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SURVEYS AND ASSESSMENTS ON BIODIVERSITY, SOCIO-ECONOMIC AND SOCIO-CULTURAL ASPECTS, ONGOING GRAZING ACTIVITIES AND LIVESTOCK SITUATION

KIZILKUYU Wildlife Development Area

FİNAL REPORT SUMMARY

SUMMARY

1. General Landscape Features

1.1. Main Results; The size of the area is 20504 ha with 4 structural plateaus; the highland, the medium elevated, the lowland and the lowest land. Geological structure consists mainly of limestones. Continental climate is dominant in the area. Settlements belonging to the Early Byzantine period in rural areas and towers dating to the Roman and Byzantine periods were identified in Kızılkuyu region. The area has four different Landscape Character Types and Six Different Landscape Character Areas.

1.2. Recommendations; Şanlıurfa Organized Industrial Zone covers the area from north to south with natural streams of wastewater discharged from industrial wastewater treatment plant. There is a discrepancy between the data in Kızılkuyu WDA Management and Development Plan prepared in 2010 and revised in 2015 and CORINE data of 2012. Thus, the current management plan should be updated and revised according to the latest research developments.

2. Biodiversity

2.1. Main Results; In terms of vegetation, Kızılkuyu WDA is in the Iran-Turanian phytogeographical region with Iran-Turanian steppes classified as low mountain steppes depending on the elevation and as malacophile and tragantic steppe in terms of physiological features. According to the EUNIS habitat types classification, it is located in Iran-Anatolian steppe habitat class defined as E1.2E habitat code. The vascular plants of Kızılkuyu represent 44 families, 160 genera and 252 taxa, 5 of which are endemic. 28 of these taxa (one is endemic) were identified as new local records. There are nearly 54 taxa and 38 genera belonging to 26 families of Cryptogamae group. All Cryptogam taxa are reported for the first time from the WDA. There are 109 species belonging to 12 orders and 58 families in Kızılkuyu under the Insects groups. In terms of Herpetefauna, there are 15 species including 3 species of amphibians, 7 species of lizards, 4 species of snakes and 1species of turtle. In terms of avifauna, there are 96 bird species belonging to 38 families and 16 species of which were included as new records for this area. There are 9 species belonging to the Rodentia (Rodents), Chiroptera (Bats) and Eulipotyphla (Insectivorous) order identified under the small mammals and 6 species belonging to Rabbits, Predators and *Gazella marica* (Gazelle) of the Cetartiodactyla identified under the large mammals. Three wild relatives of Barley (*Hordeum spontaneum, H. bulbosum, H. murinum*) and 2 wild relatives of Wheat (*Aegilops geniculata, A. triuncialis*) were identified in WDA. The only ancestor of culture barley is *Hordeum spontaneum* (Wild barley) and is commonly found in Kızılkuyu locations. Five species of wild relatives from Fabaceae (Legumes) family were collected.

2.2. Recommendations; Basic recommendations are; sending rare and endemic plant specimens and seeds to gene banks and/or investigating onsite (*in-situ*) conservation opportunities, providing incentives and support for the cultivation of some steppe plants and enriching these areas with local species specific for the purpose of increasing species diversity. *Archon apollinus* was found only in the north of the region and thus should be protected and monitored. Similarly, populations of endemic grasshopper species should be protected and monitored. Gazella (*Gazella marica*), Great bustard (*Otis tarda*), Cream colored cursor (*Cursorius cursor*), Pin tailed Sandgrouse (*Pterocles alchata*) and Montagu' Harrier (*Circus pygargus*) are recommended for monitoring and preparation of a Species Conservation Action Plan. The stony slopes and the edges of farmlands and roads in the WDA are seen as important habitats for the wild relatives of field crops such as wheat, barley, chickpea, lentil, vetch and pea. So this parts of the area should be strictly protected.

3. Socio-Cultural and Socio-Economic Aspects

3.1. Main Results; The tribal system has long been strong in the settlements. The economy is generally based on agriculture and animal husbandry and trade is low.

3.2. Recommendations; Basic recommendations for social aspects include; conducting studies on product diversity, performing demo studies on closed soilless vegetable production encouraging villagers to be carried out through cooperative initiatives, establishment of forage supply facilities, mushroom cultivation for women, pilot activities such as poultry farming, development of products for rural tourism and integration of tourism activities with agriculture.

4. Ongoing Grazing Activities

4.1. Main Results; There are 17524 ruminants, 5167 cattle and 175 culture breeds in 11 settlements within Kızılkuyu WDA. A total of 351 individual Gazelle population was counted in Kızılkuyu. There are 94583 ha pasture area in the WDA, jointly used by cattle, ruminants and gazelles. Steppe pastures are grazed above the grazing capacity (approximately 2.5 times more).

4.2. Recommendations; The pastures are unable to feed the animals in good condition in WDA. There is a 3140 tons of roughage deficit for the existing animals in Kızılkuyu. The way to prevent this is not to graze the animals in the pasture in early spring. A controlled grazing should be practiced. The Gazelle habitat should be taken into consideration during any planning studies of grazing, restoration and improvement activities foreseen in the pastures of Kızılkuyu WDA.

5. Livestock Situation

5.1. Main Results; Ruminant and cattle breeding in the region are carried out by traditional methods based on pasture management. The animals are grazed in the pasture from spring to late autumn. The number of cattle breeds in the area is culture and hybrids.

5.2. Recommendations; Overgrazing and unseasoned grazing are major problem in the region. Producers should be provided with basic training information (care-feeding) and general health protection rules. Cattle farming should be encouraged rather than sheep farming to reduce the intensive grazing pressure on pastures. In order to increase quality of the pastures, grazing plan and monitoring plan should be prepared and grazing activities should be limited by applying pasture rehabilitation activities.

6. Core Areas, Buffer Zone and Ecological Corridors

6.1. Main Results; Within the scope of the study, it is requested to plan one corridor between the core areas in order to complete the ecological networks. Two different species, gazelle and hyena, are identified as focal/target species in order to represent both carnivores and herbivores. The most important reason of this was the fact that those species could be accepted as umbrella species. The proposed buffer zone for WDA is 5664 ha. Recommended lengths of corridors between Kızılkuyu WDA and Tek Tek Mountains NP are 106 km and 156 km for gazelle. For Hyena, however, the proposed corridor lengths between Kızılkuyu WDA, Tek Tek Mountains NP and Karacadağ are 87 km (Kızılkuyu-Tek Tek NP), 145 km. (Kızılkuyu-Karacadağ), 83 km. (Tek Tek NP-Karacadağ).

6.2. Recommendations; A corridor for gazelle can naturally be established between Kızılkuyu WDA and Tek Tek Mountains NP, but there is no connection between Karacadağ and Kızılkuyu, and Karacadağ and Tek Tek Mountains NP. Şanlıurfa Organized Industrial Zone, which is located in the northwest of Kızılkuyu WDA, has expanded approximately 2.5 km^2 within the WDA border. Therefore, no buffer zone has been established in the area where the Organized Industrial Zone (OIZ) is located. Therefore, it would be appropriate to revise the Kızılkuyu WDA border again considering the future situation of the OIZ. After revising the borders of the WDA, the buffer zone study should be performed again if deemed necessary.

1. GENERAL LANDSCAPE FEATURES

Kızılkuyu WDA is located over the south-western part of Şanlıurfa Province with a size of 20504 ha and have 4 structural plateaus; the highland, the medium elevated, the lowland and the lowest. Geological structure consists mainly of limestones.

Continental climate is dominant in the area. Summers are very dry and hot, winters are rainy and relatively temperate. Since the evaporation in the study area is higher than the average rainfall, the river regimes are irregular.

The majority of Kızılkuyu WDA soils are in the Brown and Red Brown Soil Groups and the local soils are neutral, salt-free, with low organic matter levels, high lime content, and fine textured soils. When Kızılkuyu WDA is examined in terms of agricultural suitability, it is generally described as Class VII, small part of the WDA is of Class III. Soil depth is less in the parts that can be cultivated.

In the region, settlements belonging to the Early Byzantine period in rural areas or in almost every village were identified, and the towers dating to the Roman and Byzantine periods, which have the characteristics of the present-day inn buildings, were identified.

The area of Hamzan Hill South Region is a very important place in terms of being the place where the first human communities settled in the region by establishing a temporary camp.

The botanical remains and animal bones were found during the archeological excavations in the northeast of the Kızılkuyu Wildlife Development Area. As a result of the investigations, 21 ruins were identified in Kızılkuyu WDA.

According to CORINE2012 data; the current land use in the study area is mainly composed of agricultural, pasture-pasture, industrial and commercial areas and 75th year Gazelle Breeding Station, aside from rural settlements. There is no forest land in the area.

Four Landscape Character Types and Six Landscape Character Areas were defined in Kızılkuyu WDA

1.1. Threats and Recommendations

In Kızılkuyu WDA, Şanlıurfa Organized Industrial Zone covers the area from north to south with natural streams of wastewater discharged from industrial wastewater treatment plant. Water is collected by embankment on the stream where waste water flows and agriculture is carried out using this water by pumping. At the same time, these wastewaters pass through the settlements.

Samples were taken from these wastewaters. As a result of the investigations carried out Electrical Conductivity (EC) values which indicate Total Dissolved Solids concentration are between 3400 - 4000 µs / cm. Therefore, measures should be taken for potential threats of these high total dissolved solids values (the chemical composition of which must be determined).

The most important problem of the soil is an insufficient depth. However, the continuity of endemic and other plant species in the region can be ensured if human intervention, control and protection of processing and use is left to its natural state.

Field studies and observations show that, although there are not many settlements in the environment, due to the current inhabiting population and livestock activities, the land cover which is scarce is subject to erosion due to overgrazing and other uses. Thus, steppe biodiversity in the area has been damaged. Soils in Kızılkuyu WDA have some problems such as depth, slope, low organic matter, high clay, stony and rocky, but have sufficient root depth for steppe plant development.

In addition, untreated/unmanaged lands in Kızılkuyu WDA are important in terms of protection of natural life. The parts cultivated and managed in this region should be used effectively in a way that less chemicals are used, different organic agriculture productions are supported and high income is obtained from small areas that should be protected.

Although the animal husbandry in the areas damages the steppe vegetation, there are larger areas for the maintenance of plant diversity. In spite of all these, for the maintenance of plant diversity, certain regions should be protected and overgrazing should not be allowed in these region.

Intense illicit diggings were conducted in some ruins far from the settlement. Some ruins within the settlement are also in danger due to the expansion of new constructions for settlements.ons.

It can be seen that there is a discrepancy between the data in Kızılkuyu WDA Management and Development Plan prepared in 2010 and revised in 2015 and CORİNE data of 2012. The use of up-to-date data related to area during the Kızılkuyu WDA Management and Development Revision Planning processes is important for effective management of the area.

2. BIODIVERSITY

Kızılkuyu WDA is located in the Iran-Turanian phytogeographical region. In terms of vegetation, most of the region is composed of Iran-Turanian steppe. Steppe ecosystem, located within the biome of the temperate zone meadows of the terrestrial ecosystem, is dominant in Kızılkuyu WDA. The WDA steppes can be classified as low mountain (plain) steppes depending on the elevation, whereas these steppes can be classified as malacophile and tragantic steppe in terms of physiological features. Three associations belonging to low mountain (plain) steppe vegetation were determined in the area. According to the EUNIS habitat types classification, Kızılkuyu WDA is located in Iran-Anatolian steppe habitat class defined as **E1.2E** habitat code and within the **E1** Dry Meadows sub-category of the Landfills and Pastures category of *Moss, Lichen and Non-Weed Plants* (Forbs) defined under "**E category**".

✓***Seed Plants (Vascular Plants):*** As a result of literature search, field survey and assessment carried out within the scope of the project, 44 families, 160 genera and 5 of them were endemic, 252 taxa were identified. The rate of endemism was approximately 2%. As a result of field survey, a new locality record was determined for Kızılkuyu WDA belonging to 28 taxa, 1 of which is endemic.

✓***Cryptograms:*** According to the results of field survey, observations and identification, nearly 54 taxa and 38 genera belonging to 26 families of all Cryptogamae groups were identified in Kızılkuyu WDA. Most species found in the study area were identified from similar habitats in the immediate vicinity of the project boundaries. All cryptogam taxa collected from the field and given in this table are reported for the first time from Kızılkuyu WDA.

✓ ***Insects:*** 109 species belonging to 12 orders and 58 families were identified in Kızılkuyu WDA and in its surrounding areas. In the autumn period, the most dominant species in the region belong to Orthoptera (Grasshoppers). In the early spring period, especially Zegris, Euchloe ausonia, Glaucopsyche alexis, Vanessa cardui, Colias croceus, and relatively Zerynthia deyrollei are common species. Archon apollinus was found only in the north of the region and in a field study and is one of the rare butterfly species in the region. Therefore, there is a need for protection and monitoring for this species.

Populations of endemic grasshopper species (*Isophya sikorai*) in Kızılkuyu should be monitored and protected. In early spring, Kızılkuyu WDA is a region rich in beetles. In the region, important species of Lady bug (*C. semptempunctata*) for the biological control was found intensively.

✓ ***Herpetofauna:*** In the field studies, 15 species, 3 species of amphibians, 7 species of lizards, 4 species of snakes and 1 species of turtle, were identified.

✓ ***Birds:*** As a result of field survey, 96 bird species belonging to 38 families were identified by adding 16 species as new records for this area.

Great bustard (*Otis tarda*), Cream colored cursor (*Cursorius cursor)*, Pin tailed Sandgrouse (*Pterocles alchata*) and Montagu' Harrier (*Circus pygargus*) are recommended.

✓ ***Small Mammals:*** As a result of field survey conducted in Kızılkuyu WDA and its vicinity, 9 species belonging to Rodentia (Rodents), Chiroptera (Bats) and Eulipotyphla (Insectivorous) species were identified.

✓***Large Mammals:*** As a result of field survey conducted directly and indirectly in Kızılkuyu WDA, 6 species belonging to Rabbits (Lagomorpha) such as *Lepus europaeus* (Wild rabbits), Predators (Carnivora) such as *Vulpes vulpes* (Red fox), *Vormela peregusna* (Marbled polecat), *Martes foina* (Rock marten), *Meles meles* (Badger) and *Gazella marica* (Gazelle) of the Cetartiodactyla (Ungulates) were identified.

Gazella marica (Gazelle) is an important species in our country because it lives only within the boundaries of Şanlıurfa province and its distribution or extend is relatively limited in Turkey our country.

As of the end of 2018, a total of 351 individuals with 139 males, 136 females and 76 pups, were counted in Kızılkuyu WDA by the 3rd Regional Directorate of the General Directorate of Nature Conservation and National Parks, The Ministry of Agriculture and Forestry.

✓***Agricultural Biodiversity:*** Three wild relatives of Barley (*Hordeum spontaneum, H. bulbosum, H. murinum*) and 2 wild relatives of Wheat (*Aegilops geniculata, A. triuncialis*) were identified in Kızılkuyu WDA. The only ancestor of culture barley is *Hordeum spontaneum* (Wild barley) and is commonly found in Kızılkuyu locations.

Five species of wild relatives from Fabaceae (Legumes) family were collected. The presence of wild relatives of 1 lentil (*Lens culinaris* subsp. *orientalis*), 2 wild chickpea peas (*Lathyrus setifolius, Lathyrus cicera*), 1 pea (*Pisum sativum*) and 1 chickpea (*Cicer pinnatifidum*) were recorded in Kızılkuyu as a new record.

2.1. Threats and Recommendations for Biodiversity

The biodiversity threats encountered in Kızılkuyu WDA are; 1. Human-induced threats and damages to be restored; (Converting natural habitats to agriculture and settlement areas, Unconscious livestock and overgrazing, Unconscious agricultural activities (use of artificial fertilizer and unnecessary pesticides etc.), Environmental and plastic pollution, Other human activities that reduce soil quality, Replacement of natural river beds and pollution of waters, especially in winter and early spring periods, Stubble burning etc.) and 2. Natural threats; (Global warming, Falling rainfall rates or irregular rainfall regime, Reduction of groundwater resources).

Recommendations; for eliminating the threats factors for biodiversity conservation in Kızılkuyu WDA are given below;

- *Archon apollinus* was found only in the north of the region and in a field study and is one of the rare butterfly species in the region. Therefore, there is a need for protection and monitoring for this species. Similarly, populations of endemic grasshopper species (*Isophya sikorai*) in Kızılkuyu should be monitored and protected.
- Gazelle (*Gazella marica*), Great bustard (*Otis tarda*), Cream colored cursor (*Cursorius cursor*), Pin tailed Sandgrouse (*Pterocles alchata*) and Montagu' Harrier (*Circus pygargus*) are recommended for monitoring and preparation the Species Conservation Action Plan for these species.
- In terms of general bird species, the valley, which is located between Güzelkuyu and Kızılkuyu neighborhoods, accommodates many bird species due to the presence of water coming from the industry.
- The stony slopes and the edges of farmlands and roads in the WDA are seen as important habitats for the wild relatives of field crops such as wheat, barley, chickpea, lentil, vetch and pea. So this parts of the area should be strictly conserved.
- Investigating alternative opportunities (such as ornamental and medicinal plants, ecotourism) in livestock and agriculture-based areas; creating opportunities for cultivation of plants with significant potential in park and garden landscaping as ornamental plants,
- Sending rare and endemic plant specimens and seeds to gene banks and / or investigating onsite (*in-situ*) conservation opportunities,
- Ensuring the cooperation with administrative and local authorities and non-governmental organizations for the protection of plant diversity,
- Organizing periodical trainings, presentations, artistic and cultural activities in a visitor promotion center to be established in the region to guide and raise the awareness of tourists coming to the area correctly,
- Keeping as far away from the natural steppe ecosystem as possible due to all kinds of activities (overgrazing, creating agricultural areas, road expansion, construction, transportation, operation, incineration, demolition, waste storage, noise and light pollution, earthmoving, etc.) to be carried out in the area, conducting continuous control in the process,
- Control and limitation of rapid spread of settlements within the boundaries of Kızılkuyu WDA,

- Establishment of a mechanical barrier (fence, wall, etc.) between the floristic / faunistic and ecologically critical sensitive points determined by the project in order to preserve and maintain the natural structure of the steppe ecosystem in the study area,
- New agricultural areas should not be created, necessary arrangements should be prepared to increase the product diversity in agriculture, use of pesticides should be prevented and grazing plans should be prepared to control grazing,
- The physical, chemical and biological values of the heavy metals and pesticides of the organized industrial water passing through the area, which may cause harm to living things, should be regularly controlled. If these values are higher than the threshold values, they should be lowered down to a level appropriate for the living organisms,
- Habitat destruction activities should not be allowed in or near the densely populated areas. If it is necessary to allow permission, it should be done considering the annual life cycles of the birds such as breeding and hatching,
- In addition to the agricultural lands within the WDA area of Şanlıurfa Central Kızılkuyu, Great bustard *(Otis tarda*, Linnaeus, 1758) also uses agricultural lands between Yanıkçöğür, Yukarı Hamedan and Aşağı Hamedan. Therefore, it is recommended to include those areas within the boundaries of the protected area in case of changing the boundaries of a possible area,
- Although, European Turtle Dove (*Streptopelia turtur*) is a globally threatened species, classified as "Vulnerable" in current IUCN (International Union for Conservation of Nature) conservation criteria and in the BERN Convention, the species included in the Annex-III where the protected species are included, it is an important species that is allowed to be hunted in the decisions of Central Hunting Commission for economic purposes. This species, which is under protection on a world scale, should be banned to hunt by Central Hunting Commission Decisions,
- The locations where the wild relatives of the cultivated plants are observed in Kızılkuyu WDA are located within the absolute protected areas of the protected area and are among the species that can be included in the scope of agricultural biodiversity monitoring due to the fact that legumes are spread in a narrow area,
- The rocky areas between Keberli and Kızılkuyu Villages, southeast of Kızılkuyu Village and northeast of Bildim village; again, the stony area around the old waste disposal center north of İkizce Village can all be considered as important plant areas in The Kızılkuyu Wildlife Development Area,
- Implementation of conservation practices and conducting monitoring activities in areas where the distribution areas of Tortoise and Big Viper are concentrated in the area,
- The surrounding of the Keberli, Kızılkuyu-Sanayi motorway located in the north, the regions between the newly opened ring road and the Kızılkuyu region are richer than some of the regions located in the inner region especially in terms of insect species diversity. Thus these regions should carefully be protected.

3. SOCIO-CULTURAL AND SOCIO-ECONOMIC FEATURES

Considering the social, economic, cultural and gender roles in Kızılkuyu WDA, it is possible to list the results/observations and recommendations as follows:

✓ ***Socio-cultural features;*** Family and kinship ties in the region are still important. Although formal educational institutions are the basic educational institutions, secondary educational institutions, health institutions, other institutions that support education and development in the context of agriculture and livestock husbandry development are relatively insufficient. Mobile education is one of the main problems of the region. Blood feuds, conflicts and hostility are greatly diminished. Social leaders are mediators in the conflicts that occur from time to time. It is recommended that social leaders be evaluated in the context of the successful implementation of the project. Although the traditional information systems and actors have been transformed to a great extent due to the mass media, the village's history, heritage, and the leadership of elderly and experienced people in agriculture and animal husbandry remain relatively important. The general groups of the regions are farmers, shepherds, traders and seasonal workers. Most of the villages do not have occupations or tradesmen. This is a major disadvantage for the development of villages. Land distribution in the region is mostly shared –joint titles are common. There are very few personal (single) title deeds. The joint ownership of the title deed creates problems in developing/implementing projects and supporting cooperatives. The landless family is quite high in the region. Landless families earn their living by working as seasonal workers. Market-oriented production is widespread in agricultural products but very limited in animal products. In general, production is aimed at meeting household needs. The products left over from the households are brought to the market. In the context of rural development, a conscious, systematic market culture has not been found. Multiple childhood is common. The reason for this is that both men love children and see children as labor force. Polygamy is rare.

✓***Socio-economic features;*** The economy in Kızılkuyu WDA and its vicinity is generally based on agriculture and animal husbandry, with little trade. "Pistachio, wheat, barley and lentils" are the most cultivated products in the settlements of Kızılkuyu WDA. There is no irrigated agriculture in the area. There is a seasonal migration out of the village-neighborhood in the project due to limitations in agricultural production, large family structure and limitation of employment opportunities. An important part of the population works under difficult conditions over 4-9 months of the year.

Animal production and animal husbandry are the main source of livelihood for a large number of families in Kızılkuyu WDA and this is usually a necessity as crop production does not provide sufficient income due to soil, irrigation and geographical conditions.

A common point in settlements is the fact that dry agriculture is common due to the low amount of production per hectare.

The main livelihoods of families in the area may vary according to the existence of agricultural land, livestock activities, amount of labor, seasonal agricultural labor and recycling activities in Istanbul. This is followed by seasonal labor and livestock. Livestock is not a primary source of livelihood in any residential area.

✓***Recreation and Tourism:*** Kızılkuyu The WDA has the potential of nature and cultural tourism due to the presence of many places having cultural heritage features both in and around the area as well as the potential for nature-based activities. There is currently no recreation area in WDA. In addition, there is no record of visitors to WDA.

However there are the potential tourism types that appear in the study area are as follows; **i.** *Rural Tourism – Ecotourism (Bird watching, Wildlife monitoring (Gazelle monitoring), Nature hiking Photo safari)* ***ii****. Culture tourism,* ***iii****. Agro-tourism.*

3.1. Threats and Recommendations

- Greenhouses, apiculture, cooperatives and project-based economic activity seem to be absent with exceptions. Priority should be given to the necessary training and incentives.
- Rangeland is threatened by drought, misuse and construction.
- Both ruminant and cattle breeding are widespread in the region. However, there is a decrease and a slowdown in the sector due to the risks mentioned above.
- Infrastructure, superstructure and sewerage services are largely inadequate. While the roads are relatively good, in-village services are inadequate in most places.
- Recently, with the establishment of organized industry, the waste water of the industry passes through some villages in the region. Therefore, humans and animals become ill. The people of the village are disturbed both by the disease of the animals and the mosquitoes caused by this water.
- Protected wildlife in the region is at risk of hunting and theft.
- Vocational training and courses for women in the region are very poor. However, women demand training courses. Since most of the villages do not have health services, they go to city hospitals.
- The perception of girls or boys in the region is against girls because of dominant social relations and economic activity. The ratio of those who give equal value to both sexes is very small.
- Generally, the right to inheritance and property belongs to the man. No rights are generally granted to women. Women are often given low-value gifts to renounce their rights.
- The economy in Kızılkuyu WDA and its vicinity is generally based on agriculture and animal husbandry, with little trade. However, animal husbandry is gradually decreasing due to the increase in costs and drought causing seasonal agricultural and paper collection to emerge. Crop plant production is generally not practiced in the villages. Existing plants are also exhausted due to incorrect collection.
- The villages close to the city in the region under investigation started to lose its structure as a result of the pressure/domination of the city. Poverty, drought, unemployment triggered migration from the region to the city and into different provinces, while the villagers turned to subcontracting.

3.2. Recommendation on Socio-cultural and Socio-economic Features

The proposals for working areas for rural development are discussed under four main sections. These are related to the economic, organizational, socio-cultural, environmental recommendations.

Basic recommendations for economic purposes; increasing irrigation opportunities in crop production, increasing productivity in crop production, conducting studies on product diversity, performing demo studies on closed soilless vegetable production, providing input support to reduce costs, breeding on animal husbandry establishment of processing plants for milk and dairy products, diversification of products and marketing high value-added products, encouraging them to be carried our through cooperative initiatives, establishment of forage supply facilities, mushroom cultivation for women, pilot activities such as poultry farming, development of products for rural tourism and integration of tourism activities with agriculture.

✓ ***For organizational purposes;*** establishing co-operatives that will bring women's presence to the forefront in crowded populations and improving the existing cooperatives, common attitudes to reduce input costs, training for women and men on the subject of cooperatives.

✓ ***For socio-cultural purposes;*** establishment of social facilities to engage women in joint activities; creation of special programs for young people; vocational education, technology literacy, identifying activities that will facilitate the integration of home and work life for women and providing the folkloric values specific to the region.

✓ ***For environmental purposes;*** Rehabilitation of pasture and improving the productivity, village-settlement landscaping, initiation and completion of sewerage works, improvement of village-settlement roads, providing sustainable use of medicinal and aromatic plants and transforming them into economic value, conservation of biodiversity and awareness raising and taking measures for drinking water, especially in summer months. The main activity components of the Strategic Plan in terms of Development in the study area can be grouped under 4 main areas such as;

1. Processing and selling of agricultural products,
2. Activating livestock potential,
3. Increasing the value added income from agriculture,
4. Development of tourism on the common basis of tourism-agriculture-history-culture.

4. ONGOING GRAZING ACTIVITIES

According to the 2019 data of Şanlıurfa Provincial Directorate of Agriculture and Forestry in 11 settlements within Kızılkuyu WDA, there are 17524 ruminants, 5167 cattle and 175 culture breeds. As of the end of 2018, a total of 351 individuals were counted in Kızılkuyu WDA based on the census study conducted by the 3rd Regional Directorate of the General Directorate of Nature Conservation and National Parks for the gazelles. It was further stated that there were 154 individuals in Kızılkuyu Gazelle Production Station.

There are 94583 ha pasture area in the WDA, jointly used by cattle, ruminants and gazelles.

Kızılkuyu WDA steppe pastures are included in steppe pasture groups that are poor in yield and quality. Although the quality of pastures is poor, the animals are grazed well above the carrying capacity (approximately 2.5 times more). This situation shows that in Kızılkuyu WDA, ruminants, cattle and gazelles cannot be fed in a quality way.

There are 3140 tons of roughage deficit for the existing animals in the project site. This forage shortage can be met by rehabilitating steppe rangelands, controlled grazing, increasing the rate of forage crops grown in field farming and purchasing external forage.

4.1. Threats and Recommendation

İn WDA, the quality of pastures is poor. It is possible to increase the yields 2-3 times as a result of the protection of the pastures used in WDA for a period of 3-4 months.

The ratio of other pasture plants in the grazing area was higher than that of both cereals and legumes. This is not desirable situation. This is due to the fact that the animals in the pasture graze primarily plants which are delicious and of good quality. As these plants are grazed, the proportion of plants in the reproductive and invasive groups increases. Ideally, the ratio of cereals should be 70% and legumes should be 30% in a pasture. In order for this ideal cycle to occur, the animals should be grafted/ inoculated in the pasture and the seeds of the grass and legume plants compatible with the pasture should be grafted/inoculated. In addition, poisonous, prickly plants that are not grazed by animals should be controlled.

It is risky for wild and cultivated animals to maintain their life and yield shares in a sustainable manner due to the poor and insufficient vegetation of the pastures in the project area. However, the region is threatened by drought, temperature and desertification in some seasons. In addition, yields of pastures decrease in terms of both quality and quantity due to early grazing in spring and overgrazing of pastures. As a result of this vicious cycle and continuity, plant and soil loss as well as erosion are significant problems in the pastures.

The way to prevent this is not to graze the animals in the pasture in early spring. A controlled grazing should be practices, if necessary, appropriate seeds from outside the region should be sowed in the pasture, and inoculation and fertilization should be conducted. Among the pasture restoration techniques, wells should be drilled for the purpose of animal watering in appropriate sections of Kızılkuyu WDA and salt shakers, water-bowls, shades, pasture paths, itching stakes should be facilitated for the animals in the pasture.

A good pasture management planning is required for the sustainability of steppe areas. This plan has four basic principles. The success of these plans depends on their thorough implementation**. 1-**Grazing in appropriate season grazing, **2-**Grazing with the appropriate type of animal, **3-**Uniform grazing, **4-**Grazing with the number of animals according to the grazing capacity.

The reactions of plants against grazing in all seasons and every development and growth period are different. Therefore, it is extremely important for successful management to examine all the seasons thoroughly and determine the periods where the plants are not damaged. There are critical periods where pasture plants are sensitive to grazing and therefore should not be grazed at. These periods are; The Critical Period of Spring, The Period of Summer and The Critical Period of Fall.

For these three seasons, critical periods should be determined based on the characteristics of the grazing areas and the plant composition. These periods should be taken into consideration in planning the grazing activities.

In the grazing planning and pasture breeding studies, forage preferences of the animals and the plant composition of the pastures should be examined very well and planning should be carried out according to these characteristics.

The Gazelle habitat should be taken into consideration during any planning studies of grazing, restoration and improvement activities foreseen in the pastures of Kızılkuyu WDA.

In order to increase both pasture productivity and animal production in pastures, "Rotational Grazing System" should be applied in the study area.

5. LIVESTOCK SITUATION

Şanlıurfa province has an important share in the presence animals in Turkey with two million of sheep and goat and 300 thousand cattle. When the changes in the number of cattle and ruminants between 2007 and 2017 are examined, it can be seen that the number of bovine animals has increased by approximately 2.25 times and the number of ruminants has increased by only 1.2 times.

Ruminant and cattle breeding in the region are carried out by traditional methods based on pasture management. The animals are grazed in the pasture from spring to late autumn, and in winter they are fed with ration mostly consisting of barley and straw. Cattle breeding in the field can be divided into three methods; fattening cattle for meat production, dairy cattle breeding for milk production and traditional cattle breeding to meet their own needs.

It is a common practice to rent pastures as wintering areas or barracks in the region. There are 46 pastures that are rented out as a wintering area in Şanlıurfa province. The ones related to the Kızılkuyu WDA are given in Table 1. This mode of operation leads to intensive grazing of pastures not only in this area but also in other areas.

Table 1. Rangeland enterprises related to Kızılkuyu WDA

RANGELAND ENTERPRISES		Location of protected areas and rangeland	Status of enterprises
Town	District		
EYYÜBİYE	UĞURLU	Located within the project area of Kızılkuyu WDA	Active
EYYÜBİYE	KOÇÖRENİ	Located within the project area of Kızılkuyu WDA	Active
EYYÜBİYE	KADIKEND	Located within the project area of Kızılkuyu WDA	Active
EYYÜBİYE	YUKARIÇAYKUYU	Located within the project area of Kızılkuyu WDA	Active

When the livestock activities carried out in Kızılkuyu WDA are evaluated in terms of gazelles which have a significant resource value for the WDA, it can be stated that sheep breeding based on pasture leads to an important grazing competition, whereas cattle breeding does not lead to such competition.

The following conclusions and suggestions are presented based on the results of observations and researches about animal husbandry activities.

1. An alternative marketing network (Marketing cooperative?) should be sought to change the favor of producers in introducing animal products to the market.

2. Because of sharing the same pasture, animals in Kızılkuyu WDA (especially small ruminants) should be vaccinated for epidemic diseases (Brucella, alum, smallpox, echtyma etc.) which carry the risk of contamination to the gazelles. As well, regular monitoring of vaccination should be ensured.
3. Producers should be provided with basic training information (care-feeding) and general health protection rules (**isolation**: keep disease factors away, **immunization**: vaccination against common diseases and hygiene: pay attention to healthcare).
4. Grazing should be prohibited in areas (In absolute protection zones determined in Kızılkuyu WDA) where intensive grazing is carried out and which are important for the steppe ecosystem.
5. Support for animal production (credit, direct income support, tax exemptions, reduction of input costs, marketing support, etc.) should be reviewed in favor of the producer and an integrated, coherent support policy should be established.
6. Cattle farming should be encouraged rather than sheep to reduce the intensive grazing pressure on pastures.
7. The rented areas in and around Kızılkuyu WDA as wintering areas should be shut for operation.
8. Uncontrolled animal movements should be prevented to combat epidemic diseases.

6. BUFFER ZONES IN KIZILKUYU WDA

Ecological, social pressure and threat characteristics were taken into consideration in the formation of buffer zone in Kızılkuyu WDA by considering time and data accessibility limitations. Based on these characteristics, the criteria given in Table 2 are taken into consideration.

Table 2. Criteria used in determining buffer zone (taken from Anonymous 2004)

Criteria		High Sensitivity	Low Sensitivity
Ecologic	Slope	Steep slope > 10%	Plain or slight steep areas
	Aspect	Southern and western aspects	Northern and eastern aspects
	Available species	Important flora and fauna areas	General species and exotic species
	land use / land cover in vicinities	Steppe vegetation	Open areas
	Surface water	Spring waters, streams	
Cultural/Social	Historical/Archaeological sites	Registered and unregistered archaeological sites	
Pressure/threats	Structured Areas (Land use / land cover in the vicinity)	Urban Texture, Industry, Trade and Transportation Areas, Mine, Garbage Discharge and Construction Areas	

The buffer zones identified for the Kızılkuyu WDA were determined based on both the evaluations of experts in the field survey and the literature data. Equal weight was given to the criteria used here. Land uses outside the boundaries of the project sites but which are important in terms of biodiversity, ecosystem representation, archaeological / historical elements and which create pressure / threat are also taken into consideration. The buffer zones were then created by overlying all these data in the ArcGIS environment.

Kızılkuyu WDA buffer zones generated by overlapping the buffer zone criteria determined already, and the important habitats and buffer zones (Figure 2, Figure 3, Figure 4) proposed by the experts within the scope of their expertise areas in Kızılkuyu WDA are given in Figure 5.

Şanlıurfa Organized Industrial Zone, which is located in the northwest of Kızılkuyu WDA, has expanded approximately 2.5 km^2 within the WDA border. Therefore, no buffer zone has been established in the area where the Organized Industrial Zone is located. Therefore, it would be appropriate to revise the boundaries of Kızılkuyu WDA again considering the future situation of the Organized Industrial Zone. After revising the borders of the WDA, the buffer zone study should be performed again if deemed necessary.

The sizes of buffer areas determined as a result of the studies are given in Table 3.

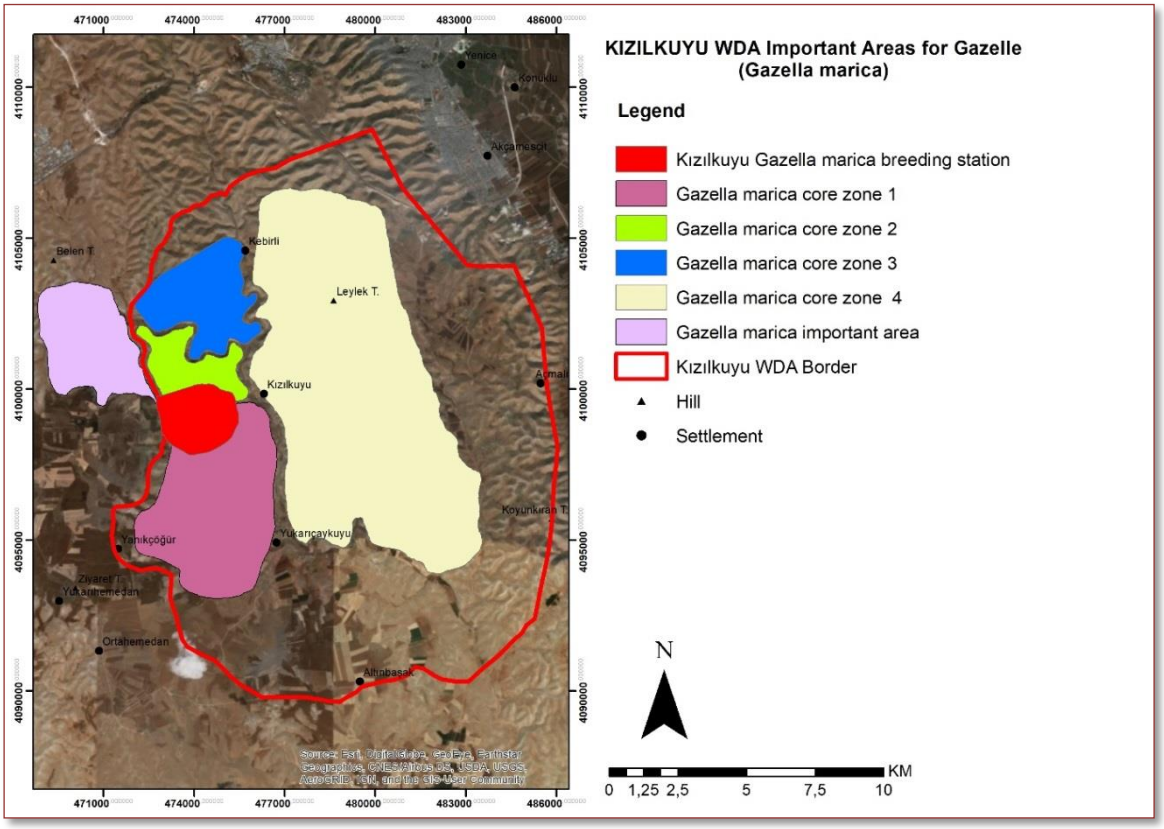

Table 3. The spatial data for Kızılkuyu WDA and Buffer Zone

Name	Area (ha)	Buffer zone (ha)
Kızılkuyu WDA	20504	5664

Figure 1. Ecological Criteria for Determining Buffer Zone for Kızılkuyu WDA: Important Habitats and Recommended Buffer Areas

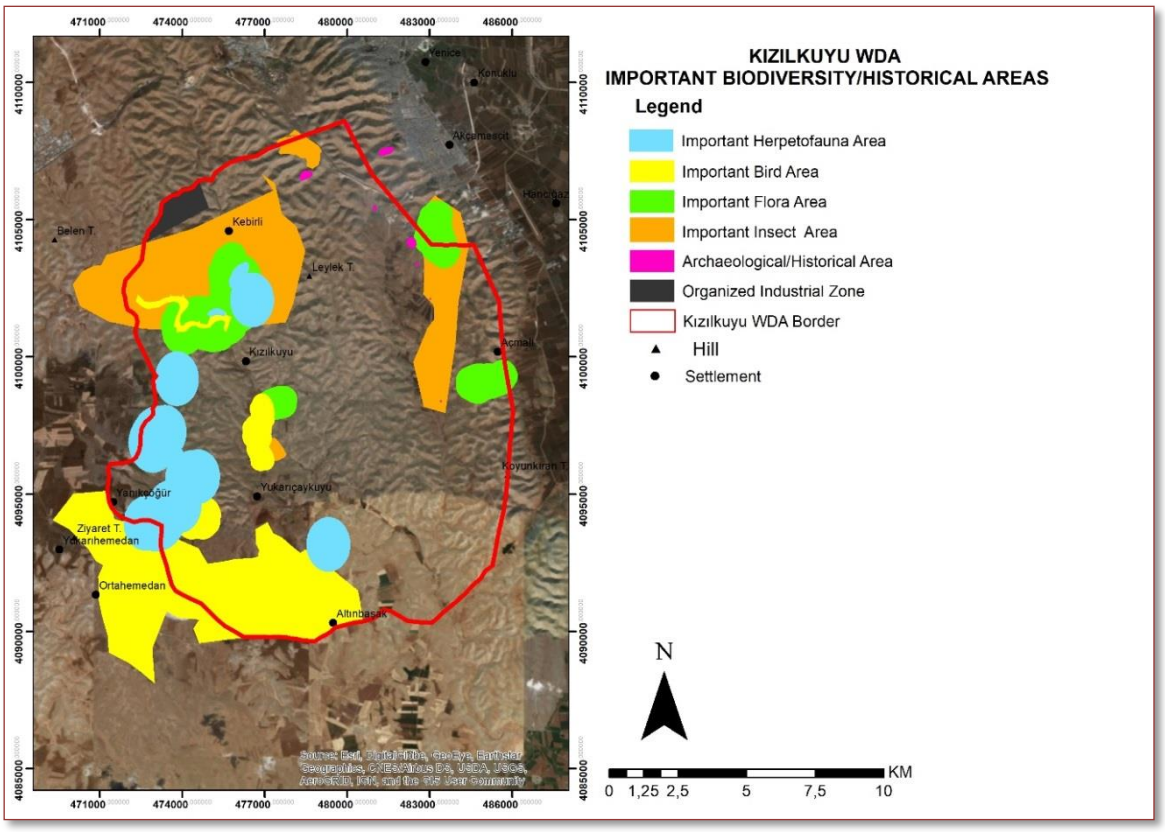

Figure 2. Ecological Elements and Pressure / Threats Used in Determining Buffer Zone for Kızılkuyu WDA

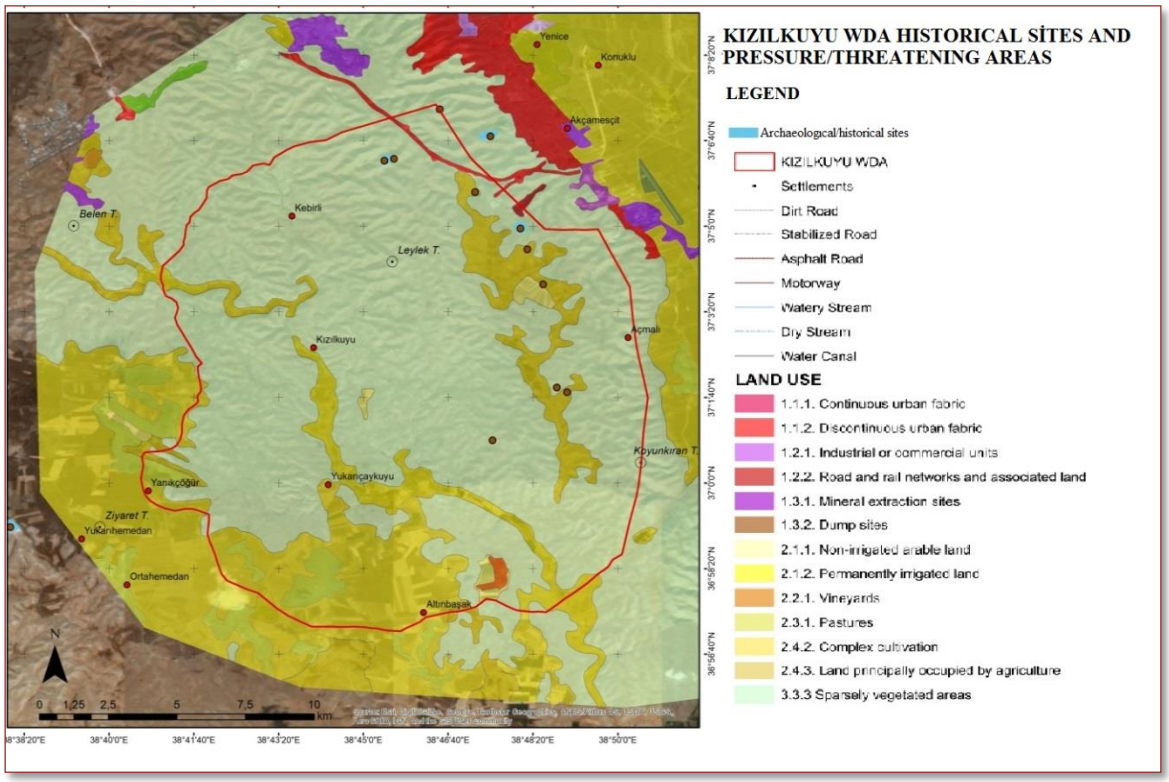

Figure 3. Cultural / Social Elements and Pressure / Threats Used in Determining Buffer Zone for Kızılkuyu WDA

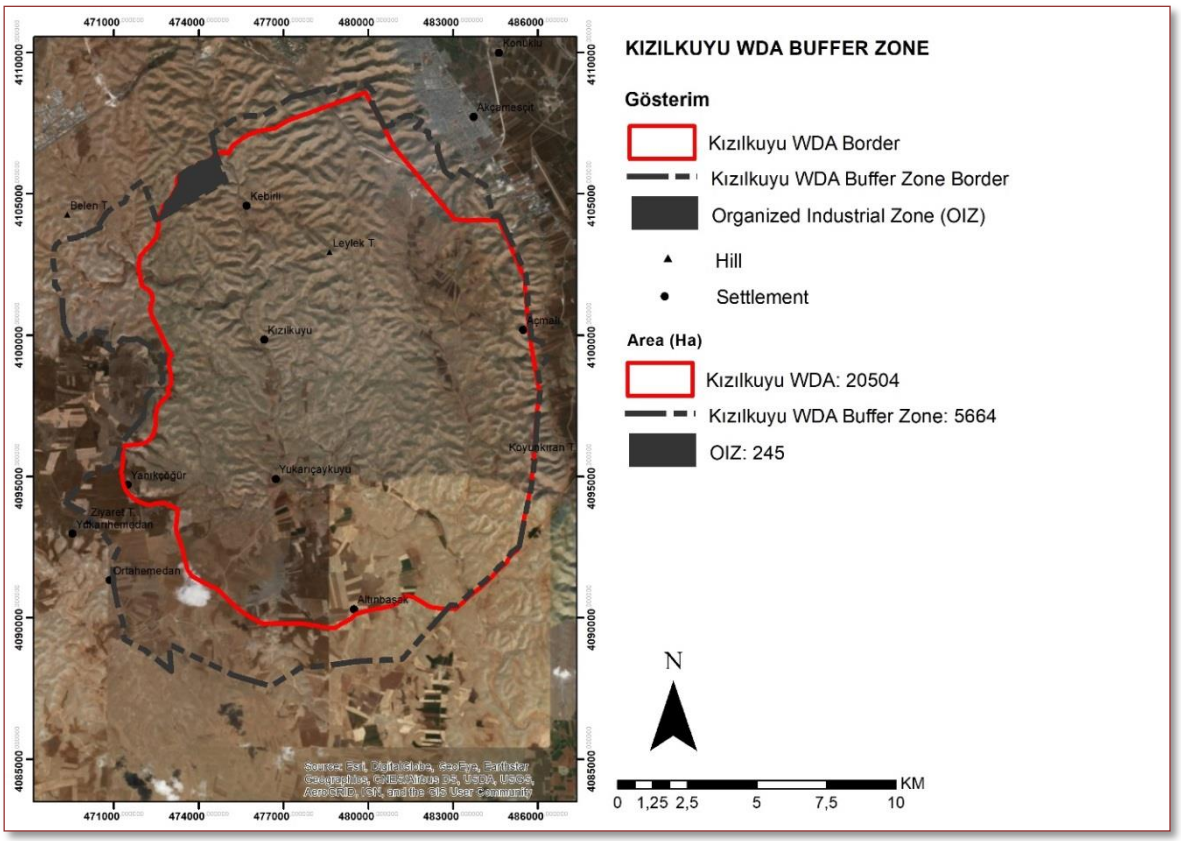

Figure 4. Determined Buffer Areas Around Kızılkuyu WDA