

**Ministry of Agriculture and Rural Affairs-World Bank
Climate Smart Management of Grassland Ecosystems Project**

Social Impact Assessment Report

**Climate Smart Management of Grassland Ecosystems Project
Management Office**

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1. Background of the project

Grassland is one of the largest terrestrial ecosystems and carbon pools on the planet. It is not only the source of forage for more than 50% of the world's herbivorous livestock, but also the main livelihood of nearly 600 million people. China is one of the countries with the largest grassland area in the world, and grassland accounts for 41.7% of the country's land area. Because most grasslands are located in the northern temperate zone with fragile environment, in recent decades, climate change and improper management and utilization have led to different degrees of grassland degradation in China. Especially in the Qinghai-Tibet Plateau and its surrounding areas, climate change tends to be warm and humid, and the temperature difference between day and night is reduced. This not only seriously weakens the function of grassland ecosystem, but also seriously threatens the livelihood of herdsmen who depend on grassland for their livelihood. Therefore, appropriate grassland management measures are needed to cope with climate change.

In this context, the project of climate-smart grassland ecosystem came into being. As an independent GEF project, the project was first proposed in August 2014 to explore regional cooperation in the sustainable management of grasslands at the landscape level and to demonstrate sustainable grazing and animal husbandry techniques for herders in the Heihe River Basin. For non-technical reasons, this idea was not approved by the GEF Secretariat at the time. In September 2017, the project adopted community participation and evidence-based grassland protection related policies as a new concept for climate-smart management of grassland ecosystems. In November 2017, it was approved by the GEF Council as a sub-project of the China-Global Environment Facility Partnership for Sustainable Agricultural Development.

The project selects Qilian County of Qinghai Province to establish demonstration zones in grassland ecosystem in the middle and upper reaches of Qilian Mountain-Heihe River basin of China. This aims to provide demonstration for technological innovation and policy adjustment of grassland animal husbandry and grassland ecosystem to cope with climate change and integration of efficient production mode of grassland animal husbandry which is conducive to carbon sequestration and emission reduction. The project proposes to improve the policy and capacity of sustainable management of grassland ecosystem, and to carry out evidence-based ecological compensation mechanism, climate-smart grassland ecosystem management demonstration and knowledge management. This is expected to enhance the ability of grassland animal husbandry and ecosystem to resist climate change, and to promote sustainable development of ecologically fragile pastoral areas sensitive to climate change and concentrated by ethnic minorities.

2. Basic conditions of the project counties, towns and villages

Qilian County is located in the northeast of Qinghai Province, north of Haibei Tibetan Autonomous Prefecture, and is known as the “North Gate” of Qinghai. The county has a total population of 51,237, including 45 administrative villages in 4 townships and 3 towns. The total number of households in agriculture and animal husbandry is 10,031 and the population is 39,876. The cultivated land area is 38,000 mu, the grassland area is 15.52 million mu, and the variety of livestock is 1,174,800 heads, the slaughter rate of livestock is 57.11%, and the commodity rate of livestock is 54.52%. Qilian County belongs to the plateau continental climate. The annual average

temperature is 1 degree Celsius and the annual precipitation is about 420 mm. The climate is cold and dry, and the temperature difference between day and night is large. The difference between the highest and lowest temperatures can reach 50-60 degrees throughout the year. Winter is long without summer, and spring and autumn are short; sunshine is abundant, water and heat are in the same period, and July-September has the highest temperature and are also rainy seasons. Under this condition, grassland has typical characteristics of unbalanced ecosystem, such as low primary productivity, high vulnerability and highly spatial and temporal heterogeneity of resource distribution. There are 521 poor households (1735 people) in Qilian County. With strong supports of governments, the per capita income standard of poor households has been greatly improved and the living standard has been rising, which is conducive to promoting the balanced economic and social development of the region. Moeller Town is a pure animal husbandry town with animal husbandry as the leading industry, which is located in the southeast of the county, bordering on Menyuan County in the east, bordering Haiyan County, Gangcha County and Datong County in the south, connecting Tianjun County of the Haixi Mongolian Tibetan Autonomous Prefecture in the west, and adjacent to five townships (towns) such as Tunbao Town of Qilian county in the north. The east-west span is 280 kilometers long and has a long and narrow distribution. The three highways of Panda, Chamo and Huangjia are in the territory. The town covers a total area of 5.74 million mu, accounting for 24.3% of the county's area. There are 3.94 million mu of available natural grassland, accounting for 22.4% of the county's grassland area. In 2018, there were 2,153 households and 7,182 people in the town. Among them, there were 1,507 herding families and 5,026 herders. There are 6 ethnic groups, including nationalities of Mongolian, Tibetan, Tu, Han, Hui and Baoan, of whom ethnic minorities account for 96% of the total population. Every year, more than 50 million yuan is allocated for projects in the town, including 20 million yuan for ecological compensation, 25 million yuan for infrastructure construction such as shacks, and the cost of subsidizing farmers to plant 5,000 mu of grass in winter nest and 1.55 million mu of black soil beach management and pest control. The per capita net income of the town is 21,528 yuan, among which the per capita income of Zhasha village is the lowest at 20,762 yuan. Duolong village has the highest per capita income at 22,126 yuan. The per capita income of other villages is higher than that of the whole town (Table 2-1).

Table 2-1 The pastoral household, population and per capita income of the villages in Moeller town

village	Total number of households (households)	Total population (person)	Number of ranchers (households)	Herd population (person)	Per capita net income (yuan)
Hailang	583	1808	408	1265	20823
Duolong	371	1199	260	839	22126
Wa Riga	309	1046	216	732	21860
Cai Shitu	275	950	193	665	22047
Lao	378	1272	265	890	21549
Rigen					
Zhasha	237	907	165	635	20762

Moeller	2153	7182	1507	5026	21528
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Data resource: Moeller town statistics, 2018.

The geographical and demographic conditions of the six villages in Moeller are different (Table 2-1). Hailang Village is located in the middle of Moeller Town, with an altitude of 3400-4600 meters, an annual average temperature is -2.3°C, an absolute frost-free period about 80 days, and the precipitation is scarce. Datong Mountain, a branch of Qilian Mountain, stretches along the southern edge of the village, Toler Mountain lies across the northern part of the village, and the Moeller River runs through it. There are 408 households with 1265 members, including Mongolian, Tibetan, Tu and Han ethnic groups. Ethnic minorities account for more than 96% of the total population of the village. Gathered by Han, Tibetan, Mongolian, Hui and Tu nationalities, Duolong Village is a pure animal husbandry village with 260 households and 839 people and the average altitude is more than 3,400 meters. Wa Riga Village is located in the north of the government of Moeller Town, 43 kilometers away from the town government with the average altitude about 3,600 meters. It is a pure animal husbandry village with 216 households and 732 people inhabited by Mongolian, Tibetan, Han and Tu nationalities. Cai Shitu Village is a pure animal husbandry village inhabited by Mongolian, Tibetan, Han, and Tu ethnic groups. The average altitude about 3,500 meters. There are 193 households with 665 people in the village, and ethnic minorities account for more than 96% of the total population of the village. Lao Rigen Village is located on the east side of the new district of Moller Town, Qilian County. It is located on the mountain and beach land on the south side of the Toler Mountain. The altitude of the territory is 3305-4460 meters, and the average annual precipitation is 348.8 mm. The northwest wind prevails throughout the year. Zhasha Village is located in the northeastern part of the town. The average altitude about 3,200 meters. There are 165 households with 635 people in the village, of which 77.9% are Mongolians, 6.9% are Tibetans, 12.5% are Huis, and 2.7% are other ethnic groups.

Table 2-2 Grassland and livestock conditions in the six villages of Moeller

village	Grassland area (10,000 mu)			Livestock (SSU)			
	Land area	Natural grassland	Winter and spring	Summer and autumn	Cattle	Sheep	Horse

Hailang	136.65	93.15	49.08	44.07	24345	45905	186
Duolong	82.32	67.16	33.28	33.88	17280	48900	175
Wa Riga	104.65	62.35	48.96	13.39	14594	27445	132
Cai Shitu	86.42	45.18	38.28	6.9	12013	24250	123
Lao Rigen	91.88	66.85	41.56	25.79	15023	20705	156
Zhasha	72.1	39.17	18.85	20.32	10800	47500	124
Moeller	574.02	373.86	230.01	144.35	94055	214705	616

Data resource: Moeller town statistics, 2018.

The grassland and livestock owned by each village in Moeller town are shown in Table 2-2. It shows that the livestock structure of the town is dominated by cattle and sheep. According to the standard of 4 sheep per cow, sheep account for about 30% of the total amount of livestock, while cattle account for about 60% and horses account for a small share. There are only over 600 horses in the town and over 100 horses in each village. According to the statistics, each standard sheep has about 60 mu of natural grassland.

3. Basic situation of project committee, groups and herders

July 13-25, 2018 World Bank and Ministry of Agriculture Project "Preparatory Baseline Survey" investigation team in Qilian, Qinghai province and Shandan, Gansu province, as well as November 19-24, 2018 small investigation team in Qilian county Moeller town baseline survey, the project was selected to be carried out in Moeller town, Qilian, Qinghai province. According to the baseline survey (see Appendix 1 for the baseline survey information), this report mainly focuses on the 6 administrative villages, 27 communities, 116 pastoral groups and 1507 pastoral household representatives in Moeller town, Qilian county. Field interviews and other means were used to collect the information of 6 villages, 27 communities and 116 pastoral cooperative groups and herders in Moeller town, where the project was located. In order to meet the needs of the project, informal organization cooperative group of herders is established on the basis of the original animal husbandry activities of herders, such as shearing wool, manuring sheep and collecting cow's hair, etc. The average group consists of 13 herder households. Since the project will be based on pastoral groups, 58 of which will be randomly selected as project implementation areas and the remaining 58 pastoral groups as control areas, these groups will be distributed in most or all of the 6 villages. As pasture contracting takes place at the social level, we take all 27 associations as project associations and each group randomly selects one herder as the sample. In addition, as more formal organizations, we have considered cooperatives. There are two cooperatives in the project area with members from different communities in their villages. The distribution of villages, associations, groups, herdsmen and cooperatives in the sample area is shown in Table 3-1.

According to the analysis of survey data, at present, the average size of herding households in each community in Moeller town is 56, and the average herding population is 186. The number of male and female herding households is symmetrical. However, the number of herding households with livestock only accounts for about half of the total number of herding households. And some herders have no grassland at all.

Table 3-1 Distribution of project committee, groups and herders reported

village	Committee (unit)	Group (unit)	Herder (household)	Cooperatives (unit)	Cooperative herder (household)
Hailang	6	29	408	-	-
Duolong	4	16	260	1	44
Wa Riga	4	20	216	-	-
Cai Shitu	4	16	193	-	-
Lao Rigen	5	25	265	1	42
Zhasha	4	10	165	-	-
Total	27	116	1507	2	86

Data source: survey conducted November 19-24, 2018

For poverty in pastoral areas, 9% of the total pastoral households in each community subject to poverty. On the whole, this proportion is relatively high. However, most of these poor households are precisely supported by the state. In terms of the distribution of population age, the number of people over the age of 60 in each cooperative is small, with an average size of only 37, and the distribution difference is larger than that of other age groups, as shown in Table 3-2. The population is mainly distributed between 20 and 60 years old, accounting for about 60% of the total population of each community, and the minimum and maximum values of the population are higher than other age groups. However, the average size of the population aged 10-20 is 42, and the number of children under the age of 10 is relatively small (27). In general, the population age distribution is relatively concentrated, with young and old people being the majority. In addition, in each age group, the distribution of men and women is more equal, about 50 percent of each. In addition, the population aged between 20 and 60 years old is the majority of grazing, which is mainly male. The proportion of people younger than 20 years old or older than 60 years old is very low. Among the population engaged in grazing, the education level is basically junior high school or below, and the education above senior high school is rarely grazing.

Table 3-2 Age distribution of population of Moeller

	Min	Max	Mean	std
More than 60 years of age	16	230	37	47
20 to 60 years old	80	220	157	35
10 to 20 years old	14	89	42	20.87
Under the age of ten	10	70	27	14

Data source: community level survey.

Table 3-3 shows education of people with different ages. The overall education level is low. In each community, only 14 people received education above high school. The distribution differences among communities are not evident. 27 people were educated above junior middle school, and 42 people received elementary school, while 91 people were never educated, suggesting that illiterates account for a large in each community. The standard deviation indicates that the distribution of illiterates varies greatly among different societies. Education level in this region needs to be improved urgently.

Table 3-3 Education level of the sampled population in communities of Moeller town

	Min	Max	Mean	Std
Senior high school and above	4	35	14.53	9.31
Junior high school	3	100	27.53	23.68
Primary school	7	100	42.16	31.69
Illiteracy	6	203	90.58	67.37

In terms of ethnic distribution, Tibetan, Mongolian, Tu and Hui ethnic groups in this region account for a large share while other ethnic groups account for a small proportion. Among them, the Mongolian nationality is the largest one, accounting for more than 50% of the total population, and the average population of each community reaches 131, accounting for a large proportion. The second is the Tibetan nationality, which accounts for about 30% of the total population. Of course, the population of Hui nationality should not be underestimated, some communities still have a certain number of Hui, while other ethnic groups account for a small proportion, basically sporadic distribution. On the whole, from the perspective of variance, the distribution of Tibetan, Mongolian and Hui ethnic groups varies greatly among different communities, which may be related to the large population base, but the variance of Tu ethnic group and other ethnic groups is small, indicating that all communities have the distribution of these ethnic groups, but only in a small proportion.

Table 3-4 Population distribution of all ethnic groups of sample community in Moeller town

	Min	Max	Mean	std
Tibetan	1	230	87.68	62.15
Mongolian	38	241	131.4	50.27
Hui	0	87	23.21	23.78
Tu	0	19	4.63	6.52
Other ethnic groups	0	30	6.89	9.57

In terms of population emigration, about 20% of herders went to the city with the whole

family in each community. Most of them moved to Qilian county. Among the migrant workers, most of them are young and middle-aged male with age of 25-40 years old, and not high education level. They are generally engaged in lower-level jobs.

In addition, Qilian county belongs to the plateau continental climate with annual average temperature of 1 °C, annual precipitation of about 420 mm. The climate is cold and dry, the temperature difference between day and night is large, the highest temperature and lowest temperature difference can reach 50-60 degrees throughout the year. Winter is long without summer, spring and autumn are short. Sunshine is abundant, water and heat are in the same period, and July-September with the highest temperature and the most rain. Under such a climate, grasslands there are characterized by unbalanced ecosystem, low primary productivity, high vulnerability and high spatial and temporal heterogeneity of resource distribution. Therefore, the project area is not suitable for agricultural production, but animal husbandry is well developed and can basically meet the living needs of local people.

As a pure animal husbandry town with animal husbandry as the leading industry, the main livestock of the six villages in Moeller town are yaks and Tibetan sheep, and a few herders have horses in their homes. 116 households were randomly selected from 116 mutual-aid groups in the whole town, and the livestock raising situation was calculated. 1 yak =4 sheep is counted as the standard sheep. Since only 18 herders keep 1-4 herds of other animals (such as horses), only yaks and sheep are added in the calculation. The results showed that in 2018, about 13 percent of herders raised less than 200 sheep, about a third raised 200-400 sheep, 45 percent had 400-1,000 sheep, and less than 10 percent had more than 1,000 sheep. In 2018, the number of yaks in each village increased significantly compared with that in previous years, and the livestock price was generally better than that in previous years. However, from 2015 to 2016, the number of yaks in each village was relatively small. According to the survey, the farmers suffered from snowstorms in those two years, and some farmers even lost more than 150 sheep and more than 50 cattle. The cattle and sheep that survived were also in poor health, and it wasn't until 2018 that sheep herds have been recovered both in amount as well as in health.

3.1 Production activities and income of herders in the project area

Animal husbandry production is the main livelihood activity of herdsman. Among the investigated herdsman, 97.4% of them regarded animal husbandry as their only source of income, and only 2.6% of the households have members going off-farm jobs and having income sources from non-livestock production. Different from other grassland pastoral areas such as Inner Mongolia, the animal husbandry in the project area still graze in a traditional way. Only 15.8% of the herdsman carry out house feeding or semi-house feeding production. Grassland and labor are the most important inputs in animal husbandry production, and infrastructure such as machinery, sheds and wells in animal husbandry production is extremely low.

Animal husbandry production calendar. The main activities and time nodes of local livestock production are as follows: lambs in November, in March, people are invited to help with sheep manure, and cow dung is cleared every day by the family; some herdsman gather in mid-June to poke cattle hair; sheep shearing and milking in June-July. In addition, there are routine animal husbandry activities such as grazing every day. Under the above condition, the animal husbandry has the massive demand to the labor force, and the production activity of different time node also

has the different request to the labor force skill. However, there are only two labors engaged in animal husbandry production in each household, which is difficult to fully meet the demand for labor in production. In this case, herdsman generally cope with the labor demand of node production activities, such as dedusting and shearing, by means of reciprocal cooperation, and meet the labor demand of conventional production activities, such as grazing, by employing other people.

Table 3-5 Gender division of labor in animal husbandry activities

Activities	Milking	Shearing	Smooth cow hair	Grazing	Sheep dung	Cow dung	Cooking	Shortening
Male		*	*	*	*	*		
Female	*	*	*	*		*	*	*

Women play a very important role in the production of animal husbandry. They participate in all animal husbandry production and living activities except for clearing sheep manure annually, but they take care of cooking for laborers in this activity (Table 3-5).

In terms of grassland input. The winter and spring pastures have been allocated to individual herdsman, but the summer and autumn pastures have not. The herdsman in the community use the pastures together. Herdsman usually use summer and autumn pastures from mid-July to August 25, and transfer livestock to autumn pastures from August 25 to October 15 (some communities do not separate autumn grasslands from summer grasslands and combine them into summer and autumn pastures, so that herdsman in these communities will graze longer in summer and autumn pastures). From October 15 to early July, the winter and spring pastures will be used, and some herdsman will rest graze during the period from mid-May to the end of June. Households whose pasture area is too small to meet the production needs of animal husbandry generally expand the grassland area by renting winter and spring pastures. According to the survey data, 45.6% of the herdsman rented pastures. In addition, a small number of herdsman expand the area of grassland use through grazing substitution. Specifically, these herdsman graze for their employers and put their livestock together on their employers' pastures. Unlike other grassland pastoral areas, the local pasture mainly relies on natural grassland to obtain the forage needed for animal husbandry production, and seldom purchases forage from outside.

3.2 Relevant knowledge, attitudes and behaviors of herders in the project area about grassland ecosystems

Herdsman's cognition of grassland ecological situation. According to the field surveys, grassland degradation is serious in Qilian County. The area of moderately and above degraded grassland is about 5.1 million mu, accounting for 33% of the available grassland area. Among them, the moderately degraded grassland area is 4.4 million mu, accounting for 28.4% of the available grassland area, and the heavily degraded grassland area is 700,000 mu, accounting for 4.4% of the available grassland area. Table 3-2 and Table 3-3 show the subjective evaluation of the quality of winter pasture and summer pasture in each of the six villages. The subjective scores of the ecological conditions of winter and spring pasture and summer and autumn pasture were 3.3, which means that grassland degradation is not serious and only slightly degraded. Among them,

Dulong and Zhasha have basically scored more than 4 on the ecological scores of the winter and spring grassland and the summer pastures, which means that the grassland ecological condition is good. By comparing the subjective evaluation of grassland ecological status of each herdsman group with the actual grassland ecological status, we can see that there is a deviation in the herdsman's understanding of grassland ecological status, and the perception of the degree of grassland degradation is not accurate enough. This may be related to data not obtained from one-to-one interviews.

The attitude and behavior of herdsmen on grassland ecological protection. According to the requirements of the “Measures for balanced management of grass and livestock”, in order to maintain and improve the ecological environment and promote the sustainable development of animal husbandry, livestock raised by herdsmen should be dynamically balanced with the total amount of forage available. In the animal husbandry production, the herdsmen will consider the ecological situation of the grassland to a certain extent, and adjust the amount of livestock raised according to the precipitation and the growth of pasture. Table 3-6 shows the main considerations for decision-making in animal husbandry production. Grassland condition, household consumption demand and the sale price of livestock products are the main factors affecting the quantity of livestock raised by herdsmen, among which grassland condition is the most important factor. Pastoralists generally said that grassland ecological protection is necessary, and local religious culture and traditional customs emphasize the respect of grasslands and the protection of ecology. In the animal husbandry production, the herdsmen mainly exert excessive negative impact on the ecology through seasonal rotational grazing and leased pasture to control production. In addition to these measures, the herdsmen rarely take other measures that are beneficial to the ecological protection of grassland, such as supplementary feeding, semi-house feeding and artificial reseeding. Therefore, although the herdsmen have a supportive attitude towards grassland ecological protection as a whole, some measures have been taken to control the negative effects of production on grassland ecology. However, in view of the degree of grassland degradation in Qilian County, these measures are obviously insufficient to achieve the goal of grassland ecological protection.

Table 3-6 Determinants of herders’ production decision-making

	Forage growth	Household consumption demand	Livestock sales price	Loan repayment demand	Ecological policy
Quantity (household)	49	25	21	16	4
Share (%)	67.1	34.2	28.8	21.9	5.5

The cognition and behavior of herders on grassland ecological protection policies and measures. At present, the policy of grassland ecological protection in Qilian County mainly includes the balanced grassland and livestock, the policy of forbidding grazing and resting grazing. Specifically, the local grass and livestock balance policy is implemented in the winter and spring pasture, and the grazing prohibition and grazing rest policy is implemented in the summer and autumn pasture. Although the central government provides pastoralists incentives and subsidies for forbidding grazing and resting grazing to encourage pastoralists to cooperate with the implementation of the policy, according to the survey at the level of pastoralists, very few

pastoralists (only 5.5%) take into account the policy requirements in livestock production when deciding how many animals they would raise. Table 3-7 shows the average livestock stocking rate of each group of herdsmen in winter pasture, and there are some differences in the average stocking rate of each village group level. In the town of 116 groups, the average 2.8 mu winter and spring pasture carries a herd of standard sheep, which is far from the livestock carrying rate standard of 8-14 mu of sheep specified by the local grass and animal balance policy. Considering the situation of summer and autumn pasture and artificial grass planting, grassland leasing and purchasing forage, the carrying pressure of livestock is reduced by twice, that is, 5.6 Mu grassland carrying a herd of standard sheep, which is still far beyond the carrying capacity.

Generally, the area of winter and spring pastures in each village is larger than that in summer and autumn pastures. The winter and spring pastures in Hailang Village, Duolong Village and Wariga Village are 497300, 299700 and 380,100 mu, respectively, while the summer and autumn pastures are 335500, 20200 and 257,700 mu, respectively. The situation in Zhasha Village is particularly prominent. There are 268,186 mu of grassland in the village, including 126,327 mu of winter and spring pasture and 141,859 mu of summer and autumn pasture. Given the total 51569 herds of livestock, even if not converting yaks and other livestock into standard sheep, the grassland pressure is 5.2 mu per herd of livestock. Of course, the 1301 mu of artificial grass in the village was not considered here, and the area of the pastures rented by the herdsmen was also not taken into account. In the ordinary herdsmen of the town (not participating in the grass planting project), about 25% of the herdsmen planted 1-2 acres of oat grass in their winter nest. According to one-acre artificial grass is equivalent to 10 acres of winter and spring grassland, one animal has a grassland area of 5.5 acres. It seems that the effect of artificial grass planting on grassland pressure is very limited. Table 3-7 shows the subjective evaluation of the ecological status of winter and spring pastures and summer and autumn pastures at the level of each village group, as well as the average stocking rate of winter and spring pastures. It can be seen that the village group basically perceived their grassland degradation as slight. In Wariga, the pastures have severer degradation, no matter for winter & spring pastures or for summer & autumn pastures, if compared with the pastures of other villages. However, the average stocking rate of winter and spring grassland in each village group was very high, and the average stocking rate was less than 3 mu to raise a herd of standard sheep. This is much less than the local standard of 8-14 mu.

Table 3-7 Subjective scores of grassland ecological status at each village level

	Average quality of winter and spring grassland (numerical value)	Average quality of summer and autumn grassland (numerical value)	Average livestock carrying rate of winter and spring grassland (mu/SSU)
Duolong	4.0	3.9	2.7
Wariga	2.7	2.5	4.3
Zhasha	5.0	5.0	1.5
Lao rigen	3.3	3.3	1.9
Hailang	3.0	3.0	3.4
Cai shitu	3.0	3.0	3.9
Total	3.3	3.3	2.8

Note: The grassland quality is scored from 1-5, with 1 being severely degraded, 2 being moderately degraded, 3

being slightly degraded, 4 being undegraded, and 5 being excellent.

3.3 Status of female herders and their participating cooperatives in the project areas

From November to December 2018, the project team conducted a rough investigation on 6 administrative villages, 27 communities, 116 herder groups and representatives of more than 1,000 herder households in Moller town, Qilian county. Among these households, the average age of male herders is about 51 years old, the oldest is 95 years old, and the youngest is 19 years old. Herders aged 40-60 are the majority, accounting for 58.15% of the total herdsman. Herders aged 40-50 and 50-60 account for 34% and 24% of the total herders respectively. The average age of female herders is over 52 years old. The oldest is 88 years old and the youngest is 17 years old. Female herders aged 40-60 accounted for nearly 60% of the total number of female herders, of which 37% and 23% were female herders aged 40-50 and 50-60, respectively. Female herders over 60 years old exceed 28% of the total number of female herders, while men are less than 25%. Generally speaking, herders are characterized by aging and feminization.

Female herders accounted for 27.1% of the total herders in the town, with the highest proportion of women in Lao Rigen Village (44.8%), 23.3% in Duolong Village and 20.6% in Wariga Village. However, in the only two animal husbandry cooperatives in the town, female herders accounted for 15.11% of the total herdsman in the cooperative, of which the female participation ratio of Lao Rigen Cooperative was 19.05% and that of Duolong was 11.36%, which were far lower than the proportion of female herders in the whole village. Moreover, on the whole, the average age of women participating in cooperatives is 50 years old, and that of men is 47 years old. The average age of males in Lao Rigen cooperatives is 50 years old, and the average age of women is 52 years old. The members of the Duolong cooperatives are younger. The male in average is 44 years old and the female is 48 years old. In general, the number of women participating in cooperatives is few and their age are older than men. The literacy level of female herders is described in the national minority development report.

Since the project has been publicized and investigated in different forms in the project area since 2014, almost all the sample herders know about the project, but the specific implementation of the project, such as which villages or communities will be implemented, and the specific measures of the project are still unclear. With the progress of the project, herders in the project area, especially women, will be informed of the progress of the project and their opinions and suggestions in time.

3.4 Poverty situation of herders in the project area

From November 2018 to January 2019, the project team conducted interviews using WeChat, telephone and questionnaire grades, including 19 community level questionnaires and 74 herder household questionnaires. In addition, the project team made an investigation from November to December 2018 on 6 administrative villages, 27 communities, 116 pastoral groups and representatives of more than 1,000 pastoral households in Moller town, Qilian county. Although the sample data are used, to some extent, they can reflect the overall situation and provide reference for the issues concerned by this project. In assessing the poverty situation of herders in the project area, we use the standard number of sheep per capita as a specific indicator. Livestock

is the most important property of pastoralists (especially livestock farmers) and is their main source of income, providing basic protection for the livelihood of pastoralists. Having a larger number of animals means that the family's standard of living is higher. According to the survey data, there are 89 standard sheep per capita in the town. Among them, Lao Rigen Village and Cai Shitu Village have 69 and 64 sheep per capita respectively, which are far below the average level. The average number of 88 sheep per capita in the village of Wariga is not much different from the average; while the amount of livestock in Dulong Village, Zhasha Village and Hailang Village is higher, reaching 97, 115 and 101 herds of sheep, respectively. If the herds are viewed as the property of the herdsmen, the villages of Lao Rigen, Caishitu Village and Wariga Village are generally at a relatively poor level, which is lower than the per capita standard of the entire project area.

Table 3-8 Situation of poor households and poor people in 6 villages in Moller town

Village	Number of poor households	Population
Hailang	35	112
Dulong	27	81
Wariga	27	80
Cai Shitu	32	100
Lao Rigen	30	95
Zhasha	22	79
Total	173	547

Source: Moller Town.

Absolute poverty still exists in the project area. The poor households in the town account for about one-tenth of the total households, and the poor population also accounts for 10% of the total population. For example, among all 237 households with 907 people in Zhasha Village, 22 households and 79 people are poor (Table 3-8), accounting for 9.2% and 8.7% of the total households and total population, respectively, and 14.5% and 11.2% of the households and population living in the project area. Survey data also confirm this ratio. Taking Wariga as an example, of the 76 households in Wariga, there are 44 households with livestock, and 7 of them are precisely poverty-alleviation households. One household has been lifted out of poverty by 2018, six households have not yet been lifted out of poverty, and another three have become poor households. Even in Hailang village where there are more livestock per capita, poverty still exists. According to the People's Daily Online (December 14th, 2018), the Dulong Ecological Animal Husbandry Cooperative spent 45,000 yuan "Industrial Park Project Fund" of the Qilian County Poverty Alleviation Bureau to help 46 poor households with 142 people in the neighboring village (East Village) for three consecutive years to get rid of poverty. At the end of 2018, the cooperative allocated 330 yuan to each person in the village. The number of poor households and poor people here exceed the statistics of 35 households with 112 people. This implies that 8.3% and 7.3% of the statistics of the poor households and population according to the total number of 2,090 households and 7505 people in the town may be slightly lower than the actual ratio.

4. Expectations and requirements of different stakeholders for project activities

The main objective of the project is to explore how to enhance the grassland protection and utilization win-win situation from the policy mechanism under climate change, not only reduce greenhouse gas emissions, improve the ability of grassland livestock production system to cope with climate change, but also improve the livelihood level of herders through capacity building. The main stakeholders of the project include the project authority, the government departments at all levels of the project and their professional and technical departments, the village community where the project is located, and the relevant herder households. The project management agency hopes that the implementation of the project in Qilian will improve the grassland ecological development model and policy innovation by using the World Bank and experts on the basis of summing up Qilian experience. They hope it can analyze the shortcomings of the existing grassland management measures, explore the co-management innovation of the herders to form a coalition to co-manage the summer pastures and control the quality of the winter pastures, enhance the management ability of the herders, design the grassland management policy that allows the herders to participate, and monitor the implementation of ecological compensations at low cost and try to maximize the income of the herders.

The survey and discussion found that herders, technicians and government officials showed great interest and enthusiasm for the project, and eagerly hoped that the project could be carried out within their own geographical area.

4.1 Expectations and requirements of provincial, state and county governments for project activities

The government department think the grassland resources as the best ecological resources. Therefore, to systematically manage grassland ecology is extremely urgent. Governing the black soil beach, protecting the grassland, and taking a path of sustainable development of grassland is an important practice of the "two mountains" theory. It is hoped that through the implementation of this project, they will cooperate with the ecological terminal, research institutes and the World Bank, including the experience of the World Bank, and integrate the use of technical forces in grassland management to better control grassland. Qilian is a national key county for grassland ecological management, a rural tourism demonstration county, and the country's largest organic pasture. It is hoped that the implementation of the project will solve some problems in the ecological protection of Qilian grassland. At present, Qilian County is implementing an ecological compensation program, implementing ban on grazing on 5.11 million mu of degraded grassland and implementing grass-animal balance on 10.4 million mu of grassland. And cooperating with the expert team to carry out desertification management, control the black soil beach through non-tillage and supplementary sowing. In the use of grassland, relying on the team to explore how to accurately grazing animal husbandry. They are trying not to graze from mid-May to late June in the grassland rejuvenation period, and then use it in nomadic way. From September to October, grazing rotationally, from October to April next year, grazing freely. Through adjusting and activating the planting structure of the whole county, optimizing the proportion of forage, grain

and oil crops planting; planting forage in winter nest. In addition, the county, townships, villages and households jointly carry out fencing management. Protecting the ecosystem without reducing the livelihood level of herders.

The ecological compensation policy will only increase the income of herders by directly distributing the compensation funds to households. If the county wants to implement the second round of ecological reward policy in accordance with the results-oriented and evidence-based ecological reward policy, it may be regarded as not to implement the current policy. Whether the result-oriented compensation can be made up, is it a supplement of grass or a supplement of money? It is not easy to explore the breakthroughs of grassland protection policy mechanism and pilot a new model in the project demonstration area.

The county hopes to choose to implement the project in a place with a high degree of organization and obedient people. They suggested that they can be based on cooperatives, with a part (one-third) of the cooperatives as a treatment and a part (two-thirds) as a comparison. The sheds and grasses in the matching funds can be tilted to the project, but the ecological compensation is not easy. It is hoped that the project will take the village as the unit, half as the project village and half as the control village, otherwise the non-project cooperatives in the same village or the non-project mutual aid groups in the same community will complain. Traditionally, neighboring herders are accustomed to mutual cooperation. If the project separates them and the implementation of the project causes a large gap in income or welfare, it may be unfavorable for the future mutual assistance and cooperation of the herdsmen.

4.2 Expectations and requirements of the town government for the project activities

The town is trying to implement a new grazing model: rest grazing in spring, nomadic in summer, rotationally grazing in autumn, freely grazing winter. The natural conditions there are harsh, the altitude is high, the temperature is low; the financial investment is insufficient, the number of greenhouses is few, and the oats are sometimes not harvested; the products are sold in a single way, the market is insufficient, and the secondary and tertiary industries are lacking. The town welcomes this project very much, and will set up a program management office to cooperate with experts and do a good job. The veterinary station said that if the people were to pay for their own grass, the goal of the project would fall short. It was suggested that the Agriculture and Animal Husbandry Department should tilt the project to Qilian and try to make the project cover more herdsmen. Without the support of the project, even if the grasslands of the herdsmen are seriously degraded, their cattle and sheep still need to use the grasslands. Supplementary feeding should be carried out in critical period.

Participation in projects on a community basis is easier to implement. The town believes that the quality of grassland is the evaluation standard, and the grassland will be compensated if it reaches a certain quality, as long as the compensation is equal to the previous pastoral income, the pastoralist can accept it. The herdsmen have the awareness of protecting the grasslands and accept ecological protection, but do not accept income reduction. Therefore, economic sustainability issues after abandoning feed need to be considered.

4.3 Expectations and requirements of villages, communities and cooperatives for project activities

The village community believed that the effect of forbidding grazing was good. The first round forbidden grazing summer pasture was adjusted to the second round of forbidden grazing autumn pasture. The ecological payment system granting compensation to households is simple and unscientific. Herders may not have to change the stocking rate. The grass can affect the herding behavior of the herders. They hope to replace the monetary payment with grass. Some village leaders believe that if the people do not go to the pastures after getting the money, they can reduce the amount of livestock. But if let them feed, the cost is too high, and it is difficult to get access to drinking water. They hope households without any livestock can transfer their grassland, so that the herders with livestock can rent in those grasslands conditionally, such as not causing the degradation of the leased pastures. In this way, both households with and without livestock can benefit equally. The village heads also said that the herders are accustomed to stocking livestock, so it is difficult for the herders to accept captive feeding.

According to the cooperative, non-tillage and supplementary sowing, rest grazing in spring, scientific breeding is very popular with herders, but it wastes feed and costs a lot. Measures such as pulling out the net fence of winter and spring grasslands can only be done by cooperatives. The surrounding cooperatives have a 40-day forbidden grazing period (from mid-May to early July), during which livestock are fed in captivity, purchased forage, and rented grasslands from other places.

4.4 Expectations and requirements of herders for project activities

The representatives of the herders believe that the main reason for the serious destruction of the pastures is that the livestock is being developed too fast, and the pastures need to be built to meet the needs of cattle and sheep. If the compensation is high enough to offset the loss of income from the reduction of livestock, the herders are willing to ban the grazing to protect the pasture. At present, none is willing to reduce livestock, mainly because income is not guaranteed. Some herders think that when grass sprouts, livestock are not allowed to eat, so the effect of rotating grazing is as good as that of resting grazing. Herders' perception of forbidding grazing: they used to think that when forbidding grazing, he would not graze sheep, others would come to graze sheep. Grass is eaten and can grow. Now the herders have the awareness of protecting the grassland. As long as they can offset the loss of income caused by the reduction of livestock, the herders are very willing to ban the grazing to protect the grassland. However, grazing resting and prohibition require more labor to supply water and feed livestock. Some herders are facing serious difficulties for livestock to drink water, and need to drive livestock several kilometers away to drink water. Some of them spend tens of thousands of dollars to buy water carts, and take water to drink livestock every day. The time and cost are huge. If the animals are housed, the problem on drinking water will become more severe.

For rodent and pest management. The occurrence of rodents and pests is frequent and serious in the project area. Herders said that although they governed it year after year, rodent and pests still occur, which has aggravated grassland degradation to some extent. Because the management of rodents and pests has some characteristics of public affairs, the overall effect of the control in small areas will not be ideal. The herders require to control rodents and insect pests on a large

scale.

As for the way of ecological reward and compensation, herders think that it is reasonable to formulate policies according to the area. Because the income of compensation is not used by herders to decide the scale of their livestock farming, it is used for family living expenses. When asked about the level of the award criteria, the herders did not feel low, and it was difficult to indicate how high the standard of rewards could affect their livestock raising behavior. However, they believed that the implementation of grass-livestock balance and forbidden grazing would be effective for grassland restoration. The local practice is generally to forbid grazing in autumn or summer grasslands. When the grass sprouts in spring or seeds in autumn, it is not allowed to graze. But in winter it is just as well to let sheep and cattle graze on the forbidden pasture for a short time.

In a word, from the experience of pastoralists, scientists and technicians, as well as villagers and local governments, participating in projects is beneficial. However, because the proposed project is significantly different from the government-driven project, these stakeholders, especially the herders may have some misunderstandings about the implementation of the project. For example, the current policy of ecological compensation has become to an inclusive policy to increase herders' income, but it has not played a role in encouraging or restricting herders to limit livestock so as to protect grassland ecology. Another example, the spring grazing rest policy which is being implemented in a small scale in the project area is a good welfare for project households only by supplying forage and feed to project households and building shantytowns. However, the expected demonstration effect of "spring grazing rest-relieving grassland pressure-restoring grassland ecology" is not obvious enough. The proposed project will compensate herders strictly according to their livestock production behavior, such as the amount of livestock raised, the length and duration of livestock grazing in winter and spring grasslands, and the impact of these behaviors on grassland ecology. This procedure is different from that of rewarding or compensating herdsman first, then restraining or encouraging herders' behavior, but first according to their behavior and effects, then approve the strength of rewards and supplements. This may cause the herders to have a sense of distrust and fear that they will not be able to get enough compensation after they have done so as to weaken their enthusiasm to participate in and implement the project.

5. Social impact analysis of the project

The project takes Moller Town, Qilian County as the project area, and helps the selected herders to establish an informal alliance. Through natural grassland management such as spring grazing rest, supplemented by small-scale artificial grassland planting and captive feeding, the project can better manage the summer pasture shared by herders. It also controls the grazing of winter pastures during spring growth to pilot a new model of grassland management, and implements an empirically based ecological compensation mechanism. Based on this, the project will carry out climate-smart grassland ecosystem management demonstration and knowledge management to promote the sustainable development of ecologically fragile pastoral areas that are sensitive to climate change and concentrated in ethnic minorities. If the project can be implemented smoothly according to the planned plan, it is expected to bring about the following

social impacts:

5.1 Change herders' traditional grazing habits to make animal husbandry more intensive and efficient

The implementation of the project will help change the habits of herders grazing on natural grass all year round. Natural grassland management activities such as spring rest grazing, captive feeding, and artificial grassland planting cannot only restore grassland in key periods such as grass germination and seed maturity, but also reduce the fat loss of livestock to a certain extent. Optimized forage can also help to adjust the nutritional structure of livestock, so as to make animal husbandry more intensive and efficient.

5.2 Change herders' concept of ecological compensation and encourage them to voluntarily protect grassland resources

The existing ecological compensation policy in the project area is distributed to the herders according to the grassland area contracted by the herders' families and the criteria of forbidding grazing and grassland-livestock balance. The empirical grassland ecological compensation policy implemented by the project will strictly implement the ecological compensation policy in accordance with the approved livestock carrying standard, that is, the participating households will be compensated for the losses caused by reduced livestock, and to reward the ecological products brought about by the protection of grassland. Through the implementation of the project for many years and its demonstration effect, the herders' concept of compensation is improved, so that herders can voluntarily protect grassland resources under the new ecological compensation mechanism.

5.3 Enhance herders' ability to accept new technologies and improve their sustainable livelihoods

During the implementation and demonstration, the project will provide consultation and guidance on animal husbandry technology, and use the agricultural technology promotion platform and the Agricultural Broadcasting School to train new types of professional farmers and herders, improve the technical acceptance of herders, enhance their human capital, broaden their livelihood strategies, and then improve herders' sustainable livelihood level. The adoption of new animal husbandry technology by project participants and the improvement of their livelihood level can also promote the adoption of technology and livelihood improvement of pastoral households in the whole project area, thus promoting the sound and rapid development of pastoral areas.

6. Potential social risks and countermeasures of the project

The eastern margin of the Qinghai-Tibet Plateau and the southern side of the Qilian Mountains are typical mountain grassland ecosystems. They are the key counties for national ecological protection. Most grasslands in the region have been designated as national parks and nature reserves. Since 2011, they have been the target counties for the implementation of the national grassland ecological reward and compensation policy. The elevation, climate, grassland type, animal husbandry production and herders' livelihood of the project village are typical and representative in the Qinghai-Tibet Plateau. Although the average per capita income of these six project villages is higher than the national average, absolute poverty still exists and relative

poverty occurs frequently. Some precise poverty-alleviation households got rid of poverty on schedule, but some new herders fell into poverty. Previous research shows that stakeholders in the project area show great enthusiasm for the project. However, the implementation of the project will involve complex and diverse socio-economic factors (such as: from the degree of organization, infrastructure conditions, and natural environment, etc., the situation of the six villages involved in the project is quite different. There are animal husbandry cooperatives in Laorigen and Duolong villages, but not in the other four villages. Infrastructure conditions vary greatly from village to village. For example, the average distance from each herdsman group in Zhasha village to the market and the medical and health centre is less than 10 kilometers, while Wariga, Duolong and Caishitu are all 20 kilometers away, some even more than 30 kilometers. The elevations of the villages are not equal. For example, the average elevation of Zhasha Village is 3,200 meters, while the average elevation of the Wariga Village is about 3,550 meters. The herders report that due to the influence of high altitude, some of the herders' winter nests cannot grow oats grass. In addition, the resource endowments of grasslands and drinking water sources in different villages are different.) Therefore, it is necessary to analyze the risks of social stability that may be caused by these factors.

6.1 Coordination of relationship between project households, project groups, and project villages are needed

According to the project plan, the project will be based on 116 herder groups of 27 communities in 6 villages of the town, based on transparent, open and voluntary, 14 communities were randomly selected as project intervention communities and the remaining 13 as control communities. 3 mutual-aid groups were randomly selected from each mutual-aid group (2 were selected for those with less than 3 mutual-aid groups). In each mutual aid group, 4 households were selected as project intervention households according to the intention and actual situation of herding households, and a total of 160 households were selected as project activity intervention households. As the participation of six villages and their 27 communities and herdsman groups in the project may vary, this will inevitably affect the resource allocation between villages and villages, between different communities in the same village and among different herdsman groups in the same community.

What needs coordinate is that for project groups with an average of 15 herdsman, a random selection of 4 households as project households may have negative effects on other herdsman in the same project group. Compared with other groups of herders, the same group of herders have closer settlements and more mutually beneficial activities in daily animal husbandry production, such as shearing wool and sheep manure. If project participants benefit more from the project, it may widen the distance between project participants and non-project participants, thus affecting the implementation and demonstration of the project.

6.2 The project area's workforce is feminized and aging seriously

The age of the project villages is relatively large, and the feminization is serious. The feminization of the herders in the Laorigen village is quite high, and nearly 45% of the herders are women; the overall trend of the aging population of the village is obvious. The average age of male and female herders is 52 and 51.5 years old; both male and female herders over 70 years old account for 12% of the total herders. In some villages, the proportion of elderly female herders is

high. For example, the average age of female herders in Duolong village is 52 years old, of which a quarter are between 60 and 70 years old, and 6.3% are over 70 years old.

On the other hand, according to our telephone interviews at the community level in the project area, the life expectancy of males in some communities is relatively short. Therefore, from the average age of herders, it seems that there is no problem with the aging of the labor force. For example, the average age of male herders is less than 45 years old, while the average age of female herders is nearly 55 years old in Wariga. The average age difference between men and women is about 10 years. According to the information at the symposium, 70% of the young people in the village work outside, and almost no one is willing to graze at home or back home.

outside, and almost no one is willing to graze at home or back home.

6.3 Grassland is small and fragmented, and grass circulation is common

After most young and middle-aged herders get married, they separate the pasture from their parents, so the pasture is fragmented. According to the survey data of 114 herders, 27.1% of herders in Muller have their own winter and spring pastures with an area of less than 600 mu, the smallest of which is only 173 mu, with an average of 1123 mu. Grassland circulation is common, with about 50% of households with livestock renting in winter and spring pastures.

The small-scale fragmentation of grassland may have a certain impact on the implementation of the project. And the circulation of grassland may also be affected by the project. The field interview found that some farmers will increase the intensity of the use of leased pasture due to the implementation of spring rest on their winter and spring pasture, transfer the grazing pressure to leased pasture and aggravate the degradation of leased pasture.

6.4 Village level organization

Of the more than 1,000 pastoral households in the six villages covered by the project, there are two pastoral professional cooperatives, with only 86 participating herders, accounting for 6 percent of the total, accounting for 16 percent and 18 percent of the villages of Duolong and Laorigen, respectively. However, the interview found that herders had a fairly common practice of mutual assistance in activities such as shearing sheep, shoveling sheep manure and rubbing cow hair, and that these loose support groups can sometimes be as large as 20 people. In general, the village-level organization level in the project area is low, and the self-service ability of herders needs to be improved. To some extent, this will have a great negative impact on the organization and implementation of project-related technologies.

6.5 The carrying capacity of livestock in the pasture is high, but the captive breeding rate is not high in winter

Due to the pursuit of higher livelihood level and the livestock market, labor force and credit market, the livestock carrying capacity in winter and spring pastures is generally high. According to the survey of 116 pastoral groups and one family in each group, if only their winter and spring pastures are taken into account, and the leased pasture area and purchased forage are excluded, the average stocking rate of each group in 6 villages in the project area is 3 mu of winter and spring pastures per sheep unit on average. Few of the herders interviewed bought forage, except in the case of disasters or participated in projects such as spring grazing rest, but such herders were rare.

It is assumed that each household rented grassland and the area of their own pasture is equivalent, so that the actual livestock carrying rate is about 6 mu of a sheep unit, with the local reasonable load of 8-14 mu of a sheep standard is also far away. This makes it possible for the implementation of the project to require the target herders to lose a large quantity of livestock.

On the other hand, the herdsman who used the method of captivity in winter accounted for only 15.8 percent of the total sample, i.e. only 18 of the 114 herders were in winter captivity. Most herders keep their traditional livestock grazing habits. The availability of forage for captive breeding can be a problem. At present, less than one-third of all herders are planting wheatgrass in their winter dens. Some herders live at higher elevations, and the weather is arider, so the effect of planting wheatgrass is not good. And the whole Qilian has 38,000 mu of arable land, which can grow pasture area is limited. Most of the forage needs to be bought in neighboring counties such as Menyuan or Shandan, which is expensive to transport. In addition, there is a need for more labor (water pulling, supplementary feeding, etc.) in captivity, so the condition of the labor force in pastoral households may be a limiting factor.

Higher livestock loads and low captive breeding rates may have an impact on the implementation of the project.

6.6 Climate change may affect project implementation

In addition, natural disasters caused by climate change may also affect project results at demonstration sites. According to the investigation, three cattle were washed away by mudslides in 2016 during heavy rains in the pasture of some farmers. Two consecutive years of snowstorms in 2015-2016 also caused huge losses of more than 150 sheep and more than 50 cattle in some herders' homes. The cattle and sheep that survived weren't strong either, and it wasn't until 2018 that their numbers and health returned. Climate change may cause some economic losses to herders, and also have an impact on the demonstration effect of the project. In addition, according to the report of herders, due to drought, low temperature, frozen water pipes cracked, some villages nearly 20% of herders have livestock drinking water difficulties, need to go 3-5 kilometers away to drink water or buy a water cart to manually pull water. According to the climatic data of Moller town, the lowest temperature in December 2017 was 31.8 degrees below zero, while the precipitation data showed that from October 2017 to April 2018, there was no precipitation in Muller town. From May to June, the precipitation was less than 20 millimeters, but from August to September, the precipitation was nearly 200 millimeters, and the rainfall was very concentrated. Lack of rain at the turn of spring and summer also affected forage germination and growth. Low temperature and seasonal drought, as well as concentrated precipitation, may affect the implementation of the project.

6.7 Grass-roots pastoral technology promotion is weak, and the technology acceptance ability of herders is weak

Qilian county has only 80 agricultural technical extension personnel, if spread equally to every township, then every township can have 11 agricultural technical extension personnel. That means each promoter is responsible for more than 300 square kilometers of Moller's 3,826 square kilometers. Coupled with the harsh climate, complex terrain and transportation conditions, as well as living very scattered herders, this makes the spread of animal husbandry technology is quite

weak. Although departments at all levels have strengthened their efforts in technology promotion and set up science and technology demonstration households. For example, 20 yak science and technology demonstration households and 36 sheep science and technology demonstration households have been set up in the town of Moller, these demonstration households still account for less than 5% of the total herding households. On the other hand, the aging of herders and the generally low education level also hinder herders' acceptance of technology to some extent. According to the survey at the community level, 70% of the herdsmen have less than primary school education, among which 60% have never received a formal education. These two factors should be taken into account in the design and implementation of the project.

7. Policy recommendations to improve the social impact of project implementation

The implementation of the project is accompanied by a series of social problems. As mentioned above, the relationship among some project households, project teams and project villages needs to be coordinated. Moreover, the current labor force in the project area shows a trend of feminization and aging, and problems with ethnic minority women needs to be solved urgently. In addition, a large number of herdsmen have small scale of grassland; so, in order to expand the operation, only grassland circulation can be carried out, which increases the social cost. It is found from the implementation of some national policies that the low level of village-level organization is not conducive to the implementation of policies. From the ecological point of view, the livestock carrying capacity of pasture is high, while the captive breeding rate is not high in winter, which increases the pressure on the pasture. Moreover, the project locates in the high-altitude, cold area with a highly variable climate, which will also affect the project implementation. Finally, the quality of the population of ethnic minorities in the project area is a problem, which is particularly reflected in the weak promotion force of grass-roots animal husbandry technology and the weak acceptance ability of herders, which may hinder the implementation of the project.

Based on these, in order to enable the project to be implemented smoothly and effectively, to meet the requirements of each group for the project, and to maximize the social benefits of the project, this report proposes the following policy recommendations based on the potential social risks faced by the project implementation, the minority development issues and restrictive access issues involved in project implementation, on the basis of full respect for local culture and customs, freedom, preposition and negotiation.

7.1 Suggestions on the coordination of the interests of vulnerable groups

For coordination of the interests of vulnerable groups, the overall principle is to ensure that their rights are not harmed and to provide them with as many development opportunities as possible, so as to help them build their capacity so that they can maintain the sustainability of their livelihood. The coordination of interests involved in project implementation mainly includes the coordination of interests between project households, project teams and project villages and non-project households, non-project teams and non-project villages, and the relationship between vulnerable groups such as women and elderly herdsmen and non-vulnerable groups, as well as the

coordination of interests of ethnic minority groups and restricted access to groups due to projects.

For the interests of project households, project teams and village associations and non-project households, non-project groups and non-project village associations, the project office and the local government shall, according to the specific conditions of each village, establish corresponding project coordination groups and project implementation groups at the village and community levels to coordinate the allocation of project resources. On the basis of unified project planning and design, the principle and standard of project resource allocation should be clarified to avoid social conflicts caused by it, and a transparent system of project resource allocation and herders complaint mechanism should be established.

For vulnerable groups such as women and elderly herders, women's needs should be understood during the implementation of the project, gender equality should be taken into account, and women's right to participate should be guaranteed. In particular, effective project information and technical support should be provided for women. In order to ensure a smooth implementation of the project, it is necessary to provide corresponding intensive technical training to the herders, especially the elderly herders, and provide effective socialized technical services to them.

The interest groups of ethnic minorities should respect their customs and religious beliefs, give due consideration to the proportion of ethnic groups, and try their best to benefit all ethnic groups equally. For the restricted access groups involved in the project implementation, their rights and interests should be protected from the losses caused by the project implementation. They should be fully consulted and compensated in a way acceptable to them.

7.2 Suggestions on the organization and capacity building of project village households

The organization and capacity building issues involved in the implementation of the project include the low level of organization at the village level, difficulties in the formal cooperation of herders, the weak promotion force of grass-level animal husbandry technology and the insufficient capacity to cope with climate change. In view of the low level of village-level organization and the difficulty in dealing with various risks and uncertainties in pastoral areas, we can start from two aspects: first, take corresponding measures to cultivate professional cooperatives of herders and give effective incentives; Second, encourage herders to carry out various forms of spontaneous cooperations, such as shearing sheep, shoveling sheep manure and rubbing cow hair, and on the basis of these mutual assistance activities, adopt relevant incentive measures to cultivate the establishment and operation of professional cooperatives of herders with certain market capacity. To solve the problem of weak popularization of grass-roots animal husbandry technology, the project can be used as an opportunity to innovate the technical service mechanism and strengthen the technical service team of towns and villages. The project may allow for: establishing a rural organic integrated animal husbandry socialized technical service system, focusing on the implementation of the project; adopt effective training models and mechanisms, taking into account ethnic herdsmen, and cultivating a certain number of herders technicians and technology demonstration households, especially women; use the national agricultural technology extension service information cloud platform to provide intensive training for township and village community technicians and pastoralists. As climate change brings more rain to the project area, it is necessary to consider measures to cope with climate change such as low temperature in winter,

seasonal drought in winter and spring, and concentrated precipitation in summer and autumn; Further strengthen the socialized service of livestock insurance; Farmers are encouraged to participate in policy-based insurance for natural disasters.

In short, in the long run, single-family-based livestock production will face many unfavorable factors, especially under climate change. Future pastoral development requires the development of informal mutually beneficial cooperation and more formal cooperative organizations so that livestock production can use resources more efficiently, implement more eco-friendly measures and target a broader livestock product market. The implementation of this project is expected to make a useful attempt in these areas.

7.3 Suggestions on pastoral habits and grassland leasing issues

In view of the high load of livestock in the pastures of ethnic minority herders in the project area, and the low rate of winter captivity, it is necessary to take the project as an opportunity to guide the herders to: change the traditional way of stocking livestock; rely on the technology provided by the project to improve the quality of livestock products; and help the herders obtain the certification of high-quality livestock products, so as to improve the price and operating efficiency of livestock products. The livestock load in the pastures may thus be reduced. As for the issues of pasture fragmentation and the common but not-standard grassland circulation, the following practices may alleviate the problem: strengthen the guidance of the herders; make the project measure as far as possible to cover its contracted winter and spring grassland; pay attention to the relevant technical measures to the adaptability of the scale of the pastoral environment in the designing process. Also, pay attention to the regulation of grassland circulation: on one hand, to guide the grassland to the larger business subject reasonable and orderly circulation; on the other hand, beware of the herders who transfer to the pastures to transfer the grazing pressure to the flowing pastures.

7.4 Recommendations for free consultation and open information

In order to enable the project to be implemented smoothly and effectively, the relevant information of the project needs to be made known to the public from the provincial, county, town, village, social and other levels, such as notice, notice, discussion and in-depth interview, and to carry out the project in an open, transparent and voluntary manner in order to gain public trust and support. Relevant compensation standards, funds and forms of compensation relating to restricted access should be fully and freely consulted with the affected population, to understand and fully take into account their aspirations, to respect the traditions and religious customs of the peoples involved and to address in a manner acceptable to the relevant issues involved in the implementation of the project. There is also a need to establish complaints committees at all levels prior to the start of the project to receive, assess and mediate complaints and grievances that may arise within ethnic minority groups.

The above recommendations are one-to-one with the social risks mentioned in the previous article, aimed at resolving social risks, promoting the smooth implementation of the project, and in the process of making the recommendations, taking into account the operability of the recommendations and respecting local culture and customs, guaranteeing the local people's right to know, to a certain extent to ensure the follow-up implementation of the project.

Appendix 1: Baseline Survey Information

1. Baseline Survey Objectives

The purpose of the baseline study is to collect data on the socio-economic base of the project area and to analyse project-related technologies and policies based on such data, thereby providing credible evidence for the project's social assessment report, thus supporting the smooth conduct of the project.

Specific objectives of the study include understanding:

- 1) The basic socio-economic situation of the project counties and villages and cooperatives;
- 2) basic condition of grassland ecosystem;
- 3) Basic situation of livestock farming;
- 4) The production activities and income of pastoralists;
- 5) The relevant knowledge, attitude, behavior and women's participation of pastoralists in grassland ecosystems;
- 6) poverty in pastoral areas;
- 7) The implementation mechanism of existing grassland conservation projects and the awareness and opinions of pastoralists on these projects.

2. Baseline Survey Logical Framework

After several discussions with the Project Office of the Ministry of Agriculture, the project expert team and the World Bank project officials, the logical framework of the baseline survey is determined as shown in Figure 1-1. Based on the relevance of project implementation, the information collected by the survey is divided into basic project information, project key information, analytical information and subjective information.

3. Acknowledgement

This baseline survey was completed under the leadership of the Project Office of the Ministry of Agriculture, including baseline survey plan determination, questionnaire design, field surveys, report writing and revision.

This baseline survey was fully coordinated by the Qilian County Animal Husbandry Department and Moeller Town. In the case of tight time and heavy tasks, the leaders of Qilian County attached great importance to it, and allocated sufficient manpower to demonstrate strong organizational management and coordination capabilities. Thank you for the strong support of Kingyun Ma Director of the Office of Qilian County Ecological animal husbandry pilot and Zasi of the people's Government of Moeller Town.

Special thanks to the sample cooperatives and sample herders who participated in this survey. They used various methods to cooperate with the research in the face of language difficulties and communication, and showed great patience in the investigation. The situation is understood and recalled as accurately as possible to ensure the validity and accuracy of the survey

information.

4. Survey method

Following a joint study by the World Bank and Ministry of Agriculture project "preparing baseline research" from July 13-25, 2018 in Qinghai province, and a baseline survey of the small study Group from November 19-24 in Qilian County Moeller Town, the project was selected to be carried out in the town of Moeller, Qinghai province. Due to time constraints, this research report is mainly aimed at 6 administrative villages, 27 communities and 116 herders groups and more than 1,000 herders in Moeller Town, Qilian County. Due to time constraints, this research report focuses on six administrative villages, 27 societies and their 116 pastoral groups and representatives of more than 1,000 herders in the town of Mueller in Yanlian County.

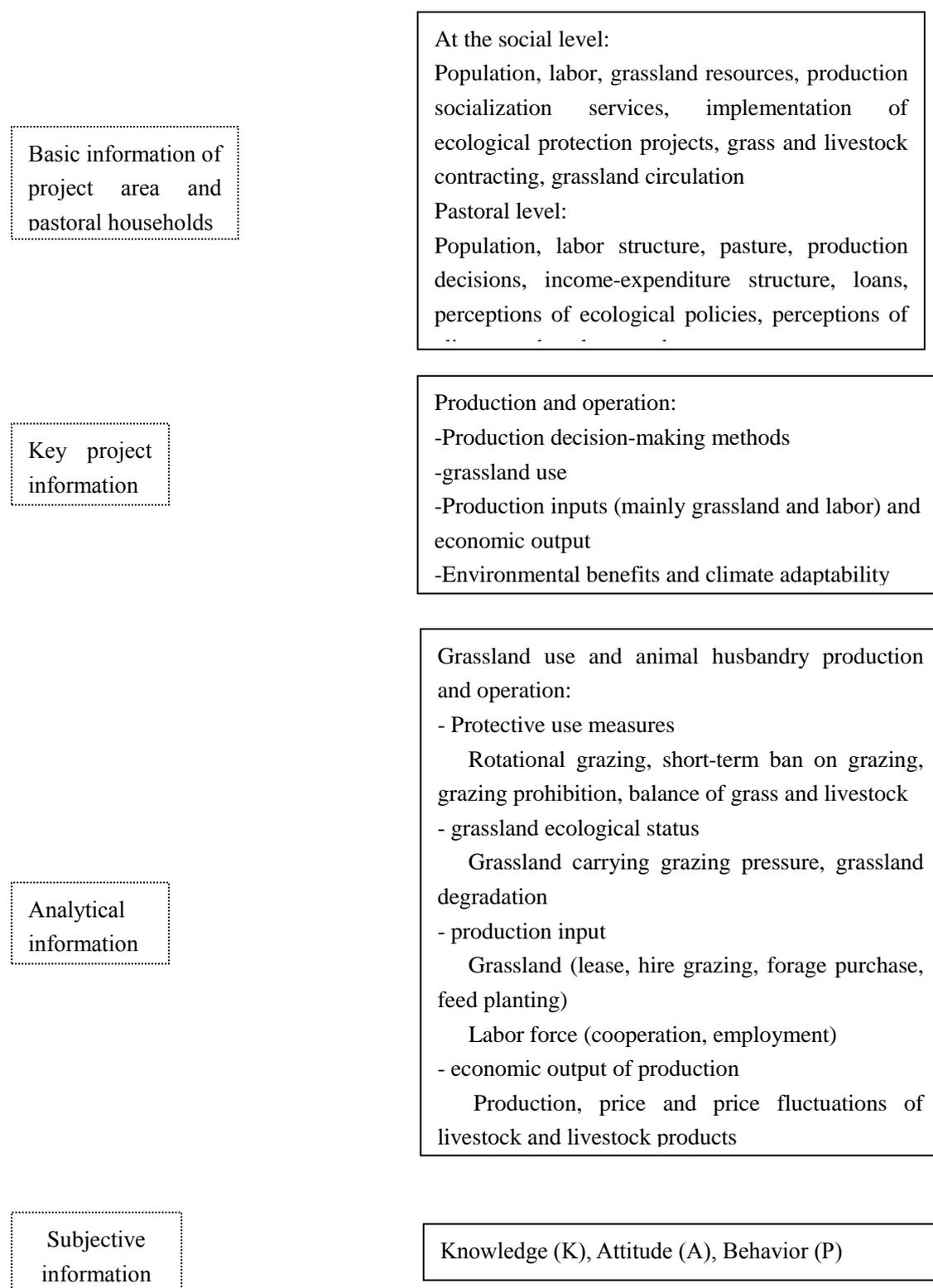


Figure 1-1 Logical framework for baseline survey of climate-smart grassland ecosystem management project

Appendix 2: Survey Methods

1. Sampling methods for communities and herders

Information on 6 villages, 27 communities, 116 herder cooperation groups and herders in the town of Moeller, where the project is located, was collected through field interviews and other means. The cooperative group of herders here is an informal organization established in accordance with the needs of the project and on the basis of the herders' original animal husbandry production activities, such as shearing wool, sheep dung and yak hair, etc. Given that the project will be based on pastoral groups, 58 of which will be randomly selected as the implementation areas and the remaining 58 pastoral groups as the control areas, these groups will be distributed in most or all cooperatives in 6 villages. Since pasture contracting is at the community level, we took all the 27 cooperatives as project cooperatives, and randomly selected one herder from each group as the sample herder. In addition, as a more formal organization, we have considered cooperatives.

2. Survey Contents

2.1 Survey content at the community level

1) The basic situation of the population, such as the distribution of the population and its age, gender, ethnic composition and educational attainment; Sex, age and education of the labor force in the population; The situation of non-pastoral employment; The situation of livestock-free households, poor households and "five guarantee families"; Grassland warden situation;

2) Land and grassland transfer: total grassland area, grassland classification and area; The circulation situation of the grassland (in, out and contract circulation); Substitute grazing situation; The size distribution of pastures of different herders;

3) Animal husbandry production: number of livestock and their types and age structure; herders distribution of different livestock sizes; livestock sales, etc.;

4) participated in projects such as spring break grazing;

5) socialized services for animal husbandry production: livestock insurance, pest control, grassland fire prevention, veterinary medicine epidemic prevention, animal husbandry technology promotion, disaster relief (such as white disaster and black disaster), etc.;

6) division of grass and livestock and implementation of balance between them: the time and mode of contracting, the type and area of grassland, the supervision and execution of the balance of grass and animal.

2.2 Survey content at the level of herders

1) Basic information of the herders, including: the basic characteristics of the respondent (usually the head of the household) (age, gender, ethnicity, village cadres or not, grazing experience) and the family population and their employment;

2) The status of the pasture in the home: the type, area and use of the contracted grassland (whether or not the area is rotated); whether to plant oat grass;

3) Grassland leasing situation: rental and lease, area, contract, lease period, price, object and

lease reasons, etc.;

- 4) The situation of foster care for livestock;
- 5) Income from family husbandry;
- 6) The status of family animal husbandry and consumer expenditure;
- 7) Family Loan situation: Amount, source, term, interest, use and loan reasons, etc.;
- 8) The implementation of Grassland Ecological award policy and herders' perception, including the balance of grass and livestock and the prohibition of pastoral;
- 9) The production decision of herders: the number and reason of raising and acquiring livestock, the livestock decision-making and the view on the future development of animal husbandry;
- 10) Perception of and response to climate and ecology;
- 11) Pastoral production season calendar.

3. Survey method

The survey was conducted using field visits (July 11-16, 2018; July 19-24, 2018), questionnaires, telephone interviews, and design web interviews (questionnaire stars). From January to April 2019, a small supplementary survey was conducted by telephone and WeChat.