of required work hours has been increased correspondingly-gr.6.

For forest planting, sowing, service, watering and other works, working standards of acting in the Azerbaijan Republic “Standards of executed manual works in forestry” dated 1995, Baku were used, as a basis.

COVER

AZERBAIJAN REPUBLIC

FORESTRY DEVELOPMENT DEPARTMENT
MINISTRY OF ECOLOGY AND NATURAL RESOURCES

WORLD WILD LIFE FUND

FOREST TRANSFORMATION FOR SELECTED PILOT FOREST AREAS IN
AZERBAIJAN
(SILVICULTURAL MEASURES)

P L A N

BAKI – 2012

Calculations of total expenses on executed works and materials and goods in both areas.

Table # 12

№	Name of activity or material	Value (manat)		
		Plot #1	Plot #2	Total
1	Fencing materials	22577.50	43040.00	65617.50
2	Fencing works	6862.50	11196.90	18059.40
	Total:	29440.00	54236.90	83676.90
3	Purchase of saplings and seeds	34060.00	36490.00	70550.00
	Total:	34060.00	36490.00	70550.00
4	Transformation Works	20647.74	29219.48	49867.22
5	Serving, watering and other works after transformation (2012- 2013)	21515.40	24479.75	45995.15
	Total:	42163.14	53699.23	95862.37
6	Serving, watering and other works after transformation (2014 -2018)	81864.00	93061.25	174925.25
	Total:	81864.00	93061.25	174925.25
	Total amount	187527.14	237487.38	425014.52

3.1.6. Forest diseases and pests

For the last 20 years mass infection cases by forest diseases and pests at quarter of pilot plot of Yevlakh FPPE were not detected. Such cases were observed at individual trees and/or small groups forests and were immediately eliminated.

Within frames of conducting of current transformation measures, it is considered to spray seeds with disinfectants to be applied at forest sowing. During transformation measures and after it, for monitoring of forest pests and diseases in the area of pilot area forest pathological observation works will be conducted.

3.1.7. Infrastructure.

In direction from East to West in pilot area, Baku-Ganja road highway passes by dividing this area into 2 equal zones. This road is very beneficial and comfortable for visits and one may state, in all points of area allows covering short distances.

3.1.8. Local communities

The residential point close to pilot area is city Yevlakh. The population of this city is dealing mostly in social service, trade and partially production areas and state works.

This community of the city is not dealing with any economic activity directly negatively impacting forest. Only, individuals in outskirts of the city breeding cattle,

endangers area. Moreover during summer months, the part of Baku-Ganja highway, which crosses project area, is occupied by local population trading with vegetables and fruit. And this endangers pollution of forest belt and creating of forest fire

For decreasing of negative impact project area and surrounding forests, local communities must undertake the following measures.

- 1) Removal of vegetable-fruit booths opened along highway passing project area
- 2) during realization of project local population may be involved directly at fencing, forest planting sowing and service works,
- 3) to conduct wide education works for surrounding villages both on ecological problems, covered by this project and generally in ecological area

Chapter 4 Description of natural environment

4.1. Natural vegetation zones of forest

4.2.1. Models of natural forest type

Forests of Yevlakh FPRE are related by grouping of National Commissar Board of Azerbaijan SSR dated 31.07.1945 to the forests of the I group.

According to forest pathological scheme composed by the doctor of biological sciences L.B.Maxatadze and candidate of agricultural sciences I.D. Popov, Yevlakh FPRE forests are related to the central eastern Trans-Caucasian circle. According to that forest pathological scheme forests of enterprise are divided by following forest types.

1. Different grass cover - Ash-tree, Currant, Poplar
2. Wheat grass cover - Poplar
3. Clay grass cover - Ash-tree, Acacia, Willow
- 4.Blackberry - Mulberry
5. Dead type cover - Pine

Area covered by project relates to pine forest with dead cover.

4.2.2. Correspondence of tree and bushes types at area of pilot plot # 2

The soil and climatic conditions of located pilot area allows locating here only breeding trees and bushes xerophilous origin, resistant to arid zone and salinity of soil. The most optimal tree and bush type specific for this area are oleaster, oak common ash-tree, currant, pomegranate, black thorn and tamariks.

Sowing envisaged for open areas of pilot plot #2 will be conducted according to snow mixing scheme of 10 I ,7 P3G, 5P5G, 5P5, in location schemes 3x1 and 3x2 m.

Forest sowing will be conducted in mixing schemes 10P, 6P4G.

Section II

5.2.1. Selection of transformation measures

Forest transformation at pilot plot # 2 will be conducted mostly by means of forest planting and sowing. One may state, that natural rehabilitation in the area is very weak, almost is none. That is why forest sowing and natural rehabilitation auxiliary measures will be jointly conducted.

Forest transformation measures in pilot plot #2 will be conducted in following order.

- 1) forest sowing in open area - 23.0 ha
- 2) under forest sowing - 22.0 ha
- 3) Forest sowing and natural rehabilitation auxiliary measures - 30.0 ha

All forest rehabilitation measures to be conducted in this area will be realized by management of local specialists and wide involvement of communities of surrounding residential points.

5.1.2. Selection of tree and bush species for planting and seed sowing at pilot plot No. 2 and selection of standard requirements for this

The priority at forest planting sowing is mostly given to the following species: long leafed oak, common ash-tree, elm-tree, wild pomegranate. Density of forest planting is considered by size of 3x2 m and 3x3 m. It will be conducted with forest areas by scheme of 3x1 m. Under forest planting will be conducted mostly in average by 500 units per hectare.

Planting and sowing materials will be taken from different facilities, which are corresponding to initial local forest planting condition.

Standard condition of all sowing materials are 1-2 year old, not exceeding this age, sound condition, root part and branch must be undamaged.

Seeds applied in forest condition at pilot plot will also be primarily prepared, in local enterprise, seeds which are not available will be brought from different facilities, close to local condition.

Seeds to be applied will be sown after corresponding laboratory analysis.

All seeds will be treated with disinfectants against pests, diseases and rodents.

5.1.3. Preparation of soil and other preventive works before sowing

Totally 40.0 ha of area at pilot plot #2 will be cleaned from thorns-and-shrubs and dry waste. Cleaning works will be conducted manually. Grass grown in the plot, thistle, thorns-and-shrubs will be cut collected and transported by traffic vehicles. Thorns-and-shrubs in the plot create danger of great fire.

Cleaning works from thorn-and-shrubs at plot will be completed till 15 August 2012 and then works on preparation of soil will start.

Plough works in the area with 38.0 ha will be conducted by means of tractor. With purpose of having higher quality plough, the works will be conducted 2 times. Lines will

be again opened by tractor for tree sowing in prepared plough. Wells, corresponding to envisaged schemes and sizes will be dug by hand tools in open lines.

For tree planting and sowing, locating and mixing schemes will be indicated in table No.1.1.

As it is indicated in pilot plot # 1 vegetation starts here very early either. That is why it is considered to conduct works on tree planting and seeds sowing during autumn months, with aim planting and sowing will adapt to this before arid summer starts.

5.1.4. Under forest planting

Under forest planting in pilot plot is envisaged to be at 22 ha area. Under forest planting will be mostly conducted by means of seeds of oak and big species.

Different density and abundance of pine trees at under forest planting, doesn't allow applying specific planting scheme. That is why at under forest planting, 500 pieces in average per 1 hectare are envisaged to be planted.

For soils 500 pieces under forest planting wells with size of 0.30 x 0.10 x 0.10 m will be dug.

Seeds to be sown will be separately soaked preliminarily before planting in manure mixed solution. Additionally to planting manure up to 4/1 of soil from each pit is added. 20 liters (2 pails) of water is applied to young plants after planting. After watering, mixture of dry manure and dry soil is added to bottom part of young plants. (with thickness of 2-5 cm). Planted seeds are to be immediately watered.

5.1.5. Planting in open plots

Planting in open plots will be conducted according to location scheme 3x1 m in preliminarily ploughed and lined soil. Totally, planting by trees in open plot with area of 23 ha is considered.

Pits to be dug for planting of trees will be with size of 0.30 x 0.30 x 0.30 m.

Like in under forest planting, before planting manure will be applied here also to each pit before and after planting, seeds will be soaked in solution of manure with plant balance. Seeds for planting will be immediately ploughed.

5.1.6. Sowing of seeds

It is considered to conduct forest sowing works at 15.0 hectares.

Forest sowing for oak and ash-tree seeds will be conducted mostly in prepared plough and partially in virgin soil with location scheme of 3x1m.

Seed sowing works will also be conducted at places envisaged for natural rehabilitation or auxiliary measures.

5.1.7. Fencing

As the area of pilot plot #2 is divided by Bakı-Ganja highway into 2 parts, fencing works will be conducted separately at 2 plots. Both plots along the whole perimeter are to be fenced. Fencing will be conducted by means of iron pipes and barbed wire, balance operations will be conducted like in pilot plot # 1.

5.1.8. Undertaking of support measures of natural rehabilitation.

Support measures of natural rehabilitation at pilot plot 2 will be undertaken by fencing with aim to restrict entering here of cattle and by partial mineralization of upper part of soil at seed sowing. With aim to support natural rehabilitation, oak and ash-tree seed sowing will be applied here.

5.1.9. Irrigation measures

As it was indicated above, the climate of area of location of pilot plot is very hot and arid, and due to salinity of soil watering works of forest planting and sowing are to be conducted more intensively.

Water of Kura river passing nearby will be applied at irrigation. By this end for directing water from Kura river to the plot, 2 pieces of engines and 2000 m rubber pipe will be used.

Chapter 6

Planning of after-transformation measures for 2012– 2013 and 2014 -2018

6.1. After-transformation measures for plot # 2

6.1.1. After-transformation measures during 2012 – 2013

Prevailing at after-transformation measures, monitoring, watering and service work will be carried out in the area of the plot #1. All measures will be undertaken under management and organizational activities of employees of Shamakhy Forest Protection and Rehabilitation Protection and Rehabilitation Enterprise.

The main inventory on all forest rehabilitation measures will be undertaken during autumn 2013, as a result of this inventory, the average growing percentage both in forest planting and forest sowing will be defined. During the same year replacement, replenishment and repair works of not grown plants and seeds by new ones will be executed. Forest planting and sowing replenishment and repair works will be completed by the end of 2013.

6.1.2 Planning of after-transformation measures during 2014-2018

Service and irrigation works will be continuing in forest sowing parts of pilot area during 2014-2018. During these years service work (cleaning of bottom part of trees, irrigation,

cleaning from weeds, manure spreading, cutting of grass and bushes between lines etc.)

For these years the following works will be executed:

5 times in 2014

4 times in 2015

3 times in 2016

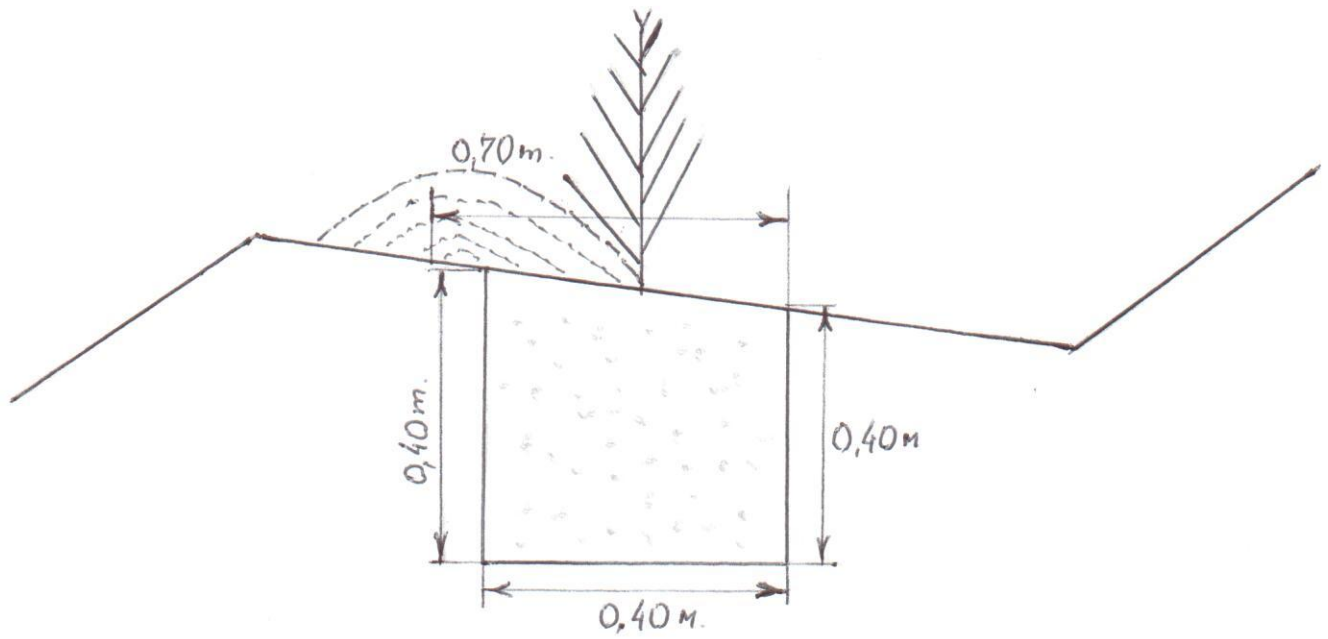
Twice in 2017

Once in 2018

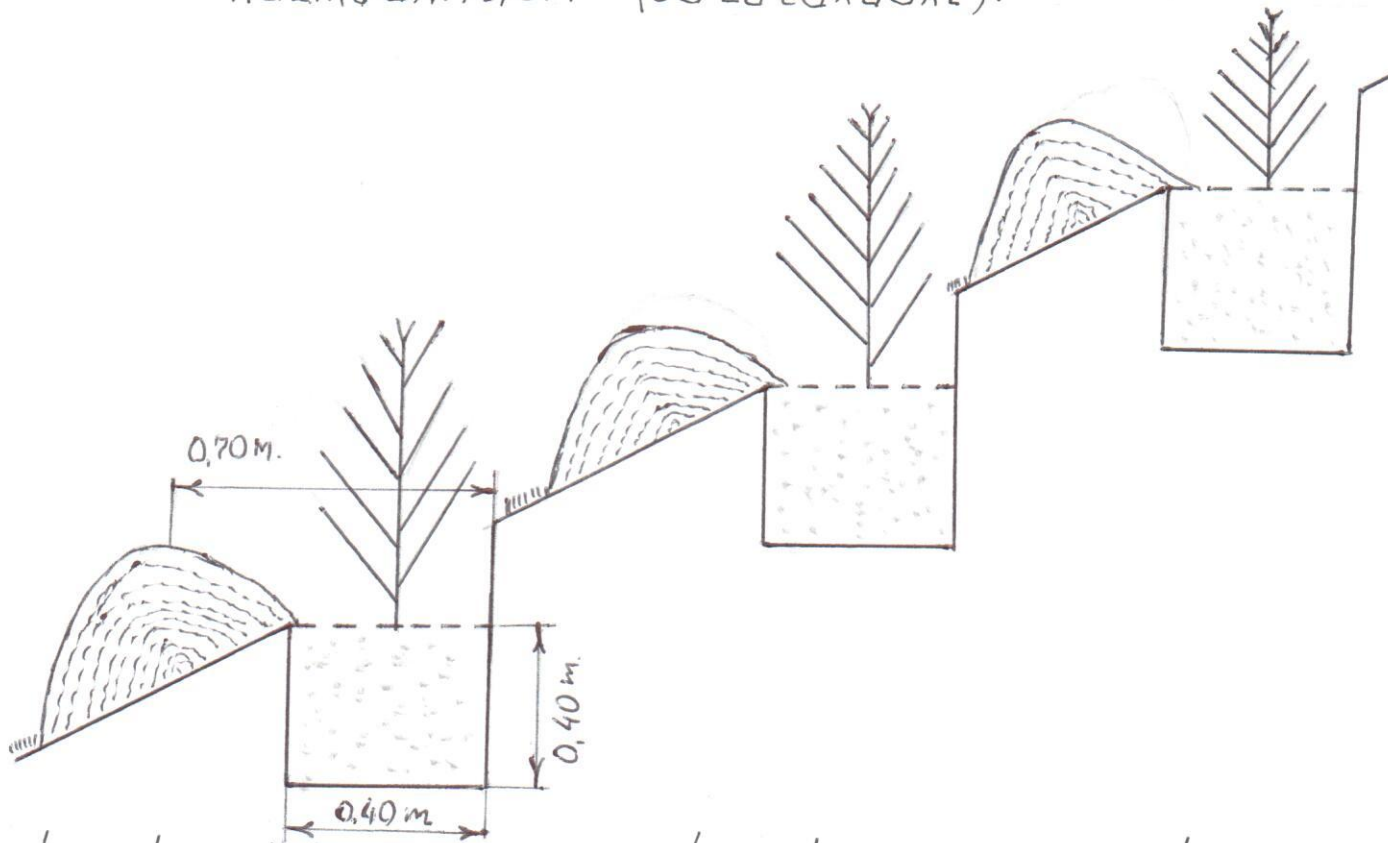
The inoculation of forest sowing is planned during the autumn of 2018.

With purpose of protection of forest from cattle, disease, pests and rodents constant monitoring will be continuing in the territory. All these measures will be undertaken under management, participation and organizational activities of employees of Shamakhy Forest Protection and Rehabilitation Protection and Rehabilitation Enterprise.

Səkil 1. Terraslarda quyuların hazırlanması və əkinini.



Səkil 2. Terrasların olmadığı yamaclarda quyuların hazırlanması. (sütuturları).

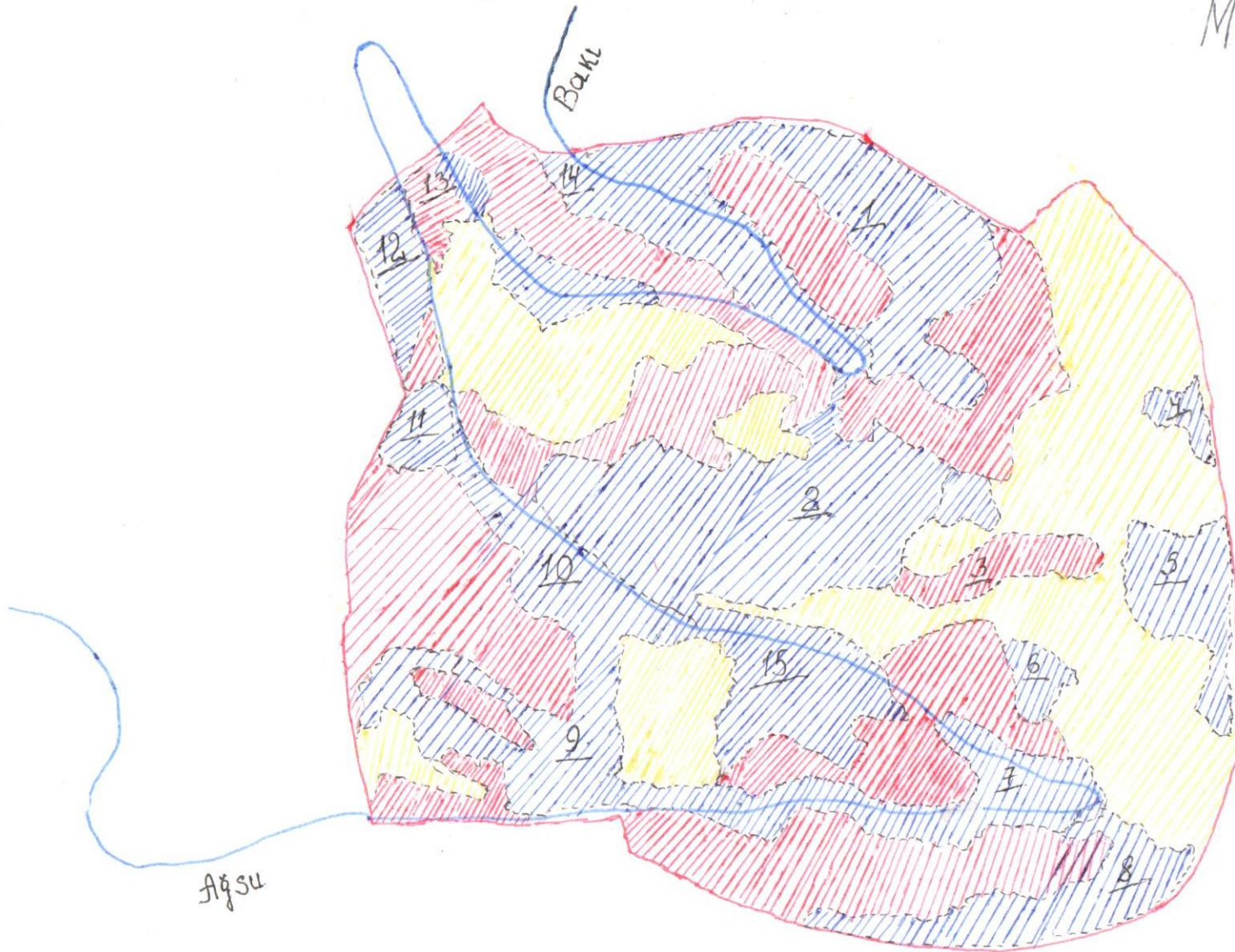


Quyular hazırlanarkən çıxarılan torpağı yamac boyu quyudan aşağı hissəyə toplamaq lazımdır. Bu əkindən sonra quyuya suyun yığılmasına və burada daha çox qalmasına şərait yaradır.

Pilot sahə №-1-də aparılacaq transformasiya tədbirlərinin
aparılacağı ərazilər.

$S = 75,0$ ha


Miqyas: 1:7000.



Şərti işarələr.

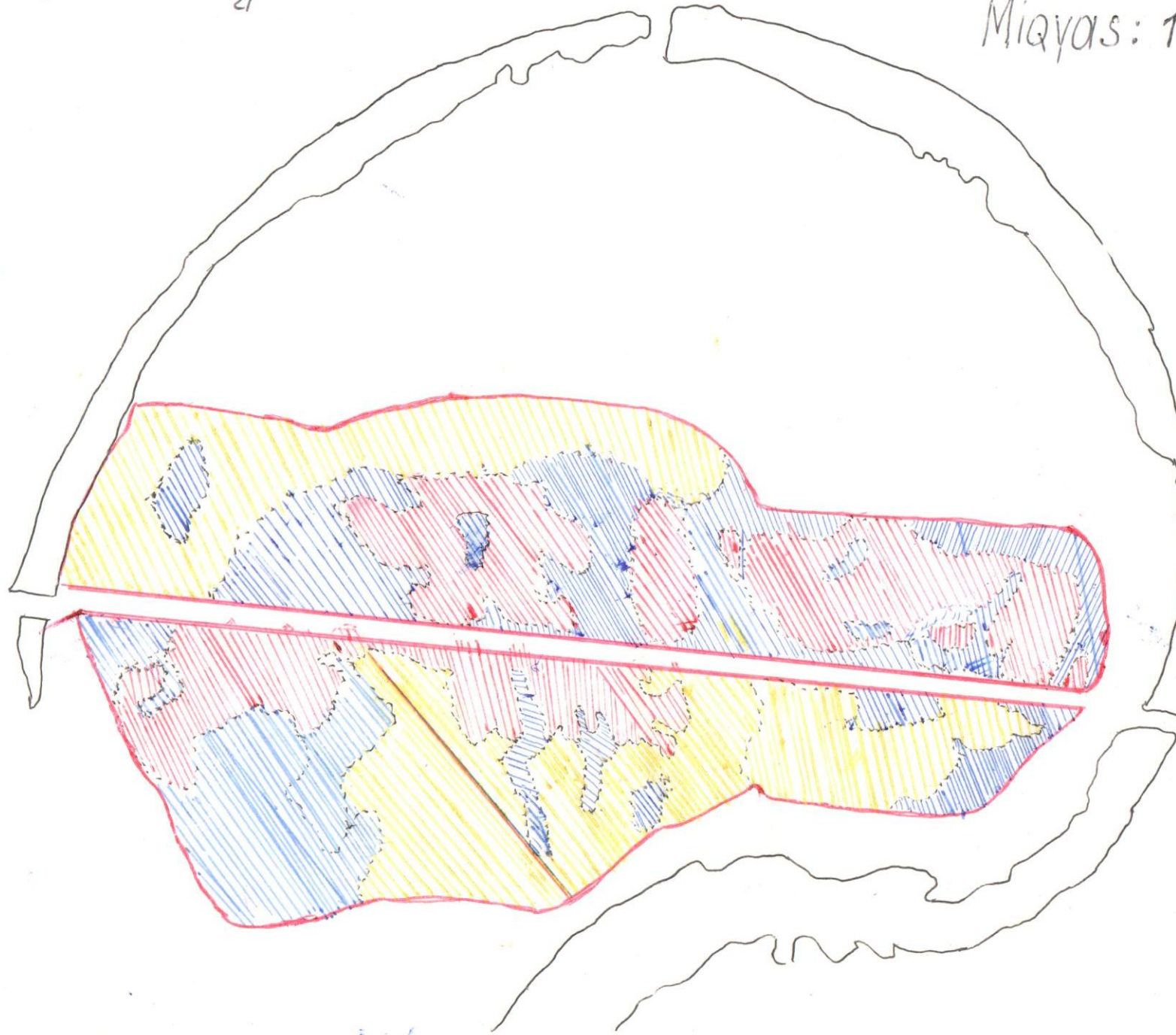
 - Açıq sahələrdə əkin.

 - Meşəaltı əkin.

 - Sapın və Təbii bərpe

dirpəriləcəyi ərazilər. $S=75,0$ ha.

Miqyas: 1:



Şərti işarələr.

- aqıq sahələrdə əkin.



- meşəaltı əkin.



- səpin və təbii bərpa.

