

# XINJIANG BURQIN IMPROVED GRASSLAND MANAGEMENT PROJECT



Document Prepared by Climate Bridge (Shanghai) Ltd.

|                             |                                                                                                                                                                                                                                                                                                              |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>        | Xinjiang Burqin Improved Grassland Management Project                                                                                                                                                                                                                                                        |
| <b>Version</b>              | 05                                                                                                                                                                                                                                                                                                           |
| <b>Date of Issue</b>        | 04-May-2023                                                                                                                                                                                                                                                                                                  |
| <b>Project Location</b>     | Burqin County, Altai City, Xinjiang Uygur Autonomous Region, China                                                                                                                                                                                                                                           |
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|                                       |                                                       |
|---------------------------------------|-------------------------------------------------------|
| <b>Project Lifetime</b>               | 26-June-2017 to 25-June-2057; 40-year lifetime        |
| <b>GHG Accounting Period</b>          | 26-June-2017 to 25-June-2057; 40-year lifetime        |
| <b>History of CCB Status</b>          | Under validation combined with the first verification |
| <b>Gold Level Criteria</b>            | N/A                                                   |
| <b>Expected Verification Schedule</b> | June 2022                                             |

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## 1 SUMMARY OF PROJECT BENEFITS

### 1.1 Unique Project Benefits

| Outcome or Impact Estimated by the End of Project Lifetime                                                                                                                                                                                                                     | Section Reference |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 1) Restored 65,000.00 ha of degraded grassland and improve grassland productivity and forage quality in the project zone, and prevented continued degradation of grassland, which could significantly improve the ecological aesthetics value of local touristic resources.    | 2.1               |
| 2) Organized special community cultural activities for local residents, improved the interaction within the local Kazakh community, increased connection between local Kazakh herders and other community members and indirectly promote the diffusion of traditional culture. | 4.2               |
| 3) Improve the habitat environment of wildlife and increase the biodiversity of the project area.                                                                                                                                                                              | 5.2               |

## 1.2 Standardized Benefit Metrics

| Category                            | Metric                                                                                                                                                                                              | Estimated by the End of Project Lifetime | Section Reference |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------|
| GHG emission reductions or removals | Net estimated emission removals in the project area, measured against the without-project scenario                                                                                                  | 10,706,152 tCO <sub>2</sub> e            | 3.2               |
|                                     | Net estimated emission reductions in the project area, measured against the without-project scenario                                                                                                | /                                        | /                 |
| Forest <sup>1</sup> cover           | For REDD <sup>2</sup> projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario                                               | Not applicable                           | /                 |
|                                     | For ARR <sup>3</sup> projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario                                             | Not applicable                           | /                 |
| Improved land management            | Number of hectares of existing production forest land in which IFM <sup>4</sup> practices are expected to occurred as a result of project activities, measured against the without-project scenario | Not applicable                           | /                 |
|                                     | Number of hectares of non-forest land in which improved land management practices are expected to occurred as a result of project activities, measured against the without-project scenario         | Not applicable                           | /                 |
| Training                            | Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities                                          | 4,875 <sup>5</sup>                       | 2.3               |
|                                     | Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities                                                  | 1,950                                    | 2.3               |

<sup>1</sup> Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)

<sup>2</sup> Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)

<sup>3</sup> Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

<sup>4</sup> Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

<sup>5</sup> 467 permanent jobs and 4,408 temporary jobs

| Category    | Metric                                                                                                                                                   | Estimated by the End of Project Lifetime | Section Reference |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------|
| Employment  | Total number of people expected to be employed in project activities, <sup>6</sup> expressed as number of full-time employees <sup>7</sup>               | 812 <sup>8</sup>                         | 2.3               |
|             | Number of women expected to be employed as a result of project activities, expressed as number of full-time employees                                    | 325                                      | 2.3               |
| Livelihoods | Total number of people expected to have improved livelihoods <sup>9</sup> or income generated as a result of project activities                          | 4,875                                    | 2.3               |
|             | Number of women expected to have improved livelihoods or income generated as a result of project activities                                              | 1,950                                    | 2.3               |
| Health      | Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario | Not applicable                           | /                 |
|             | Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario        | Not applicable                           | /                 |

<sup>6</sup> Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

<sup>7</sup> Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102]; [17.28])

<sup>8</sup> During the implementation of the project, about 4,875 local herders will directly participate in grass seeding and rodent control, of which 40% were women. According to the payment records, the working hours was 1,624,000 hours per year during this monitoring period, and the legal working hours is 2,000 hours per year according to Labour Law of China. Therefore, total number of people employed in the project expressed as number of full-time employees is 812 (1,624,000/2,000 =812)

<sup>9</sup> Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

| Category                  | Metric                                                                                                                                                                                                  | Estimated by the End of Project Lifetime | Section Reference |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------|
| Education                 | Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario                               | Not applicable                           | /                 |
|                           | Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario                            | Not applicable                           | /                 |
| Water                     | Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario | Not applicable                           | /                 |
|                           | Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario        | Not applicable                           | /                 |
| Well-being                | Total number of community members whose well-being <sup>10</sup> is expected to improve as a result of project activities                                                                               | 4,875                                    | 2.3               |
|                           | Number of women whose well-being is expected to improve as a result of project activities                                                                                                               | 1,950                                    | 2.3               |
| Biodiversity conservation | Expected change in the number of hectares managed significantly better by the project for biodiversity conservation, <sup>11</sup> measured against the without-project scenario                        | 1,079,666 ha <sup>12</sup>               | 2.1               |
|                           | Expected number of globally Critically Endangered or Endangered species <sup>13</sup> benefiting from reduced                                                                                           | 4                                        | 5.2               |

<sup>10</sup> Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

<sup>11</sup> Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

<sup>12</sup> According to PRA Report, the total area of Burqin County is 1,079,666 ha. The project restored degraded grassland, guided herders to graze reasonably, prevented sustainable degradation of grassland, provided more habitats for wild animals and increased biodiversity in the project zone.

<sup>13</sup> Per IUCN's Red List of Threatened Species

| Category | Metric                                                                                                 | Estimated by the End of Project Lifetime | Section Reference |
|----------|--------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------|
|          | threats as a result of project activities, <sup>14</sup> measured against the without-project scenario |                                          |                   |

<sup>14</sup> In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

## 2 GENERAL

### 2.1 Project Goals, Design and Long-Term Viability

#### 2.1.1 Summary Description of the Project (G1.2)

Xinjiang Burqin Improved Grassland Management Project (hereafter as “the project”) is located in Burqin County, Altai City, Xinjiang Uygur Autonomous Region, China. The project is aimed to restore the local degraded grassland ecosystem from adoption of sustainable grassland management practices, such as improving the rotation of grazing animals between summer and winter pastures, limiting the timing and number of grazing animals on degraded pastures, and restoration of severely degraded land by replanting with perennial grasses and ensuring appropriate management over the long-term. The project proponent is Burqin Jinhua Urban Construction and Investment Co., Ltd.

According to the Parameters for Degradation, Sandification and Salification of Rangelands (National standard of China, GB19377-2003) and Project Design Report, moderately degraded areas refer to the total grass yield decreased by 21%-50% compared with that before degradation and the total grass yield decreased by 50% compared with that before degradation is regarded as severely degraded grasslands. According to the baseline survey, before the implementation of the project, the grassland in the project area was facing serious degradation and even desertification due to the impact of climate change and human activities, most of them were moderately degraded while some of them even severely degraded for years.

Totally, 65,000.00 ha of degraded grassland have been managed sustainably by rotational and rest grazing through fence building and grass seeding of local high-quality forage. And that reduce net GHG emissions by increasing carbon stocks and/or reducing non-CO<sub>2</sub> GHG emissions.

There are two main restoration measures in the project:

1) Grass seeding was implemented in severely degraded grasslands where grass seeds of local high-quality forage was sowed under the condition of fencing enclosure for 2 years, and then the grassland should be used reasonably and sustainably according to the local approved livestock carrying capacity. In this project, 5,000 ha of severely degraded grassland (grass yield is about 58.78 Kg/Mu which was decreased by 52.72% compared with the non-degraded grassland data in 2000<sup>15</sup>) have been managed sustainably by the implementation of grass seeding. The grass species are all perennial grasses, including *Elymus nutans* (Hook head grass), *Agropyron cristatum* (Ice grass), *Festuca rubra* (Pennlawn) and *Artemisia sphaerocephala* (sagebrush).

2) Rest and rotational grazing were implemented in 60,000 ha of moderately degraded grassland where grass yield is about 84.00 Kg/Mu which was decreased by 32.43% compared with the non-degraded grassland data in 2000. For the first five years, grazing was strictly forbidden and then, sustainable grassland management methods will be applied, such as rotational grazing in different pastoral areas, limits the time and number of grazing in the project area to protect the natural grassland resources, curb the deterioration of the ecological environment of the natural grassland, It requires that the grazing time shall be halved by dividing grasslands into seasonal grazing land

<sup>15</sup> Annual Survey report of grass yield conducted by Burqin County Forest and Grassland Bureau

according to the livestock carrying capacity of the grassland by fence building. Then based on specified grazing order, grazing cycle and zoning grazing time, the grassland is grazed area by area and used in turn.

Grazing is forbidden for the first five years after the implementation of the project for relevant project area, and then controlled grazing will be allowed depending on the growth situation of the forage. Although the grazing days are strictly managed, reasonable grazing is still allowed based on the Grazing Displacement Management Plan. The rotational and rest grazing has been implemented by stages for three years (2017-2019, refer to Section 2.1.13 for details), and the implementation of the entire region with 65,000.00 hectares was completed in September 2019. Therefore, grazing is completely prohibited in the project area from 2019, and grazing activities were allowed in the area where the project has not yet been implemented in 2017-2018.

Besides these main restoration measures, the project also alleviates soil desertification and restore grassland vegetation to improve soil carbon storage and local biodiversity through grassland management measures, such as daily management measures from other protect projects like rodent and pest control and grassland fire prevention to ensure the long-term sustainable management of the project area.

The objectives of the project including:

**Climate:** Restore the degraded grassland ecosystem, increase grassland coverage, increase grassland carbon sink function and reduce GHG emissions.

**Community:** Improve the livelihood of local herders, provide permanent and temporary job opportunities for them, increase their income. Provide technical skills and training in sustainable grassland management, increases interaction within the community and improve the well-being of local communities.

**Biodiversity:** Provide more suitable habitats for wild animals and increase local biodiversity.

The project is estimated to generate GHG emission removals of 10,706,152 tCO<sub>2</sub>e in 40 years, with an average annual GHG emission removal of 267,654 tCO<sub>2</sub>e.

### 2.1.2 Project Scale

| Project Scale |   |
|---------------|---|
| Project       | ✓ |
| Large project |   |

### 2.1.3 Project Proponent (G1.1)

|                   |                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Organization name | Burqin Jinhua Urban Construction and Investment Co. Ltd.                                                                         |
| Contact person    | Xue Ruxue                                                                                                                        |
| Title             | Manager                                                                                                                          |
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| Email     | 3542346576@qq.com |

The project proponent Burqin Jinhua Urban Construction and Investment Co., Ltd. is responsible for the management and operation of the project and has established a project working group (covering aspects of carbon sink, ecology, grassland, community, geographic information, etc.).

#### 2.1.4 Other Entities Involved in the Project

|                      |                                                                                       |
|----------------------|---------------------------------------------------------------------------------------|
| Organization name    | Climate Bridge (Shanghai) Ltd.                                                        |
| Roles/Responsibility | Consultant                                                                            |
| Contact person       | Gao Zhiwen                                                                            |
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Climate Bridge (Shanghai) Ltd., who has tremendous experience in development of carbon sink related VCS+CCB projects, is responsible for the development of the project and purchasing the carbon credit of the project.

|                      |                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------|
| Organization name    | National Forestry and Grassland Administration Northwest Investigation and Planning Institute |
| Roles/Responsibility | Consultant                                                                                    |
| Contact person       | Yao Xin                                                                                       |
| Title                | Project Manager                                                                               |
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National Forestry and Grassland Administration Northwest Investigation and Planning Institute is a subordinate organization of The National Forestry and Grassland Administration, who has rich experience in forest management in Northwest of China, including artificial afforestation, forest protection and management, forest damage control and technical training.

#### 2.1.5 Physical Parameters (G1.3)

The project is located in Burqin County, Altai City, Xinjiang Uygur Autonomous Region, China. Burqin County is a border county in the northwest of Xinjiang, located in the southern slope of the

mid-west Altai Mountains, the northwestern margin of Junggar Basin. Burqin county is a rare area that borders on the three countries at the same time. It is also the only county in Xinjiang that has a common border with Russia and can open up direct trade ports between China and Russia. The geographical coordinates of Burqin County between 86°25' and 88°06' east longitude and between 47°22' and 49°11' north latitude.

According to CCB standard, Burqin County is defined as the project zone, and the project implementation area in Burqin is defined as project area. The boundaries of project area and project zone are shown in Figure 2-1 and Figure 2-2, and the KML file has also been uploaded to Verra Registry.

The basic physical parameters of the project zone are summarized as follows:

### **Topography**

The whole county is high in the north and low in the south, from Hüiten Peak to the southwest, with a clear four-step descent to the lowest Irtysh River valley. South of the river valley, it gradually rose to an elevation of 1,558.4 m above sea level in the southern Coxon Mountains. The plain was like a trough with a strong horizontal recumbent. The relative height difference from north to south is 3,900m. In the territory, mountains and ravines are distributed longitudinally and horizontally, and the topography is complex. They are roughly divided into four geomorphologic units, namely, the high-middle mountain, the low mountain, the alluvial-diluvial plain and the denudation low mountain south of the Irtysh River, of which the high mountain area accounts for 52.19%, hilly areas accounted for 15.87%, low mountain areas for 13.7% and plain areas for 18.24%. High school mountainous areas: north elevation above 3,100m for modern glaciers and permanent snow; elevation 2,300 ~ 3,100m for alpine, sub-alpine belts; elevation 1,300 ~ 2,400m for the Zhongshan Belt, deep valleys, many steep cliff deep valley. The low mountain area is 650 ~ 1,300m above sea level, the runoff cutting is deep, and the terrain is gentle during the distribution of Intermountain Fault Basin. The Piedmont alluvial-diluvial plain is composed of Burqin River and Irtysh River fan at an elevation of 456 ~ 650m. The terrain is flat, the Quaternary sediments are thin and the topsoil is shallow. The arid, low mountain south of the Irtysh River lies in the Tascombe Desert, a chain of faults and folds in the south and Barchan in the west.

### **Soils**

The soil in the county can be divided into two series: plain soil and mountain soil, with 14 soil classes and 22 subclasses. The mountain soil mainly includes mountain ice marsh soil, mountain stone desert soil, mountain meadow soil, subalpine meadow soil, mountain brown coniferous forest soil, mountain black calcium soil, dark meadow soil, mountain marsh soil and so on. There are 6 kinds of soils in the plain area, including chestnut soil, synthetic calcium soil, fluvo-aquic soil, 17 subclasses, 10 genera, 26 soil species and 17 varieties. Most of the soils have the characteristics of thin soil layer, coarse soil, more gravel, poor water retention and fertility. Soil nutrient, organic matter content is on the low side, lack of nitrogen and phosphorus. Within the county territory, chestnut soil is distributed over a large area, spanning the Irtysh River and the Shawuer Mountains and hills, and divided into two sub-types; the Chao soil is mainly distributed in the Burqin River Terrace, there are 3 subclasses, 4 soil genera, 13 soil species and 9 varieties in the gully lands of the plain in front of the Altay Mountains, and the meadow soil is mainly distributed in the secondary

forest belt of the Irtysh River, fertile soil, easy irrigation, suitable for farming and animal husbandry, can be divided into two subclasses; Aeolian sandy soil, which is mainly distributed on both sides of the Irtysh River and is mainly deposited by the wind; and saline soil, which is due to the rise of the groundwater level, there are 3 subclasses of water-formed natural soil formed by soil morass and salinization.

### **Climate**

Burqin County is a north temperate continental climate. As a result of low latitude, summer is short and not very hot, winter is long and cold, spring and autumn is cool and windy, and the temperature difference between day and night is large. Due to the great difference in height within the territory, with the rise in altitude from the south to the north gradually become cold. The annual mean temperature is 4.1 °C, the annual extreme maximum temperature is 38 °C, the extreme minimum temperature is -41.2 °C, the annual accumulated temperature is 2488 °C  $\geq 10^{\circ}\text{C}$ . The mean temperature in July was 22.4°C, the extreme maximum temperature was 38°C, the average temperature in January was -16.4°C, and the extreme minimum temperature was -41.2 °C. The sunshine duration was 2971h and frost-free period was 126 days. The annual average rainfall is 118.7mm and the annual evaporation potential is 1754.5mm. The soil was frozen around November 20, thawed in the middle of April, the thickness of snow was 5 ~ 15 cm, and the maximum depth of frozen soil was 1.8 m. The wind direction is mainly easterly and westerly, the frequency is 23% and 28%, the average wind speed is 3.4 m/s, the maximum wind speed is 16 m/s. The main disastrous weather is drought, dry hot wind, low temperature, snowstorm and cold wave strong temperature.

### **Hydrology**

Burqin County is rich in water resources, with the Irtysh River and Burqin River as the main stream of many water systems, annual runoff of 7.472 billion cubic meters, 514 million cubic meters of groundwater reserves. The Irtysh River is an international river that flows from east to west across the county border of Habahe County to the Arctic Ocean, the source of China's only Arctic water system, the largest tributary of the Irtysh River. The total length of the territory is 80.5 km, with an annual average runoff of 3.18 billion m<sup>3</sup>. The Burqin River is a tributary of the Irtysh River. It has its source in Hüiten Peak, runs through the county from north to south and joins the Irtysh River in the west of Burqin Town. The total length of the river is 269.6 km. The basin area is 9,960 km<sup>2</sup> with an average runoff of 4.273 billion cubic meters, influenced by rainfall, the annual variation of runoff is large, the coefficient of variation is 0.224, the annual distribution is uneven from June to August, the runoff accounts for 74.9% of the whole year. The groundwater in Burqin County has a good hydrogeological condition, and the distribution of shallow groundwater is common, but the distribution of confined water is uneven due to the difference of geological structure. The surface runoff and groundwater in the county are characterized by low salinity, little suspended matter and good water quality.

### **Types of vegetation**

There are seven vegetation types in Burqin County including forest, meadow, steppe, shrub, alpine vegetation, stone vegetation, marsh and aquatic vegetation, and the vertical distribution law is obvious, which can be divided into five zones from bottom to top: zhongshan forest meadow zone, subalpine meadow zone, alpine meadow zone, alpine tundra vegetation zone and permanent snow

mountain zone. The forest vegetation is mainly distributed in shady slope, semi-shady slope and gully below 2,800m. The forest-meadow belt is 1,300 ~ 2,300 meters above sea level. The forest vegetation is dominated by *Larch*, *Spruce*, *Abies* and *Pinus Chinensis*, followed by *Aspen*, *Betula Verruca* and *Salix*. River Terrace, forest clearing and sunny slope are mostly meadow grassland vegetation. In the valley between the mountains, Lake Mouth on both sides of the development of swamp vegetation swamp. The shrub vegetation composed of mesophytic and mesophytic shrubs was fully developed. From 2,200 to 2,300 meters, it is subalpine meadow zone, but it is not sufficient in many areas. It is well developed in the peneplain. Plant species to the middle grass, weeds composition. Subalpine meadow vegetation coexisted with forest vegetation from 2,100 m. 2,400 ~ 2,600 meters of alpine meadow belt. Forest vegetation gradually sparse, mesophytes and weeds composed of plant communities widely developed. Coniferous shrub is more common, in gentle slopes, valley areas with good moisture conditions, there is a large area of broad-leaved shrub dominated by *Betula* round leaf.

### 2.1.6 Social Parameters (G1.3)

The basic social parameters of the project zone are summarized as follows:

#### Main settlements

Burqin County has jurisdiction over 5 townships, 2 towns and 74 administrative villages. It is a border county with Kazakh nationality as the main body and multi-ethnic settlement. The Kazakh population of the county is 41,583, accounting for 57.45% of the total population, 21,473 Han people, accounting for 29.67%, the Hui population is 4,758, accounting for 6.57%, Mongolian 1763, accounting for 2.44%, there are 2,911 people from other ethnic groups, accounting for 3.87%. The total number of households in the county was 26,163, with 72,378 people. The urban population is 22,218 and the rural population 50,160. Among the rural population, there are 6,411 farming households, 19,406 people.

#### Land use and Economic activities

The total land area of Burqin County is 1,079,666 ha<sup>16</sup>, and the gross natural grassland area is 676,733 ha, accounting for 62.67% of the total land area of the county. Farmland area 22,813 ha, accounting for 2.11% of the county's total land area; Forest area of 96,980 ha, accounting for 8.98% of the county's total land area. Other land areas of 283,226 ha, accounting for 26.24% of the county's total land area. Total GDP of the county was 2.104 billion RMB, of which the added value of the primary industry was 348 million RMB, the added value of the secondary industry was 899 million RMB, and the added value of the tertiary industry was 857 million RMB. The total output value of farming, forestry, animal husbandry and fishery in the county was 767 million RMB, and the per capita income of farmers and herdsmen was 10,736 RMB.

County crop sown area of 441,000 mu. Among them, 136,600 mu of grain crops, 1,300 mu of potato, 135,000 mu of oil crops, 1,800 mu of vegetables, 73,000 mu of melon, 65,700 mu of forage land, 22,100 mu of pumpkin. The total grain output was 74,291 tons, 24,302 tons of oil crops, 5,814 tons of vegetables, 7,613 tons of melon, 2,208 tons of pumpkin, 21,300 tons of alfalfa and 162,200 tons of silage corn.

<sup>16</sup> 16.195 million mu, 1 ha=15 mu

Burqin county has the characteristics of vertical gradient distribution of mountains, hills, plains and deserts, which provide favorable conditions for the development of animal husbandry. At the end of the year, the county had 360,500 livestock, including 82,700 cattle, 18,000 horses, 3,019 camels, 1,006 pigs, 220,000 sheep and 35,800 goats.

### **Relevant historic conditions**

The county got its name from the Burqin River, 'Burqin', Weilat Mongolian. In Weilat, the three-year-old male camel is called a 'bur', and 'qin' means herder. Burqin County is a place where nomadic peoples in western China have been living and multiplying since ancient times. According to historical records, Burqin belongs to Altai area, known as the grasslands of western Mongolia in ancient times. After 1919, people omitted the word "river" and called it "Burqin County". In August 1950, the first meeting of people's representatives of all ethnic groups and all walks of life was held in Burqin County, and the People's government of Burqin County was elected.

### **Socio-cultural information**

Burqin County is a border county with Kazakh nationality as the main body and multi-ethnic settlement, which has Kazakh, Han, Hui, Mongolian and other ethnic groups. The Kazakh population of the county is 41,583, accounting for 57.45% of the total population. There are 37,362 males, accounting for 51.62% of the total population, and 35,016 females, accounting for 48.38% of the total population. According to age, the population aged 0-14 is 14,747, accounting for 20.38% of the total population; the population aged 15-64 is 53,447, accounting for 73.84% of the total population, and those aged 65 and over are 4,184, accounting for 5.78% of the total population.

The urban population is 22,218 and the rural population 50,160, the urbanization rate is 30.70%. The per capita disposable income of urban residents is 27,173 RMB, and the per capita net income of farmers and herdsmen is 10,736 RMB.

The county has 18 primary and secondary schools. Among them, there are 4 ordinary middle schools and 14 primary schools with 1,285 teaching and administrative staff. The total number of students in the school is 9,795, including 3,738 students in ordinary middle schools (1,386 students in senior high schools and 2,352 students in junior high schools) and 6,057 students in primary schools. The enrollment rate of junior high school is 90.6%, the enrollment rate of senior high school is 100%, and the enrollment rate and graduation rate of primary school-age children are 99.94% and 100% respectively.

The county has 11 health institutions, including 1 county hospital, 1 disease prevention and control center, 1 maternal and child health institutions, and 8 township health centers. There are 397 hospital beds, 147 doctors and 473 health technicians, including 98 practicing doctors. 42,348 people participated in rural cooperative medical care in the whole county, with a participation rate of 100%.

Kazakh is one of the world's most famous nomads. This is mainly because the herders usually have to raise hundreds of cattle and sheep to survive, so they need to constantly choose pastures to meet the supply of cattle and sheep. When they settle down in a place, they check out the local pasture, water resources, etc. Herdsmen generally follow the natural and do not wait until the surrounding grass has been eaten up before moving. In order to resist the harsh winter, for the

circulation of the grassland, but also for their own cattle and sheep to survive, they forage for water, grass and raise cattle. Moreover, such a traditional transition life has continued for nearly 3,000 years, the history of the Kazakh is written in nomadism.

Prior to the project initiation, some of the project lands are state owned, rest of them are collective owned. All project land owners agree to Burqin Agriculture and Animal Husbandry Bureau to organize the implementation of the degraded grass land restoration project and carry out sustainable management of grassland, including the development of grassland carbon sink project. In 2019, the Agriculture and Animal Husbandry Bureau was abolished<sup>17</sup>, and some functional departments were transferred to the Forestry and Grassland Bureau, such as Grassland Station, which continued to be responsible for the management of the degraded grass land restoration project, including the development of grassland carbon sink project. And Burqin Forestry and Grassland Bureau authorized Burqin Jinhua Urban Construction and Investment Co., Ltd. the rights to control and operate the project as Project Proponent during the whole project crediting period. Please refer to Section 2.5 for details.

#### **2.1.7 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2)**

The project is located in Burqin County, Altai City, Xinjiang Uygur Autonomous Region, China. The geographical coordinates of the project are between 86°25' and 88°06' east longitude and between 47°22' and 49°11' north latitude.

The location of the project activity in Burqin County is illustrated in Figure 2-1. According to CCB standard, the Burqin County is defined as the project zone, and the implementation area is defined as project area, and the project activities in the project area will generate net climate benefits. The boundaries of project area and project zone is shown in Figure 2-2, and the KML file has also been submitted<sup>18</sup>.

The location of communities (identified in Section 2.1.9) is also show in Figure 2-2, there are no high conservation value (HCV) areas, and no offsite climate and biodiversity impacts areas. There are no negative well-being impacts on other stakeholders.

As described in section 3.2.3, grazing was forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage, and the Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. So, there is leakage in the project zone due to grazing displacement activities. And the offsite climate impacts areas are defined as the project zone which is outside of the project area, as shown in Figure 2-2.

<sup>17</sup> Plan for Institutional reform of The State Council,  
[http://www.gov.cn/xinwen/2018-03/17/content\\_5275116.htm](http://www.gov.cn/xinwen/2018-03/17/content_5275116.htm)

<sup>18</sup> <https://registry.verra.org/app/projectDetail/VCS/2852>



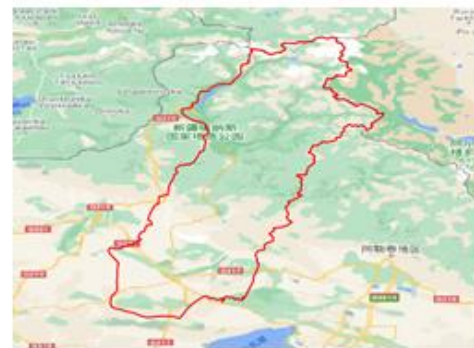
(a) The map of China



(b) The map of Xinjiang Uygur Autonomous Region



(c) The map of Altai



(d) The map of Burqin

Figure 2-1 The project location

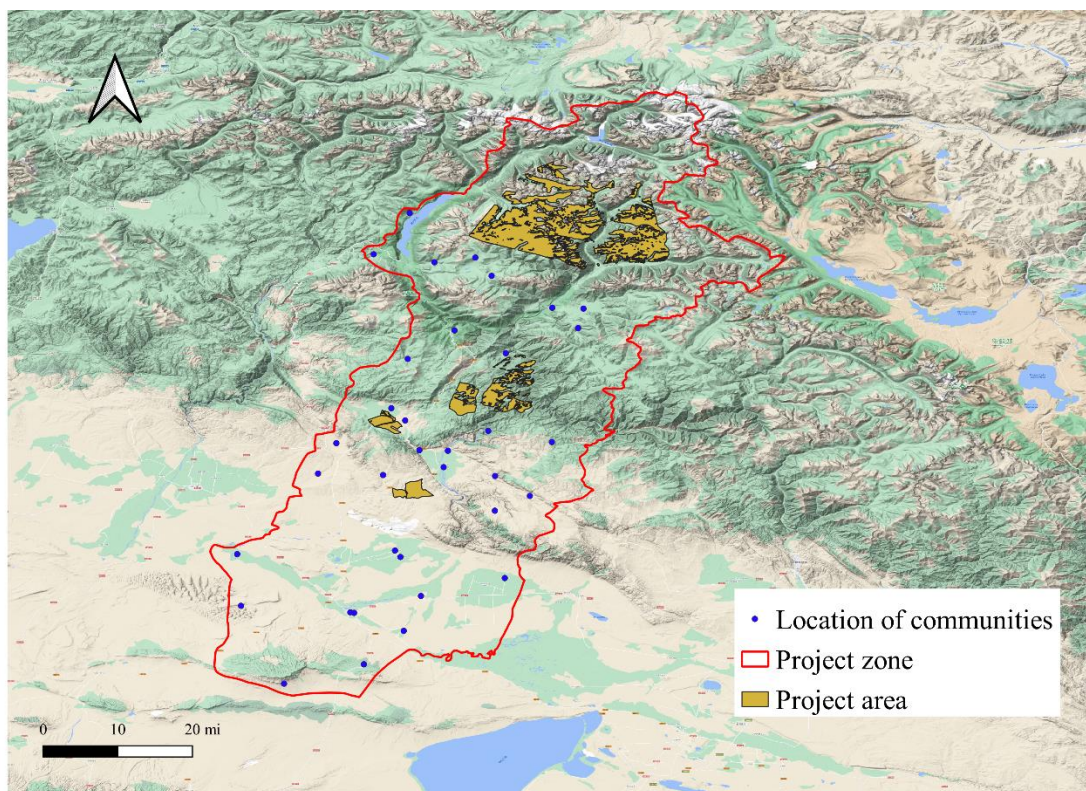


Figure 2-2 The project zone and project area

### 2.1.8 Stakeholder Identification (G1.5)

The following proposed steps were adapted to identify stakeholders according to SBIA Manual:

#### **Step 1: Brainstorm with key informants or focus groups to list and classify stakeholders**

This brainstorm starts by listing all the people or groups who might have an influence over or be impacted by a project. The local village committees and village officials were considered to be the key informants and focus groups who know best about the local residents.

Burqin County has been identified as the project zone. And it will be impacted directly by the project activities, hence all communities, community groups in Burqin County should be identified as stakeholders. In addition, we have also identified other stakeholders who may be affected by the project activities. The most meaningful stakeholder categories are listed below.

#### **1) Local residents around project area**

The project provided short-term work such as fence building and grass seeding but also the long-term work such as the grassland guardians for local residents around project area, which will increase their household income. The project restored the degraded grassland and improved their living environment. These residents can be divided into the following categories:

**Local residents**

Local residents are the main labor resources during the project implementation, and some of them are employed as grassland guardians.

**Local women**

Women and men often have very different roles and interests in natural resource management and can contribute complementary skills and knowledge. There is also evidence that when women receive income, positive welfare outcomes are more likely. Therefore, women should be regarded as the important stakeholders. In this project, more than 40 percentage of the local residents directly involved in the project are women. The project provided them with skills training in fence building and sustainable grassland management, which is conducive to increasing family income and improving local ecological environment.

**Local Kazakh**

About 57.45% of the total population in Burqin is Kazakh nationality, which is one of the world's famous nomads. The implementation area is located in grasslands and will impact the traditional lifestyle of local Kazakh, therefore they should be identified as stakeholders.

**Local herders**

Local herders live by grazing, so the grassland ecosystem will have a great impact on their traditional livelihood. Also overgrazing is the main factor leading to the continued degradation of the grassland ecosystem. The project restored the degraded grassland and guided them to graze reasonably.

**Grassland guardians**

Approximately 467 local herders were employed as grassland guardians, with an annual salary of 22,800 RMB (3,579.60 USD) per person. They will protect and manage the grassland under the guidance of the project proponent and the local forestry and grassland bureau.

**2) Village collectives**

According to Grassland Law of People's Republic of China, the ownership of grassland belongs to the state and the collectives. Therefore, village collectives that own the grassland should be identified as stakeholders.

**3) Burqin Forestry and Grassland Bureau**

Burqin Forestry and Grassland Bureau is a government department responsible for implementing national forestry and grassland regulations, formulating development strategies, and managing local forest and grassland resources. The project was approved by Burqin Agriculture and Animal Husbandry Bureau in 2017, and the Agriculture and Animal Husbandry Bureau has been dismissed in 2019 due to the reform of government function, and some functional departments related to grassland management have been transferred to Burqin Forestry and Grassland Bureau. Burqin

Forestry and Grassland Bureau is positive to assist and participate in the routine management during the implementation phase of the project. Therefore, the Burqin Forestry and Grassland Bureau should be also identified as stakeholders.

#### **4) Local government**

The government agency Burqin Finance Bureau provided the initial funds for the implementation of the project. The government also supervises the environmental and social impacts of the project, such as the restoration of the grassland ecosystem and employment issues.

#### **5) Other stakeholders**

According to the definition of other stakeholders mentioned above, we also identified some groups separately, which include scientific research institutions and tourism companies.

##### ***Scientific research institutions***

Grassland is of great significance in purifying water sources and improving the ecological environment. Research institutions have carried out research on grass species, grassland degradation mechanisms, and grassland restoration, which are the key to promoting sustainable grassland development. The project aims to restore the degraded grassland, which is the hot topic of scientific research in grassland ecological protection.

##### ***Tourism companies***

The grassland ecosystem in the project area is seriously degraded, which is not conducive to the sustainable development of tourism. After the successful implementation of the project, the restored grassland is beneficial to rebuild local pleasant and beautiful ecological system which is basic of tour and sightseeing. Therefore, the project will generate a certain degree of impact for all tourism companies within or outside the project area.

#### **Step 2: Well-being ranking of local or community stakeholders**

Reference to procedures: The “Who Counts First?” matrix evolved as part of the “Criteria and Indicators” for sustainable forest management process of Center for International Forestry Research (CIFOR), we also involve ranking stakeholder groups according to seven dimensions of well-being or importance:

- Proximity to the grassland
- Pre-existing rights
- Dependency on the grassland
- Poverty level
- Local or indigenous knowledge
- Grassland/culture integration (i.e., the cultural importance of the forest)

- Power deficit of stakeholder group compared to other stakeholders

Each stakeholder group is scored, according to the extent that each dimension applies to them, with the following simple scoring system:

1 = high

2 = medium

3 = low

Table 2-1 Importance of stakeholder groups analysis

| Stakeholder                                                                 | Local residents | Local women | local Kazakh | Local herders | Grassland guardians | Village collectives | Burqin Forestry and Grassland Bureau | Local government | Scientific research institutions | Tourism companies |
|-----------------------------------------------------------------------------|-----------------|-------------|--------------|---------------|---------------------|---------------------|--------------------------------------|------------------|----------------------------------|-------------------|
| Proximity to the grassland                                                  | 1               | 1           | 1            | 1             | 1                   | 1                   | 2                                    | 2                | 3                                | 3                 |
| Pre-existing rights                                                         | 2               | 1           | 1            | 1             | 2                   | 2                   | 1                                    | 1                | 3                                | 3                 |
| Dependency on the grassland                                                 | 1               | 1           | 1            | 1             | 1                   | 2                   | 1                                    | 1                | 3                                | 3                 |
| Poverty level                                                               | 1               | 1           | 1            | 1             | 1                   | 2                   | 3                                    | 3                | 3                                | 3                 |
| Local or indigenous knowledge                                               | 1               | 1           | 1            | 1             | 1                   | 1                   | 1                                    | 2                | 3                                | 3                 |
| Grassland/culture integration (i.e., the cultural importance of the forest) | 2               | 2           | 2            | 2             | 2                   | 1                   | 2                                    | 2                | 3                                | 3                 |
| Power deficit of stakeholder group compared to other stakeholders           | 1               | 1           | 1            | 1             | 1                   | 1                   | 1                                    | 2                | 3                                | 3                 |
| <b>Average score</b>                                                        | <b>1.28</b>     | <b>1.14</b> | <b>1.14</b>  | <b>1.14</b>   | <b>1.28</b>         | <b>1.43</b>         | <b>1.57</b>                          | <b>1.86</b>      | <b>3</b>                         | <b>3</b>          |

An average over the seven dimensions is estimated as stakeholder groups scores. In the case study applications of this method, stakeholder groups scores with less than 2 are regarded as important stakeholders from an equity perspective, while those scoring 2 or more are regarded as less critical.

**Step 3: Analyze each stakeholder group in terms of their interests, motivation to participate and relationships with other stakeholders**

This information can be summarized in Table 2-2

Table 2-2 Stakeholder Analysis

| Stakeholder or stakeholder sub-group | interests in the project                                                | Effect of project on their interest(s)                                                                     | Capacity and motivation to participate | Relationship with other stakeholders |
|--------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------|
| Local residents                      | Job opportunity                                                         | Create job opportunity, provide work training                                                              | Higher income                          | Partnership                          |
| Local women                          | Job opportunity                                                         | Create job opportunity, provide work training                                                              | Higher income                          | Partnership                          |
| local Kazakh                         | Job opportunity                                                         | Create job opportunity, provide work training                                                              | Higher income                          | Partnership                          |
| Local herders                        | Job opportunity                                                         | Create job opportunity, provide work training and extra subsidies from government                          | Higher income                          | Partnership                          |
| Grassland guardians                  | Job opportunity                                                         | Create job opportunity, provide work training and extra subsidies from government                          | Higher income                          | Partnership                          |
| Village collectives                  | Restoration of degraded grassland and drive the development of tourism. | Increase the coverage and ecological value of grassland; provide sustainable grassland management training | Achievement                            | Partnership                          |

|                                      |                                                                                                |                                                                                                        |                      |             |
|--------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------|-------------|
| Burqin Forestry and Grassland Bureau | Sustainable grassland management                                                               | Organize project implementation and protect grasslands as the achievement                              | Achievement and duty | Partnership |
| Local government                     | Financial support, Local social and environmental management, employment and welfare of county | Enhance local social and environmental management. Increased employment and improved welfare of county | Achievement          | Partnership |
| Scientific research institutions     | Provide experimental evidence for theoretical research                                         | Apply research results to specific projects                                                            | Achievement          | Partnership |
| Tourism companies                    | Obtain tourism income                                                                          | Attract more people to travel and increase income                                                      | Higher income        | Partnership |

The descriptions of each community group have been stated in the following section 2.1.9.

#### **Step 4: Analysis of the level of influence and importance of each potential stakeholder group**

Influence refers to the extent to which a stakeholder or stakeholder group has power over the project, and can therefore facilitate or hinder project interventions, and importance refers to how much the achievement of project goals depends upon the involvement of a given stakeholder. The levels of influence and importance are classified into low, moderate, significant and critical.

In the project, according to the step 1 and step 3, the relevant analysis is summarized as below.

##### **A. Local residents**

Some local residents around the project area participated in the implementation of the project, such as fences building and seeding grassland. However, the absence of local residents around the project area will not hinder the implementation of the project. Therefore, the importance of local residents around the project area is assessed as 'Significant' and its influence is 'Critical'.

##### **B. Local women**

More than 40% of the local residents directly involved in the project are women, which will contribute to empower women and build community capacity in gender and sustainable grassland management. However, the absence of female workers will not hinder the implementation of the project. Therefore, the importance of female workers is assessed as 'Critical' and its influence is 'Moderate'.

**C. Local Kazakh**

About 57.45% of the total population in Burqin is Kazakh nationality, which is one of the world's famous nomads. The implementation area is located in grasslands and will impact the traditional lifestyle of local Kazakh, therefore they should be identified as stakeholders.

**D. Local herders**

Local herders live by grazing, and overgrazing is the main factor leading to the continued degradation of the grassland ecosystem. The project restored degraded grassland and guided them to graze reasonably. Therefore, herders' grazing activities have a significant impact on the achievement of the project goals. However, the absence of local herders will not hinder the implementation of the project. Therefore, the importance of local herders is assessed as 'Critical' and its influence is 'Moderate'.

**E. Grassland guardians**

Approximately 467 local herders will be employed as grassland guardians, and they will protect and manage the grassland under the guidance of the project proponent and the local forestry and grassland bureau. However, the absence of local herders will not hinder the implementation of the project. Therefore, the importance of local herders is assessed as 'Critical' and its influence is 'Moderate'.

**F. Village collectives**

According to Grassland Law of People's Republic of China, the ownership of grassland belongs to the state and the collectives. Therefore, without the support of the village collectives, the project cannot be successfully carried out. Therefore, the importance and influence of village collectives are assessed as 'Significant'.

**G. Burqin Forestry and Grassland Bureau**

In 2019, the County Grassland Station which belongs to County Agriculture and Animal Husbandry Bureau has transferred to Burqin Forestry and Grassland Bureau is responsible for the project implementation and sustainable management of project. In addition, the county forestry bureau provides training on rodent control, seeding grass and reasonable grazing for the project implementers, which is beneficial to the achievement of the project goals. Therefore, the importance and influence of Burqin Forestry and Grassland Bureau are assessed as 'Critical'.

**H. Local government**

Burqin County Government approved the request of the Forestry and Grass Bureau to carry out the grassland carbon sink project. But local government did not participate in the management and implementation of the project, therefore, the importance of local government is assessed as 'low' and its influence is 'Significant'.

**I. Scientific research institutions**

Research institutions have carried out research on grass species, grassland degradation mechanisms, and grassland restoration, which are the key to promoting sustainable grassland development. However, the scientific research institutions have low influence to hinder the implementation of the project. Therefore, the importance of scientific research institutions is assessed as 'moderate' and its influence is 'Low'.

#### **J. Tourism companies**

The relationship of tourism companies and the project is reciprocal in long term. The success of the project may bring abundant of tourism resources, in turn, the tour and sightseeing may play a role of dissemination and facilitate development of similar project. And the tourism companies have low influence to hinder the implementation of the project. Therefore, the importance and influence of tourism companies is assessed as 'Low'.

Table 2-3 Influence and Importance of stakeholder to project achievement

| Influence of Stakeholder | Importance of stakeholder to project achievement |          |             |            |
|--------------------------|--------------------------------------------------|----------|-------------|------------|
|                          | Low                                              | Moderate | Significant | Critical   |
| Low                      | J                                                | I        |             |            |
| Moderate                 |                                                  |          |             | B, C, D, E |
| Significant              |                                                  | H        | F           |            |
| Critical                 |                                                  |          |             | A, G       |

According to the above scoring and analysis, the local residents around the project area and local Forestry and Grassland Bureau are the most important stakeholders in this project.

#### **Step 5: Publish the results of identified stakeholders**

According to the step 4, the influence and importance rank of stakeholders is as follow: A, G>B, C, D, E>F>H>I>J. The final stakeholders are identified and listed as below. The final stakeholders are identified the top three of the total rank and they have been stated in the following section 2.1.9.

Table 2-4 Final Stakeholders

| Category Code | Stakeholders Group                   | Rank |
|---------------|--------------------------------------|------|
| A             | Local residents                      | 1    |
| B             | Local women                          | 2    |
| C             | Local Kazakh                         | 1    |
| D             | Local herders                        | 2    |
| E             | Grassland guardians                  | 2    |
| F             | Village collectives                  | 3    |
| G             | Burgin Forestry and Grassland Bureau | 1    |
| H             | Local government                     | 3    |

The results of identified stakeholders will be publicly announced on CCB and VCS website as part of the draft PD which can be accessed by everyone, in case there is any other person who may consider themselves as one of the project's stakeholders, they can directly contact the project owner for consultation.

## Step 6: Final continuous input / grievance mechanism

According to the step 5, there are different response mechanisms with different rank level of stakeholders group, are summarized as below.

After approval, Burqin Agriculture and Animal Husbandry Bureau would organize the implementation and cooperate with local residents. Because the Grassland Station under the Animal Husbandry Bureau was transferred to the Forestry and Grass Bureau, and the Agriculture and Animal Husbandry Bureau was abolished. Therefore, during the whole credit period, the project will be under the supervision and management of project owner and Burqin Forestry and Grassland Bureau.

Firstly, once there are any complaints or grievances, project proponent shall contact and discuss with relevant community or other stakeholders within 3 days; secondly, the specific staff of project proponent should propose a solution and mediation which is performed by relevant government agency within a week based on all collected information; Thirdly, the project proponent will address their complaints or grievances by relevant legal method such as arbitration and courts if necessary. Finally, the entire complaints or grievances redress process shall be dealt within 30 days.

### 2.1.9 Stakeholder Descriptions (G1.6, G1.13)

As described above, Burqin County is defined as the project zone, so the identified stakeholders can summarize below:

Table 2-5 Stakeholder descriptions

| Stakeholder     | Rights, Interest and Overall Relevance to the Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local residents | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To be provided with an environment and working conditions that ensure the minimum conditions of well-being.</li> <li>• To be trained on issues related to the development of project activities.</li> <li>• To express opinions on the direct and indirect impact of the project on the interests of the community.</li> <li>• To express opinions on the direct and indirect impact of the project on climate and biodiversity.</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• To have more and better job opportunities for both men and women.</li> <li>• To have increased economic support.</li> <li>• To receive training.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Direct beneficiaries of projects economic outcome, as well as impacts on climate, communities, and biodiversity.</li> </ul> |

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Burqin Forestry and Grassland Bureau | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To regulate land use in the Project Area.</li> <li>• Responsible for approval of project implementation.</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• To ensure compliance with current regulations on land use.</li> <li>• To ensure the sustainable development of their jurisdiction by verifying compliance with existing environmental regulations for the different project activities.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Burqin Forestry and Grassland Bureau is a government department responsible for the supervision and management of the grassland and ecological construction.</li> </ul>                                                                                                                                                                                                                                                                           |
| Local women                          | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To be provided with an environment and working conditions that ensure the minimum conditions of well-being.</li> <li>• To be trained on issues related to the development of project activities.</li> <li>• To express opinions on the direct and indirect impact of the project on the interests of the community.</li> <li>• To express opinions on the direct and indirect impact of the project on climate and biodiversity.</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• To have more and better job opportunities.</li> <li>• To have increased economic support.</li> <li>• To receive training.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Female rural workers are the main labor resources during the project implementation, and some of them are employed as grassland guardians. Women accounted for more than 40% of the local residents involved in the project.</li> </ul> |
| Local herders                        | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To be provided with an environment and working conditions that ensure the minimum conditions of well-being.</li> <li>• To be trained on issues related to the development of project activities.</li> <li>• To express opinions on the direct and indirect impact of the project on the interests of the community.</li> <li>• To express opinions on the direct and indirect impact of the project on climate and biodiversity.</li> </ul> <p><b>Interest:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <ul style="list-style-type: none"> <li>• To have more and better job opportunities for both men and women.</li> <li>• To have increased economic support.</li> <li>• To receive training.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Direct beneficiaries of projects economic outcome, as well as impacts on climate, communities, and biodiversity.</li> <li>• Some herders participated in the planting and fences building work of the project. Local herders live by grazing, so grassland ecosystem will have a great impact on their traditional livelihood.</li> </ul>                                                            |
| Local Kazakh        | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To be trained with sustainable and scientific grazing skills</li> <li>• To have more opportunities to organize and participate in traditional culture activities</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• To improve grazing productivity</li> <li>• To promote traditional livelihood</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Over half of the local residents are Kazakh whose traditional livelihood is herding and grazing which would be impacted by the implementation of the project</li> </ul>                               |
| Grassland guardians | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• To be trained on issues related to the development of project activities.</li> <li>• To express opinions on the direct and indirect impact of the project on climate and biodiversity.</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• To receive training.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Some local herders were employed as grassland guardians to manage and protect the grassland under the guidance of the project proponent and the local forestry and grassland bureau through and beyond the project lifetime.</li> </ul> |
| Village collectives | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• Village collectives own some land ownership of the project.</li> <li>• To have an environment that ensures the minimum conditions of well-being and security.</li> <li>• To have equal rights to participate and apply for employment opportunities in their locality.</li> </ul> <p><b>Interest:</b></p>                                                                                                                                                                                                                                                                                                    |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <ul style="list-style-type: none"> <li>• To support the social and organizational development of the community.</li> <li>• To promote and develop work capacity of the community.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• Village collectives own some land ownership of the project and villagers can transfer the land usage right to the project owner before the start of the project.</li> <li>• Direct beneficiaries of projects economic outcome, as well as impacts on climate, communities, and biodiversity.</li> </ul>                                                                        |
| Local government | <p><b>Rights:</b></p> <ul style="list-style-type: none"> <li>• Compliance with municipal regulations related to the Project.</li> <li>• Provide recommendations on project activities.</li> </ul> <p><b>Interest:</b></p> <ul style="list-style-type: none"> <li>• Development of indirect economic activities that stimulate community development.</li> </ul> <p><b>Relevance:</b></p> <ul style="list-style-type: none"> <li>• The government provided the initial fund, approved and supervised the environmental and social impacts of the project, such as the restoration of the grassland ecosystem and employment issues.</li> </ul> |

### 2.1.10 Sectoral Scope and Project Type

According to Appendix of 1 Eligible AFOLU Project Categories of the VCS Standard (version 4.3), eligible Agricultural Land Management (ALM) activities are those that reduce net GHG emissions on croplands and grasslands by increasing carbon stocks in soils and woody biomass and/or decreasing CO<sub>2</sub>, N<sub>2</sub>O and/or CH<sub>4</sub> emissions from soils, which include Improved Cropland Management (ICM), Improved Grassland Management (IGM) and Cropland and Grassland Land-use Conversions (CGLC).

The project restores degraded grassland by planting grass and sustainable management of grazing activities, thus increasing soil carbon stocks. So, the project is developed under VCS scope 14 "Agriculture, Forestry and Other Land Use (AFOLU)" with a project category of Agricultural Land Management (ALM), and belongs to the category of Improved Grassland Management (IGM) that demonstrably reduce net GHG emissions of grassland ecosystems by increasing soil carbon stocks. The project is not a grouped project.

### 2.1.11 Project Activities and Theory of Change (G1.8)

#### GHG emission reduction or removal activities

Total 65,000.00 ha of degraded grassland have been managed scientifically by fence building and grass seeding of local high-quality forage. And that reduce net GHG emissions by increasing carbon stocks and/or reducing non-CO<sub>2</sub> GHG emissions.

There are two main restoration measures in the project: 1) Grass seeding on 5,000 hectares of severely degraded grassland where grass seeds of local high-quality forage was sowed under the condition of fencing enclosure for 2 years, and then the grassland should be used reasonably and sustainably according to the local approved livestock carrying capacity. 2) Rest and rotational grazing were implemented in 60,000 ha of moderately degraded grassland. For the first five years, grazing was strictly forbidden and then, sustainable grassland management methods will be applied, such as rotational grazing in different pastoral areas, limits the time and number of grazing in the project area to protect the natural grassland resources, curb the deterioration of the ecological environment of the natural grassland, It requires that the grazing time shall be halved by dividing grasslands into seasonal grazing land according to the livestock carrying capacity of the grassland by fence building. Then based on specified grazing order, grazing cycle and zoning grazing time, the grassland is grazed area by area and used in turn.

Grazing is forbidden for the first five years after the implementation of the project for relevant project area, and then controlled grazing will be allowed depending on the growth situation of the forage. Although the grazing days are strictly managed, reasonable grazing is still allowed based on the Grazing Displacement Management Plan. The rotational and rest grazing has been implemented by stages for three years (2017-2019, refer to Section 2.1.13 for details), and the implementation of the entire region with 65,000.00 hectares was completed in September 2019. Therefore, grazing is completely prohibited in the project area from 2019, and grazing activities were allowed in the area where the project has not yet been implemented in 2017-2018.

According to the Parameters for Degradation, Sandification and Salification of rangelands (National standard of China, GB19377-2003) and Project Design Report, the project area in baseline is moderately degraded areas (total grass yield is about 84.00 Kg/Mu decreased by 32.43% compared with that before degradation) and severely degraded grasslands (total grass yield is about 58.78 Kg/Mu that decreased by 52.72% compared with the non-degraded grassland data in 2000<sup>19</sup>).

Rotational grazing and rest grazing was implemented in moderately degraded areas and grass seeding was implemented in severely degraded areas.

Through scientific and sustainable management of grazing, relevant training about technical skills, scientific and effective management plan, alleviate soil desertification and restore grassland vegetation to improve soil carbon storage and local biodiversity, and enhance the capabilities of local communities and residents.

According to the project design report and the project approvals, the project doesn't take place within the jurisdiction covered by a jurisdictional REDD+ program in China, which is double confirmed by Burqin Forestry and Grassland Bureau<sup>20</sup>.

The project is estimated to generate GHG emission removals of 10,706,152 tCO<sub>2</sub>e, with average annual GHG emission removals of 267,654 tCO<sub>2</sub>e.

<sup>19</sup> Annual Survey report of grass yield conducted by Burqin County Forest and Grassland Bureau

<sup>20</sup> According to the 'Statement of Land Use' report released by Burqin Forestry and Grassland Bureau for the project area, the project does not take place within the jurisdiction covered by a jurisdictional REDD+ program in China.



Figure 2-3 The restored degraded grassland in the project area

### Theory of Change

As explained in the following sections, the without project scenario may have three focal issues:

- 1) The project is located in Burqin County with fragile ecology. Due to the long-term climate change and overgrazing, the grassland ecosystem will continue to degrade, which will bring serious damage to the local environment and sustainable development.
- 2) Continuous degradation of grassland ecosystem will deteriorate the living environment of local herders and affect their livelihoods.
- 3) Continuous degradation of grassland ecosystem poses a long-term threat to local climate conditions and biodiversity.

The main objective of the project is to restore the degraded grassland ecosystem by planting grass seeds and carrying out sustainable grassland management to address the above issues.

**Grassland ecosystem degradation focal issue:** In the absence of the project, the project area will remain as degraded grassland and the surrounding communities will be threatened by continue degradation of grassland ecosystem. After the implementation of the project, the grassland coverage has increased and grazing measures have been improved, which is beneficial to the local environment by maintenance of the water and soil, and healthy grassland ecosystem is an attractive landscape which could significantly benefit local touristic resources and promote the local economy.

**Local herders' livelihood focal issue:** Local herders live by grazing, in the absence of the project, the project area will remain as degraded grassland, the area available for grazing will gradually decrease, and their income will decrease in long-term. The project will offer some short-term and long-term job opportunities for local residents which could increase the income of the households. The restoration of degraded grassland and sustainable grazing will improve grazing productivity of local herders. And the project provides equal job opportunities for local women and men which could build community capacity in gender equity by empowering women. In addition, the project is located in Burqin County which is the traditional Kazakh region and the local residents employed by the project are mostly Kazakhs. The project will organize special community cultural activities for local residents which could provide more opportunities for Kazakh to inherit their traditional cultural and increase their social connection. All these will significantly improve the well-being of local communities.

**Threat to biodiversity focal issue:** In the absence of the project, the project area will continue degradation with much threat to local climate and biodiversity condition. There are 3 endangered species (*Gulo gulo*, *Cervus canadensis*, *Tetrao urogallus*) and 1 critically endangered species (*Alces alces*) are listed in the IUCN Red List (please refer to Section 5.1 for details of the endangered bird species) at the project site for its unique grassland habitat. The implementation of the project can preserve the natural habitats of wild animals by increase vegetation cover and avoid soil desertification in the project area. Therefore, the population of the endangered animals could be maintained and enhanced due to the better environment of the habitat which could increase the long-term biodiversity of local ecosystem.

Table 2-6 Project Activities and Theory of Change Table

| Activity description                                                                                                   | Expected climate, community, and/or biodiversity                                                                                                                                |                                                                                                                           |                                                                                                                                                                                                                           | Relevance to project's objectives                               |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
|                                                                                                                        | Outputs (short term)                                                                                                                                                            | Outcomes (medium term)                                                                                                    | Impacts (long term)                                                                                                                                                                                                       |                                                                 |
| Plant grass seeds on the degraded grassland and build grassland fences to promote the sustainable grassland management | Increase grassland coverage around the project area;<br>Prevent continue degradation of grassland ecosystem                                                                     | Increase habitat area for wild lives; Generate GHG emission removals;<br>Improve the knowledge or skills of local herders | Maintain and enhance the natural grassland ecosystem in project area;<br>Increase the population of the endangered animals within the project zone;<br>Improve local touristic development and promote the local economy. | Climate benefits<br>Biodiversity benefits<br>Community benefits |
| Offer permanent and temporary job opportunities to local herders, including women                                      | Create 4,875 job opportunities (467 permanent jobs and 4,408 temporary jobs), which is equally offered to local women and men;<br>Increase household incomes of local residents | Empower women and build community capacity in gender equity;<br>Improve living level of local residents                   | With other employees participating in community activities, women may get more happiness than doing housework only, so their well-being would be significantly improved.                                                  | Community benefits                                              |
| Provide technical skills and training of sustainable grazing                                                           | Improve grazing productivity,<br>Prevent                                                                                                                                        | Enhance capabilities of local herders                                                                                     | Improve well-being of local residents,                                                                                                                                                                                    | Community benefits;<br>Biodiversity                             |

| Activity description                                                                                                                                                                           | Expected climate, community, and/or biodiversity                                               |                                                                                                                                                                                           |                                                                                                                                                                                 | Relevance to project's objectives |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|                                                                                                                                                                                                | Outputs (short term)                                                                           | Outcomes (medium term)                                                                                                                                                                    | Impacts (long term)                                                                                                                                                             |                                   |
| method                                                                                                                                                                                         | continue degradation of grassland ecosystem                                                    | and increase their household income, Provide better habitat for wild lives                                                                                                                | Increase local biodiversity                                                                                                                                                     | benefits                          |
| Organize special community cultural activities for Local residents, since 60% of the local residents employed by the project are Kazakhs, and all the other community members are also invited | Increase social connection of Local residents and improve the interaction within the community | The project is located in Burqin County which is a traditional Kazakh region, the project provides more opportunities for Kazakhs to inherit their traditional cultural in a positive way | Improve well-being of local residents;<br>The connection between local Kazakh herders and other community members could indirectly promote the diffusion of traditional culture | Community benefits                |

The Grassland Station of Burqin Forestry and Grassland Bureau will be responsible for the implementation and management of the project during the project lifetime. And Burqin Forestry and Grassland Bureau will take over of the responsibility beyond the project lifetime. The technicians from local forestry and grassland bureau will measure the grass yield regularly in the project area and guide the herders to graze in a sustainable way. In addition, approximately 467 local herders were employed as grassland guardians to manage and protect the grassland under the guidance of the project proponent and the local forestry and grassland bureau through and beyond the project lifetime.

The improvement of the living standard for local herders would accelerate their transition of traditional overgrazing to sustainable grazing which could benefit for the maintenance and conservation of the local grassland ecosystem. In addition, the implementation of the project offers permanent and temporary job opportunities to local herders, including women, which empower women and build community capacity in gender equity and improve living level of local residents. The healthy grassland ecosystem is an attractive landscape which could significantly benefit local touristic resources and promote the local economy, which could therefore enhance the long-term benefit beyond the project lifetime.

All of these could guarantee the long-term climate, community, and biodiversity benefits.

## 2.1.12 Sustainable Development

The project provided many benefits that will help to achieving China's Sustainable Development Goals as following:



The project provided job opportunities for local residents, all residents have been given an equal opportunity to participate in the project if they meet the job requirements. Women and vulnerable people who come from the poorest local households were not only provided with equal opportunities but also consciously ensured that they can be part of the project. All the employees that were involved in grass seeding and fence building were paid 80 RMB (11.43 USD)/day. Grassland guardians were paid around 22,800 RMB (3,579.60 USD) / year.



The project proponent has referenced Labor Law of the People's Republic of China and adapted them to meet the local conditions to ensure workers' health and safety. The workers' health and safety policy, including items covering the health insurance scheme for workplace accidents and evacuation plans is made available for workers and implemented by Burqin Forestry and Grassland Bureau.



During the project implementation, about 4,875 local herders participated in the project, of which 1,950 are women. This will contribute to empower women and build community capacity in gender and sustainable grassland management. By being trained with the sustainable grassland management skills and participating the community activities together with other employees, women may gain more happiness compares to doing housework only, thus positive welfare outcomes for local households are more likely to be expected.



The purpose of the project is to restore the degraded grassland ecosystem by seeding grass and building fences to managed grazing which will generate GHG emission removals by increasing soil organics or avoiding soil degradation, mitigate the impact of climate change on the local ecological environment.



The project can improve the quality and quantity of the grassland vegetation and provide more habitat for wild animals to enhance biodiversity conservation by seeding grass or scientific grazing.

### 2.1.13 Implementation Schedule (G1.9)

Table 2-7 Timeline of the project

| Date                                                                  | Milestone(s) in the project's development and implementation                                                          |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 30-September-2016                                                     | The Participatory Rural Appraisal (PRA) Report was completed                                                          |
| 19-October-2016                                                       | The baseline biodiversity survey report was completed                                                                 |
| December-2016                                                         | The Project Design Report was completed                                                                               |
| 05-March-2017                                                         | The Project Design was approved by Burqin Agriculture and Animal Husbandry Bureau <sup>21</sup>                       |
| 26-June-2017                                                          | Started fence building (start date of project activity and crediting period)                                          |
| 26-June-2017 to 04-September-2017                                     | Rest and rotational grazing were implemented in 49,333.33 ha of degraded alpine meadow grassland and fence building   |
| 05-June-2018 to 10-September-2018                                     | Rest and rotational grazing were implemented in 10,666.67 ha of degraded mountain meadow grassland and fence building |
| 25-May-2019 to 25-June-2019                                           | Grass seeding was implemented in 5,000.00 ha severely degraded grasslands                                             |
| 15-June-2019 to 05-September-2019                                     | Repaired the fences                                                                                                   |
| 09-November-2020 to 30-November-2020 and 01-June-2021 to 25-June-2021 | Biodiversity monitoring in winter and summer season respectively                                                      |
| 04-September-2021 to 30-September-2021 <sup>22</sup>                  | Filed monitoring and survey for the first monitoring period, including climate and community                          |
| 30-December-2021                                                      | Draft PD and PD summary finished                                                                                      |
| 24-February-2022 to 26-March-2022                                     | Public comment period for draft PD and MR                                                                             |
| 20-June-2022 to 24-June-2022                                          | VVB site visit                                                                                                        |

<sup>21</sup> Since the Burqin Agriculture and Animal Husbandry Department has been dismissed in 2019 due to the reform of government function, and some functional departments related to grassland management have been transferred to Burqin Forestry and Grassland Bureau.

<sup>22</sup> According to the methodology, the monitoring of SOC stock should be at the end of growing season in the year measured, therefore the field monitoring activities for this monitoring period has been conducted in September of 2021.

#### 2.1.14 Project Start Date

According to VCS standard, the project start date is the date on which activities that lead to the generation of GHG emission reductions or removals are implemented, for this project, the project start date is 26-June-2017 when the fence building started<sup>23</sup>.

#### 2.1.15 Benefits Assessment and Crediting Period (G1.9)

The project crediting period is from 26-June-2017 to 25-June-2057 with a lifetime of 40 years which is the same as the CCB benefits assessment period.

#### 2.1.16 Differences in Assessment/Project Crediting Periods (G1.9)

The GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment and periods are all the same.

#### 2.1.17 Estimated GHG Emission Reductions or Removals

Table 2-8 Estimated GHG removals of the project

| Year | Estimated GHG emission removals (tCO <sub>2</sub> e) |
|------|------------------------------------------------------|
| 1    | 120,885                                              |
| 2    | 251,652                                              |
| 3    | 269,689                                              |
| 4    | 271,998                                              |
| 5    | 271,998                                              |
| 6    | 271,998                                              |
| 7    | 271,998                                              |
| 8    | 271,998                                              |
| 9    | 271,998                                              |
| 10   | 271,998                                              |
| 11   | 271,998                                              |
| 12   | 271,998                                              |
| 13   | 271,998                                              |
| 14   | 271,998                                              |
| 15   | 271,998                                              |
| 16   | 271,998                                              |
| 17   | 271,998                                              |

<sup>23</sup> Fence building contracts.

|                                        |                   |
|----------------------------------------|-------------------|
| 18                                     | 271,998           |
| 19                                     | 271,998           |
| 20                                     | 271,998           |
| 21                                     | 271,998           |
| 22                                     | 271,998           |
| 23                                     | 271,998           |
| 24                                     | 271,998           |
| 25                                     | 271,998           |
| 26                                     | 271,998           |
| 27                                     | 271,998           |
| 28                                     | 271,998           |
| 29                                     | 271,998           |
| 30                                     | 271,998           |
| 31                                     | 271,998           |
| 32                                     | 271,998           |
| 33                                     | 271,998           |
| 34                                     | 271,998           |
| 35                                     | 271,998           |
| 36                                     | 271,998           |
| 37                                     | 271,998           |
| 38                                     | 271,998           |
| 39                                     | 271,998           |
| 40                                     | 271,998           |
| <b>Total estimated ERs</b>             | <b>10,706,152</b> |
| <b>Total number of crediting years</b> | <b>40</b>         |
| <b>Average annual ERs</b>              | <b>267,654</b>    |

## 2.1.18 Risks to the Project (G1.10)

Table 2-9 Risk analysis of the project

| Identify Risk                    | Potential impact of risk on climate, community and/or biodiversity benefits                                                                                                                                                                                                           | Actions needed and designed to mitigate the risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fire                             | The planting area is degraded grassland with low coverage, thus the risk of fire is quite low in the early phase of the project. With the increase of grassland coverage, the risk of fire may increase, and the project owner will adopt the necessary measures for fire preventing. | This can be alleviated through technical and awareness training to local herders/communities, strengthening patrolling and monitoring. According to the Chinese Grassland Law, the local government should carry out the construction of grassland fire prevention facilities, and once a fire disaster occurs, the local government should be responsible for relevant rescuing immediately. And the project proponent is experienced in local natural risk control and has established a Grassland Management Manual for the project which includes specific instruction in fire prevention. |
| Rodents and pests                | There could be rodents and pests that may damage the grassland, but the rodents and pests will be prevented by routine overseeing.                                                                                                                                                    | The biological methods are used to control rodents, such as building eagle's nest. The chemical pesticides are allowed to be used only if there is a serious pest problem erupted in the project area, and the pesticides will be used in accordance with the National Pesticides Policy. The project proponent is also experienced in local natural risk control and has established a Grassland Management Manual for the project which includes specific instruction in rodents and pests prevention and control.                                                                           |
| Frost                            | The project area is located in Burqin County, where the temperature is low, but the frost disaster has little impact on the grassland.                                                                                                                                                | Grass species planted in the project are native species, which can adapt to the local climate. In case of frost disaster, grass can grow smoothly in the second year.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Human-induced risk (Overgrazing) | Overgrazing is the main factor leading to grassland degradation. The local government guide herders to carry out sustainable grazing, which can slow down the degradation of grassland.                                                                                               | Local herders are employed as grassland guardians, they protect and manage the grassland under the guidance of the project proponent and the local forestry and grassland bureau. Also, local forestry and grassland bureau vigorously promotes grassland protection, provides relevant training for herders, and raises herders' awareness of grassland protection.                                                                                                                                                                                                                           |

Also, please refer to Non-Permanence Risk Report of the project for more detailed analysis of project risk.

### **2.1.19 Benefit Permanence (G1.11)**

To maintain and enhance the climate, community and biodiversity benefits, the forage suitable for alpine region (e.g. *Elymus nutans*, *Agropyron cristatum*, *Festuca rubra* and *Artemisia sphaerocephala*) were selected to be planted in the project, and built eagle's nest in the project area to control rodents, which could guarantee the long-term benefits through and beyond the project lifetime. Also, grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage, and the fences were built around the project area.

According to Grassland Law of People's Republic of China, the ownership of grassland belongs to the state and the collectives, to make sure the successful development of the relevant carbon credits of the project, all project land owners agreed to authorize Burqin Agriculture and Animal Husbandry Bureau the rights of lands and grassland management within the project boundary during the project crediting period. After the implementation of the project, the Burqin Agriculture and Animal Husbandry Bureau has been dismissed in 2019 due to the reform of government function, and some functional departments related to grassland management have been transferred to Burqin Forestry and Grassland Bureau. Then, Grassland Station of local Forestry and Grassland Bureau has cooperated with Burqin Jinhua Urban Construction and Investment Co., Ltd. to help with the sustainable grassland management. In order to develop carbon credits of the project, with support of Burqin Forestry and Grassland Bureau, all project land owners agreed to authorize Burqin Jinhua Urban Construction and Investment Co., Ltd. the rights of lands and grassland management within the project boundary during the project crediting period, and the authorization has also been confirmed by local government.

So, Burqin Jinhua Urban Construction and Investment Co., Ltd. have the rights to control and operate the project as Project Proponent during the whole project crediting period. The carbon revenue will be used to pay the salaries of the grassland guardians, which is conducive to the sustainable development of the project.

The technicians from local forestry and grassland bureau will measure the grass yield regularly in the project area and guide the herders to graze reasonably. In addition, approximately 467 local herders were employed as grassland guardians to manage and protect the grassland under the guidance of the project proponent and the local forestry and grassland bureau through and beyond the project lifetime.

The improvement of the living standard for local herders would accelerate their transition of traditional overgrazing to sustainable grazing which could benefit for the maintenance and conservation of the local grassland ecosystem, and the healthy grassland ecosystem is an attractive landscape which could significantly benefit local touristic resources and promote the local economy, therefore enhance the long-term benefit beyond the project lifetime.

All of these could guarantee the long-term climate, community, and biodiversity benefits.

### **2.1.20 Financial Sustainability (G1.12)**

The cost of building fence is about 70 RMB (10.98 USD) / Mu, grass seeding is about 500 RMB (78.45 USD)/Mu, the total cost for the grassland restoration is about 570 RMB (89.43 USD) /Mu, and the estimated cost for subsequent management and protection would reach 11.71 million RMB (1.84 million USD) every year during the whole lifetime. Considering the widely dispersed distribution of the project land, it is difficult for any of the lands owner to raise enough fund and

effectively maintain the implementation of the project during such a long period. Therefore, after seriously considered the carbon revenue and thought the revenue could help to mitigate the investment barrier, Burqin Agriculture and Animal Husbandry Bureau has organized and managed the project implementation during the early phase, including conducting baseline survey and raising initial fund from Burqin Finance Bureau for the grass planting and fence building.

The actual revenue of 100 million RMB from Burqin Finance Bureau is used for preliminary investigation, grass seeds purchase, fences building and labour cost to restore degraded grassland, improve local environment, maintain or increase the diversity and abundance of characteristic species, create job opportunities for local residents.

However, the initial fund is not sufficient for the continued maintenance of the grassland which is crucial for sustainable management and restoration of the grassland ecosystem, therefore, after the implementation of the project, Grassland Station of local Forestry and Grassland Bureau has cooperated with Burqin Jinhua Urban Construction and Investment Co., Ltd. to help with the sustainable grassland management. In order to develop carbon credits of the project, with support of Burqin Forestry and Grassland Bureau, all project land owners agreed to authorize Burqin Jinhua Urban Construction and Investment Co., Ltd. the rights of lands and grassland management within the project boundary during the project crediting period, and the authorization has also been confirmed by local government.

Burqin Jinhua Urban Construction and Investment Co., Ltd. as the project proponent will be responsible for maintenance fee of 11.71 million RMB every year in the following years. To solve the project fund problem, the project proponent applied for a bank loan<sup>24</sup>, and which will be paid back with the potential subsidy from carbon revenue during the crediting period. After the carbon market research, the project is expected to obtain a carbon sequestration income of 12 million RMB per year, which is just enough to cover the annual management costs based on the estimated volume of GHG emission removals generated from the project and the estimated credit price of 45 RMB/tCO<sub>2</sub>. With this, local commercial bank agreed to provide loan for fund of the project with the consideration of the carbon revenue. Thus, the finance of the project is sustainable.

### **2.1.21 Grouped Projects**

N/A.

## **2.2 Without-project Land Use Scenario and Additionality**

### **2.2.1 Land Use Scenarios without the Project (G2.1)**

To determine land use scenarios without the project, Climate Bridge (Shanghai) Ltd. (hereafter as Climate Bridge) using “Image Classification Techniques in Remote Sensing”<sup>25</sup> to classify the land use of the project area. The 3 main types of image classification techniques in remote sensing are:

- Unsupervised image classification
- Supervised image classification
- Object-based image analysis

<sup>24</sup> The Project loan application documents

<sup>25</sup> Image classification is the process of assigning land cover classes to pixels. For example, classes include water, urban, forest, agriculture, and grassland.

Supervised and unsupervised classification is pixel-based. In other words, it creates square pixels and each pixel has a class. But object-based image classification groups pixels into representative vector shapes with size and geometry. Spatial resolution is an important factor when selecting image classification techniques<sup>26</sup>, due to the low spatial resolution image in the project area, supervised image classification techniques perform well and has been used for the project.

In supervised classification, Climate Bridge select training samples and classify image based on chosen samples. The training samples are key because they will determine which class each pixel inherits in overall image.

When run a supervised classification, perform the following 3 steps:

#### Step 1. Select training areas

In this step, Climate Bridge find training samples for each land cover class which want to create. For example, draw a polygon for a no-grassland area such as a lake, road or forestry. Then, continue drawing no-grassland areas representative of the entire image. Make sure it's not just a single area.

Once have enough samples for no-grassland areas, it can start adding training samples for another land cover class. For example, can add polygons over grassed areas for the "grassland" class.

#### Step 2. Generate signature file

At this point, it should have training samples for each class. The signature file is what holds all the training sample data that have collected up to this point. It's a way to save samples to work on at a later time.

#### Step 3. Classify

Finally, the last step would be to use the signature file to run a classification. From here, would have to pick a classification algorithm, as shown in several studies, SVM is one of the best classification algorithms in remote sensing<sup>27</sup> which has been used for prediction. In this step, the input is signature file which has the training samples.

Through land use analysis of the project area satellite images in 2007 and 2016<sup>28</sup> (Figure 2-4, 2-5, 2-6 and 2-7), it can be known that the land in the project area belongs to grassland, which is consistent with the land cover data released by the National Basic Geographic Information Center<sup>29</sup>, and comparing the satellite images in 2007 and 2016, there is no change in land use in the project area. The project area photos taken in 2017 (Figure 2-8) also shows the land is identified as grassland.

According to the Parameters for Degradation, Sandification and Salification of Rangelands (GB19377-2003)<sup>30</sup>, the total grass yield decreased by more than 10% compared with that before degeneration was defined as degraded grassland. Before the start of the project, the local Forestry

<sup>26</sup> <https://doi.org/10.1016/j.isprsjprs.2009.06.004>.

<sup>27</sup> <https://www.tandfonline.com/doi/abs/10.1080/01431160512331314083>

<sup>28</sup> Download from website: <https://ladsweb.modaps.eosdis.nasa.gov/search/>

<sup>29</sup> The data comes from the global land cover data product service website of the National Basic Geographic Information Center (DOI: 10.11769)

<sup>30</sup> GB19377-2003 is a national standard document of the people's Republic of China which issued by The Ministry of Agriculture and Rural Affairs to assess the level of degradation, desertification and salinization of natural grassland. The original website of the standard is

<http://c.gb688.cn/bzgk/gb/showGb?type=online&hcno=5F1960D0692A36C09136E04E6DE60B4E>

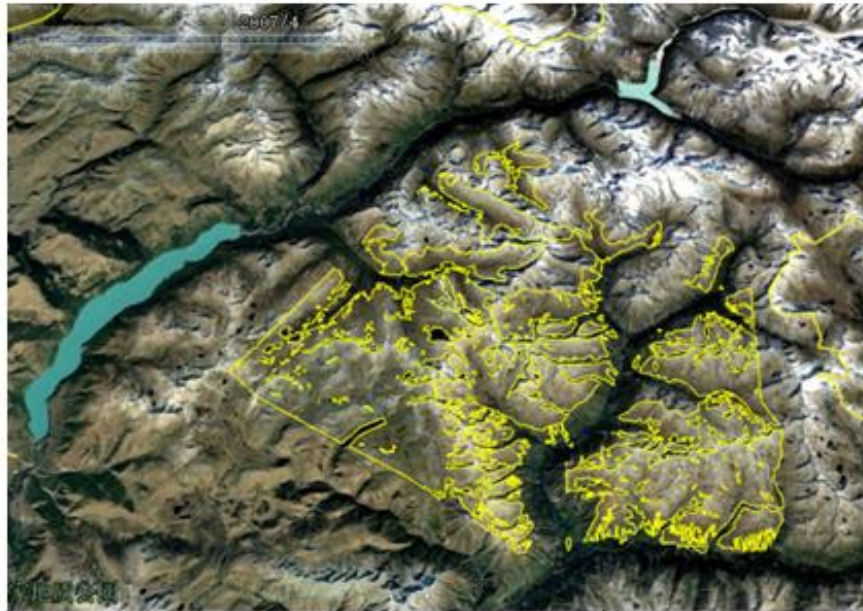
and Grassland Bureau monitored the grass yield in the project area. The data showed that the total grass yield in the project area has decreased by 21%-50% (moderately degraded grasslands) and more than 50% (severely degraded grasslands.) compared with the total yield of non-degraded grassland<sup>31</sup> at the start of the project, which met the requirements of item (iv) of (c) in Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM A/R Project Activities (Version 1.0). According to the PRA Report, the grassland in the project area has been degraded for more than ten years due to climate change and overgrazing, under the baseline scenario, herders still graze on degraded grassland, while no restoration activities are carried out. So, there were a reduction in plant productivity due to overgrazing. The land in the project area is degraded at the start of the project and that in the baseline scenario the land will continue to degrade.

Besides, as the described in Participatory Rural Appraisal (PRA) Report and Project Design, the total land area of Burqin County is 16.195 million mu<sup>32</sup>, and the gross natural grassland area is 10.151 million mu, accounting for 62.67% of the total land area of the county, and all the project area was degraded grassland before the project, which can be confirmed by the certificate document of *Land Use in the Project Area* issued by Burqin Forestry and Grassland Bureau.

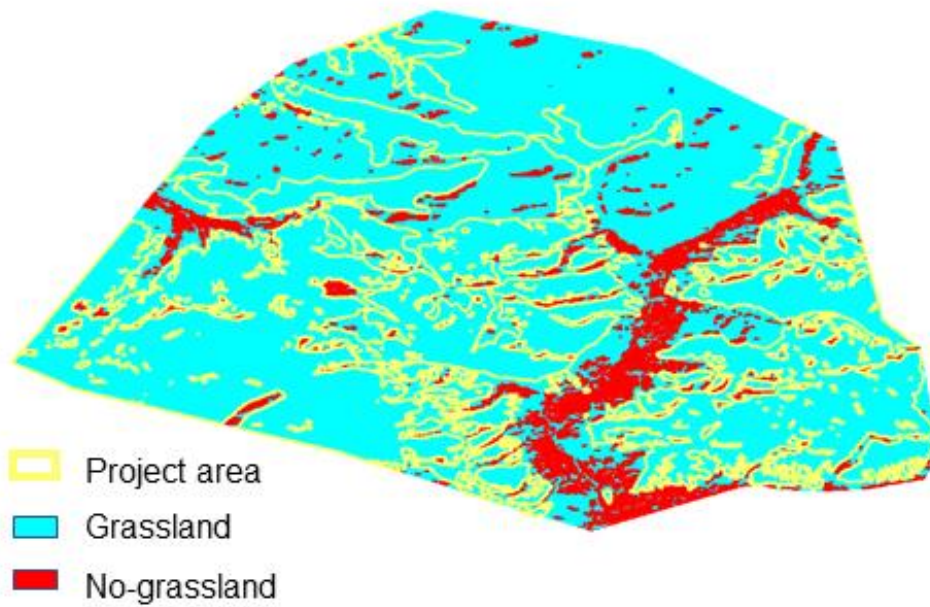
The baseline scenario is the same as the conditions existing prior to the project initiation. And the lands will continue degradation without the project. Section 3.1.4 provides more detail information on baseline scenario.

<sup>31</sup> According to the national standard GB19377-2003, the data of grassland before degradation is based on the annual grassland survey data conducted by Burqin County Forest and Grassland Bureau.

<sup>32</sup> 1 ha=15 mu

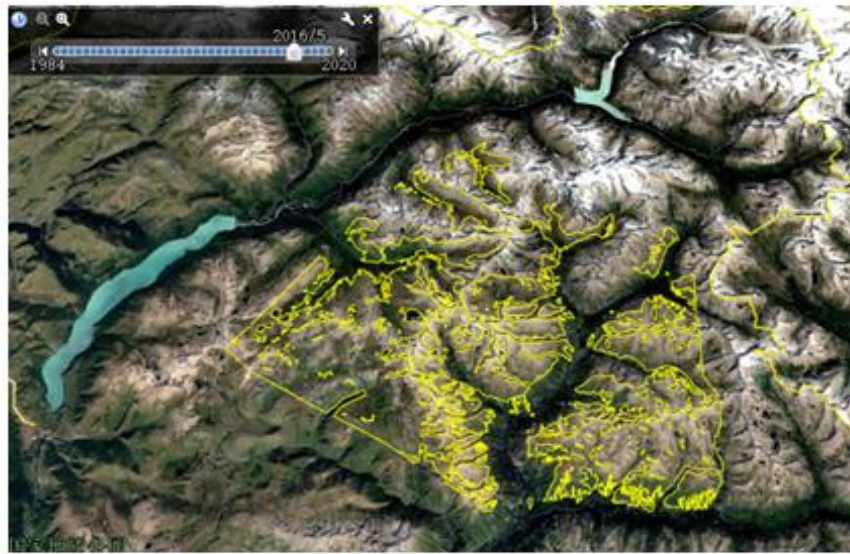


(a) Satellite image in 2007

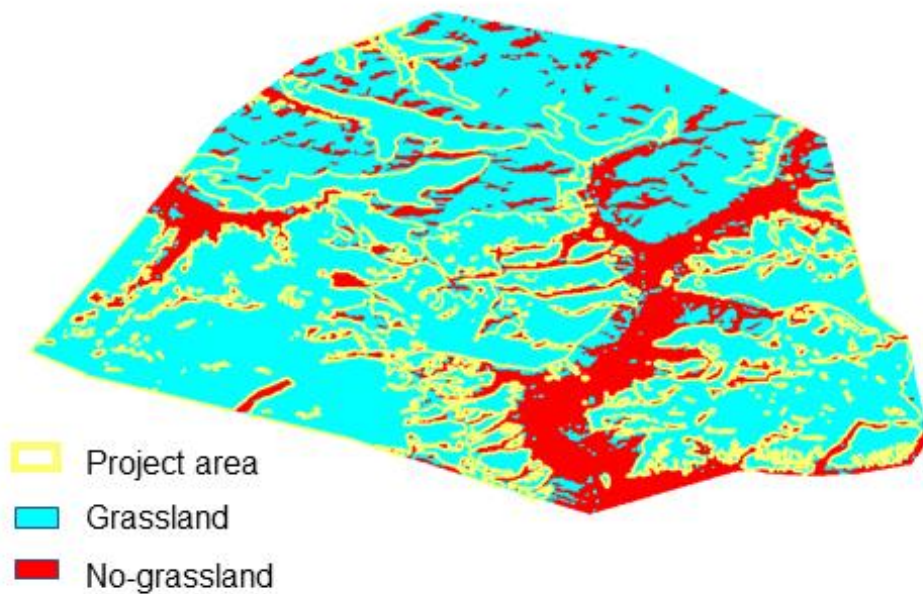


(b) Land use categories identified using ENVI

Figure 2-4 Satellite images of the project area in December 2007



(a) Satellite image in 2016

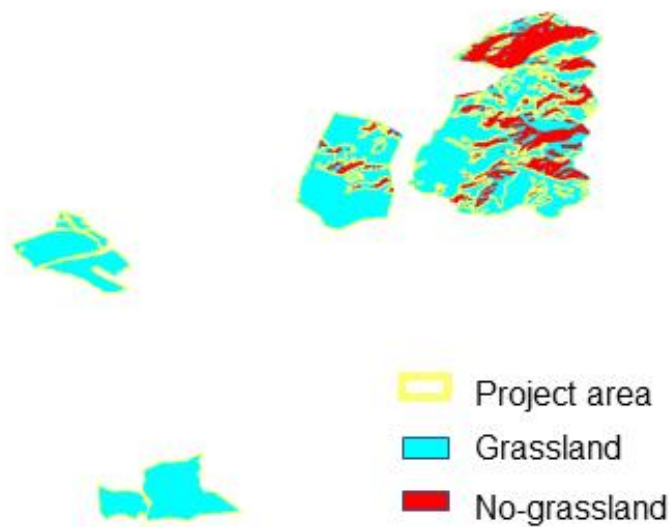


(b) Land use categories identified using ENVI

Figure 2-5 Satellite images of the project area in December 2016



(a) Satellite image in 2007

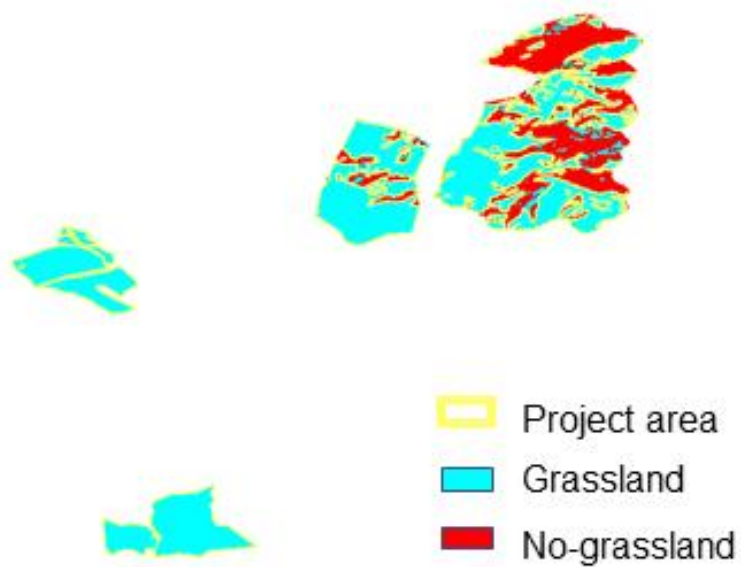


(b) Land use categories identified using ENVI

Figure 2-6 Satellite images of the project area in February 2007



(a) Satellite image in 2016



(b) Land use categories identified using ENVI

Figure 2-7 Satellite images of the project area in 2016



Figure 2-8 degraded grassland in the project area at the start of the project

### 2.2.2 Most-Likely Scenario Justification (G2.1)

The most-likely scenario is the same as baseline scenario, which is the lands would continue degradation without the project, please refer to section 3.1.4 for detailed information.

### 2.2.3 Community and Biodiversity Additionality (G2.2)

China has successively issued and revised a series of laws and administrative regulations related to grassland, such as the Grassland Law<sup>33</sup>, the Regulations on the Protection of Wild Plants and Animals<sup>34</sup>, the Regulation on Nature Reserve<sup>35</sup>, the Regulation on Grassland Fire Control<sup>36</sup>, and the Regulation on Forest Diseases and Pests Control<sup>37</sup>, etc. And none of the laws and regulations mandate the restoration of degraded grassland.

Prior to the implementation of the project, the local grassland ecosystem was degraded due to climate change and overgrazing. Due to lack of funds and the traditional grazing methods of herders have not been changed, the local grassland ecosystem continues to degenerate.

The project restored degraded grassland by seeding grass, forbidding grazing and sustainable grassland management, the total investment is 100 million RMB, which comes from the Burqin Finance Bureau. And the sustainable grassland management would require continued funding support, such as 467 local herders were employed as grassland guardians, with an annual salary of 22,800 RMB (3,579.60 USD) per person. The carbon revenue generated from the project could be used to pay the salaries of the guardians, which could reduce the funding difficulty. Due to the lack of rational grazing skills, the grassland in the project area may be degraded continuously. So,

<sup>33</sup> [http://www.gov.cn/gongbao/content/2003/content\\_62420.htm](http://www.gov.cn/gongbao/content/2003/content_62420.htm)

<sup>34</sup> <http://www.djrd.gov.cn/html/flfg/xzfg/17/10/3972.html>.

<sup>35</sup> <http://www.forestry.gov.cn/main/3950/20170314/459882.html>

<sup>36</sup> [http://www.gov.cn/zhengce/zhengceku/2008-12/05/content\\_2756.htm](http://www.gov.cn/zhengce/zhengceku/2008-12/05/content_2756.htm)

<sup>37</sup> <http://www.forestry.gov.cn/main/3950/20170314/459886.html>

the local forestry and grassland bureau provides training on rational grazing and grassland protection for local herders to enhance their awareness of ecological protection, which is conducive to the sustainable development of the project. So, if the project is implemented without registration as a VCS project, the financial and technical barriers would lead to the failure of the project.

Therefore, the community and biodiversity project benefits would not occur in the absence of the project. The detailed additionality assessment was demonstrated by using the Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (VT0001), please refer to Section 3.1.5 for details.

#### **2.2.4 Benefits to be used as Offsets (G2.2)**

N/A.

### **2.3 Stakeholder Engagement**

#### **2.3.1 Stakeholder Access to Project Documents (G3.1)**

The project documentation have been published on VCS and CCB website for public comments, and the local communities and other stakeholders can easily download from the website<sup>38</sup>. The project owner would notice local stakeholders every milestone of the project development by publishing the summary project documents in the public notice boards in each village, including listing, registered, issuance, etc.

#### **2.3.2 Dissemination of Summary Project Documents (G3.1)**

Along with the project implementation, the project documentation have been published on VCS and CCB website for all stakeholders to obtain the detailed project information and development progress. Also, the summary of project description in local language and Chinese version have been distributed among local communities during the community monitoring activity and the website address to download all the summary project documents has been provided to communities which has also been published in the public notice boards in each village. In addition, a contact person with phone numbers was published through villager assembly in case any stakeholders want to directly contact the project proponent and raise opinions.

#### **2.3.3 Informational Meetings with Stakeholders (G3.1)**

To ensure the continued effectiveness of the participation mechanisms, investigation team conducted a Participatory Rural Appraisal (PRA) in the counties where project located prior to project initiation, in order to obtain basic information, data and information of socio-economic situation on the project area and the surrounding, understand the major socio-economic and environmental issues from the stakeholders, collect their willingness to participate and take advantage of the demands of the proposed project activity and analysis the potential socio-economic and environmental impacts of the proposed project activity.

During the PRA survey from 05-July-2016 to 27-September-2016, the project owner also held a physical stakeholder meeting to collect the direct feedback and suggestions. The meeting notice is publicized on the village collective bulletin board, and the representatives of village collectives, local Grassland Station, Burqin Finance Bureau and local government were invited to attend the meeting

<sup>38</sup> <https://registry.verra.org/app/projectDetail/VCS/2852>

by telephone. During the meeting, questionnaires were distributed to attendees to collect their feedback. In addition, the contents of the meeting were publicized on the village collective bulletin board.

Please refer to Section 2.3.7 for details.

## **2.3.4 Community Costs, Risks, and Benefits (G3.2)**

### **The direct Costs, Risks, and Benefits to Community**

During the PRA survey from 05-July-2016 to 27-September-2016, Burqin Agriculture and Animal Husbandry Bureau sorted out Chinese version summary of the potential costs, risks and benefits identified by interview and questionnaires for local residents. A week before the start of the stakeholder meeting in August 2016, the project owner has entrusted representatives of township grass station with delivering Chinese version summary to relevant communities and stakeholders, in order to make them have sufficient time prior to decision they may be asked to make with respect to participation in the project.

In the stakeholder meeting, local Forestry and Grassland Bureau is responsible to explain further the potential costs, risks and benefits to relevant communities and stakeholders, then invited them to give their feedback. The analysis based on following table is quite clear and understandable.

| Benefits                                                                                    | Costs and Risks                                        | Mitigations                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Income improvement, Increase job and training opportunities, Establish community capability | Grazing is strictly forbidden in the first five years. | The local government issued subsidies to the herders in the project area who implemented the prohibition of grazing. Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. Also, the project provides job opportunities for local herders, which will increase their income in long term. |

Local herders lived by grazing, and the traditional grazing methods were unsustainable, such as overgrazing. The project will change the traditional grazing method of some local herders, by guiding herders to carry out sustainable grazing.

According to the analysis, the community realizes they may suffer costs and risks that grazing is strictly forbidden in the project area at the first five years after the implement of the project. The local government issued subsidies to the herders in the project area who implemented the prohibition of grazing. Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. All these measures adopt positively mitigations to deal with the potential risks and cost. Meanwhile, the community benefits of the project include income improvement, job creation, training opportunities and capability establishment.

## **2.3.5 Information to Stakeholders on Validation and Verification Process (G3.3)**

The villager assembly is held once a year, all community group leaders participate in the village assembly, and the contents of the assembly will be conveyed to all community members by the leaders. Therefore, the villager assembly is considered as the most appropriate means for sharing information with local communities. A contact person with phone numbers was published through villager assembly in case any stakeholders wish to participate in any activities related to the project.

The status and process of the project for CCB and VCS validation and verification were published through routine villager assembly and posted on local bulletin boards, also the mobile phone number of contact person of the project was provided to all the stakeholders so they can directly make a call in case they have any problem about the project.

### 2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

The local stakeholders have been informed timely regarding the project process, especially when the auditor would take the site visit. And a week prior to the visit, the project staff has informed relevant stakeholders in advance about the details of the audit process and arrange a half day for the auditor's interview with stakeholders so that the stakeholders have sufficient time to communicate with the auditor.

The VVB auditors took a site visit of the project from 20-June-2022 to 24-June-2022. When the auditors came to the project site, the project proponent organized a stakeholder meeting on 20-June-2022, after Meeting they spent four days to visit the project area for detailed information. Some representatives of the stakeholders from local villages participated in stakeholder meetings and had a conversation with the project proponent and the auditors on project issues of their concern. The conversation between the representatives of the stakeholders and the auditor were deliberately separate in the absence of other people.

### 2.3.7 Stakeholder Consultations (G3.4)

As mentioned above, the stakeholder consultation includes PRA and meetings. During the PRA survey from 05-July-2016 to 27-September-2016, the survey team from Burqin Agriculture and Animal Husbandry Bureau went to the villages where the project located and took the interview with head of the villages to collect the basic information of the villagers and characteristics of local communities. Then they conducted the household interviews with local villagers and collected the questionnaires from them. There are totally 4,875 households involved in the project, a randomly sampling method was applied to distribute the survey questionnaires. According to Guideline of Sampling and Surveys for CDM project Activities and Programmes of Activities (Ver 04.0), the total sampling size was calculated as 48 (see the following equations for details), and the final number has been adjusted into 70 to make sure the household interview could represent the different community group, such as local Kazak nationality, herders and grassland guardians.

$$n \geq \frac{1.645^2 N \times P(1-P)}{(N-1) \times 0.1^2 \times P^2 + 1.645^2 P(1-P)}$$

Where:

|       |   |                                                                                                                                                  |
|-------|---|--------------------------------------------------------------------------------------------------------------------------------------------------|
| $n$   | = | Sample size                                                                                                                                      |
| $N$   | = | Total number of households                                                                                                                       |
| $P$   | = | Expected proportion, which is defined as 0.85 based on the empirical value provided by Burqin Jinhua Urban Construction and Investment Co., Ltd. |
| 1.645 | = | Represents the 90% confidence required                                                                                                           |
| 0.1   | = | Represents the 10% relative precision                                                                                                            |

As N is 4,875 as determined of total number of households, P is determined as 85% based on the empirical value provided by Burqin Jinhua Urban Construction and Investment Co., Ltd., and taking 90% level of confidence, n is therefore calculated as  $1.645^2 \times 4,875 \times 0.85 \times (1-0.85) / ((4,875-1) \times 0.1^2 \times 0.85^2 + 1.645^2 \times 0.85 \times (1-0.85)) = 48$ .

During the PRA survey, a total of 70 questionnaires were distributed to the representatives of the local stakeholders from local government and surrounding villages, and 62 copies were collected with valid answers. The representatives covered different ages, different occupations and different education levels which were summarized in Table 2-10. The respondents are representative of the public opinions in terms of their gender, age and educational levels. Therefore, it can be considered that responses to the survey have comprehensively reflected the attitudes towards the project of the stakeholders possibly affected by the project.

The quality of monitoring results is determined by the quality of data collection and processing. In order to ensure true and effective monitoring results, the project owner arranges for data collection and analysis supervisors to constantly check the data collection and processing throughout the PRA monitoring process to ensure that the questionnaires are completed, the survey records are reviewed and the data processing form is filled in clearly and accurately.

The quantitative data can be analyzed by direct calculation methods, such as summation, average, proportion, etc. By comparing and analyzing the values, it can discuss the similarity and differences between monitoring objects, or summarize the relationship between values. Quantitative data can be directly statistically analyzed manually, or with the help of computers and statistical software such as Excel, SPSS, etc.

The summary of qualitative data is complex. The following are the basic steps of qualitative data analysis:

- 1) Briefly summarize the main points of each person's answer to the question.
- 2) Check these answers carefully. Make a note of the most important points. Then review all the responses and count the total number of respondents with the same major opinion. Alternatively, count the number of people who hold or disagree with a particular opinion and rank their opinions. If the number and proportion of opinion-holders cannot be calculated accurately, then at least some trend must be pointed out, that is, whether "All", "The vast majority", or "Minority" of respondents had a point of view.
- 3) Ask others to check these conclusions to ensure that the answers are accurately interpreted.

After data analysis and processing, the results were summarized as follows.

Table 2-10 The representatives' information

|           |                              |     |
|-----------|------------------------------|-----|
|           | number                       | 62  |
| Gender    | Male                         | 61% |
|           | female                       | 39% |
| Age       | 20--30                       | 18% |
|           | 30--50                       | 50% |
|           | above 50                     | 32% |
| Education | Junior high school and below | 53% |
|           | senior middle school         | 34% |

|  |                                    |     |
|--|------------------------------------|-----|
|  | junior college education and above | 13% |
|--|------------------------------------|-----|

Table 2-11 The survey results

|                                                                                                                       |                                                                                                                                                                                                                                                         |      |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1. Do you know this project will bring carbon revenue?                                                                | Yes                                                                                                                                                                                                                                                     | 69%  |
|                                                                                                                       | No                                                                                                                                                                                                                                                      | 31%  |
| 2. Do you willing to participate in this project?                                                                     | Yes                                                                                                                                                                                                                                                     | 100% |
|                                                                                                                       | No                                                                                                                                                                                                                                                      | 0%   |
| 3. Do you want to get economic profit by participating in the project?                                                | Yes                                                                                                                                                                                                                                                     | 78%  |
|                                                                                                                       | No                                                                                                                                                                                                                                                      | 22%  |
| 4. Do you think this project can bring economic benefits to the local area and promote local sustainable development? | Yes                                                                                                                                                                                                                                                     | 86%  |
|                                                                                                                       | No                                                                                                                                                                                                                                                      | 14%  |
| 5. How do you want to participate in the project?                                                                     | Participate in grass planting, fences building, pest control and sustainable grassland management.                                                                                                                                                      |      |
| 6. How will the project affect local herders engaged in grazing around the project area?                              | Grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. However, the project provides job opportunities and reasonable grazing training for local herders. |      |
| 7. What do you think are the main benefits of the project?                                                            | Create jobs, economic benefits and improve the ecological environment.                                                                                                                                                                                  |      |
| 8. Do you support the project?                                                                                        | Yes                                                                                                                                                                                                                                                     | 100% |
|                                                                                                                       | No                                                                                                                                                                                                                                                      | 0%   |

According to the results of the questionnaire, all the local residents wanted to participate in the implementation of the project because they thought the project could protect local ecological environment and improve living standards of local residents.

According to the result of the survey, 14% of the representatives thought that the project does not bring economic benefits and promote local sustainable development to the area; and 22% of them show no interests in getting economic profit by participating in the project.

To help the stakeholder to have better understanding of the project, the project proponent Burqin Jinhua Urban Construction and Investment Co. Ltd. also held a physical stakeholder meeting in the meeting room of Burqin Agriculture and Animal Husbandry Bureau on 15-November-2016. Villagers and representatives of other stakeholders were invited, including officers from local government agency and researchers (rich experience in grassland protection) from National Forestry and Grassland Administration Northwest Investigation and Planning Institute. About 20 people attended the stakeholder meeting.

At the meeting, project proponent introduced the implementation plan of the project and explained the potential costs, risks and benefits to relevant communities and stakeholders, and discussed all the issues raised by representatives, such as subsidy for rest grazing and potential new job opportunities.

Stakeholders were asked to raise their opinions of the project design and their willingness to participate the following implementation. All of them had no opinion on the project design and would

like to participate in the implementation and maintenance of the project. But some of them have some concerns on getting economic profit by participating in the project, because they go out to work all the year round, and they did not want to give up those work opportunities for this project. The project proponent explained that the project could restore their degraded grassland, and if they agreed to restore the degraded grassland and implemented grazing prohibition, they would receive corresponding subsidies even they chose not to participate in the implementation and management of the grassland, they are free to go out for work or take the job opportunities offered by this project. The subsidy standards for sub vary from county to county, ranging from 4.1 RMB/Mu to 10.4 RMB/Mu. All the stakeholders were satisfied with this arrangement and happy to introduce the restoration project on their degraded grassland.

Some of the residents also expressed their concerns about the project may affect their grazing time and their income from selling livestock products may reduce. For their concerns, the project proponent and grass station explained that they would measure the grass yield of the surrounding grasslands in the project area, although grazing was strictly forbidden in the first five years after seeding, the Burqin Forestry and Grassland Bureau would guide herders to graze within the acceptable area, and ensure the project will not reduce their grazing productivity and the project will not affect herder's grazing time and reduce herder's grazing income..

After in-depth communication, they finally agreed to restore their degraded grassland by the project proponent and local Forestry and Grassland Bureau. So, there was no change to the Project Design Report.

### **2.3.8 Continued Consultation and Adaptive Management (G3.4)**

The Project Design was completed by the professional institute, Xinjiang Agriculture and Animal Husbandry Engineering Consultation Center, the stakeholders have been consulted before the implementation of the project and they all agreed and supported the project. Through the consultation, most of the stakeholder were willing to participate the project in fence building, grass seeding, grassland sustainable management and fire prevention, therefore the project provided all the job opportunities to local communities, including temporary job (fence building, grass seeding) and permanent job (grassland guardian).

Throughout the lifetime of the project, the staff of project owner will visit village collectives, local forestry and grassland bureau, Burqin Finance Bureau and local government once a year, and communicate the progress and problems of the project with them. This will establish a commitment to communication and consultation to keep stakeholders informed of project activities including restoration, maintenance, monitoring and the CCB validation and verification process. In addition, the project staff in the field will maintain communications with local residents around project area including local women, local herders and grassland guardians through in-person talking. And the project will actively listen to recommendations made by any identified community members, or other stakeholder groups, and adapt and improve methods as necessary.

The project has an adaptive management plan to effectively evolve as the project progresses, and systematically develop existing practices through project monitoring and evaluation. The project will periodically review plans, methods, goals and objectives, to incorporate new lessons learned, available technology, and scientific knowledge. These strategies will be in accordance with project's Standard Operating Procedures (SOPs) and monitoring plans.

### **2.3.9 Stakeholder Consultation Channels (G3.5)**

As stated in Section 2.3.3, an investigation team from Grassland Station conducted a Participatory Rural Appraisal (PRA) in the counties where project located prior to project initiation, during the PRA survey 05-July-2016 to 27-September-2016, the project owner also held a stakeholder meeting to collect the direct feedback and suggestions. Local residents directly impacted by the project were invited to attend the stakeholders' meeting through their most convenient way: the routine villager assembly, in addition, a contact person with phone numbers was published through villager assembly in case any stakeholders wish to participate in any activities related to the project. Local policy makers and grassland experts were also invited by phone calls. All the stakeholders have been informed directly or through their representatives.

The summary of project description in local language has been distributed among local communities during the community monitoring activity in September 2021 and also in the stakeholder meeting with VVB held in June 2022 and the website address to download all the summary project documents has been provided to communities during the meeting which has also been published in the public notice boards in each village. All of these measures provide those adequate levels of information sharing have occurred.

### **2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)**

In the project planning phase, stakeholders were fully involved in the land selection, grass species selection, etc., through villagers meeting and PRA methods. As mentioned above in Section 2.3.7, before the project started, local residents around project area including local women, local herders and grassland guardians were asked to raise their opinions during the PRA survey, and village collectives, local Grassland Station, Burqin Finance Bureau and local government were asked to raise their opinions during the stakeholder meeting. Also, 62 valid questionnaires have been collected from the representatives of the local stakeholders of local government and surrounding villages. Stakeholders from different age, gender and culture background has been prudently taken into account during the distribution of the questionnaires, and the feedbacks reflected in the interview and questionnaire has been seriously addressed immediately. Based on stakeholder consultation, all of the representatives of the stakeholders support the implementation of the project.

To enable the effective participation of all communities in a culturally appropriate and gender sensitive manner, the project proponent particularly encouraged the participation of women by maintaining the regular communications with women's Federation of local towns. During the project implementation, about 4,875 local herders (1,950 are women) participated in grass seeding and fences building, of which 467 local herders (192 are women) were employed as guardians. Among the 4,875 jobs opportunities, 4,408 are temporary jobs, which lasted from 2017 to 2019 and 467 are permanent jobs, which lasted through the entire project crediting period. All the employees will be provided related skill training periodically. Local residents who involved in grass planting were compensated 80 RMB (12.55 USD)/day. Grassland Guardian were paid around 22,800 RMB (3,579.60 USD) /year, higher than the per capita disposable income of farmers and herdsmen in Burqin County (10,736 RMB (1,685.55 USD) /year). During the project implementation, the local communities will play as the direct implementers of the project, and the project proponent will play as coordinator who is in-charge of the overall management. All the critical information regarding decision-making will be published to local stakeholders, and the decision should be revised according to further discussion in case there is any feedback from stakeholders.

In the monitoring period, the project proponent will invite some of the local residents to help conduct the field work with payment, such as soil sample collection and questionnaire survey collection. And a contact person with phone numbers was published through villager assembly in case any stakeholders wish to participate in the following monitoring or other activities related to the project.

### **2.3.11 Anti-Discrimination Assurance (G3.7)**

According to Labor Law of the People's Republic of China, it is illegal to discriminate on grounds of race, nation, sex or religion. The project owner will obey the Labor Law of the People's Republic of China and have established the anti-discrimination rules in the implementation of the project, including:

- Managers must treat all employees equally and without any discrimination in the recruitment or implement process.
- Women and men receive equal pay for equal work. Women who meet the recruitment requirements enjoy equal employment rights.
- Employees shall not be discriminated against or restricted in employment, compensation, training and promotion on the basis of their race, sex, pregnancy, age, religion, belief, disability, nationality, etc.
- Under no circumstances should managers be allowed to engage in coercive, threatening, abusive, exploitative or psychologically abusive or sexually harassing acts against their staff, including postures, language and physical contact.
- In case of discrimination, the employee may report the complaint according to the “Feedback and Grievance Redress Procedure” of this project. Any person has the right to report it directly or anonymously.
- The project owner shall not interfere with the religious, sexual orientation, appearance, political, personal interests and other rights of all employees.

All the rules have been emphasized during staff training sessions. And there is a grievance and redress procedure which has been described in section 2.3.12 and 2.3.13 of the PD, in case of any discrimination occurred, anyone could report to the project proponent follow the relevant procedure.

### **2.3.12 Feedback and Grievance Redress Procedure (G3.8)**

In case of any conflicts and grievances, stakeholders can either appeal through village representatives or directly to the local forestry and grass bureau, which is the most effective ways to solve the problems. They are familiar with the phone numbers of the project staff or the related focal point, or during community meetings. Moreover, the planting and management work will avail community labour which will allow the community villagers to participate in project implementation themselves and find out or seek for solutions to the conflicts and grievances in the projects.

The project owner nominated a specific staff in charge of recording and collecting conflicts and grievances of local communities and individual herders. All of the grassland guardians are coming from local communities whose name and contact number were published through villager assembly. Grassland guardians in each project site will play an important role of treating with ordinary conflicts and grievances, and report to Burqin Forestry and Grassland Bureau.

Once a grievance case reported to the specific staff, the staff will contact the relevant stakeholders directly and discuss with them for an acceptable solution within one week; if the stakeholder's demand cannot be satisfied in a short time, the specific staff will contact with the head of the village where the stakeholders come from, who will play as a mediation to discuss with both sides together and seek for a further solution, which should be no more than 30 days; for more complicated case which cannot be settled by mediation, the project proponent shall report to local government, and follow the relevant legal procedure of arbitration or courts.

### **2.3.13 Accessibility of the Feedback and Grievance Redress Procedure (G3.8)**

The feedback and grievance redress procedure has been decided and published and made accessible to communities and other stakeholders. The grievance mechanism has also been explained to local communities orally through the workshop and engagement sessions. Local communities are aware that if they have any complaints, they are able to raise concerns and/or complaints with the field collaborator or field facilitators via phone call or email. All grievances that are raised during the project lifetime will be recorded and made publicly available. Project owner will also be updated on the outcomes of grievances, in person, through community meetings. To ensure accessibility to grievance mechanism, the project has established the following:

- Telephone access
- Email
- Suggestion boxes

All the feedback and grievance received, and the relevant solution shall be recorded and summarized in the project monitoring report in the next verification, and all the project documents has been published on Verra website and the website address to download all the summary project documents has been provided to communities through the public notice boards in each village.

### **2.3.14 Worker Training (G3.9)**

There is a Grassland monitoring technical manual provided for each employee which includes technical advice for their work, and all the workers were offered the technical training immediately once they were hired. Such skills and knowledge include are useful for grassland management, such as fire prevention and forage supplementary sowing technology. These technical manuals were distributed to each household in the local villages, including the villagers who haven't participated in the project. The members of local communities were trained equally as long as they lived around the project area and willing to participate the training process, so that the local capacity won't be lost through staff turnover.

Besides the training on technical skills of grass planting, local workers were trained on relevant skills for their future livelihood, such as sustainable grassland management. These skills will benefit the long-term development of the local communities who participate in the project.

There were routine training courses arranged in September 2017, July 2019 and July 2021 respectively during the implementation of the project by providing rodent control and seeding skills and experience for workers.

In September 2017, Burqin Agriculture and Animal Husbandry Bureau organized the training session for local residents who participated in the project on the responsibilities and scope of

authority of grassland guardians, grassland grazing prohibition and grassland distribution map "software technology".

In July 2019, Burqin Forestry and Grassland Bureau arranged the training session for grassland guardians regarding the relevant grassland law enforcement and the specific protection measures to be implemented, including investigation, prevention and control technology for grassland fire, rodent and insect damage, etc

In July 2021, National Forestry and Grassland Administration Northwest Investigation and Planning Institute organized systematic and detailed lectures on the field investigation and application system of grassland monitoring and evaluation, grassland patch zoning method, grassland plant identification technology, application method of grassland monitoring and evaluation App and detailed rules of grassland monitoring and evaluation technology.

### **2.3.15 Community Employment Opportunities (G3.10)**

The project will mobilize the whole community, including women and least privileged group. All people from the communities will be given an equal opportunity to fill in the work positions if they meet the job requirements. Women and vulnerable people who come from the poorest local households will not only be provided with equal opportunities but also consciously ensure that they can be part of the project.

During the project implementation, about 4,875 local herders (1,950 are women) participated in grass seeding and fences building, of which 467 local herders (192 are women) were employed as guardians. Among the 4,875 jobs opportunities, 4,408 are temporary jobs, which lasted from 2017 to 2019 and 467 are permanent jobs, which lasted through the entire project crediting period. The project is expected to create 812 job opportunities expressed as number of full-time employees, 325 of which will be offered to women. All the employees will be provided related skill training periodically. Local residents who involved in grass planting were compensated 80 RMB (12.55 USD)/day. Grassland Guardian were paid around 22,800 RMB (3,579.60 USD) /year, higher than the per capita disposable income of farmers and herdsmen in Burqin County (10,736 RMB (1,685.55 USD) /year).

The current cost of the employment came from Burqin Finance Bureau. However, the initial fund is not sufficient for the continued maintenance of the grassland, so the project is seeking for the subsidy of carbon credits which could help to mitigate the funding shortage and ensure sustainable management and restoration of the grassland ecosystem.

### **2.3.16 Relevant Laws and Regulations Related to Worker's Rights (G3.11)**

The local people will be under the protection of Labor Law of the People's Republic of China<sup>39</sup> and no forced labour is allowed, and they are free to establish and join any labor organizations as they wish. There will be regular training provided to workers before they start the job, which will clearly indicate their rights and mechanism for grievance appeal, and the worker's rights are guaranteed in the labour contracts for each worker.

<sup>39</sup> [http://www.mohrss.gov.cn/SYrlzyhshbzb/zcfg/flfg/fl/201605/t20160509\\_239643.html](http://www.mohrss.gov.cn/SYrlzyhshbzb/zcfg/flfg/fl/201605/t20160509_239643.html)

### **2.3.17 Occupational Safety Assessment (G3.12)**

The project owner has referenced Labor Law of the People's Republic of China and adapted them to meet the local conditions to ensure workers' health and safety. The workers' health and safety policy, including items covering the health insurance scheme for workplace accidents and evacuation plans is made available for workers and implemented by the village committee.

The potential risks of the project mainly include risks such as fire, driving, and unexpected situations in the wild.

To minimize the potential risk, all the workers have been provided new staff training before they start to work. The training includes all necessary risk control measures during the work, as well as the health and safety policy mentioned before.

## **2.4 Management Capacity**

### **2.4.1 Project Governance Structures (G4.1)**

In order to ensure the development and implementation of the project, the project owner has established a project work group and the expert group. Burqin Jinhua Urban Construction and Investment Co., Ltd. is responsible for the project's overall implementation and decision-making and has established a project working group (covering aspects of carbon sink, ecology, grassland, community, geographic information, etc.). The Grassland Station of Burqin Forestry and Grassland Bureau is responsible for organizing the implementation of the project. Burqin Finance Bureau provided the initial fund of the project. National Forestry and Grassland Administration Northwest Investigation and Planning Institute and Climate Bridge (Shanghai) Ltd. are responsible for technical support for the project development and implementation; the responsibility of local residents and communities is daily supervision and data management during the project implementation.

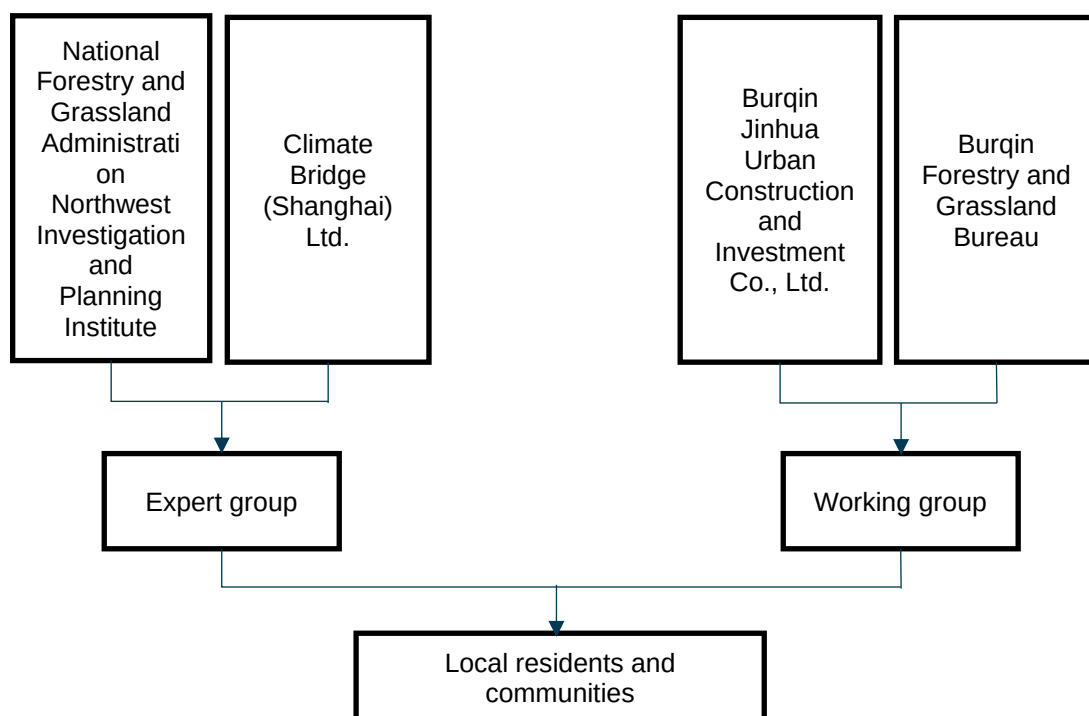


Figure 2-9 The project governance structure

## 2.4.2 Required Technical Skills (G4.2)

The project requires technical skills of community engagement, biodiversity assessment and carbon measurement and monitoring in order to implement the project activities. Table below outlines the skills required per project activity.

Table 2-12 Key skills required to implement the project activities

| Project Activity                         | Specific measures                                                                                                                                      | Key Skills Required                                                                                                                                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grass seeding and fence building         | Project community division, grass seed and sowing method selection, fence design                                                                       | Construction capacity, Supplementary sowing techniques, GIS for site selection                                                                             |
| Carbon stock measurements and monitoring | Soil carbon monitoring, land cover mapping, grazing monitoring, climate monitoring, biodiversity monitoring, community monitoring, and fire monitoring | Soil organic carbon and bulk density test, GIS/remote sensing, grazing record, diesel and gasoline consumption records, rodent control and fire management |

|                                        |                                                                                          |                                                                                                                                                                              |
|----------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community engagement and development   | Stakeholder consultation, livelihood development, and education program                  | Community organizing, conflict resolution, business management, adult education, livelihoods and social science surveys                                                      |
| Biodiversity assessment and monitoring | Sustainable grassland management, biodiversity monitoring, endangered animals monitoring | Fence building, grass seeding, rotational grazing, biodiversity survey, field investigation, Infrared camera technology, global positioning system (GPS) tracking technology |

### 2.4.3 Management Team Experience (G4.2)

The project proponent Burqin Jinhua Urban Construction and Investment Co., Ltd. is a legally registered company, who is in rich experience in sustainable grassland management, including grassland protection and management, technical training, carbon measurement and monitoring and biodiversity assessment.

Burqin Forestry and Grassland Bureau is a local government agency who is in rich experience in community engagement, including holding stakeholders' meeting, mediation with local communities and provide guidance for local herders in related to rational grazing. Burqin Forestry and Grassland Bureau is also good at sustainable grassland management, including grass planting, fence building and technical training.

National Forestry and Grassland Administration Northwest Investigation and Planning Institute is a public welfare institution directly under the State Forestry and Grassland Administration. It is an important technical team set up by the State Forestry and Grassland Administration. It mainly undertakes the monitoring and assessment of forest resources, desertification and grassland, wetland and wildlife, carbon sequestration and biodiversity in important nature reserves in northwest China.

Climate Bridge (Shanghai) Ltd. is one of the largest developers of Afforestation VCS+CCB projects in China and has a reputation for producing quality credits under both CDM, VCS, GS and the CCER (Chinese Certified Emission Reduction) program. In addition, as the largest developer and dealer of VER projects in China, Climate Bridge is experienced in carbon measurement and monitoring. These experiences will help project proponent to ramp up the capability of project implementing and management. Climate Bridge (shanghai) Ltd. brings about tremendous experience in development of AFOLU related VCS+CCB projects. They shared such experience with the local Forestry and Grassland Bureau in ensuring the smooth operations of the project implementation during the lifetime of the project.

### 2.4.4 Project Management Partnerships/Team Development (G4.2)

As listed in Table 2-12 in Section 2.4.1, the key skills required by the project include community engagement, biodiversity assessment and carbon measurement and monitoring skills.

As described in Section 2.4.3 the project proponent and other stakeholders are experienced in sustainable grassland management and VCS+CCB projects development.

Therefore, the project management team has sufficient experience and skills required by the project.

#### **2.4.5 Financial Health of Implementing Organization(s) (G4.3)**

Burqin Forestry and Grassland Bureau and Burqin Finance Bureau are government agencies, National Forestry and Grassland Administration Northwest Investigation and Planning Institute is a subordinate organization of The National Forestry and Grassland Administration, they are financially supported by local government, which could guarantee the financial health over the project lifetime. In addition, Burqin Jinhua Urban Construction and Investment Co., Ltd. and Climate Bridge (Shanghai) Ltd. are legally registered companies in China, and according to the public information listed in National Enterprise Credit Information Publicity System<sup>40</sup>, doesn't involved in nor complicit in any form of corruption such as bribery, embezzlement, fraud, favouritism, cronyism, nepotism, extortion, and collusion.

#### **2.4.6 Avoidance of Corruption and Other Unethical Behavior (G4.3)**

As legally registered companies, the project proponent and other involved entities have the obligation to comply with relevant regulations, including anti-corruption law. The annual audit by the government makes sure that it operates with full compliance with China law and regulations.

#### **2.4.7 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)**

None of the project documents will be considered as commercially sensitive information, and all of the documentations are available to any stakeholders.

### **2.5 Legal Status and Property Rights**

#### **2.5.1 Statutory and Customary Property Rights (G5.1)**

According to the Land Management Law of China<sup>41</sup>, there are three legal categories of land in China based on their using purpose: agricultural land, construction land and unused land. The term "agricultural land" refers to the land used for agricultural production, including cultivated land, forest land, grassland, land for farmland water conservancy, water surface for breeding, barren lands, etc.; The term "construction land" refers to the land for buildings and structures, including land for urban and rural housing and public facilities, land for Industry and mining, land for transportation water conservancy facilities, land for tourism, land for military facilities, etc.; The term "unused land" refers to land other than agricultural land and land for construction. All the land must be used in accordance with their legal categories defined in General Land Utilization Plan approved by government. It is strictly forbidden for any individuals or entities to change the using purpose of any land.

<sup>40</sup><http://www.gsxt.gov.cn/index.html>

<sup>41</sup><https://baike.baidu.com/item/%E4%B8%AD%E5%8D%8E%E4%BA%BA%E6%B0%91%E5%85%B1%E5%92%8C%E5%9B%BD%E5%9C%9F%E5%9C%B0%E7%AE%A1%E7%90%86%E6%B3%95/61839?fromtitle=%E5%9C%9F%E5%9C%B0%E7%AE%A1%E7%90%86%E6%B3%95&fromid=10599533&fr=aladdin>

According to the Article 10 of the Constitution of the People's Republic of China<sup>42</sup> and the provisions of the Land Management Law of China, the land ownership belongs to state or village collective, which is a non-transferable right while the land usage right can be transferred by law.

The state-owned land shall be managed through the State Council and the collective-owned land shall be centrally managed by the respective village committees. The "agricultural land" which belongs to village collective could be used by villagers in the form of household contract with the rural collective economic organization. The barren hills, ditches, hills and beaches that are not suitable for household contract may be contracted in the form of bidding, auction, public consultation, etc., for the use purpose of planting industry forestry, animal husbandry and fishery production. The "agricultural land" which belongs to state but managed by village collectives could also be used by individuals or entities by signing contracts with the rural collective economic organization. Both parties should contract the right and obligations and should protect and make rational use of the land in accordance with the purposes stipulated in the contract.

The people's government at the county level (or higher if necessary) shall register, issue certificates and confirm the ownership, any disputes regarding ownership or usage right of the land shall be arbitrated by the people's government at or above the county level.

According to Participatory Rural Appraisal (PRA) Report, the total land area of Burqin County is 16.195 million mu, and the gross natural grassland area is 10.151 million mu, accounting for 62.67% of the total land area of the county. According to Grassland Law of People's Republic of China, prior to the project initiation, the ownership of 65,000.00 ha grassland of the project belongs to the state and collectives.

## **2.5.2 Recognition of Property Rights (G5.1)**

Prior to the project initiation, the project area is collectively owned by each village.. Considering the widely dispersed distribution of the project land, it is difficult for any of the lands owner to raise enough fund and effectively maintain the implementation of the project during such a long period. Therefore, after seriously considered the carbon revenue and thought the revenue could help to mitigate the investment barrier, under the approval of Burqin County government, Burqin Agriculture and Animal Husbandry Bureau has organized and managed the project implementation during the early phase, including conducting baseline survey, signing consultant agreement with National Forestry and Grassland Administration Northwest Investigation and Planning Institute for development of carbon credits and raising initial fund from Burqin Finance Department for seeding and maintenance expenses for the first three years.

After the implementation of the project, the Burqin Agriculture and Animal Husbandry Bureau has been dismissed in 2019 due to the reform of government function, and some functional departments related to grassland management have been transferred to Burqin Forestry and Grassland Bureau. Then, Grassland Station of local Forestry and Grassland Bureau has cooperated with Burqin Jinhua Urban Construction and Investment Co., Ltd. to help with the sustainable grassland management. In order to develop carbon credits of the project, with support of Burqin Forestry and Grassland Bureau, all project land owners agreed to authorize Burqin Jinhua Urban Construction and Investment Co., Ltd. the rights of lands and grassland management within the project boundary

<sup>42</sup><https://baike.baidu.com/item/%E4%B8%AD%E5%8D%8E%E4%BA%BA%E6%B0%91%E5%85%B1%E5%92%8C%E5%9B%BD%E5%AE%AA%E6%B3%95/241136?fr=aladdin>

during the project crediting period, and the authorization has also been confirmed by local government.

So, Burqin Jinhua Urban Construction and Investment Co., Ltd. have the rights to control and operate the project as Project Proponent during the whole project crediting period. In addition, the Project Proponent will also be responsible for development of the carbon credits and the carbon revenue will be used for sustainable development and management of the project activities.

Therefore, all property rights involved in the project are recognized, respected, and supported.

### **2.5.3 Free, Prior and Informed Consent (G5.2)**

As described above, Burqin Jinhua Urban Construction and Investment Co., Ltd. has been authorized the rights of grassland management within the project boundary during the project crediting period, so the project will not encroach uninvited on private property, community property or government property.

To make sure all the stakeholders to be aware of the potential impact of the project on their life, an investigation team of the Grassland Station has conducted a Participatory Rural Appraisal (PRA) in the counties where project located 05-July-2016 to 27-September-2016, in order to obtain basic information, data and information of socio-economic situation on the surrounding area, understand the major socio-economic and environmental issues from the stakeholders, collect their willingness to participate and take advantage of the demands of the proposed project activity and analysis the potential socio-economic and environmental impacts of the proposed project activity.

Also, a stakeholder meeting was held during the PRA survey and questionnaires were distributed to attendees to collect their feedback. During the meeting, the project owner publicized the draft Project Design Report and informed stakeholders of the project's impact.

The project will not change the ownership of the project land, but some herders are affect by the project, due to grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. To mitigate the impact of project implementation, the project proponent and Burqin Forestry and Grassland Bureau will measure the grass yield of the surrounding grasslands in the project area in July and August every year, calculate the reasonable grazing quantity according to the carrying capacity standard of Xinjiang Uygur Autonomous Region, and guide herders to graze within the acceptable area to make sure their grazing productivity could be maintained. So, the project will not reduce the grazing time and quantity, instead of which, the sustainable grazing could improve the grazing productivity in a long term. And the leakage emissions due to grazing displacement are calculated in section 3.2.3.

Through meeting interviews and questionnaire surveys, all stakeholders know the impact of the project and they though that the implementation of the project can restore degraded grasslands and increase grazing areas in long term. And the project provides job opportunities for local herders, which will increase their income. In addition, according to the Implementation Plan of The Subsidy and Incentive Policy for Farmers and Herders issued by Burqin Government<sup>43</sup>, due to the prohibition of grazing, herders in the project area can receive corresponding subsidies. The subsidy standards for grazing prohibition vary from 4.1 RMB/Mu to 10.4 RMB/Mu. Every year, the project proponent and the Burqin Forestry and Grassland Bureau will visit all project participants to investigate the

<sup>43</sup> Official gazette of Burqin County People's Government

completion of the grazing prohibition and report it to the financial department, which will issue subsidy funds.

Therefore, all of the stakeholders including the herders impacted by the prohibited grazing are satisfied with this subsidy policy and think that the project can improve the local ecological environment and increase household income, and all of them agree the implementation of the project.

In conclusion, the project has received free, prior, and informed consent from relevant property rights holders prior to commencing with project activities.

#### **2.5.4 Property Rights Protection (G5.3)**

Prior to the project implementation, the project area is mostly degraded grassland with no residents, and Burqin Forestry and Grassland Bureau has confirmed the right of grassland management to the project proponent during the project crediting period. The project will not change the ownership of the project land, but some herders are affected by the project, due to grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. Also, the project provides job opportunities for local herders, which will increase their income in long term. In addition, due to the prohibition of grazing, herders in the project area can receive corresponding subsidies.

Therefore, the project will not change the ownership of the project land, lead to involuntary removal or relocation of property rights holders from their lands or territories and does no force rights holder to relocate activities important to their culture or livelihood.

#### **2.5.5 Illegal Activity Identification (G5.4)**

Currently all project lands are defined as grassland by local government. According to Chinese grassland law<sup>44</sup>, activities that destroy the grassland like mining and construction without pre-approval by local authority are strictly prohibited. Prior to the implementation of the project, the project area was degraded due to long-term overgrazing but no mining or construction or other destroying activities exist on the grassland, thus no illegal activities occurred around the project area. Although a series of laws and administrative regulations in China prohibit destruction of grassland, none of them mandate the restoration of degraded grassland like the project activities, See the Section 3.1.4 for details.

Therefore, the project's climate, community and biodiversity impacts will not be affected by the illegal activities.

#### **2.5.6 Ongoing Disputes (G5.5)**

Prior to the project initiation, the project area is collectively owned by each village,, there is no unresolved conflicts or disputes over rights to lands, territories and resources and also any disputes that were resolved during the last twenty years. At the project start, the local residents lived by grazing, and there were not much other job opportunities offered, and most of the local women has no income.

<sup>44</sup> <http://www.forestry.gov.cn/main/3949/20180918/114120127762082.html>

The project will not change the ownership of the project land, but some herders are affected by the project, due to grazing was strictly forbidden in the first five years after seeding, and then controlled grazing will be allowed depending on the growth situation of the forage. Burqin Forestry and Grassland Bureau will measure the grass yield of the surrounding grasslands in the project area, and guide herders to graze in a reasonable area. Also, the project provides job opportunities for local herders, which will increase their income in long term. In addition, due to the prohibition of grazing, herders in the project area can receive corresponding subsidies.

The healthy grassland ecosystem is an attractive landscape which could significantly benefit local touristic resources and promote the local economy. After the implementation of the project, local residents have more opportunities to work together, which will give them the motivation to organize more social activities and hence increase the interaction within the community. So, there is no ongoing or unresolved conflicts or disputes over rights to lands, territories and resources exist.

### **2.5.7 National and Local Laws (G5.6)**

The project conforms to all kinds of regulations in the grassland field, as listed below:

PRC Constitution, PRC Grassland Law, PRC Wildlife Protection Law, Grassland Fire Prevention Regulations, Insect Control Regulation, PRC Production Safety Law, PRC Labour Law;

GB19377-2003 Parameters for Degradation, Sandification and Salification of Rangelands<sup>45</sup>;

NY/T 1176-2006 Technical Guidelines for Seasonal Grazing Banning and Long-term Grazing;

NY/T 1342-2007 Technical Rules for Establishing Cultivated Grassland;

According to Article 51 of the PRC Grassland Law, the planting of forage grass or fodder crops on grasslands shall comply with the plans for the protection, construction and utilization of grasslands; The grass seeding and fencing construction of the project in strict accordance with the requirements of GB/T 27514-2011 Technical Regulation of Reseeding on Sandy Grassland<sup>46</sup> and NY/T 1237-2006 Technical Rule for Fences Construction of Rangeland;

According to Article 53 of the PRC Grassland Law and the Grassland Fire Prevention Regulations, a responsibility system for grassland fire prevention should be established, the grassland fire prevention period should be stipulated, the grassland fire prevention and suppression plan should be formulated, and the prevention and suppression of grassland fires should be effectively done.

The project proponent is experienced in local natural risk control and has established a Grassland Management Manual for the project which includes specific instruction in fire prevention.

As described in section 2.3.17, negative well-being impacts on community groups including fires, emergencies, and dangerous driving, this can be alleviated through technical and awareness training to local herders/communities, strengthening patrolling and monitoring. Also, the project proponent and Burqin Forestry and Grassland Bureau provided relevant skill training for local herders, to strengthen the safety awareness of herders. Also, local herders the local forestry and grassland bureau was equipped with fire protection facilities, such as fire protection clothing, fire trucks, and fire water guns, etc., in addition, the local herders conducted daily patrols on the grasslands, which could prevent grassland fires. Furthermore, there is a first aid kit on the grassland patrol vehicle to prevent emergencies.

<sup>45</sup> <http://openstd.samr.gov.cn/bzgk/gb/newGbInfo?hcno=5F1960D0692A36C09136E04E6DE60B4E>

<sup>46</sup> <http://std.samr.gov.cn/gb/search/gbDetailed?id=71F772D7DFEED3A7E05397BE0A0AB82A>

According to the Inspection and Acceptance Report of the project, the project has complied with the above regulations and laws during construction period and will be under regular inspection by local government during the implementation period to ensure the continuous compliance.

#### **2.5.8 Approvals (G5.7)**

The project has been approved by Burqin Agriculture and Animal Husbandry Bureau on 18-March-2017.

#### **2.5.9 Project Ownership (G5.8)**

As stated in Section 2.5.2, prior to the project initiation, the project area is collectively owned by each village. Considering the widely dispersed distribution of the project land, it is difficult for any of the lands owner to raise enough fund and effectively maintain the implementation of the project during such a long period. Therefore, after seriously considered the carbon revenue and thought the revenue could help to mitigate the investment barrier, all project land owners agreed to authorize Burqin Agriculture and Animal Husbandry Bureau the rights of lands and grassland management within the project boundary during the project crediting period.

After the implementation of the project, the Burqin Agriculture and Animal Husbandry Bureau has been dismissed in 2019 due to the reform of government function, and some functional departments related to grassland management have been transferred to Burqin Forestry and Grassland Bureau. Then, Grassland Station of local Forestry and Grassland Bureau has cooperated with Burqin Jinhua Urban Construction and Investment Co., Ltd. to help with the sustainable grassland management. In order to develop carbon credits of the project, with support of Burqin Forestry and Grassland Bureau, all project land owners agreed to authorize Burqin Jinhua Urban Construction and Investment Co., Ltd. the rights of lands and grassland management within the project boundary during the project crediting period, and the authorization has also been confirmed by local government.

So, Burqin Jinhua Urban Construction and Investment Co., Ltd. have the rights to control and operate the project as Project Proponent during the whole project crediting period. The Project Proponent should be responsible for the maintenance and overall management of the grassland during the whole crediting period. In addition, the Project Proponent will also be responsible for development of the carbon credits and the carbon revenue will be used for sustainable development and management of the project activities.

Therefore, the Project Proponent of the project has the unconditional, undisputed and unencumbered ability to claim that the project will generate the project's climate, community and biodiversity benefits.

#### **2.5.10 Management of Double Counting Risk (G5.9)**

This project will not seek to generate or has received any form of environmental or social credit.

#### **2.5.11 Emissions Trading Programs and Other Binding Limits**

The project will not seek to generate or has received any form of environmental credits, and the GHG emission removals generated by the project will not be used for compliance under such programs or mechanisms.

China has a national emissions trading scheme only cover the high-emission industries, such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO<sub>2</sub>e/year. And the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner according to the enforced company list in public information. Hence, it is confirmed that the emission reductions will not be double counted. The project will not seek to generate or has received any form of environmental credits, and the GHG emission removals generated by the project will not be used for compliance under such programs or mechanisms.

#### **2.5.12 Other Forms of Environmental Credit**

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates.

#### **2.5.13 Participation under Other GHG Programs**

The project has not been registered and is not seeking registration under any other GHG programs.

#### **2.5.14 Projects Rejected by Other GHG Programs**

The project has not been rejected by any other GHG programs.

#### **2.5.15 Double Counting (G5.9)**

The credits generated from the project will be sold as offsets on VCS registry, the series number of the issued credits can be tracked to avoid any potential double counting.

### **3 CLIMATE**

#### **3.1 Application of Methodology**

##### **3.1.1 Title and Reference of Methodology**

VM0026/Version 1.1 “Sustainable Grassland Management”.

Reference: [VM0026 Methodology for Sustainable Grassland Management \(SGM\), v1.1 - Verra](#)

The following methodological tools, to which the selected methodology refers to, are used:

Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (version 3.0)<sup>47</sup>

Guidelines for sampling and surveys for CDM project activities and programmes of activities, (version 4.0)<sup>48</sup>

Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM AR Project Activities (version 1.0)<sup>49</sup>

<sup>47</sup> <https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/>

<sup>48</sup> <https://cdm.unfccc.int/Reference/tools/index.html>

<sup>49</sup> <https://cdm.unfccc.int/Reference/tools/index.html>

Estimation of emissions from market leakage (VMD0033, version1.0)<sup>50</sup>

Leakage from displacement of grazing activities (VMD0040, version 1.0)<sup>51</sup>

### 3.1.2 Applicability of Methodology

VM0026/Version 1.1 “Sustainable Grassland Management” are applicable under the following conditions:

| Applicability conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Justification / Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(1) The project area is grassland at the start of the project. The project area is land that is degraded at the start of the project and degradation will continue in the baseline scenario on the basis that degradation drivers or pressures are still present in the baseline scenario. The procedures outlined the latest version of the CDM Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM A/R Project Activities must be used to determine both that the land is degraded at the start of the project and that in the baseline scenario the land will continue to degrade.</p> <p>The procedures outlined the CDM Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM A/R Project Activities (Version 1.0) is described below.</p> <p>The presence of one of the following is enough for demonstrating that land is “degraded” and/or “degrading”:</p> <p>(a) Provide documented evidence that the area has been classified as “degraded” under verifiable local, regional, national or international land classification system or peer-review study, participatory rural appraisal, satellite imagery and/or</p> | <p>According to the satellite image in 2007 and 2016 (Figure 2-4, 2-5, 2-6, 2-7), the project area is identified as grassland at the start of the project.</p> <p>According to the Parameters for Degradation, Sandification and Salification of Rangelands (GB19377-2003)<sup>52</sup>, the total grass yield decreased by more than 10% compared with that before degeneration was defined as degraded grassland. Before the start of the project, the local Forestry and Grassland Bureau monitored the grass yield in the project area. The data showed that the total grass yield in the project area has decreased by 21%-50% (moderately degraded grasslands) and more than 50% (severely degraded grasslands.) compared with the total yield of non-degraded grassland<sup>53</sup> at the start of the project, which met the requirements of item (iv) of (c) in Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM A/R Project Activities (Version 1.0). According to the PRA Report, the grassland in the project area has been degraded for more than ten years due to climate change and overgrazing, under the baseline scenario, herders still graze on degraded grassland, while no restoration</p> |

<sup>50</sup> <https://verra.org/methodology/vmd0033-estimation-of-emissions-from-market-leakage-v1-0/>

<sup>51</sup> <https://verra.org/methodology/vmd0040-leakage-from-displacement-of-grazing-activities-v1-0/>

<sup>52</sup> GB19377-2003 is a national standard document of the people's Republic of China which issued by The Ministry of Agriculture and Rural Affairs to assess the level of degradation, desertification and salinization of natural grassland. The original website of the standard is

<http://c.gb688.cn/bzgk/gb/showGb?type=online&hcno=5F1960D0692A36C09136E04E6DE60B4E>

<sup>53</sup> According to the national standard GB19377-2003, the data of grassland before degradation is based on the annual grassland survey data conducted by Burqin County Forest and Grassland Bureau.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>photographic evidence in the last 10 years. If the documented evidence of degradation is older than ten years then:</p> <p>(i) Provide evidence that the natural or anthropogenic degradation drivers and pressures that led to the land becoming “degraded” are still present and/or that there are no insufficient land management interventions to reverse degradation.</p> <p>(b) Demonstrate through a comparative study that the candidate lands in the proposed project area have similar or equivalent conditions (e.g. vegetation, soil, climate, topography, altitude, soil class and land use) and socio-economic pressures and drivers of degradation to reference degraded lands elsewhere, verifiably classified and documented as degraded lands. The proof of similarity of lands should be made through verifiable documentation and/or visual field assessment and data sets:</p> <p>(c) Demonstrate through direct evidence based on selected indicators of land degradation that the area is “degraded” and/or “degrading” through conducting either a visual assessment of the state and condition of the indicators or a verifiable participatory rural appraisal (PRA). The indicators of degradation should be locally relevant and verifiable. Candidate lands shall be declared as “degraded” and/or “degrading” if they show at least one of the following:</p> <p>(i) The severity and extent of soil compaction and soil erosion, as determined by the presence of: reductions in topsoil depth (as shown by root exposure, presence of pedestals; exposed sub-soil horizons or armour layers); gully, sheet or rill erosion, landslides, or other forms of mass-movement erosion;</p> <p>(ii) Decline in organic matter content and/or recession of vegetation cover as shown by reduction in plant cover or productivity due to overgrazing or other land management</p> | <p>activities are carried out. So, there were a reduction in plant productivity due to overgrazing. The land in the project area is degraded at the start of the project and that in the baseline scenario the land will continue to degrade.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>practices, thinning of topsoil organic layer, scarcity of topsoil litter and debris (GPS and photo evidence should be provided);</p> <p>(iii) Presence of plant species locally known to be related to the condition of degradation of the land or field/lab tests showing nutrient depletion (e.g. reduced growth, leaf loss, dessication, leaf chlorosis), salinity or alkalinity, toxic compounds and heavy metals;</p> <p>(iv) A reduction in plant cover or productivity due to overgrazing or other land management practices.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>(2) The project area is subject to livestock grazing, burning, and/or nitrogen fertilization in the baseline scenario.</p>                                                                                                                                                                                                                                                                                                                                                                                                               | <p>According to the Baseline Survey Report, in the baseline scenario the project area was subject to livestock grazing, but no burning and nitrogen fertilization.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>(3) In the baseline scenario, more than 95 percent of animal dung from grazing animals deposited on grassland is allowed to lie as is, and is not managed, and in the project scenario no more than 5 percent of the animal dung from grazing animals within the project area is managed with alternative manure management systems.</p>                                                                                                                                                                                                 | <p>In the baseline scenario, there is no any restrictions or regulations for the deposition of animal dung in the project area, all animal dung from grazing animals deposited on grassland lie as is, and is not managed.</p> <p>Grazing is forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. So, there is no animal dung in the first five years within project area under the project scenario. After grazing is allowed under the project scenario, no animal dung will be managed with alternative manure management systems.</p> |
| <p>(4) The project area must not have been cleared of native ecosystems within the 10 year period prior to the project start date.</p>                                                                                                                                                                                                                                                                                                                                                                                                      | <p>According to the Project Design Report and related satellite pictures of the project area, the project area is natural grassland, which is continuously degraded due to overgrazing, and have not been cleared of native ecosystems within the 10 year period prior to the project start date.</p>                                                                                                                                                                                                                                                                                                                |
| <p>(5) The project area is located in a region where precipitation is less than evapotranspiration for most of the year and leaching is unlikely to occur.</p>                                                                                                                                                                                                                                                                                                                                                                              | <p>According to PRA report, the annual precipitation of Burqin County was 118.7mm, the annual evapotranspiration was 1754.5mm, and the precipitation was less than evapotranspiration for most of the year, so leaching is unlikely to occur.</p>                                                                                                                                                                                                                                                                                                                                                                    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(6) If a biogeochemical model is selected for estimation of change in soil carbon stocks, the following conditions must be met:</p> <p>The model must comply with the requirements for models as set out in the VCS rules.</p> <p>The model must be appropriate for the region within which the project is situated. There must be studies by appropriately qualified experts (eg, scientific journals, university theses, local research studies or work carried out by the project proponent) that demonstrate that the use of the selected biogeochemical model is appropriate for the IPCC climatic regions (see 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 3), or the agroecological zone (AEZ) in which the project is situated (see Section 9.3.2).</p> | <p>N/A.</p> <p>In the project the change of soil carbon stock is calculated based on the content of soil organic carbon which is directly monitored from soil samples.</p>                                                                                                           |
| <p>(7) Project activities must not include land use change. Note that seeding perennial grasses or legumes on degraded grassland is not considered a land use change activity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>The project planted grass on the degraded grassland, would not change the land use.</p>                                                                                                                                                                                           |
| <p>(8) Project activities must not lead to an increase in the use of fossil fuels and fuel wood from non-renewable sources for cooking and heating.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Grazing is forbidden in the first five years, herders graze around the project area under the guidance of the local forestry and grassland bureau, and use cow dung as fuel, so the project activities will not lead to an increase in the use of fossil fuels and fuel wood.</p> |
| <p>(9) Project activities must not occur on wetlands or peatlands.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>The project activity was implemented on degraded grassland, not involving wetlands and peatlands.</p>                                                                                                                                                                             |

Therefore, VM0026/Version 1.1 is applicable for the proposed project.

Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities (Version 3.0) is applicable under the following conditions:

| Applicability conditions                                                                                                                                                                                                                                                                                                                                                                         | Justification / Explanation                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) AFOLU activities the same or similar to the proposed project activity on the land within the project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced;                                                                                                                         | The restoration of degraded grassland is encouraged in China, and there is no legal prohibition for the project, therefore the proposed project activity on the land within the project boundary does not lead to violation of any applicable law.                                                         |
| (2) The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity. | The baseline scenario is identified using the methodology "Sustainable Grassland Management" (Version 1.1), which provides for a stepwise approach justifying the determination of the most plausible baseline scenario no new baseline methodologies involved. Please refer to Section 3.1.4 for details. |

Therefore, tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities (Version 3.0) is applicable for the proposed project.

Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM AR Project Activities (version 1.0) provides a procedure for the identification of degraded or degrading lands for the purpose of application of A/R CDM methodologies. There is no mandatory applicability requirement.

According to Appendix of 1 Eligible AFOLU Project Categories of the VCS Standard (version 4.3), eligible ALM activities are those that reduce net GHG emissions on croplands and grasslands by increasing carbon stocks in soils and woody biomass and/or decreasing CO<sub>2</sub>, N<sub>2</sub>O and/or CH<sub>4</sub> emissions from soils. The project area shall not be cleared of native ecosystems within the 10-year period prior to the project start date. Eligible ALM activities include:

1) Improved Cropland Management (ICM): This category includes practices that demonstrably reduce net GHG emissions of cropland systems by increasing soil carbon stocks, reducing soil N<sub>2</sub>O emissions, and/or reducing CH<sub>4</sub> emissions.

2) Improved Grassland Management (IGM): This category includes practices that demonstrably reduce net GHG emissions of grassland ecosystems by increasing soil carbon stocks, reducing N<sub>2</sub>O emissions and/or reducing CH<sub>4</sub> emissions.

3) Cropland and Grassland Land-use Conversions (CGLC): This category includes practices that convert cropland to grassland or grassland to cropland and reduce net GHG emissions by increasing carbon stocks, reducing N<sub>2</sub>O emissions, and/or reducing CH<sub>4</sub> emissions.

The project restored degraded grassland by seeding of grass, building fences and other sustainable grassland management measures. It increases soil carbon stocks, reduce N<sub>2</sub>O and CH<sub>4</sub> emissions,

which met the requirements of Improved Grassland Management (IGM). As described in Section 2.2.1 and Figure 2-4 to 2-8, the land use scenarios of the project zone in 2007 and 2016 is grassland. So, the project area has not been cleared of native ecosystems within the 10-year period prior to the project start date.

So, all the Tools and the methodology VM0026/Version 1.1 are applicable for the project.

### 3.1.3 Project Boundary

As stated above, the Burqin County is defined as the project zone, and the area which adopting planting and fence building is defined as project area, thus the project boundaries are the administrative boundaries of Burqin County. The physical locations of where management activities taking place is shown in Figure 3-1, and the KML file has also been submitted to Verra Registry.

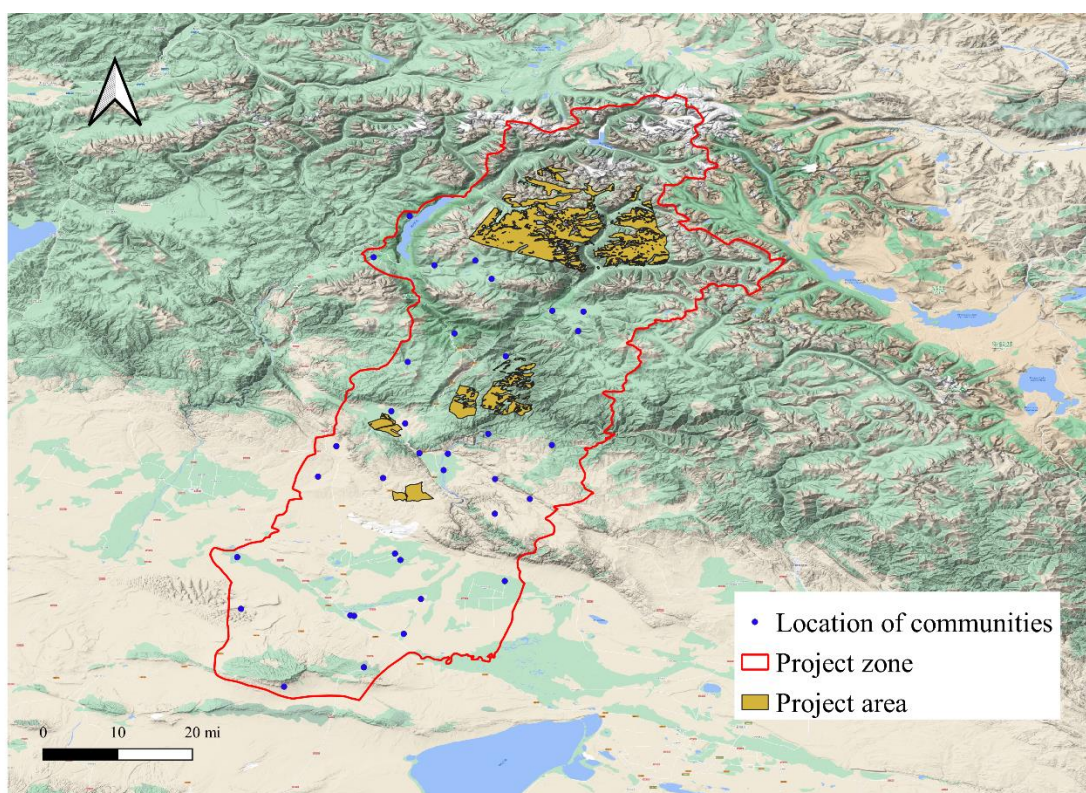


Figure 3-1 The physical locations of where management activities taking place

As described in section 3.2.3, grazing was forbidden in the first five years after the implementation of the project, and then controlled grazing will be allowed depending on the growth situation of the forage, and the Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. So, there is leakage in the project zone due to grazing displacement activities. And the offsite climate impacts areas are defined as the project zone which is outside of the project area.

The carbon pools selected for accounting of carbon stock changes are shown in table 3-1:

Table 3-1 Carbon pools selected for accounting of carbon stock changes

| Carbon pool                   | Whether Selected | Justification                                                                                                                                                                   |
|-------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aboveground woody biomass     | Yes              | SGM may reduce aboveground woody biomass.                                                                                                                                       |
| Aboveground non-woody biomass | No               | The increase of aboveground non-woody biomass resulting from SGM is transient in nature and can be conservatively excluded.                                                     |
| Below-ground biomass          | No               | It is a conservative choice to exclude the below-ground biomass.                                                                                                                |
| Dead wood                     | No               | None of the applicable SGM practices decrease dead wood. Thus it can be conservatively excluded.                                                                                |
| Litter                        | No               | None of the applicable SGM practices decrease the amount of litter. Thus it can be conservatively excluded.                                                                     |
| Soil organic carbon           | Yes              | A major carbon pool affected by grassland management practices that is expected to increase after adoption of SGM practices.                                                    |
| Wood products                 | No               | None of the applicable SGM practices increases or decreases wood products. Because carbon changes in aboveground woody biomass is considered, it can be conservatively ignored. |

The emission sources and GHGs selected for accounting are shown in Table 3-2:

Table 3-2 Emission sources and GHGs selected for accounting

| Source   |                         | Gas              | Included? | Justification/Explanation                                                                                                                                                                                                                            |
|----------|-------------------------|------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseline | Use of fertilizers      | CO <sub>2</sub>  | No        | N/A                                                                                                                                                                                                                                                  |
|          |                         | CH <sub>4</sub>  | No        | N/A                                                                                                                                                                                                                                                  |
|          |                         | N <sub>2</sub> O | No        | No fertilizer was used in baseline scenario.                                                                                                                                                                                                         |
|          | Use of N-fixing species | CO <sub>2</sub>  | No        | N/A                                                                                                                                                                                                                                                  |
|          |                         | CH <sub>4</sub>  | No        | N/A                                                                                                                                                                                                                                                  |
|          |                         | N <sub>2</sub> O | No        | N <sub>2</sub> O is the main gas for this source, but in the baseline N <sub>2</sub> O emissions from this source are conservatively excluded.                                                                                                       |
|          | Burning of biomass      | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from biomass burning in grassland are not reported since they are largely balanced by the CO <sub>2</sub> that is reincorporated back into biomass via photosynthetic activity, within weeks to a few years after burning. |
|          |                         | CH <sub>4</sub>  | No        | No burning of biomass occurred in baseline scenario.                                                                                                                                                                                                 |
|          |                         | N <sub>2</sub> O | No        | No burning of biomass occurred in baseline scenario.                                                                                                                                                                                                 |

| Source  |                                           | Gas              | Included? | Justification/Explanation                                                                                                                                                                                                                                        |
|---------|-------------------------------------------|------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Manure deposition on grassland            | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from biomass decomposition are not reported because net CO <sub>2</sub> emissions from this source are assumed to be zero – the CO <sub>2</sub> photosynthesized by plants is returned to the atmosphere as respired CO <sub>2</sub> . |
|         |                                           | CH <sub>4</sub>  | Yes       | Significant emission source.                                                                                                                                                                                                                                     |
|         |                                           | N <sub>2</sub> O | Yes       | Main gas for this source.<br>Annual precipitation in the project area is less than annual potential evapotranspiration, so indirect N <sub>2</sub> O emissions from leaching and runoff can be excluded from the project boundary.                               |
|         | Farming machine                           | CO <sub>2</sub>  | No        | No farming machinery was used in baseline scenario.                                                                                                                                                                                                              |
|         |                                           | CH <sub>4</sub>  | No        | Not main gas for this source. Excluded for simplification.                                                                                                                                                                                                       |
|         |                                           | N <sub>2</sub> O | No        | Not main gas for this source. Excluded for simplification.                                                                                                                                                                                                       |
|         | Animal respiration / Enteric fermentation | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from animal respiration are not reported because net CO <sub>2</sub> emissions from this source are assumed to be zero – the CO <sub>2</sub> photosynthesized by plants is returned to the atmosphere as respired CO <sub>2</sub> .    |
|         |                                           | CH <sub>4</sub>  | Yes       | Main gas for this source.                                                                                                                                                                                                                                        |
|         |                                           | N <sub>2</sub> O | No        | No N <sub>2</sub> O emission from enteric fermentation.                                                                                                                                                                                                          |
| Project | Use of fertilizers                        | CO <sub>2</sub>  | No        | N/A                                                                                                                                                                                                                                                              |
|         |                                           | CH <sub>4</sub>  | No        | N/A                                                                                                                                                                                                                                                              |
|         |                                           | N <sub>2</sub> O | No        | No fertilizers used in the project                                                                                                                                                                                                                               |
|         | Use of N-fixing species                   | CO <sub>2</sub>  | No        | N/A                                                                                                                                                                                                                                                              |
|         |                                           | CH <sub>4</sub>  | No        | N/A                                                                                                                                                                                                                                                              |
|         |                                           | N <sub>2</sub> O | No        | No N-fixing species were planted in the project.                                                                                                                                                                                                                 |
|         | Burning of biomass                        | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from biomass burning in grassland are not reported since they are largely balanced by the CO <sub>2</sub> that is reincorporated back into biomass via photosynthetic activity, within weeks to a few years after burning.             |
|         |                                           | CH <sub>4</sub>  | No        | No burning of biomass occurred in project scenario.                                                                                                                                                                                                              |

| Source |                                           | Gas              | Included? | Justification/Explanation                                                                                                                                                                                                                                                                                                                                                        |
|--------|-------------------------------------------|------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                           | N <sub>2</sub> O | No        | No burning of biomass occurred in project scenario.                                                                                                                                                                                                                                                                                                                              |
|        | Manure deposition on grassland            | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from biomass decomposition are not reported since they are largely balanced by the CO <sub>2</sub> that is reincorporated back into biomass via photosynthetic activity, within weeks to a few years after burning.                                                                                                                                    |
|        |                                           | CH <sub>4</sub>  | Yes       | Significant emission source.                                                                                                                                                                                                                                                                                                                                                     |
|        |                                           | N <sub>2</sub> O | Yes       | Main gas for this source.                                                                                                                                                                                                                                                                                                                                                        |
|        | Farming machine                           | CO <sub>2</sub>  | Yes       | CO <sub>2</sub> emissions from fossil fuels used in farming machinery is the main gas for this source. Where project emissions from this source are larger than baseline emissions, project proponent must account for this source of project emissions. The use of trucks and tractors during the implementation of the project consumes diesel oil and emits CO <sub>2</sub> . |
|        |                                           | CH <sub>4</sub>  | No        | Not main gas for this source. Excluded for simplification.                                                                                                                                                                                                                                                                                                                       |
|        |                                           | N <sub>2</sub> O | No        | Not main gas for this source. Excluded for simplification.                                                                                                                                                                                                                                                                                                                       |
|        | Animal respiration / Enteric fermentation | CO <sub>2</sub>  | No        | CO <sub>2</sub> emissions from enteric fermentation are not reported since they are largely balanced by the CO <sub>2</sub> that is reincorporated back into biomass via photosynthetic activity, within weeks to a few years after burning.                                                                                                                                     |
|        |                                           | CH <sub>4</sub>  | Yes       | Main gas for this source.                                                                                                                                                                                                                                                                                                                                                        |
|        |                                           | N <sub>2</sub> O | No        | No N <sub>2</sub> O emission from enteric fermentation.                                                                                                                                                                                                                                                                                                                          |

### 3.1.4 Baseline Scenario

#### Step 1. Identification of alternative land use scenarios to the proposed SGM project

##### Sub-step 1a) Identify and list all credible alternative land use scenarios to the proposed SGM project:

According to “Sustainable Grassland Management” (Version 1.1)<sup>54</sup>, the project refers to the VCS Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other

<sup>54</sup> <https://verra.org/methodologies/vm0026-methodology-for-sustainable-grassland-management-sgm-v1-0/>

Land Use (AFOLU) Project Activities<sup>55</sup> for guidance on identification of realistic and credible alternative land uses.

As stated in the following section 3.1.5, the identified land use scenarios shall at least include:

- i. Continuation of pre-project land use
- ii. Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;
- iii. If applicable, activities similar to the proposed project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate resulting from:
  - Legal requirements; or
  - Extrapolation of observed similar activities in the geographical area with similar socioeconomic and ecological conditions to the proposed VCS AFOLU project activity occurring in the period beginning ten years prior to the project start date.

For (iii), the lands within the project boundary of the proposed VCS AFOLU project are all with the same legal requirements, there are no legal requirements to carry out similar project activities. And according to the PRA Report and satellite pictures in 2007 and 2016<sup>56</sup> (Figure 2-4, 2-5, 2-6 and 2-7), the project area existed as degraded land more than ten years prior to the project start date. So (iii) is not applicable.

Pre-project land use scenario is degraded grassland ecosystem which is the common situation in Burqin<sup>57</sup> (See relevant proof process of Section 3.1.2), it is feasible for the project area taking into account local grassland resources were severely damaged for more than ten years. China has successively issued and revised a series of laws and administrative regulations such as “Law of the People’s Republic of China on Grasslands”<sup>58</sup> related to grassland in order to protect grasslands. But none of the laws and regulations mandate the restoration of degraded grassland the same as the project activities. Therefore, the degradation of the grassland of the project area would continue in the absence of the project, the restoration measures implemented by the project activities such as seeding grasses, building fences are not be mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries<sup>59</sup>, any systematically enforced law, statute or other regulatory framework. Thus Scenario (i) remains possible baseline scenario.

Scenario ii faces the technical and investment which will be discussed in the next section. However, it does not violate any existing enforced mandatory applicable laws and regulations.

**Outcome of Sub-step 1a:** List of credible alternative land use scenarios that could have occurred on the land within the project boundary of the VCS AFOLU project.

<sup>55</sup> <https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/>

<sup>56</sup> Download from website: <https://adsweb.modaps.eosdis.nasa.gov/search/>

<sup>57</sup> [https://wenku.baidu.com/view/4d2bb24b02f69e3143323968011ca300a6c3f636.html?\\_wks\\_=1672293757606](https://wenku.baidu.com/view/4d2bb24b02f69e3143323968011ca300a6c3f636.html?_wks_=1672293757606)

<sup>58</sup> [https://www.mee.gov.cn/ywgz/fgbz/fl/200212/t20021228\\_81958.shtml](https://www.mee.gov.cn/ywgz/fgbz/fl/200212/t20021228_81958.shtml)

<sup>59</sup> <https://unfccc.int/non-annex-I-NCs>

As described before, the list of credible alternative land use scenarios is Scenario (i) and (ii).

**Sub-step 1b) Check the consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations:**

China has successively issued and revised a series of laws and administrative regulations related to grassland, such as the Grassland Law<sup>60</sup>, the Regulations on the Protection of Wild Plants and Animals<sup>61</sup>, the Regulation on Nature Reserve<sup>62</sup>, the Regulation on Grassland Fire Control<sup>63</sup>, and the Regulation on Forest Diseases and Pests Control<sup>64</sup>, etc.

Although these regulations had set overall development goals for grassland development and were started before the adoption by the COP of the CDM M&P (/decision 17/CP.7, 11 November 2001), none of the regulations mandate the restoration of degraded grassland ecosystem. Thus the scenario (i) Continuation of pre-project land use is in compliance with mandatory legislation and regulations.

And in China, there is no restrictions, fees or fines for the restoration of degraded grassland as long as the planting area has not been approved for other use. For this project, the project area is located in Burqin County where all the land are approved for the restoration of degraded grassland, therefore scenario (ii) Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project is also in compliance with mandatory legislation and regulations.

**Outcome of Sub-step 1b:** List of plausible alternative land use scenarios to the VCS AFOLU project activity that are in compliance with mandatory legislation and regulations taking into account their enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations.

Thus Scenario (i) and (ii) remains possible baseline scenarios.

**Step 2: Select the most plausible baseline scenario**

**Sub-step 2a) Barrier analysis:**

The barrier analysis was conducted to identify realistic and credible barriers that prevent implementation of these land use scenarios following the procedures described in Step 3 of the VCS Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities<sup>65</sup>.

**1. Investment barriers**

As the Project Design Report described, the project restored degraded grassland by seeding grass, forbidding grazing and building fences, the total investment is 100 million RMB, which comes from

<sup>60</sup> [http://www.gov.cn/gongbao/content/2003/content\\_62420.htm](http://www.gov.cn/gongbao/content/2003/content_62420.htm)

<sup>61</sup> <http://www.djrd.gov.cn/html/flfg/xzfg/17/10/3972.html>.

<sup>62</sup> <http://www.forestry.gov.cn/main/3950/20170314/459882.html>

<sup>63</sup> [http://www.gov.cn/zhengce/zhengceku/2008-12/05/content\\_2756.htm](http://www.gov.cn/zhengce/zhengceku/2008-12/05/content_2756.htm)

<sup>64</sup> <http://www.forestry.gov.cn/main/3950/20170314/459886.html>

<sup>65</sup> <https://verra.org/methodology/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/>

the Burqin Finance Bureau. In order to ensure the sustainable development of the project, according to “Management and maintenance contract”, 467 of local herders were employed as grassland guardians, with an annual salary of 22,800 RMB (3,579.60 USD) per person<sup>66</sup>, the total cost of 10.65 million RMB (1.67 million USD) per year needs to be raised by the project proponent. Since the project has no benefits, there is no institutional investment. Therefore, the investment barrier for this project is the lack of access to credit.

## **2. Technological barriers**

According to the research of the Pan Qingming et al<sup>67</sup>, the structure and functionality of grassland vegetation must currently be restored over a longer period of time in China, and the country lacks the capacity to create distinct restoration solutions for various types of grassland and stages of degradation. In addition, grassland grazing management technology is still in its growing stages. Most herdsmen are still in the initial free grazing stage of their grazing management. Because of the expensive expense of the fence, the grazing restriction technique cannot be widely adopted. For Scenario ii, project activity on the land within the project boundary performed without being registered as the VCS AFOLU project, the project owner needs to hire local residents to plant grass, but the survey conducted by the project owner<sup>68</sup> shows that local residents lack access to high-quality grass seeds and necessary tools, such as trucks, tractors and seeders, etc. They also lack skills in grass planting, rodent control, fire prevention, and sustainable grassland management. In addition, the lack of organizational instruments also prevents them from overcoming technological barriers. Therefore, the technological barrier for this project is the lack of access to planting materials and equipment for implementing the technology.

Upon applying for VCS and CCB project, the carbon revenue is the key to sustainable management of project area. And without applying for VCS, the investment barriers (lack of access to credit) and technological barriers (lack of access to planting materials and equipment for implementing the technology) would not be overcome.

### **Sub-step 2b) Eliminate alternative land use scenarios that face a barrier to implementation:**

Scenario i does not require extra investment or labor force. Thus, it is not prevented by any of the identified barriers; Scenario ii faces the investment and technological barriers (lack of access to credit, planting materials and equipment for implementing the technology) as stated above which should be eliminated of the list.

### **Sub-step 2c) Select most plausible baseline scenario (if allowed by barrier analysis):**

As analyzed in Sub- step 2a and 2b, the baseline scenario of the project is Scenario i: continuation of pre-project use (i.e. lands remain degraded grassland ecosystem).

<sup>66</sup> Salary payment record

<sup>67</sup> PAN Qingmin, SUN Jiamei, YANG Yuanhe, LIU Wei, LI Ang, PENG Yunfeng, XUE Jianguo, XIA Hao, HUANG Jianhui. Issues and Solutions on Grassland Restoration and Conservation in China. Bulletin of Chinese Academy of Sciences, 36(6): 666-674

<sup>68</sup> The PRA report.

### 3.1.5 Additionality

Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (version 3.0) is applied to demonstrate the additionality.

#### **Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity;**

As described in step 1 of section 3.1.4, the methodology has confirmed the possible baseline scenarios.

#### **Step 2. Investment analysis**

##### **Sub-step 2a. Determine appropriate analysis method**

The project generates no financial or economic benefits other than VCS related income, then apply the simple cost analysis (Option I).

##### **Sub-step 2b. – Option I. Apply simple cost analysis**

According to the Project Design Report, the cost of building fence is about 70 RMB (10.98 USD) / Mu, grass seeding is about 500 RMB (78.45 USD)/Mu, and the estimated cost for subsequent management and protection would reach 11.71 million RMB (1.84 million USD) every year during the whole lifetime. Since the project is planting grass and building fences on the degraded grassland, there is no financial benefits except VCS related income will be produced by the project.

Then proceed to Step 4 (Common practice analysis) based on the tool.

#### **STEP 4. Common practice analysis**

The previous steps shall be complemented with an analysis of the extent to which similar activities have already diffused in the geographical area of the proposed VCS AFOLU project activity. According to the tool, similar activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology. Other registered VCS AFOLU project activities shall not be included in this analysis. Considerations shall be limited to the period beginning 10 years prior to the project start date.

As the framework conditions vary significantly between each province and Autonomous region of China, the investment climate, tariff, land policy, regulations etc. for degraded grassland restoration project are only comparable in the same province or the same autonomous region. The project is located in Burqin County, Altai City, Xinjiang Uygur Autonomous Region, so the relevant geographical area for common practice analysis is selected to be Xinjiang Uygur Autonomous Region.

The project planted *Elymus nutans*, *Agropyron cristatum*, *Festuca rubra* and *Artemisia sphaerocephala* on the degraded grassland. And considering  $\pm 50\%$  of the project planting scale,

the similar project scale is defined as 32,500-97,500 ha. The project start date is 26-June-2017, so the similar considerations were limited to the period beginning from June 2007.

Based on the public and accessible information<sup>69</sup>, and check with local authority,, there were no other degraded grassland restoration project on a scale similar with the project have been implemented previously in Xinjiang Uygur Autonomous Region.

Therefore, there is no similar project activity identified within the common practice boundary, so step 4 is satisfied.

Thus, the project is not a common practice and the project activity is not the baseline scenario which is additional.

### 3.1.6 Methodology Deviations

N/A.

## 3.2 Quantification of GHG Emission Reductions and Removals

### 3.2.1 Baseline Emissions

#### 1. Baseline N<sub>2</sub>O emissions due to fertilizer use

According to the Baseline Survey Report and Participatory Rural Appraisal (PRA) Report of the project, no nitrogen fertilizer was applied in baseline scenario. So, baseline N<sub>2</sub>O emissions due to fertilizer use  $BE_{N_2O_{SN},b}$  is considered to be 0 tCO<sub>2</sub>e.

#### 2. Baseline emissions due to the use of N-fixing species

According to the methodology (VM0026/Version 1.1), N<sub>2</sub>O emissions due to the use of N-fixing species in the baseline are excluded.

#### 3. Baseline emissions due to burning of biomass

According to the Baseline Survey Report and Participatory Rural Appraisal (PRA) Report, there was no biomass burning in the project area in baseline scenario. So, baseline emissions due to burning of biomass is considered to be 0 tCO<sub>2</sub>e.

#### 4. Baseline CH<sub>4</sub> emissions due to enteric fermentation

Baseline CH<sub>4</sub> emissions from enteric fermentation are calculated using the following:

$$BE_{CH_4EF,b} = \frac{GWP_{CH_4} \times \sum_{l=1}^L P_{l,b} \times EF_l \times Days_{l,b}}{1000 \times 365} \quad (1)$$

Where:

<sup>69</sup> <http://lcj.xinjiang.gov.cn/>

|              |   |                                                                                                              |
|--------------|---|--------------------------------------------------------------------------------------------------------------|
| $GWP_{CH_4}$ | = | Global-warming potential for CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> )                        |
| $P_{l,b}$    | = | Population of grazing livestock type l, in baseline year b (head)                                            |
| $l$          | = | Index of livestock type                                                                                      |
| $EF_l$       | = | Enteric CH <sub>4</sub> emission factor per head of livestock type l per year (kg CH <sub>4</sub> head*year) |
| $Days_{l,b}$ | = | Grazing days inside the project area for each livestock type l in baseline year b (days)                     |
| 1000         | = | Conversion factor for t CH <sub>4</sub> to kg CH <sub>4</sub>                                                |
| 365          | = | Conversion factor for years to days                                                                          |

## 5. Baseline N<sub>2</sub>O and CH<sub>4</sub> emissions due to manure management

Baseline emissions from manure management include N<sub>2</sub>O and CH<sub>4</sub> emissions from manure and urine deposited on grassland soil during the grazing season.

$$BE_{GHG_{MD},b} = BE_{N_2O_{MD},b} + BE_{CH_4_{MD},b} \quad (2)$$

Where:

|                    |   |                                                                                                                                |
|--------------------|---|--------------------------------------------------------------------------------------------------------------------------------|
| $BE_{N_2O_{MD},b}$ | = | Baseline N <sub>2</sub> O emissions from manure and urine deposited on grassland soil in baseline year b (t CO <sub>2</sub> e) |
| $BE_{CH_4_{MD},b}$ | = | Baseline CH <sub>4</sub> emissions from manure and urine deposited on grassland soil in baseline year b (t CO <sub>2</sub> e)  |

### 1) Baseline N<sub>2</sub>O emissions from manure management

$$BE_{N_2O_{MD},b} = GWP_{N_2O} \times (BE_{D,N_2O_{MD},b} + BE_{ID,N_2O_{MD},b}) \quad (3)$$

Where:

|                       |   |                                                                                                                                                         |
|-----------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| $GWP_{N_2O}$          | = | Global warming potential for N <sub>2</sub> O (t CO <sub>2</sub> e/t N <sub>2</sub> O)                                                                  |
| $BE_{D,N_2O_{MD},b}$  | = | Direct N <sub>2</sub> O emissions from manure and urine deposited on grassland soil during the grazing season in baseline year b (t N <sub>2</sub> O)   |
| $BE_{ID,N_2O_{MD},b}$ | = | Indirect N <sub>2</sub> O emissions from manure and urine deposited on grassland soil during the grazing season in baseline year b (t N <sub>2</sub> O) |

### 2) Baseline direct N<sub>2</sub>O emissions from manure and urine deposited on grassland soil

Direct Baseline direct N<sub>2</sub>O emissions from manure and urine deposited on grassland soil are calculated using the following:

$$BE_{D,N_2O_{MD},b} = \sum_{l1=1}^{L1} F_{MD,l1,b} \times EF_{3,PRP,CPP} \times 44/28 \quad (4)$$

And/or

$$BE_{D,N_2O_{MD},b} = \sum_{l2=1}^{L2} F_{MD,l2,b} \times EF_{3,PRP,SO} \times 44/28 \quad (5)$$

$F_{MD,l1,b}$  and  $F_{MD,l2,b}$  must be calculated using the following equation for livestock type I.

$$F_{MD,l1,b} = \frac{P_{l,b} \times W_{l,b} \times Nex_l \times H_{l,b} \times Days_{l,b} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b} \quad (6)$$

Where:

- $F_{MD,l1,b}$  = Annual amount of nitrogen in cattle, poultry and pigs manure and urine deposited on grassland soil during the grazing season in baseline year b, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)
- $F_{MD,l2,b}$  = Annual amount of nitrogen in sheep and other animals manure and urine deposited on grassland soil during the grazing season in baseline year b, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)
- $EF_{3,PRP,CPP}$  = N<sub>2</sub>O emission factor for cattle, poultry and pigs manure and urine deposited on grassland soil during the grazing season (kg N<sub>2</sub>O-N/kg N input)
- $EF_{3,PRP,SO}$  = N<sub>2</sub>O emission factor for sheep and other animals manure and urine deposited on grassland soil during the grazing season (kg N<sub>2</sub>O-N/kg N input)
- $l1$  = Index of livestock cattle, poultry and pigs
- $l2$  = Index of livestock sheep and other animals
- $P_{l,b}$  = Population of livestock type I in baseline year b (head)
- $W_{l,b}$  = Average weight of livestock type I in baseline year b (kg livestock mass/head)
- $Nex_l$  = Nitrogen excretion of livestock type I (kg N deposited /(t livestock mass\*day))
- $1000_a$  = Conversion factor for t livestock mass to kg livestock mass
- $H_{l,b}$  = Average grazing hours per day for livestock type I in baseline year b (hour)
- $24$  = Conversion factor for days to hours
- $Days_{l,b}$  = Grazing days for livestock type I inside the project area in baseline year b (days)

|                 |   |                                                                                                                                         |
|-----------------|---|-----------------------------------------------------------------------------------------------------------------------------------------|
| $1000_b$        | = | Conversion factor for t N to kg N                                                                                                       |
| $Frac_{GAS,MD}$ | = | Fraction of volatilization from manure and urine deposited by grazing animals as $NH_3$ and $NO_x$ (kg N volatilized/kg of N deposited) |
| $I$             | = | Index of grazing livestock types                                                                                                        |

### 3) Baseline indirect $N_2O$ emissions from urine and manure N deposited on grassland soils

According to the methodology (VM0026/Version 1.1) and previous research, the annual precipitation of the project area is less than annual potential evapotranspiration, so, indirect  $N_2O$  emissions from leaching and runoff can be excluded.

The indirect  $N_2O$  emissions from the atmospheric deposition of N volatilized as  $NH_3$  and  $NO_x$  after urine and manure N is deposited on grassland soils in baseline year b, are calculated using the following:

$$BE_{ID,N_2O,MD,b} = \sum_{l=1}^L F_{MD,l,b} \times Frac_{GAS,MD} \times EF_{4,MD} \times 44/28 \quad (7)$$

Where:

|                     |   |                                                                                                                                                                                          |
|---------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $BE_{ID,N_2O,MD,b}$ | = | Indirect $N_2O$ emissions from manure and urine deposited on grassland soil during the grazing season in baseline year b (t $N_2O$ )                                                     |
| $F_{MD,l,b}$        | = | Annual amount of manure and urine deposited on grassland soil from livestock type l during the grazing season in baseline year b, adjusted for volatilization as $NH_3$ and $NO_x$ (t N) |
| $Frac_{GAS,MD}$     | = | Fraction of volatilization from manure and urine deposited by grazing animals as $NH_3$ and $NO_x$ (kg N volatilized/kg of N deposited)                                                  |
| $EF_{4,MD}$         | = | $N_2O$ emission factor for atmospheric deposition of urine and manure N on soils and water surfaces, (kg $N_2O$ -N/(kg $NH_3$ -N + $NO_x$ -N volatilized))                               |
| $L$                 | = | Index of grazing livestock types                                                                                                                                                         |

### 4) $CH_4$ emissions from manure management

Baseline  $CH_4$  emissions from manure management are calculated using the following:

$$BE_{CH_4,MD,b} = \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{lM} \times P_{l,b} \times H_{l,b} \times Days_{l,b}}{1000 \times 365 \times 24} \quad (8)$$

Where:

|              |   |                                                                                                   |
|--------------|---|---------------------------------------------------------------------------------------------------|
| $P_{l,b}$    | = | Population of grazing livestock type l, in baseline year b, head                                  |
| $EF_{lM}$    | = | CH <sub>4</sub> emission factor from manure of livestock type l (kg CH <sub>4</sub> /(head*year)) |
| $H_{l,b}$    | = | Average grazing hours per day for livestock type l in baseline year b (hour)                      |
| $Days_{l,b}$ | = | Grazing days for livestock type l inside the project area in baseline year b (days)               |
| 1000         | = | Conversion factor for t CH <sub>4</sub> to kg CH <sub>4</sub>                                     |
| 365          | = | Conversion factor for years to days                                                               |
| 24           | = | Conversion factor for days to hours                                                               |

## 6. Baseline CO<sub>2</sub> emissions due to the use of fossil fuels for grassland management

According to the Participatory Rural Appraisal (PRA) Report, there was no grassland management in baseline scenario, thus did not involve agricultural machinery. So, baseline CO<sub>2</sub> emissions due to the use of fossil fuels for grassland management is considered to be 0 tCO<sub>2</sub>e.

## 7. Baseline emission removals from existing woody perennials

According to the Baseline Survey Report and Participatory Rural Appraisal (PRA) Report, there were no perennial woody plants in the project area under the baseline scenario. So, baseline emission removals from existing woody perennials is considered to be 0 tCO<sub>2</sub>e.

## 8. Baseline emission removals due to changes in soil organic carbon

According to the methodology, since the applicability conditions limit the project to land that is degraded and is continuing to degrade, it can be conservatively assumed that the changes in SOC in the baseline scenario is 0 tCO<sub>2</sub>e.

## Baseline emissions and removals

The emissions and removals in baseline year b are calculated as follows:

$$BE_b = BE_{N_2O_{SN},b} + BE_{BB,b} + BE_{CH_4EF,b} + BE_{GHG_{MD},b} + BE_{FC,b} - BRWP_b \quad (9)$$

Where:

|                    |   |                                                                                                    |
|--------------------|---|----------------------------------------------------------------------------------------------------|
| $BE_b$             | = | Baseline emissions and removals in year b (t CO <sub>2</sub> e)                                    |
| $BE_{N_2O_{SN},b}$ | = | Baseline N <sub>2</sub> O emissions due to fertilizer use in baseline year b (t CO <sub>2</sub> e) |

|                 |   |                                                                                                                          |
|-----------------|---|--------------------------------------------------------------------------------------------------------------------------|
| $BE_{BB,b}$     | = | Baseline GHG emissions from biomass burning in baseline year b (t CO <sub>2</sub> e)                                     |
| $BE_{CH_4EF,b}$ | = | Baseline CH <sub>4</sub> emissions from enteric fermentation in baseline year b (t CO <sub>2</sub> e)                    |
| $BE_{GHGMD,b}$  | = | Baseline GHG emissions from manure management in baseline year b (t CO <sub>2</sub> e)                                   |
| $BE_{FC,b}$     | = | Baseline CO <sub>2</sub> emissions from farming machine fossil fuel consumption in baseline year b, (t CO <sub>2</sub> ) |
| $BRWP_b$        | = | Baseline removals from existing woody perennials in baseline year b (t CO <sub>2</sub> )                                 |

As described above, baseline emissions due to enteric fermentation and manure management should be calculated.

$$\begin{aligned}
 BE_b &= BE_{CH_4EF,b} + BE_{GHGMD,b} \\
 &= BE_{CH_4EF,b} + BE_{N_2O_{MD},b} + BE_{CH_4MD,b} \\
 &= \frac{GWP_{CH_4} \times \sum_{l=1}^L P_{l,b} \times EF_l \times Days_{l,b}}{1000 \times 365} + GWP_{N_2O} \times \left( \frac{P_{l,b} \times W_{l,b} \times Nex_l \times H_{l,b} \times Days_{l,b} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b} \right) \times EF_{3,PRP,CPP} \times \\
 &\quad \frac{44}{28} + \frac{P_{l,b} \times W_{l,b} \times Nex_l \times H_{l,b} \times Days_{l,b} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b} \times EF_{3,PRP,SO} \times \frac{44}{28} + \sum_{l=1}^L F_{MD,l,b} \times Frac_{GAS,MD} \times EF_{4,MD} \times \\
 &\quad \frac{44}{28} + \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{lM} \times P_{l,b} \times H_{l,b} \times Days_{l,b}}{1000 \times 365 \times 24} \quad (10)
 \end{aligned}$$

$$BE_b = 9,675 + 132 + 159 = 9,966 \text{ tCO}_2\text{e}$$

Therefore, the baseline emissions are 9,966 tCO<sub>2</sub>e, please refer to ER spreadsheet for detailed calculation.

### 3.2.2 Project Emissions

#### 1. Project N<sub>2</sub>O emissions due to fertilizer use

According to the Project Design Report of the project, no nitrogen fertilizer was applied in project scenario of the project area.

#### 2. Project emissions due to the use of N-fixing species

According to the Project Design Report, the project planted Elymus nutans, Agropyron cristatum, Festuca rubra and Artemisia sphaerocephala on degraded grassland, which did not involve N-fixing species. So, project emissions due to the use of N-fixing species is considered to be 0 tCO<sub>2</sub>e.

#### 3. Project emissions due to burning of biomass

According to the records of grassland guardian and local forestry and grass bureau<sup>70</sup>, there is no biomass burning in this project. So, project emissions due to burning of biomass is considered to be 0 tCO<sub>2</sub>e.

#### 4. Project CH<sub>4</sub> emissions due to enteric fermentation

Project CH<sub>4</sub> emissions from enteric fermentation are calculated using the following:

$$PE_{CH_4EF,t} = \frac{GWP_{CH_4} \times \sum_{l=1}^L P_{l,t} \times EF_l \times Days_{l,t}}{1000 \times 365} \quad (11)$$

Where:

|              |   |                                                                                                              |
|--------------|---|--------------------------------------------------------------------------------------------------------------|
| $GWP_{CH_4}$ | = | Global-warming potential for CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> )                        |
| $P_{l,t}$    | = | Population of grazing livestock type l in year t under project (head)                                        |
| $l$          | = | Index of livestock type                                                                                      |
| $EF_l$       | = | Enteric CH <sub>4</sub> emission factor per head of livestock type l per year (kg CH <sub>4</sub> head*year) |
| $Days_{l,t}$ | = | Grazing days inside the project area for each livestock type l in the project year t (days)                  |
| 1000         | = | Conversion factor for t CH <sub>4</sub> to kg CH <sub>4</sub>                                                |
| 365          | = | Conversion factor for years to days                                                                          |

#### 5. Project N<sub>2</sub>O and CH<sub>4</sub> emissions due to manure management

The project emissions from manure management include N<sub>2</sub>O and CH<sub>4</sub> emissions from manure and urine deposited on grassland soil during the grazing season.

$$PE_{GHGMD,t} = PE_{N_2O_{MD},t} + PE_{CH_4MD,t} \quad (12)$$

Where:

|                    |   |                                                                                                                      |
|--------------------|---|----------------------------------------------------------------------------------------------------------------------|
| $PE_{GHGMD,t}$     | = | Project GHG emissions from manure management in year t (t CO <sub>2</sub> e)                                         |
| $PE_{N_2O_{MD},t}$ | = | Project N <sub>2</sub> O emissions from manure and urine deposited on grassland soil in year t (t CO <sub>2</sub> e) |
| $PE_{CH_4MD,t}$    | = | Project CH <sub>4</sub> emissions from manure and urine deposited on grassland soil in year t (t CO <sub>2</sub> e)  |

<sup>70</sup> The project employed 467 herders as guardians, who regularly patrol the grasslands, record abnormal phenomena and report to Burqin Forestry and Grassland Bureau.

## 1) Project N<sub>2</sub>O emissions from manure management

$$PE_{N_2O_{MD},t} = GWP_{N_2O} \times (PE_{D,N_2O_{MD},t} + PE_{ID,N_2O_{MD},t}) \quad (13)$$

Where:

$GWP_{N_2O}$  = Global warming potential for N<sub>2</sub>O (t CO<sub>2</sub>e/t N<sub>2</sub>O)

$PE_{D,N_2O_{MD},t}$  = Project direct N<sub>2</sub>O emissions from manure and urine deposited on grassland soil during the grazing season in year t (t N<sub>2</sub>O)

$PE_{ID,N_2O_{MD},t}$  = Project indirect N<sub>2</sub>O emissions from manure and urine deposited on grassland soil during the grazing season in year t (t N<sub>2</sub>O)

## 2) Project direct N<sub>2</sub>O emissions from manure and urine deposited on grassland soil

$$PE_{D,N_2O_{MD},t} = \sum_{l1=1}^{L1} F_{MD,l1,t} \times EF_{3,PRP,CPP} \times 44/28 \quad (14)$$

And/or

$$PE_{D,N_2O_{MD},t} = \sum_{l2=1}^{L2} F_{MD,l2,t} \times EF_{3,PRP,SO} \times 44/28 \quad (15)$$

$F_{MD,l1,t}$  and  $F_{MD,l2,t}$  must be calculated using the following equation for livestock type l.

$$F_{MD,l1,t} = \frac{P_{l,t} \times W_{lp} \times Nex_l \times H_{l,t} \times Days_{l,t} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b} \quad (16)$$

Where:

$F_{MD,l1,t}$  = Annual amount of nitrogen in cattle, poultry and pigs manure and urine deposited on grassland soil during the grazing season in year t, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)

$F_{MD,l2,t}$  = Annual amount of nitrogen in sheep and other animals manure and urine deposited on grassland soil during the grazing season in year t, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)

$EF_{3,PRP,CPP}$  = N<sub>2</sub>O emission factor for cattle, poultry and pigs manure and urine deposited on grassland soil during the grazing season (kg N<sub>2</sub>O-N/kg N input)

$EF_{3,PRP,SO}$  = N<sub>2</sub>O emission factor for sheep and other animals manure and urine deposited on grassland soil during the grazing season (kg N<sub>2</sub>O-N/kg N input)

$l1$  = Index of livestock cattle, poultry and pigs

$l2$  = Index of livestock sheep and other animals

$P_{l,t}$  = Population of grazing livestock type l in year t (head)

|                 |   |                                                                                                                                                           |
|-----------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| $W_{l,p}$       | = | Average weight of livestock l under project (kg livestock mass/head)                                                                                      |
| $Nex_l$         | = | Nitrogen excretion of livestock type l (kg N deposited /(t livestock mass*day))                                                                           |
| $1000_a$        | = | Conversion factor for t livestock mass to kg livestock mass                                                                                               |
| $H_{l,t}$       | = | Average grazing hours per day during grazing season in year t (hours)                                                                                     |
| 24              | = | Conversion factor for days to hours                                                                                                                       |
| $Days_{l,t}$    | = | Grazing days for livestock type l inside the project area in year t (days)                                                                                |
| $1000_b$        | = | Conversion factor for t N to kg N                                                                                                                         |
| $Frac_{GAS,MD}$ | = | Fraction of volatilization from manure and urine deposited by grazing animals as NH <sub>3</sub> and NO <sub>x</sub> (kg N volatilized/kg of N deposited) |
| l               | = | Index of grazing livestock types                                                                                                                          |

### 3) Project indirect N<sub>2</sub>O emissions from urine and manure N deposited on grassland soils

According to the methodology (VM0026/Version 1.1) and PRA report, the annual precipitation of the project area is less than annual potential evapotranspiration, so, indirect N<sub>2</sub>O emissions from leaching and runoff can be excluded.

Indirect N<sub>2</sub>O emissions from the atmospheric deposition of N volatilized as NH<sub>3</sub> and NO<sub>x</sub> after urine and manure N is deposited on grassland soils under the project, are calculated using the following:

$$PE_{ID,N_2O_{MD},t} = \sum_{l=1}^L F_{MD,l,t} \times Frac_{GAS,MD} \times EF_{4,MD} \times 44/28 \quad (17)$$

Where:

|                       |   |                                                                                                                                                                                                   |
|-----------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $PE_{ID,N_2O_{MD},t}$ | = | Project indirect N <sub>2</sub> O emissions from manure and urine deposited on grassland soil during the grazing season in year t (t N <sub>2</sub> O)                                            |
| $F_{MD,l,t}$          | = | Annual amount of manure and urine deposited on grassland soil from livestock type l during the grazing season in year t, adjusted for volatilization as NH <sub>3</sub> and NO <sub>x</sub> (t N) |
| $Frac_{GAS,MD}$       | = | Fraction of volatilization from manure and urine deposited by grazing animals as NH <sub>3</sub> and NO <sub>x</sub> (kg N volatilized/kg of N deposited)                                         |
| $EF_{4,MD}$           | = | N <sub>2</sub> O emission factor for atmospheric deposition of urine and manure N on soils and water surfaces, (kg N <sub>2</sub> O-N/(kg NH <sub>3</sub> -N + NO <sub>x</sub> -N volatilized))   |

### 4) CH<sub>4</sub> emissions from manure management

$$PE_{CH_4MD,t} = \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{lM} \times P_{l,t} \times H_{l,t} \times Days_{l,t}}{1000 \times 365 \times 24} \quad (18)$$

Where:

|              |   |                                                                                                   |
|--------------|---|---------------------------------------------------------------------------------------------------|
| $P_{l,t}$    | = | Population of livestock type l in year t (head)                                                   |
| $EF_{lM}$    | = | CH <sub>4</sub> emission factor from manure of livestock type l (kg CH <sub>4</sub> /(head*year)) |
| $H_{l,t}$    | = | Average grazing hours per day during grazing season in year t (hours)                             |
| $Days_{l,t}$ | = | Grazing days for livestock type l inside the project area in year t (days)                        |
| 1000         | = | Conversion factor for t CH <sub>4</sub> to kg CH <sub>4</sub>                                     |
| 365          | = | Conversion factor for years to days                                                               |
| 24           | = | Conversion factor for days to hours                                                               |

## 6. Project CO<sub>2</sub> emissions due to the use of fossil fuels

According to Project Design Report, project emissions from the use of fossil fuels are larger than baseline emissions although the project construction follows the principle of energy conservation and environmental protection, so the project emissions from the use of fossil fuels must be account.

However, the use of fossil fues only occurred in 2017-2019 during construction period for fence building and grass seeding, no fossil fuel used thereafter.

Project CO<sub>2</sub> emissions due to the use of fossil fuels are calculated using the following:

$$PE_{FC,t} = \frac{\sum_{p=1}^P \sum_{j=1}^J \sum_{k=1}^K FC_{p,j,k,t} \times EF_{CO_2,k} \times NCV_k}{1000} \quad (19)$$

Where:

|                |   |                                                                                                     |
|----------------|---|-----------------------------------------------------------------------------------------------------|
| $FC_{p,j,k,t}$ | = | Fuel consumption by fuel type k, by machine type j, on grassland parcel p, in year t (kg fuel/year) |
| $EF_{CO_2,k}$  | = | CO <sub>2</sub> emission factor by fuel type k (t CO <sub>2</sub> /GJ).                             |
| $NCV_k$        | = | Thermal value of fuel type k (GJ/t fuel)                                                            |
| 1000           | = | Conversion factor for tonnes fuel to kg fuel                                                        |
| K              | = | Index of fuel type                                                                                  |
| J              | = | Index of machine type                                                                               |
| P              | = | Index of grassland parcel                                                                           |

## 7. Project removals from woody perennials

According to the Project Design Report, the project activities involve the planting of grass and grazing management on degraded grassland, without the removal of existing woody biomass. So, the project removals from woody perennials are considered to be 0 tCO<sub>2</sub>e.

## 8. Project removals due to changes in soil organic carbon

Estimate of project removals due to changes in SOC using a direct measurement approach (Option 2). According to the methodology, for measuring soil organic carbon stock changes, soil sampling must follow a scientifically established method (eg, methods described in Carter and Gregoroch, 2006), or a nationally-approved standard. For the project, the nationally-approved standard *The Technical Specification for Soil Environmental Monitoring* (HJ/T 166-2004)<sup>71</sup> was used for sampling process. National standard *Method for Determination of Soil Organic Matter* (NY/T 1121.6-2006)<sup>72</sup> was used to measure SOC of the soil samples.

Sampling procedures were designed such that the statistical significance of soil carbon stock changes between the baseline carbon stock and the carbon stock in time t can be determined with a 95 percent confidence interval. The Guidelines for sampling and surveys for CDM project activities and programs of activities (version 04.0) was followed to determine the sampling procedure and sample size.

The SOC stock in stratum s, sampling site i, under project in year t are calculated using the following:

$$P_{SOC_{mG,s,i,t}} = SOC_{mG,s,i,t} \times BD_{mG,s,i,t} \times Depth \times (1 - FC_{mG,s,i,t}) \times 0.1 \quad (20)$$

Where:

|                      |   |                                                                                                                                                                                     |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $P_{SOC_{mG,s,i,t}}$ | = | SOC stock in the top 30 cm (or greater depth if required) of soil for management practice mG, stratum s, sampling site i under project in year t (t C/ha)                           |
| $SOC_{mG,s,i,t}$     | = | SOC content in the top 30 cm of soil (or greater depth if required) for management practice mG, stratum s, sampling site i, under project in year t (g C/kg soil)                   |
| $BD_{mG,s,i,t}$      | = | Soil bulk density in the top 30 cm of soil (or greater depth if required) for management practice mG, stratum s, sampling site i, under project in year t (g soil/cm <sup>3</sup> ) |
| $Depth$              | = | Top soil depth, for calculating grassland SOC stock in the top 30 cm of soil (or greater depth if required) (cm)                                                                    |
| $FC_{G,s,i,t}$       | = | Percentage of rocks larger than 2mm, roots, and other dead residues with a diameter in the top 30 cm of soil (or greater depth if required), for                                    |

<sup>71</sup> <https://www.doc88.com/p-360144165334.html>, Issued by the Ministry of Ecology and Environment of the People's Republic of China in 2004.

<sup>72</sup> Issued by the Ministry of Agriculture of the People's Republic of China in 2006.

management practice  $mG$ , stratum  $s$ , sampling site  $i$  under project in year  $t$  (percent)

0.1 = Conversion factor for SOC to t C/ha

$mG$  = Index of management practice

$S$  = Index of stratum

$i$  = Index of sampling site

Calculate average carbon stock of all monitored sites in management practice  $mG$ , stratum  $s$ , under project using the following:

$$P_{SOC_{mG,s,t}} = \frac{\sum_{i=1}^I P_{SOC_{mG,s,i,t}}}{I} \quad (21)$$

Where:

$P_{SOC_{mG,s,t}}$  = Average carbon stock in stratum  $s$  under project (t C/ha)

$P_{SOC_{mG,s,i,t}}$  = SOC stock in the top 30 cm (or greater depth if required) of soil for management practice  $mG$ , stratum  $s$ , sampling site  $i$  under project in year  $t$  (t C/ha)

$I$  = Monitored sites in stratum  $s$ , under project

The following is used to calculate the difference between the carbon stock for management practice  $mG$  under project in year  $t$ , and the carbon stock under the baseline scenario, for all strata.

$$P_{mG,t} = \sum_{s=1}^S (P_{SOC_{mG,s,t}} - SOC_{s,Baseline}) \times PA_{mG,s,t} \quad (22)$$

Where:

$P_{mG,t}$  = Difference in the carbon stock between the project in year  $t$  and the baseline scenario (t C)

$PA_{mG,s,t}$  = Project areas with management practice  $mG$  in stratum  $s$  in year  $t$  (ha)

$P_{SOC_{mG,s,t}}$  = Average carbon stock in stratum  $s$  under project in year  $t$  (t C / ha)

$SOC_{s,Baseline}$  = Baseline SOC stock of stratum  $s$ , in the top 30 cm soil layer (or greater depth if required) (t C / ha)

$S$  = Strata under project

$s$  = Index of stratum

The following is applied to calculate average carbon stock of all management practice, under project in year t.

$$P_t = \sum_{mG=1}^M P_{mG,t} \quad (23)$$

Where:

$P_t$  = Carbon stock under project in year t (t C)

$M$  = Number of management practice

For the first monitoring of SOC stock, the annual project removals due to changes in SOC stock in year t must be calculated using the following:

$$PR_t = \frac{(P_t)}{n} \times \frac{44}{12} \quad (24)$$

Where:

$PR_t$  = Project removals due to changes in SOC in year t (t CO<sub>2</sub>e)

$n$  = Number of years from the project start date to year t (years)

For the second and subsequent monitoring of SOC stock, the annual project removals due to changes in SOC stock in year t must be calculated using the following:

$$PR_t = \frac{(P_t - P_{t-f})}{f} \times \frac{44}{12} \quad (25)$$

Where:

$PR_t$  = Project removals due to changes in SOC in year t (t CO<sub>2</sub>e)

$P_t$  = Carbon stock under project in year t (t C)

$P_{t-f}$  = Carbon stock under project in year t-f (t C)

$f$  = SOC monitoring frequency (years)

## 9. Uncertainty analysis

All parameters are selected according to section 9.1 and 9.2 of the methodology (VM0026, Version 1.1), and soil organic carbon data are obtained by laboratory tests. For the project, the project proponent conducted a survey of all grazing agents whose livestock grazed in the project area prior to the project start date. This survey covered a full census of project participants and project non-participants whose livestock graze in the project area during the baseline period (covering the one year prior to the project start date) covered by the survey, and collected grazing data in the project area under the baseline scenario, such as the number and days of grazing, etc. Also, the project proponent and the Burqin Forestry and Grassland Bureau recorded all the diesel oil consumed by

the project. The parameters about grazing and diesel oil consumption are conservative, and the uncertainty is considered to be 0.

As mentioned before, the project use Option 2 (measurement approach) to estimate project removals due to changes in SOC, the measured SOC changes is derived from sample surveys undertaken within the project area, and the sample size is large, therefore a conservative estimate of carbon sequestration by carbon pools in the project scenario should be given by adopting a value that represents the lower bound of the 95 percent confidence interval (sample mean - 1.96 × standard error).

However, for the ex-ante estimation in this PD, the SOC changes in project scenario is based on the literature sources<sup>73</sup>, therefore the uncertainty is considered to be zero. And the confidence interval will be adopted in the following verification.

### **Project net GHG emissions by sources and removals by sinks**

Project net GHG emissions by sources and removals by sinks are calculated as follows:

$$PE_t = PE_{N_2O_{SN},t} + PE_{N_2O_{NF},t} + PE_{GHG_{BB},t} + PE_{CH_4_{EF},t} + PE_{GHG_{MD},t} + PE_{FC,t} - PRWP_t - PR_t \quad (26)$$

Where:

|                    |   |                                                                                                                            |
|--------------------|---|----------------------------------------------------------------------------------------------------------------------------|
| $PE_t$             | = | Project net GHG emissions by sources and removals by sinks in year t (t CO <sub>2</sub> e)                                 |
| $PE_{N_2O_{SN},t}$ | = | Project N <sub>2</sub> O emissions due to fertilizer use in year t (t CO <sub>2</sub> e)                                   |
| $PE_{N_2O_{NF},t}$ | = | Project N <sub>2</sub> O emissions as a result of N-fixing species within the project area in year t (t CO <sub>2</sub> e) |
| $PE_{GHG_{BB},t}$  | = | Project GHG emissions from biomass burning in year t (t CO <sub>2</sub> e)                                                 |
| $PE_{CH_4_{EF},t}$ | = | Project CH <sub>4</sub> emissions from enteric fermentation in year t (t CO <sub>2</sub> e)                                |
| $PE_{GHG_{MD},t}$  | = | Project GHG emissions from manure management in year t (t CO <sub>2</sub> e)                                               |
| $PE_{FC,t}$        | = | Project CO <sub>2</sub> emissions from farming machine fossil fuel consumption in year t (t CO <sub>2</sub> )              |
| $PRWP_t$           | = | Project average net change in carbon stocks of existing woody biomass in year t (t CO <sub>2</sub> )                       |
| $PR_t$             | = | Project removals due to changes in SOC in year t (t CO <sub>2</sub> e)                                                     |

<sup>73</sup> Zhou Xiaoyan.(2019) Impacts of different restoration years of returning grazing land to grassland on community characteristics and soil nutrients of alpine grassland in Maqu County

As described above, project emissions due to enteric fermentation, manure management and the use of fossil fuels, and project removals due to changes in soil organic carbon should be calculated.

$$PE_t = PE_{CH_4EF,t} + PE_{GHGMD,t} + PE_{FC,t} - PR_t \quad (27)$$

$$= \frac{GWP_{CH_4} \times \sum_{l=1}^L P_{l,t} \times EF_l \times Days_{l,t}}{1000 \times 365} + \frac{P_{l,t} \times W_{l,p} \times Nex_l \times H_{l,t} \times Days_{l,t} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b}$$

$$\times EF_{3,PRP,PPP} \times \frac{44}{28} + \frac{P_{l,t} \times W_{l,p} \times Nex_l \times H_{l,t} \times Days_{l,t} \times (1 - Frac_{GAS,MD})}{1000_a \times 24 \times 1000_b} \times EF_{3,PRP,SO} \times \frac{44}{28}$$

$$+ \sum_{l=1}^L F_{MD,l,t} \times Frac_{GAS,MD} \times EF_{4,MD} \times \frac{44}{28} + \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{lM} \times P_{l,t} \times H_{l,t} \times Days_{l,t}}{1000 \times 365 \times 24}$$

$$+ \frac{\sum_{p=1}^P \sum_{j=1}^J \sum_{k=1}^K FC_{p,j,k,t} \times EF_{CO_2,k} \times NCV_k}{1000} +$$

$$\frac{(\sum_{mG=1}^M \sum_{s=1}^S (\sum_{l=1}^L \frac{SOC_{mG,s,l,t} \times BD_{mG,s,l,t} \times Depth \times (1 - FC_{mG,s,l,t}) \times 0.1}{I} - SOC_{s,Baseline}) \times PA_{mG,s,t})}{n} \times \frac{44}{12} \quad (28)$$

Project net GHG emissions during the crediting period is summarized in the following table, please refer to ER spreadsheet for detailed calculation.

Table 3-3 The ex ante estimation of project GHG emissions removals during the crediting period

| Crediting period | $PE_{CH_4EF,t}$     | $PE_{N_2O_{MD},t}$  | $PE_{CH_4MD,t}$     | $PE_{FC,t}$         | $PR_t$              | $PE_t$              |
|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Year             | t CO <sub>2</sub> e | t CO <sub>2</sub> e | t CO <sub>2</sub> e | t CO <sub>2</sub> e | t CO <sub>2</sub> e | t CO <sub>2</sub> e |
| 2017             | 1,582               | 22                  | 26                  | 920                 | 118,484             | -115,934            |
| 2018             | 520                 | 7                   | 8                   | 165                 | 248,495             | -247,795            |
| 2019             | 0                   | 0                   | 0                   | 77                  | 266,444             | -266,367            |
| 2020             | 0                   | 0                   | 0                   | 0                   | 268,676             | -268,676            |
| 2021             | 0                   | 0                   | 0                   | 0                   | 268,676             | -268,676            |
| 2022             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2023             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2024             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2025             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2026             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2027             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2028             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2029             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2030             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2031             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2032             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2033             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2034             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2035             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2036             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |
| 2037             | 3,225               | 44                  | 53                  | 0                   | 268,676             | -265,354            |

|              |                |              |              |              |                   |                    |
|--------------|----------------|--------------|--------------|--------------|-------------------|--------------------|
| 2038         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2039         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2040         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2041         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2042         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2043         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2044         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2045         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2046         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2047         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2048         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2049         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2050         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2051         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2052         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2053         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2054         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2055         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| 2056         | 3,225          | 44           | 53           | 0            | 268,676           | -265,354           |
| <b>Total</b> | <b>114,977</b> | <b>1,569</b> | <b>1,889</b> | <b>1,162</b> | <b>10,574,435</b> | <b>-10,454,838</b> |

### 3.2.3 Leakage

The leakage is estimated as follows:

$$LE_t = LE_{M,t} + LE_{GD,t} \quad (29)$$

Where:

$LE_t$  = Leakage emissions in year t (t CO<sub>2</sub>e)

$LE_{M,t}$  = Leakage emissions due to market leakage in year t (t CO<sub>2</sub>e)

$LE_{GD,t}$  = Leakage emissions due to grazing displacement in year t (t CO<sub>2</sub>e)

#### (1) Leakage emissions due to market leakage

Estimation of emissions from market leakage (VMD0033, Version 1.0) is used to calculate the leakage emissions due to market leakage.

The module provides methods for estimating whether reductions in the production of commodities (such as wood, animals or agricultural products) resulting from the project activity is likely to result in increased emissions from the production of those products elsewhere, and provides methods for determining the volume of such emissions.

For the project, the main production in the project area is cattle and sheep. Grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth

situation of the forage. Besides, the Burqin Forestry and Grassland Bureau will measure the grass yield of the surrounding grasslands in the project area, and guide herders to graze in a reasonable area. According to the annual statistical Yearbook of Burqin County (2018-2020), the annual output of cattle and sheep in Burqin County has not decreased. The project would not lead to reductions in the production of cattle and sheep, therefore, the market leakage is considered to be 0 tCO<sub>2</sub>e.

## **(2) Leakage emissions due to grazing displacement**

Leakage from Displacement of Grazing Activities (VMD0040, Version 1.0) is used to calculate the leakage emissions due to grazing displacement, and is applicable under the following conditions:

- The project area is subject to livestock grazing in the baseline scenario.

According to the PRA Report and Project Design Report, local herders graze in the project area under the baseline scenario. Therefore, Leakage from Displacement of Grazing Activities (VMD0040, Version 1.0) is applicable for the proposed project.

And grazing was forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage, Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. So, leakage from displacement of grazing activities to outside the project boundary should be calculated.

### **1) Assess whether Grazing Displacement Takes Place**

According to the Baseline Survey Report and Project Design Report, local herders graze in the project area under the baseline scenario, but grazing was forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. So, there is likely to be displacement of grazing activity, then proceed to the next step.

### **1) Survey of Grazing Displacement and Relocation Plans**

According to (VMD0040, Version 1.0), a survey must be conducted of all grazing agents whose livestock graze in the project area prior to the project start date. The period covered by this survey must be consistent with the baseline period used to quantify baseline emissions within the project area (ie, covering the five years period prior to the project start date, or if management records for this period are unavailable, at a minimum covering the one year prior to the project start date). This survey must cover a full census or representative sample of project participants and project non-participants whose livestock graze in the project area during the baseline period covered by the survey. Where sample surveys are used, sampling approaches must enable estimation of the sample mean within a 95 percent confidence interval to a precision of 15 percent. For both types of grazing agent, the survey must quantify the number and type of livestock and the duration of each year that these livestock graze in the project area. The survey must additionally collect data on the number and type of livestock, and duration, that livestock under the control of project participants graze outside the project area during the period covered by the survey. For both types of grazing agent, the survey must also collect information on intended location of grazing after implementation of the project.

For the project, Burqin Forestry and Grassland Bureau conducted a survey of all grazing agents whose livestock grazed in the project area prior to the project start date (05-July-2015 to 27-September-2016)<sup>74</sup>, which met the requirements of the tool (VMD0040, Version 1.0). This survey covered a full census of project participants and project non-participants whose livestock graze in the project area during the baseline period (covering the one year prior to the project start date) covered by the survey. In addition, the survey collected data on the number and type of livestock, and duration, that livestock under the control of project participants graze outside the project area during the period covered by the survey.

According to the survey, under the baseline scenario, the project participants stocked 13,837 cattle and 55,231 sheep in the project area, grazing for about 120 days every year and 10 hours every day. And project non-participants would not graze in the project area both under the baseline scenario and the project scenario.

In 2016, Burqin Forestry and Grassland Bureau measured the grass yield of the grassland around the project area, and calculated the reasonable grazing quantity, designated a grazing area of 270,693 hectares. And the project participants grazed in the designated area under the guidance of Burqin Forestry and Grassland Bureau. But the specific land parcels available for use by project participants may change from year to year, based on the actual situation of grassland, such as grass yield.

## **2) Prepare a Grazing Displacement Management Plan**

A grazing displacement management plan was prepared on the basis of the survey of grazing displacement and relocation plans. The grazing displacement management plan recorded planned grazing activities for all livestock that are to be relocated to lands outside the project area and that are under the control of project participants. According to the survey, project non-participants would not graze in the project area both under the baseline scenario and the project scenario. The grazing displacement management plan recorded for the years after the project start date, the following data:

- The identity of each grazing agent;
- The number and type of livestock to be relocated;
- The number of days each year which they will graze outside the project area (measured in days, or the whole year if appropriate);
- The location and area in hectares of each land parcel to which grazing will be relocated;
- A unique identifier code (where applicable) for each land parcel to which grazing will be relocated;
- The type of land (grassland, forest land, cropland) of each parcel to which grazing will be relocated, and where appropriate note the status (eg, degradation level) of the lands to which grazing will be relocated; and

<sup>74</sup> Records of full census grazing survey from 05-July-2015 to 27-September-2016

- Any planned actions to avoid loss of above- or belowground carbon pools on the land parcels to which grazing will be relocated.

In July and August each year, Burqin Forestry and Grassland Bureau measured the grass yield of the grassland around the project area, then calculate the reasonable grazing quantity. And the project participants grazed in the designated area under the guidance of Burqin Forestry and Grassland Bureau. But the specific land parcels available for use by project participants may change from year to year, based on the actual situation of grassland. And the grazing displacement management plan record the number and type of livestock to be relocated and the type of land (grassland, forest land, cropland) to which grazing is planned to be displaced. In this case, the type of land to which grazing may be displaced must be categorized as unidentified grassland.

According to the full census grazing survey conducted in 2015-2016, all grazing agents were interviewed, and collected the information of the number and type of livestock to be relocated. As mentioned in Section 2.5, due to the prohibition of grazing, project participants would receive subsidies. Therefore, the project proponent and Burqin Forestry and Grassland Bureau will visit all project participants to investigate the project situation and issue subsidies based on this.

### **3) Determine whether Lands to which Livestock are Displaced are Identified or Unidentified**

The grazing displacement management plan does not record the geographic location to which livestock under the control of project participants were relocated. Besides, the process of identifying the specific land areas to which livestock will be relocated would be not feasible at reasonable cost (because project non-participants are scattered over wide distances and not contactable at reasonable cost). So, the land to which livestock grazing activity is displaced should be categorized as unidentified.

For unidentified land, assessment procedures mandate the use of conservative assumptions that do not underestimate the effects of grazing displacement on carbon stocks in unidentified lands, and in the case of land that remains unidentified after monitoring begins, conservative assumptions that do not underestimate leakage emissions caused by grazing displacement must also be used.

### **4) Define the Type of Land to which Grazing will be Relocated**

The total land area of Burqin County is 16.195 million Mu<sup>75</sup>, and the gross natural grassland area is 10.151 million mu, accounting for 62.67% of the total land area of the county. In 2016, Burqin Forestry and Grassland Bureau designated a grazing area of 270,693 hectares, all of the specific land parcels are grassland. And the project participants grazed in the designated area under the guidance of Burqin Forestry and Grassland Bureau and grassland guardians. But the specific land parcels available for use by project participants may change from year to year, based on the actual situation of grassland, such as grass yield. So, the relocated lands should be categorized as unidentified grassland.

### **Estimation of Leakage Emissions due to Displacement of Livestock Grazing to Unidentified Grasslands**

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<sup>75</sup> 1 ha=15 mu

### Step 1: Estimate the area of grassland needed to sustain the population of livestock relocated to unidentified grasslands

The total area of unidentified grassland required to sustain the population of livestock relocated to unidentified grassland is to be calculated as:

$$Area_{GUI,t} = \frac{DMI_{GUI,t}}{ANPP_{GUI,REF}} \quad (30)$$

$$DMI_{GUI,t} = \sum_{l=1}^L \left( \frac{DMI_{day,l} \times P_{GUI,l,t}}{1000} \right) \times Days_{GUI,l,t} \quad (31)$$

Where:

|                  |   |                                                                                                                                                                |
|------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $Area_{GUI,t}$   | = | Area required to sustain the population of livestock displaced to unidentified grasslands in year t (ha)                                                       |
| $DMI_{GUI,t}$    | = | Dry matter intake required to sustain the total number of livestock of all types l relocated to unidentified grasslands in year t (t dm)                       |
| $ANPP_{GUI,REF}$ | = | Aboveground net primary productivity in the reference region that is the likely location of unidentified grasslands to which livestock are relocated (t dm/ha) |
| $DMI_{day,l}$    | = | Daily dry matter intake requirement of each type of livestock l (kg dm/(head*day))                                                                             |
| $P_{GUI,l,t}$    | = | Population of livestock of each type relocated to unidentified grasslands in year t (head)                                                                     |
| $Days_{GUI,l,t}$ | = | Days that the population of each type of relocated livestock of type l graze in unidentified grassland in year t (days)                                        |

### Step 2: Assess the risk of soil carbon loss due to overgrazing in unidentified grasslands

The calculation result of step 1 shows that, the total area of unidentified grassland required to sustain the population of livestock relocated to unidentified grassland is 11,466 ha (See the ER table for details). And the available grassland area is 676,733 ha in Burqin County, which is much higher than the displacement area.

So, the grazing displacement will not lead to consumption exceeding 50 percent of available biomass, and leakage due to soil carbon loss does not need to be accounted for.

### Step 3: Estimate emissions from livestock displacement to unidentified grasslands

#### Step 3a: Estimate methane emissions from enteric fermentation by livestock displaced to unidentified grasslands

Calculate the leakage emissions due to enteric fermentation by livestock displaced to all unidentified grasslands outside the project area using:

$$LE_{GUI,CH_4EF,t} = \frac{\sum_{l=1}^L P_{GUI,l,t} \times EF_l \times Days_{GUI,l,t} \times GWP_{CH_4}}{1000 \times 365} \quad (32)$$

Where:

|                     |   |                                                                                                                               |
|---------------------|---|-------------------------------------------------------------------------------------------------------------------------------|
| $LE_{GUI,CH_4EF,t}$ | = | Leakage emissions in year t from enteric fermentation by livestock displaced to unidentified grasslands (t CO <sub>2</sub> e) |
| $P_{GUI,l,t}$       | = | Population of grazing livestock type l in year t displaced outside the project area to unidentified grasslands (head)         |
| $Days_{GUI,l,t}$    | = | Days in year t that livestock of each type l grazes on unidentified grassland (days)                                          |
| $GWP_{CH_4}$        | = | Global-warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> )                                          |
| $EF_l$              | = | Enteric CH <sub>4</sub> emission factor per head of livestock type l per year (kg CH <sub>4</sub> /(ha*year))                 |
| $l$                 | = | Index of grazing livestock types                                                                                              |

### Step 3b: Estimate GHG emissions from manure management

Calculate the N<sub>2</sub>O and CH<sub>4</sub> leakage emissions due to manure deposition on grassland caused by relocating the livestock to unidentified grasslands outside the project area using:

$$LE_{GUI,MD,t} = LE_{GUI,N_2O,MD,t} + LE_{GUI,CH_4,MD,t} \quad (33)$$

Where:

|                      |   |                                                                                                                               |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------|
| $LE_{GUI,MD,t}$      | = | Leakage emissions from manure and urine deposited on unidentified grassland in year t (t CO <sub>2</sub> e)                   |
| $LE_{GUI,N_2O,MD,t}$ | = | Leakage N <sub>2</sub> O emissions from manure and urine deposited on unidentified grasslands in year t (t CO <sub>2</sub> e) |
| $LE_{GUI,CH_4,MD,t}$ | = | Leakage CH <sub>4</sub> emissions from manure and urine deposited on unidentified grasslands in year t (t CO <sub>2</sub> e)  |

$LE_{GUI,N_2O,MD,t}$  is calculated as the sum of direct N<sub>2</sub>O emissions and indirect N<sub>2</sub>O emissions using:

$$LE_{GUI,N_2O,MD,t} = GWP_{N_2O} \times (LE_{GUI,D,N_2O,MD,t} + LE_{GUI,ID,N_2O,MD,t}) \quad (34)$$

Where:

|                      |   |                                                                                                                              |
|----------------------|---|------------------------------------------------------------------------------------------------------------------------------|
| $LE_{GUI,N_2O,MD,t}$ | = | Leakage N <sub>2</sub> O emission from manure and urine deposited on unidentified grasslands in year t (t CO <sub>2</sub> e) |
| $GWP_{N_2O}$         | = | Global-warming potential of N <sub>2</sub> O (t CO <sub>2</sub> e/t N <sub>2</sub> O)                                        |

$LE_{GUI_D,N_2O_{MD},t}$  = Leakage direct N<sub>2</sub>O emissions from manure and urine deposited on unidentified grasslands in year t (t N<sub>2</sub>O)

$LE_{GUI_{ID},N_2O_{MD},t}$  = Leakage indirect N<sub>2</sub>O emissions from manure and urine deposited on unidentified grasslands in year t (t N<sub>2</sub>O)

Leakage direct N<sub>2</sub>O emission from manure and urine deposited on unidentified grasslands ( $LE_{GUI_D,N_2O_{MD},t}$ ) is calculated using:

$$LE_{GUI_D,N_2O_{MD},t} = \sum_{l1=1}^{L1} F_{MD,GUI,t,l1} \times EF_{3,PRP,CPP} \times \frac{44}{28} \quad (35)$$

And/or

$$LE_{GUI_D,N_2O_{MD},t} = \sum_{l2=1}^{L2} F_{MD,GUI,t,l2} \times EF_{3,PRP,SO} \times \frac{44}{28} \quad (36)$$

Where:

$LE_{GUI_D,N_2O_{MD},t}$  = Leakage direct N<sub>2</sub>O emissions from manure and urine deposited on unidentified grasslands in year t (t N<sub>2</sub>O)

$F_{MD,GUI,t,l1}$  = Annual amount of nitrogen in cattle, poultry and pig manure and urine deposited on unidentified grasslands in year t, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)

$F_{MD,GUI,t,l2}$  = Annual amount of nitrogen in sheep and other animal manure and urine deposited on unidentified grasslands in year t, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)

$EF_{3,PRP,CPP}$  = N<sub>2</sub>O emission factor for cattle (dairy, non-dairy and buffalo), poultry and pigs manure and urine deposited on grasslands (kg N<sub>2</sub>O-N/kg N input)

$EF_{3,PRP,SO}$  = N<sub>2</sub>O emission factor for sheep and other animals manure and urine deposited on grasslands (kg N<sub>2</sub>O-N/kg N input)

$$F_{MD,GUI,t,l} = \frac{P_{GUI,l,t} \times W_l \times Nex_l \times H_{GUI,l,t} \times Days_{GUI,l,t} \times (1 - Frac_{GAS,MD,l})}{1000_a \times 24 \times 1000_b} \quad (37)$$

Where:

$F_{MD,GUI,t,l}$  = Annual amount of nitrogen in manure and urine deposited on unidentified grasslands by livestock type l, adjusted for volatilization as NH<sub>3</sub> and NO<sub>x</sub> (t N)

$P_{GUI,l,t}$  = Population of grazing livestock type l in year t displaced outside the project area to unidentified grasslands (head)

|                   |   |                                                                                                                                         |
|-------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------|
| $W_l$             | = | Average weight of livestock l displaced to unidentified grasslands (kg/head)                                                            |
| $Nex_l$           | = | Nitrogen excretion from livestock type l (kg N/(t animal mass*day))                                                                     |
| $1000_a$          | = | Conversion factor for nitrogen excretion (kg/t livestock mass) to nitrogen excretion (kg/kg livestock mass)                             |
| $H_{GUI,l,t}$     | = | Average grazing hours per day during grazing season for livestock of each type l displaced to unidentified grassland in year t (hours)  |
| 24                | = | Conversion day to hour                                                                                                                  |
| $Days_{GUI,l,t}$  | = | Grazing days in year t for livestock type l displaced to unidentified grasslands (days)                                                 |
| $1000_b$          | = | Conversion factor for kg to t                                                                                                           |
| $Frac_{GAS,MD,l}$ | = | Fraction of volatilization from manure and urine deposited by grazing animals as $NH_3$ and $NO_x$ (kg N volatilized/kg of N deposited) |
| $t$               | = | Year                                                                                                                                    |
| $l$               | = | Index of grazing livestock types                                                                                                        |

CH<sub>4</sub> emission from manure management due to displacement of livestock to unidentified grasslands is calculated using:

$$LE_{GUI,CH_4MD,t} = \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{l,m} \times P_{GUI,l,t} \times H_{GUI,l,t} \times Days_{GUI,l,t}}{24 \times 365 \times 1000} \quad (38)$$

Where:

|                     |   |                                                                                                                                        |
|---------------------|---|----------------------------------------------------------------------------------------------------------------------------------------|
| $LE_{GUI,CH_4MD,t}$ | = | Leakage CH <sub>4</sub> emissions from manure and urine deposited on unidentified grasslands in year t (t CO <sub>2</sub> e)           |
| $GWP_{CH_4}$        | = | Global-warming potential of CH <sub>4</sub> (t CO <sub>2</sub> e/t CH <sub>4</sub> )                                                   |
| $EF_{l,m}$          | = | CH <sub>4</sub> emission factor per head of livestock type l in manure management system m (kg CH <sub>4</sub> /(head*yr))             |
| $P_{GUI,l,t}$       | = | Population of livestock type l in year t displaced to unidentified grasslands (head)                                                   |
| $H_{GUI,l,t}$       | = | Average grazing hours per day during grazing season for livestock of each type l displaced to unidentified grassland in year t (hours) |

$Days_{GUI,l,t}$  = Grazing days in year t for livestock type l displaced to unidentified grasslands (days)

1000 = Conversion factor for kg to t

#### Step 4: Calculate total leakage emissions from relocation of grazing to unidentified grasslands

Total leakage emissions from relocation of grazing to unidentified grasslands must be calculated as:

$$LE_{GUI,t} = LE_{GUI,CH_4EF,t} + LE_{GUIMD,t} \quad (39)$$

Where:

$LE_{GUI,t}$  = Leakage due to displacement of livestock to unidentified grasslands in year t (t CO<sub>2</sub>e)

$LE_{GUI,CH_4EF,t}$  = Leakage due to enteric fermentation by livestock displaced to unidentified grasslands in year t (t CO<sub>2</sub>e)

$LE_{GUIMD,t}$  = Leakage due to N<sub>2</sub>O and CH<sub>4</sub> emissions in manure and urine deposited on grasslands by livestock displaced to unidentified grasslands in year t (t CO<sub>2</sub>e)

As described above, project leakage due to grazing displacement should be calculated.

$$\begin{aligned} LE_t &= LE_{GD,t} = LE_{GUI,t} = LE_{GUI,CH_4EF,t} + LE_{GUIMD,t} \\ &= \frac{\sum_{l=1}^L P_{GUI,l,t} \times EF_l \times Days_{GUI,l,t} \times GWP_{CH_4}}{1000 \times 365} + GWP_{N_2O} \times \\ &\quad \left( \frac{P_{GUI,l_1,t} \times W_{l_1} \times Nex_{l_1} \times H_{GUI,l_1,t} \times Days_{GUI,l_1,t} \times (1 - Frac_{GAS,MD,l_1})}{1000_a \times 24 \times 1000_b} \times EF_{3,PRP,CP} \times \frac{44}{28} + \right. \\ &\quad \left. \frac{P_{GUI,l_2,t} \times W_{l_2} \times Nex_{l_2} \times H_{GUI,l_2,t} \times Days_{GUI,l_2,t} \times (1 - Frac_{GAS,MD,l_2})}{1000_a \times 24 \times 1000_b} \times EF_{3,PRP,SO} \times \frac{44}{28} \right) + \\ &\quad \frac{GWP_{CH_4} \times \sum_{l=1}^L EF_{l,m} \times P_{GUI,l,t} \times H_{GUI,l,t} \times Days_{GUI,l,t}}{24 \times 365 \times 1000} \end{aligned} \quad (40)$$

The total leakage emissions during the crediting period is summarized in the following table, please refer to ER spreadsheet for detailed calculation.

Table 3-4 The Estimation of leakage emissions from relocation of grazing during the crediting period

| Crediting period | $LE_{GUI,CH_4EF,t}$ | $LE_{N_2OMD,t}$    | $LE_{CH_4MD,t}$    | $LE_{GUI,t}$       |
|------------------|---------------------|--------------------|--------------------|--------------------|
| Year             | tCO <sub>2</sub> e  | tCO <sub>2</sub> e | tCO <sub>2</sub> e | tCO <sub>2</sub> e |
|                  | A                   | B                  | C                  | D=A+B+C            |
| 2017             | 4,868               | 67                 | 80                 | 5,015              |
| 2018             | 5,930               | 81                 | 98                 | 6,109              |
| 2019             | 6,450               | 88                 | 106                | 6,644              |
| 2020             | 6,450               | 88                 | 106                | 6,644              |
| 2021             | 6,450               | 88                 | 106                | 6,644              |
| 2022             | 3,225               | 44                 | 53                 | 3,322              |
| 2023             | 3,225               | 44                 | 53                 | 3,322              |
| 2024             | 3,225               | 44                 | 53                 | 3,322              |
| 2025             | 3,225               | 44                 | 53                 | 3,322              |
| 2026             | 3,225               | 44                 | 53                 | 3,322              |
| 2027             | 3,225               | 44                 | 53                 | 3,322              |
| 2028             | 3,225               | 44                 | 53                 | 3,322              |
| 2029             | 3,225               | 44                 | 53                 | 3,322              |
| 2030             | 3,225               | 44                 | 53                 | 3,322              |
| 2031             | 3,225               | 44                 | 53                 | 3,322              |
| 2032             | 3,225               | 44                 | 53                 | 3,322              |
| 2033             | 3,225               | 44                 | 53                 | 3,322              |
| 2034             | 3,225               | 44                 | 53                 | 3,322              |
| 2035             | 3,225               | 44                 | 53                 | 3,322              |
| 2036             | 3,225               | 44                 | 53                 | 3,322              |
| 2037             | 3,225               | 44                 | 53                 | 3,322              |
| 2038             | 3,225               | 44                 | 53                 | 3,322              |
| 2039             | 3,225               | 44                 | 53                 | 3,322              |
| 2040             | 3,225               | 44                 | 53                 | 3,322              |
| 2041             | 3,225               | 44                 | 53                 | 3,322              |
| 2042             | 3,225               | 44                 | 53                 | 3,322              |
| 2043             | 3,225               | 44                 | 53                 | 3,322              |
| 2044             | 3,225               | 44                 | 53                 | 3,322              |
| 2045             | 3,225               | 44                 | 53                 | 3,322              |
| 2046             | 3,225               | 44                 | 53                 | 3,322              |
| 2047             | 3,225               | 44                 | 53                 | 3,322              |
| 2048             | 3,225               | 44                 | 53                 | 3,322              |
| 2049             | 3,225               | 44                 | 53                 | 3,322              |
| 2050             | 3,225               | 44                 | 53                 | 3,322              |
| 2051             | 3,225               | 44                 | 53                 | 3,322              |
| 2052             | 3,225               | 44                 | 53                 | 3,322              |
| 2053             | 3,225               | 44                 | 53                 | 3,322              |
| 2054             | 3,225               | 44                 | 53                 | 3,322              |

|              |                |              |              |                |
|--------------|----------------|--------------|--------------|----------------|
| 2055         | 3,225          | 44           | 53           | 3,322          |
| 2056         | 3,225          | 44           | 53           | 3,322          |
| <b>Total</b> | <b>143,023</b> | <b>1,952</b> | <b>2,351</b> | <b>147,326</b> |

### 3.2.4 Net GHG Emission Reductions and Removals

The amount of emission reductions achieved by the project in project year  $t$  must be calculated as follows:

$$ER_t = BE_b - PE_t - LE_t \quad (41)$$

$$VCU_t = ER_t - BC_t \quad (42)$$

$$BC_t = RR_t * (PRWP_t + PR_t - PRWP_b) \quad (43)$$

Where:

$ER_t$  = Emission reductions in year  $t$  (t CO<sub>2</sub>e)

$BE_b$  = Baseline emissions and removals in year  $b$  (t CO<sub>2</sub>e)

$PE_t$  = Project emissions and removals in year  $t$  (t CO<sub>2</sub>e)

$LE_t$  = Leakage emissions in year  $t$  (t CO<sub>2</sub>e)

$VCU_t$  = Emission reductions eligible to be issued as VCUs in year  $t$  (t CO<sub>2</sub>e)

$BC_t$  = AFOLU buffer credits in year  $tm$  (t CO<sub>2</sub>e)

$RR_t$  = Non-permanence risk rating in year  $t$  (percent)

$PRWP_t$  = Project average net change in carbon stocks of existing woody biomass for species  $j$ , in year  $t$  (t CO<sub>2</sub>e)

$PR_t$  = Project removals due to changes in SOC in year  $t$  (t CO<sub>2</sub>e)

$PRWP_b$  = Baseline removals from existing woody perennials in baseline year  $b$  (t CO<sub>2</sub>e)

According to the Non-permanence Risk Report of the project, the non-permanence risk rating is determined as 10%. There is no woody biomass in this project, so the Project average net change in carbon stocks of existing woody biomass  $PRWP_t$  and Baseline removals from existing woody perennials  $PRWP_b$  are considered to be 0 tCO<sub>2</sub>e.

The net anthropogenic GHG removals by sinks by the project are summarized below.

Table 3-5 The net GHG emission removals

| Year | Estimated baseline emissions (tCO <sub>2</sub> e) | Estimated project emissions <sup>76</sup> (tCO <sub>2</sub> e) | Estimated leakage emissions (tCO <sub>2</sub> e) | Estimated Project removals (t CO <sub>2</sub> e) | Estimated net GHG emission removals (tCO <sub>2</sub> e) | Buffer (tCO <sub>2</sub> e) | Net VCUs (tCO <sub>2</sub> e) |
|------|---------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------------------|-----------------------------|-------------------------------|
|      | A                                                 | B                                                              | C                                                | D                                                | E=A -B- C+D                                              | F=D*10%                     | G=E-F                         |
| 2017 | 9,966                                             | 2,550                                                          | 5,015                                            | 118,484                                          | 120,885                                                  | 11,848                      | 109,037                       |
| 2018 | 9,966                                             | 700                                                            | 6,109                                            | 248,495                                          | 251,652                                                  | 24,850                      | 226,802                       |
| 2019 | 9,966                                             | 77                                                             | 6,644                                            | 266,444                                          | 269,689                                                  | 26,644                      | 243,045                       |
| 2020 | 9,966                                             | 0                                                              | 6,644                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2021 | 9,966                                             | 0                                                              | 6,644                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2022 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2023 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2024 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2025 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2026 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2027 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2028 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2029 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2030 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2031 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2032 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2033 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2034 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2035 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2036 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2037 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2038 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2039 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2040 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2041 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2042 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |
| 2043 | 9,966                                             | 3,322                                                          | 3,322                                            | 268,676                                          | 271,998                                                  | 26,868                      | 245,130                       |

<sup>76</sup> Project activities emissions of N<sub>2</sub>O, CH<sub>4</sub> and fossil-derived CO<sub>2</sub>, excluding soil carbon sinks.

|                       |                |                |                |                   |                   |                  |                  |
|-----------------------|----------------|----------------|----------------|-------------------|-------------------|------------------|------------------|
| 2044                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2045                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2046                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2047                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2048                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2049                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2050                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2051                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2052                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2053                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2054                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2055                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| 2056                  | 9,966          | 3,322          | 3,322          | 268,676           | 271,998           | 26,868           | 245,130          |
| <b>Total</b>          | <b>398,640</b> | <b>119,597</b> | <b>147,326</b> | <b>10,574,435</b> | <b>10,706,152</b> | <b>1,057,458</b> | <b>9,648,694</b> |
| <b>Annual average</b> | <b>9,966</b>   | <b>2,990</b>   | <b>3,683</b>   | <b>264,361</b>    | <b>267,654</b>    | <b>26,436</b>    | <b>241,217</b>   |

### 3.3 Monitoring

#### 3.3.1 Data and Parameters Available at Validation

|                                                                                              |                                                                       |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Data / Parameter                                                                             | $GWP_{N_2O}$                                                          |
| Data unit                                                                                    | t CO <sub>2</sub> e/t N <sub>2</sub> O                                |
| Description                                                                                  | Global-warming potential for N <sub>2</sub> O                         |
| Source of data                                                                               | VCS Standard (Version 4.3)                                            |
| Value applied                                                                                | 265                                                                   |
| Justification of choice of data or description of measurement methods and procedures applied | Default value                                                         |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions |
| Comments                                                                                     | N/A                                                                   |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{4,MD}$                                                                                                                                                                                                                                                                                                                             |
| Data unit                                                                                    | kg N <sub>2</sub> O-N/(kg NH <sub>3</sub> -N + NO <sub>x</sub> -N volatilized)                                                                                                                                                                                                                                                          |
| Description                                                                                  | N <sub>2</sub> O emission factor for atmospheric deposition of urine and manure N on soils and water surfaces                                                                                                                                                                                                                           |
| Source of data                                                                               | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                                                                                                                                                                                                                                               |
| Value applied                                                                                | 0.005                                                                                                                                                                                                                                                                                                                                   |
| Justification of choice of data or description of measurement methods and procedures applied | The default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 11.3, Chapter 11, Volume 4) of IPCC good practice guidance for AFOLU have been followed. Since the project area belongs to cool temperate, dry of IPCC climate zones, the default factor is 0.005. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                                                                                                                                                               |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                     |

|                  |              |
|------------------|--------------|
| Data / Parameter | $GWP_{CH_4}$ |
|------------------|--------------|

|                                                                                              |                                                                       |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Data unit                                                                                    | t CO <sub>2</sub> e/t CH <sub>4</sub>                                 |
| Description                                                                                  | Global-warming potential for CH <sub>4</sub>                          |
| Source of data                                                                               | VCS Standard (Version 4.3)                                            |
| Value applied                                                                                | 28                                                                    |
| Justification of choice of data or description of measurement methods and procedures applied | Default value                                                         |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions |
| Comments                                                                                     | N/A                                                                   |

|                                                                                              |                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $P_{l,b}$                                                                                                                                                                                       |
| Data unit                                                                                    | Head                                                                                                                                                                                            |
| Description                                                                                  | Population of grazing livestock type l, in baseline year b                                                                                                                                      |
| Source of data                                                                               | PRA Report                                                                                                                                                                                      |
| Value applied                                                                                | Cattle: 13,837<br>Sheep: 55,231                                                                                                                                                                 |
| Justification of choice of data or description of measurement methods and procedures applied | The animal population were obtained based on a full census grazing survey of the animal population grazing in the project area year prior to the project start date during the baseline period. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions                                                                                                                           |
| Comments                                                                                     | N/A                                                                                                                                                                                             |

|                  |                                                                                           |
|------------------|-------------------------------------------------------------------------------------------|
| Data / Parameter | $EF_l$                                                                                    |
| Data unit        | kg CH <sub>4</sub> / (head * year)                                                        |
| Description      | Enteric CH <sub>4</sub> emission factor per head of livestock type l per year             |
| Source of data   | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. |
| Value applied    | Cattle: 56<br>Sheep: 5                                                                    |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable. the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 10.10 or 10.11, Chapter 10, Volume 4). According to the Project Design Report, local productivity system is low productivity system which based on animal feeding systems where locally produced roughage (e.g. crop residues) or low quality rangelands represent the major source of feed utilized. So the default factor of sheep is 5. The cattle in the project area not dairy cattle, so the default value is 56. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                                                                              |                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{3,PRP,CPP}$                                                                                                                                                                                                                                                                                                  |
| Data unit                                                                                    | kg N <sub>2</sub> O-N/kg N input                                                                                                                                                                                                                                                                                  |
| Description                                                                                  | N <sub>2</sub> O emission factor for cattle (dairy, non-dairy and buffalo), poultry and pigs manure and urine deposited on of applied to grassland                                                                                                                                                                |
| Source of data                                                                               | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                                                                                                                                                                                                                         |
| Value applied                                                                                | 0.002                                                                                                                                                                                                                                                                                                             |
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable. the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 11.1, Chapter 11, Volume 4). Since the project area belongs to cool temperate, dry of IPCC climate zones, the default factor is 0.002. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                                                                                                                                         |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                               |

|                  |                                                                                                                    |
|------------------|--------------------------------------------------------------------------------------------------------------------|
| Data / Parameter | $EF_{3,PRP,SO}$                                                                                                    |
| Data unit        | kg N <sub>2</sub> O-N/kg N input                                                                                   |
| Description      | N <sub>2</sub> O emission factor for sheep and other animals manure and urine deposited on of applied to grassland |
| Source of data   | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                          |
| Value applied    | 0.003                                                                                                              |

|                                                                                              |                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable. the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 11.1, Chapter 11, Volume 4). |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                               |
| Comments                                                                                     | N/A                                                                                                                                                                                                     |

|                                                                                              |                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $N_{ex_l}$                                                                                                                                                                                              |
| Data unit                                                                                    | kg N deposited/(t livestock mass * day)                                                                                                                                                                 |
| Description                                                                                  | Nitrogen excretion of livestock type l                                                                                                                                                                  |
| Source of data                                                                               | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                                                                                                               |
| Value applied                                                                                | Cattle: 0.38<br>Sheep:0.32                                                                                                                                                                              |
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable. the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Table 10.19, Chapter 10, Volume 4) |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                               |
| Comments                                                                                     | N/A                                                                                                                                                                                                     |

|                  |                                                   |
|------------------|---------------------------------------------------|
| Data / Parameter | $W_{l,b}$                                         |
| Data unit        | kg                                                |
| Description      | Average weight of livestock l, in baseline year b |
| Source of data   | Local expert judgment.                            |
| Value applied    | Cattle: 300<br>Sheep: 45                          |

|                                                                                              |                                                                                     |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Justification of choice of data or description of measurement methods and procedures applied | PRA Report, data from local expert judgement that are specific to the project area. |
| Purpose of data                                                                              | Calculation of baseline emissions                                                   |
| Comments                                                                                     | N/A                                                                                 |

|                                                                                              |                                                                                     |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $W_{l,p}$                                                                           |
| Data unit                                                                                    | kg                                                                                  |
| Description                                                                                  | Average weight of livestock under project                                           |
| Source of data                                                                               | Local expert judgment.                                                              |
| Value applied                                                                                | Cattle: 300<br>Sheep: 45                                                            |
| Justification of choice of data or description of measurement methods and procedures applied | PRA Report, data from local expert judgement that are specific to the project area. |
| Purpose of data                                                                              | Calculation of project emissions                                                    |
| Comments                                                                                     | N/A                                                                                 |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $Days_{l,b}$                                                                                                                                                                                                                                                                                                                                                               |
| Data unit                                                                                    | Days                                                                                                                                                                                                                                                                                                                                                                       |
| Description                                                                                  | Grazing days for livestock type l in baseline year b                                                                                                                                                                                                                                                                                                                       |
| Source of data                                                                               | Grazing Displacement Management Plan                                                                                                                                                                                                                                                                                                                                       |
| Value applied                                                                                | 120                                                                                                                                                                                                                                                                                                                                                                        |
| Justification of choice of data or description of measurement methods and procedures applied | Grazing days were obtained from the grazing survey of livestock grazing in the project area covering the one year prior to the project start date.<br><br>From 5-July-2015 to 27-September-2016, a full census grazing survey was conducted by Burqin Forestry and Grassland Bureau and the survey results have been recorded in the Grazing Displacement Management Plan. |
| Purpose of data                                                                              | Calculation of baseline emissions                                                                                                                                                                                                                                                                                                                                          |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                        |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $H_{l,b}$                                                                                                                                                                                                                                                                                                                                                           |
| Data unit                                                                                    | Hours                                                                                                                                                                                                                                                                                                                                                               |
| Description                                                                                  | Average grazing hours for livestock type l per day during the grazing season in baseline year b                                                                                                                                                                                                                                                                     |
| Source of data                                                                               | Grazing Displacement Management Plan                                                                                                                                                                                                                                                                                                                                |
| Value applied                                                                                | 10                                                                                                                                                                                                                                                                                                                                                                  |
| Justification of choice of data or description of measurement methods and procedures applied | Grazing hours were obtained from grazing survey of livestock grazing in the project area covering the one year prior to the project start date.<br>From 5-July-2015 to 27-September-2016, a full census grazing survey was conducted by Burqin Forestry and Grassland Bureau and the survey results have been recorded in the Grazing Displacement Management Plan. |
| Purpose of data                                                                              | Calculation of baseline emissions                                                                                                                                                                                                                                                                                                                                   |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                 |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $Frac_{GAS,MD}$                                                                                                                                                                                                                                                                                                                 |
| Data unit                                                                                    | kg N volatilized/kg of N deposited                                                                                                                                                                                                                                                                                              |
| Description                                                                                  | Fraction of volatilization from manure and urine deposited by grazing animals as $NH_3$ and $NO_x$                                                                                                                                                                                                                              |
| Source of data                                                                               | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                                                                                                                                                                                                                                       |
| Value applied                                                                                | 0.212                                                                                                                                                                                                                                                                                                                           |
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable, the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. According to the methodology, the project activities cannot involve the manure management system, so Table 8A.1, Chapter 11, Volume 4 are finally adopted. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                                                                                                                                                       |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                             |

|                  |                                                        |
|------------------|--------------------------------------------------------|
| Data / Parameter | $EF_{l,M}$                                             |
| Data unit        | kg $CH_4$ /(head * year)                               |
| Description      | $CH_4$ emission factor from manure of livestock type l |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source of data                                                                               | 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.                                                                                                                                                                                                                                                    |
| Value applied                                                                                | 0.6                                                                                                                                                                                                                                                                                                                                          |
| Justification of choice of data or description of measurement methods and procedures applied | Due to detailed data are unavailable, the default value recommended by the 2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. According to the methodology, the project activities involve the Pasture Range and Paddock management system, so Table 10.14, Chapter 10, Volume 4 are finally adopted. |
| Purpose of data                                                                              | Calculation of baseline emissions<br>Calculation of project emissions<br>Calculation of leakage emissions                                                                                                                                                                                                                                    |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                          |

|                                                                                              |                                                              |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{CO_2,k}$                                                |
| Data unit                                                                                    | t CO <sub>2</sub> /GJ                                        |
| Description                                                                                  | CO <sub>2</sub> emission factor by fuel type k               |
| Source of data                                                                               | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value applied                                                                                | Diesel: 0.0741                                               |
| Justification of choice of data or description of measurement methods and procedures applied | Default value                                                |
| Purpose of data                                                                              | Calculation of project emissions                             |
| Comments                                                                                     | N/A                                                          |

|                                                                                              |                                                              |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Data / Parameter                                                                             | $NCV_k$                                                      |
| Data unit                                                                                    | GJ/t fuel                                                    |
| Description                                                                                  | Thermal value of fuel type k                                 |
| Source of data                                                                               | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value applied                                                                                | Diesel: 43.0                                                 |
| Justification of choice of data or description of measurement methods and procedures applied | Default value                                                |

|                 |                                                                       |
|-----------------|-----------------------------------------------------------------------|
| Purpose of data | Calculation of baseline emissions<br>Calculation of project emissions |
| Comments        | N/A                                                                   |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $SOC_{s,Baseline}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Data unit                                                                                    | t C/ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Description                                                                                  | Baseline SOC stock in the top 30 cm of soil layer (or greater depth if required) in stratum s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Source of data                                                                               | Laboratory test data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Value applied                                                                                | Please refer ER calculation sheets for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Justification of choice of data or description of measurement methods and procedures applied | <p>Option 2 was applied to estimate project removals due to changes in SOC, and the procedures of Section 8.2.8 in VM0026 were follow. The <math>SOC_{s,Baseline}</math> was tested in 2016, which less than two years prior to the project start time.</p> <p>From September 14 to September 30, 2016, the organic carbon, bulk density and sand-gravel ratio (percentage of rocks larger than 2mm, roots, and other dead residues with a diameter in the top 30 cm of soil) of 31 soil samples were measured by Shandong Huasheng Tiantong Standard Technical Service Co., Ltd., which was registered in Jinan City, Shandong Province in 27-August-2015.</p> <p>Soil sampling followed General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities.</p> <p>The nationally approved standard Method for Determination of Soil Organic Matter (NY/T 1121.6-2006) was used to measure SOC of the soil samples.</p> |
| Purpose of data                                                                              | Calculation of project emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Comments                                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                  |                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------------------------------------|
| Data / Parameter | $DMI_{day,l}$                                                                                                     |
| Data unit        | kg dm/(head*day)                                                                                                  |
| Description      | Daily dry matter intake requirement of each type of livestock l                                                   |
| Source of data   | National standards<br>The notice on standardizing and unifying the statistics of grassland carrying capacity data |
| Value applied    | Sheep: 1.8<br>Cattle: 8.1                                                                                         |

|                                                                                              |                                  |
|----------------------------------------------------------------------------------------------|----------------------------------|
| Justification of choice of data or description of measurement methods and procedures applied | Default value                    |
| Purpose of data                                                                              | Calculation of leakage emissions |
| Comments                                                                                     | N/A                              |

|                                                                                              |                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $ANPP_{GUI,REF}$                                                                                                                                                             |
| Data unit                                                                                    | t dm/ha                                                                                                                                                                      |
| Description                                                                                  | Aboveground net primary productivity in the reference region that is the likely location of unidentified grasslands to which livestock are relocated                         |
| Source of data                                                                               | Peer-reviewed studies<br>Wang jie.(2017) The Relationship between Biodiversity and Aboveground Biomass with Soil Properties in North Slope of Qilian Mountains Meadow Steppe |
| Value applied                                                                                | 1.38                                                                                                                                                                         |
| Justification of choice of data or description of measurement methods and procedures applied | Values come from published studies in the project region.                                                                                                                    |
| Purpose of data                                                                              | Calculation of leakage emissions                                                                                                                                             |
| Comments                                                                                     | N/A                                                                                                                                                                          |

|                                                                                              |                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $H_{GUI,l,t}$                                                                                                                                                                                                                                                                |
| Data unit                                                                                    | Hours                                                                                                                                                                                                                                                                        |
| Description                                                                                  | Average grazing hours per day during grazing season for livestock of each type / displaced to unidentified grassland in year t                                                                                                                                               |
| Source of data                                                                               | Grazing Displacement Management Plan                                                                                                                                                                                                                                         |
| Value applied                                                                                | 10                                                                                                                                                                                                                                                                           |
| Justification of choice of data or description of measurement methods and procedures applied | Grazing hours were obtained from grazing survey of livestock grazing in the project area covering the one year prior to the project start date.<br>From 5-July-2015 to 27-September-2016, a full census grazing survey was conducted by Burqin Forestry and Grassland Bureau |

|                 |                                                                                        |
|-----------------|----------------------------------------------------------------------------------------|
|                 | and the survey results have been recorded in the Grazing Displacement Management Plan. |
| Purpose of data | Calculation of leakage emissions                                                       |
| Comments        | N/A                                                                                    |

### 3.3.2 Data and Parameters Monitored

|                                                                 |                                                                                                                                                                                                                                                   |        |       |      |      |      |        |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|------|------|------|--------|
| Data / Parameter                                                | $P_{l,t}$                                                                                                                                                                                                                                         |        |       |      |      |      |        |
| Data unit                                                       | Head                                                                                                                                                                                                                                              |        |       |      |      |      |        |
| Description                                                     | Population of livestock type l under project in year t                                                                                                                                                                                            |        |       |      |      |      |        |
| Source of data                                                  | Project records                                                                                                                                                                                                                                   |        |       |      |      |      |        |
| Description of measurement methods and procedures to be applied | The project proponent and the Burqin Forestry and Grassland Bureau visit all the project participants every year to investigate the situation of the project.                                                                                     |        |       |      |      |      |        |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                          |        |       |      |      |      |        |
| Value applied                                                   | For the first five years (2017-2021), the results of annual grazing survey was applied, and for the year from 2022 forward, the estimated value of Grazing Displacement Management Plan was applied which will be 50% of the baseline population. |        |       |      |      |      |        |
|                                                                 | Livestock type                                                                                                                                                                                                                                    | 2017   | 2018  | 2019 | 2020 | 2021 | 2022   |
|                                                                 | Cattle                                                                                                                                                                                                                                            | 3,396  | 1,147 | 0    | 0    | 0    | 6,919  |
|                                                                 | Sheep                                                                                                                                                                                                                                             | 13,529 | 4,091 | 0    | 0    | 0    | 27,616 |
| Monitoring equipment                                            | N/A                                                                                                                                                                                                                                               |        |       |      |      |      |        |
| QA/QC procedures to be applied                                  | Guidance provided in IPCC, 2003 chapter 5 or IPCC, 2000 chapter 8 is applied                                                                                                                                                                      |        |       |      |      |      |        |
| Purpose of data                                                 | Calculation of project emissions                                                                                                                                                                                                                  |        |       |      |      |      |        |
| Calculation method                                              | N/A                                                                                                                                                                                                                                               |        |       |      |      |      |        |
| Comments                                                        | N/A                                                                                                                                                                                                                                               |        |       |      |      |      |        |

|                                                                 |                                                                                                                                                               |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $H_{l,t}$                                                                                                                                                     |
| Data unit                                                       | Hours                                                                                                                                                         |
| Description                                                     | Average grazing hours per day of livestock type I during grazing season in year t                                                                             |
| Source of data                                                  | Project records                                                                                                                                               |
| Description of measurement methods and procedures to be applied | The project proponent and the Burqin Forestry and Grassland Bureau visit all the project participants every year to investigate the situation of the project. |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                      |
| Value applied                                                   | The ex-ante value is 10 which comes from Grazing Displacement Management Plan.<br>Please refer ER calculation sheets for details.                             |
| Monitoring equipment                                            | N/A                                                                                                                                                           |
| QA/QC procedures to be applied                                  | Guidance provided in IPCC, 2003 chapter 5 or IPCC, 2000 chapter 8 is applied                                                                                  |
| Purpose of data                                                 | Calculation of project emissions                                                                                                                              |
| Calculation method                                              | N/A                                                                                                                                                           |
| Comments                                                        | N/A                                                                                                                                                           |

|                                                                 |                                                                                                                                                               |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $Days_{l,t}$                                                                                                                                                  |
| Data unit                                                       | Days                                                                                                                                                          |
| Description                                                     | Grazing days of livestock I in year t under project                                                                                                           |
| Source of data                                                  | Project records                                                                                                                                               |
| Description of measurement methods and procedures to be applied | The project proponent and the Burqin Forestry and Grassland Bureau visit all the project participants every year to investigate the situation of the project. |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                      |

|                                |                                                                                                                                              |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Value applied                  | For ex ante calculation, the es value of Grazing Displacement Management Plan was applied<br>Please refer ER calculation sheets for details. |
| Monitoring equipment           | N/A                                                                                                                                          |
| QA/QC procedures to be applied | Crosscheck with previous records and reconduct the survey if there is a significant change observed                                          |
| Purpose of data                | Calculation of project emissions                                                                                                             |
| Calculation method             | N/A                                                                                                                                          |
| Comments                       | N/A                                                                                                                                          |

|                                                                 |                                                                                                                                                                                               |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $FC_{p,j,k,t}$                                                                                                                                                                                |
| Data unit                                                       | Kg fuel                                                                                                                                                                                       |
| Description                                                     | Fuel consumption by type k, machine type j, parcel grassland p, in year t under project                                                                                                       |
| Source of data                                                  | Project records                                                                                                                                                                               |
| Description of measurement methods and procedures to be applied | Trucks and tractors were used in the project, which consumed diesel oil, and the drivers recorded the fuel consumption each day which were summarized by Burqin Forestry and Grassland Bureau |
| Frequency of monitoring/recording                               | Every day during construction of grass seeding and fence building.                                                                                                                            |
| Value applied                                                   | The ex ante value comes from Project Design Report.<br>Please refer ER calculation sheets for details.                                                                                        |
| Monitoring equipment                                            | N/A                                                                                                                                                                                           |
| QA/QC procedures to be applied                                  | Guidance provided in IPCC, 2003 chapter 5 or IPCC, 2000 chapter 8 is applied                                                                                                                  |
| Purpose of data                                                 | Calculation of project emissions                                                                                                                                                              |
| Calculation method                                              | N/A                                                                                                                                                                                           |
| Comments                                                        | Fuel consumption only occurred in 2017-2019 for construction of grass seeding and fence building                                                                                              |

|                                                                 |                                                                                                                |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $PA_{mG,s,i,t}$                                                                                                |
| Data unit                                                       | ha                                                                                                             |
| Description                                                     | Project areas of grassland with management practice mG in stratum s in year t                                  |
| Source of data                                                  | Project records                                                                                                |
| Description of measurement methods and procedures to be applied | Record the area of grassland with management practice mG in stratum s.                                         |
| Frequency of monitoring/recording                               | Record the area and management practice just after the management practice has taken place and report annually |
| Value applied                                                   | The ex ante value comes from Project Design Report.<br>Please refer ER calculation sheets for details.         |
| Monitoring equipment                                            | N/A                                                                                                            |
| QA/QC procedures to be applied                                  | Crosscheck with previous records and satellite images                                                          |
| Purpose of data                                                 | Calculation of project emissions                                                                               |
| Calculation method                                              | N/A                                                                                                            |
| Comments                                                        | N/A                                                                                                            |

|                                                                 |                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $SOC_{mG,s,i,t}$                                                                                                                                                                                                                                |
| Data unit                                                       | g C/kg soil                                                                                                                                                                                                                                     |
| Description                                                     | SOC stock in the top 30 cm of soil (or greater depth if required) for management practice mG, stratum s (or greater depth if desired), sampling site i                                                                                          |
| Source of data                                                  | Project records                                                                                                                                                                                                                                 |
| Description of measurement methods and procedures to be applied | Handling, storage, processing, measurement, and quality control of soil samples must follow scientifically established procedures such as the procedures described in Carter and Gregoroch, 2006, OECD, 1998, or nationally approved standards. |

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | <p>Soil sampling based on the nationally-approved standard Soil Quality Guidelines for Soil Sampling Techniques (GB/T 36197-2018).</p> <p>The SOC measurement based on the nationally-approved standard Method for Determination of Soil Organic Matter (NY/T 1121.6-2006) was used to.</p>                                                                                                                                                                                                                                                                                                           |
| Frequency of monitoring/recording | At least once every five years, at the end of growing season in the year measured, until the end of the project crediting period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Value applied                     | <p>For ex ante calculation, the <math>SOC_{s,Baseline}</math> were measured by Shandong Huasheng Tiantong Standard Technical Service Co., Ltd., which was registered in Jinan City, Shandong Province in 27-August-2015. And the growth rate of SOC is 1.02%, which comes from previous study.</p> <p>Zhou Xiaoyan (2019) Impacts of different restoration years of returning grazing land to grassland on community characteristics and soil nutrients of alpine grassland in Maqu County (Master's thesis, Northwest Normal University).</p> <p>Please refer ER calculation sheets for details.</p> |
| Monitoring equipment              | Electric furnace, test tube, oil bath pot, wire cage and dropper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| QA/QC procedures to be applied    | The collection of soil samples for measuring SOC will be carried by suitably trained staff. The measurement of SOC will be carried out by a laboratory that can demonstrate adherence to the principles of good laboratory practices, outlined in OECD (1998).                                                                                                                                                                                                                                                                                                                                        |
| Purpose of data                   | Calculation of project emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Calculation method                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Comments                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                  |                                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter | $BD_{mG,s,i,t}$                                                                                                                                                       |
| Data unit        | g soil/cm <sup>3</sup>                                                                                                                                                |
| Description      | Soil bulk density in the top 30 cm of soil (or greater depth if required) for management practice $mG$ , stratum $s$ (or greater depth if desired), sampling site $i$ |
| Source of data   | Project records                                                                                                                                                       |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description of measurement methods and procedures to be applied | <p>Handling, storage, processing, measurement, and quality control of soil samples must follow scientifically established procedures such as the procedures described in Carter and Gregoroch, 2006, OECD, 1998, or nationally approved standards.</p> <p>Soil sampling based on the nationally-approved standard Soil Quality Guidelines for Soil Sampling Techniques (GB/T 36197-2018).</p> <p>The <math>BD_{mG,s,i,t}</math> measurement based on the nationally-approved standard Method for determination of soil bulk density (NY/T 1121.4-2006).</p> |
| Frequency of monitoring/recording                               | At least once every five years, at the end of growing season in the year measured, until the end of the project crediting period.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Value applied                                                   | <p>For ex ante calculation, the <math>BD_{mG,s,i,t}</math> were measured by Shandong Huasheng Tiantong Standard Technical Service Co., Ltd., which was registered in Jinan City, Shandong Province in 27-August-2015.</p> <p>Please refer ER calculation sheets for details.</p>                                                                                                                                                                                                                                                                            |
| Monitoring equipment                                            | Ring knife, electronic scale, rubber hammer, oven and dryer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| QA/QC procedures to be applied                                  | The collection of soil samples for measuring soil bulk density will be carried by suitably trained staff. The measurement of soil bulk density will be carried out by a laboratory that can demonstrate adherence to the principles of good laboratory practices, outlined in OECD (1998).                                                                                                                                                                                                                                                                  |
| Purpose of data                                                 | Calculation of project emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Calculation method                                              | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Comments                                                        | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                  |                                                                                                                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter | $FC_{mG,s,i,t}$                                                                                                                                                                                            |
| Data unit        | percent                                                                                                                                                                                                    |
| Description      | Percentage of rocks with a diameter larger than 2mm, roots, and other dead residues in the top 30 cm of soil (or greater depth if desired), for management practice $mG$ , stratum $s$ , sampling site $i$ |
| Source of data   | Project records                                                                                                                                                                                            |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description of measurement methods and procedures to be applied | <p>Handling, storage, processing, measurement, and quality control of soil samples must follow scientifically established procedures such as the procedures described in Carter and Gregoroch, 2006, OECD, 1998, or nationally approved standards.</p> <p>Soil sampling based on the nationally-approved standard Soil Quality Guidelines for Soil Sampling Techniques (GB/T 36197-2018).</p> <p>There is no nationally recognized standard for measuring soil <math>FC_{mG,s,i,t}</math>, so previous research standard are used.</p> <p>Xie yingge, Li xia. Research progress on determination methods of gravel content in soil[J]. Soils, 2012,44(1):17-22.</p> |
| Frequency of monitoring/recording                               | At least once every five years, at the end of growing season in the year measured, until the end of the project crediting period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Value applied                                                   | <p>For ex ante calculation, the <math>FC_{mG,s,i,t}</math> were measured by Shandong Huasheng Tiantong Standard Technical Service Co., Ltd., which was registered in Jinan City, Shandong Province in 27-August-2015.</p> <p>Please refer ER calculation sheets for details.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| Monitoring equipment                                            | Ring knife, electronic scale and sieve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| QA/QC procedures to be applied                                  | The collection of soil samples for measuring $FC_{mG,s,i,t}$ will be carried by suitably trained staff. The measurement of $FC_{mG,s,i,t}$ will be carried out by a laboratory that can demonstrate adherence to the principles of good laboratory practices, outlined in OECD (1998).                                                                                                                                                                                                                                                                                                                                                                              |
| Purpose of data                                                 | Calculation of project emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Calculation method                                              | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Comments                                                        | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                  |                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------|
| Data / Parameter | <i>Depth</i>                                                                                                  |
| Data unit        | cm                                                                                                            |
| Description      | Total soil depth, for calculating grassland SOC stock in the top 30 cm of soil (or greater depth if required) |
| Source of data   | Project records                                                                                               |

|                                                                 |                                                                                               |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Description of measurement methods and procedures to be applied | Collect soil samples with soil drill with 30cm scale.                                         |
| Frequency of monitoring/recording                               | Recorded with each measurement taken                                                          |
| Value applied                                                   | Due to full depth of affected soil layers is not known, a minimum depth of 30 cm was applied. |
| Monitoring equipment                                            | Soil drill with scale.                                                                        |
| QA/QC procedures to be applied                                  | N/A                                                                                           |
| Purpose of data                                                 | Calculation of project emissions                                                              |
| Calculation method                                              | N/A                                                                                           |
| Comments                                                        | N/A                                                                                           |

|                                                                 |                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $P_{GUI,t}$                                                                                                                                                                                                                                                                                                                                 |
| Data unit                                                       | Head                                                                                                                                                                                                                                                                                                                                        |
| Description                                                     | Total population of livestock of each type relocated to unidentified grasslands in year t                                                                                                                                                                                                                                                   |
| Source of data                                                  | Project grazing record                                                                                                                                                                                                                                                                                                                      |
| Description of measurement methods and procedures to be applied | <p>The project proponent and the County Forestry and Grassland Bureau visit all the project participants every year to conduct the Survey of Grazing Displacement and investigate the grazing situation of the project.</p> <p>Then the population of livestock of herders under the project are summarized in Project grazing records.</p> |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                                                                                                                    |
| Value applied                                                   | For the first five years (2017-2021), the results of annual grazing survey was applied, and for the year from 2022 forward, the estimated value of Grazing Displacement Management Plan was applied which will be 50% of the baseline population.                                                                                           |

|                                | Livestock type                                                               | 2017   | 2018   | 2019   | 2020   | 2021   |
|--------------------------------|------------------------------------------------------------------------------|--------|--------|--------|--------|--------|
|                                | Cattle                                                                       | 10,441 | 12,690 | 13,837 | 13,837 | 13,837 |
|                                | Sheep                                                                        | 41,702 | 51,140 | 55,231 | 55,231 | 55,231 |
| Monitoring equipment           | N/A                                                                          |        |        |        |        |        |
| QA/QC procedures to be applied | Guidance provided in IPCC, 2003 chapter 5 or IPCC, 2000 chapter 8 is applied |        |        |        |        |        |
| Purpose of data                | Calculation of project leakage                                               |        |        |        |        |        |
| Calculation method             | N/A                                                                          |        |        |        |        |        |
| Comments                       | N/A                                                                          |        |        |        |        |        |

|                                                                 |                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $Days_{GUI,l,t}$                                                                                                                                                                                                                                                                                                   |
| Data unit                                                       | days                                                                                                                                                                                                                                                                                                               |
| Description                                                     | Days that the population of each type of relocated livestock of type l graze in unidentified grassland in year t                                                                                                                                                                                                   |
| Source of data                                                  | Project grazing records                                                                                                                                                                                                                                                                                            |
| Description of measurement methods and procedures to be applied | <p>The project proponent and the County Forestry and Grassland Bureau visit all the project participants every year to conduct the Survey of Grazing Displacement and investigate the grazing situation of the project.</p> <p>Then the grazing days of the project are summarized in Project grazing records.</p> |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                                                                                           |
| Value applied                                                   | 80                                                                                                                                                                                                                                                                                                                 |
| Monitoring equipment                                            | N/A                                                                                                                                                                                                                                                                                                                |
| QA/QC procedures to be applied                                  | Guidance provided in IPCC, 2003 chapter 5 or IPCC, 2000 chapter 8 is applied                                                                                                                                                                                                                                       |
| Purpose of data                                                 | Calculation of project leakage                                                                                                                                                                                                                                                                                     |
| Calculation method                                              | N/A                                                                                                                                                                                                                                                                                                                |

|          |     |
|----------|-----|
| Comments | N/A |
|----------|-----|

### 3.3.3 Monitoring Plan

#### 1. Operation and management structure

The project proponent hired local herders and communities (monitoring staff and auditing staff) for daily supervision and data management during the project implementation while office manager oversee the whole working group. A monitoring group has been established by Burqin Jinhua Urban Construction and Investment Co., Ltd. to carry out the monitoring work. The structure of the monitoring group is as follows:

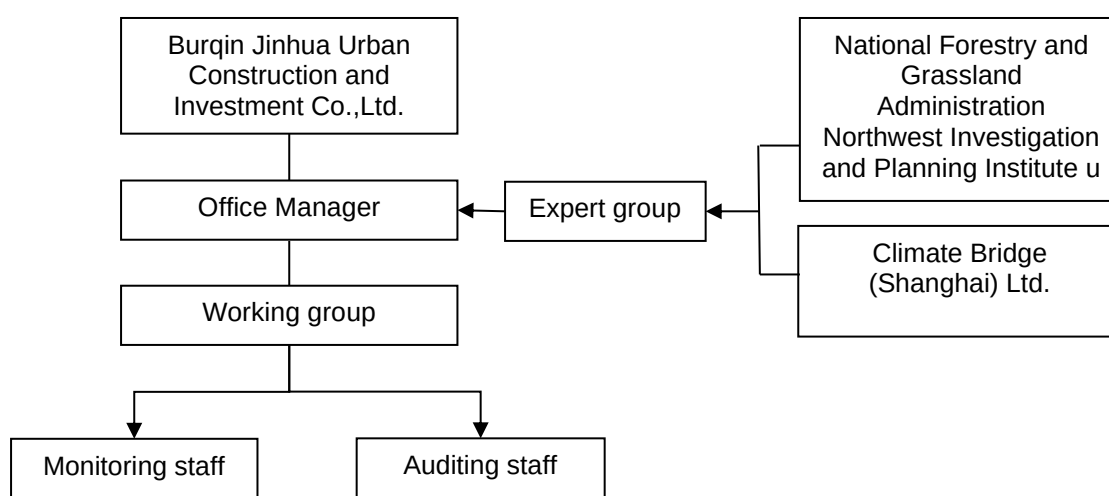


Figure 3-2 Organization structure of the monitoring team

The responsibilities of each role in the team structure are:

- Office manager has the overall management responsibility, especially supervising the implementation of the monitoring plan, and assigning each member of the monitoring team their individual responsibility during the monitoring;
- Expert group provides professional technique related to monitoring activities to make sure all the monitoring activities meet the requirement of VCS and CCB standards;
- Monitoring staff conducts the following monitoring process, measures the required parameters of the project as listed in the above Section 3.3.2 particularly, and collects all the original evidence and data and make relevant records;
- Auditing staff performs internal verification of the measurement, reviews all the monitoring records and documents, crosschecks evidence and calculates emission removals during each verification period.

A Monitoring Manual will be provided to each member of the monitoring team with a specific explanation to make sure they fully understand all the monitoring process and issues concerned.

The monitoring activities will be arranged before each verification and the detailed plan for the certain monitoring activities will be reviewed by the expert group who come from Burqin Forestry and Grassland Bureau and Climate Bridge (Shanghai) Ltd. as well as the draft monitoring results, to make sure the monitoring is implemented in line with monitoring plan. If there are non-conformances founded, expert group will ask the monitoring team to take necessary compensation measures (redo some of the monitoring activities or calculation) until all the non-conformances been corrected. If the registered monitoring plan is unable to be implemented, or the monitoring would permanently deviate from the applied methodologies, the applied standardized baselines, or the other applied methodological regulatory documents, the project participants shall describe the nature and extent of the non-conforming monitoring in a revised monitoring plan and submitted to Verra to request a change of the monitoring plan.

## **2. Monitoring process**

### **1) Monitor the applicability conditions listed in methodology**

As mentioned in Section 3.1.2, the methodology VM0026/Version 1.1 “Sustainable Grassland Management” is applicable under the following conditions:

- The project area is grassland at the start of the project. The project area is land that is degraded at the start of the project and degradation will continue in the baseline scenario on the basis that degradation drivers or pressures are still present in the baseline scenario. The procedures outlined the latest version of the CDM Tool for Identification of Degraded or Degrading Lands for Consideration in Implementing CDM A/R Project Activities must be used to determine both that the land is degraded at the start of the project and that in the baseline scenario the land will continue to degrade.
- The project area is subject to livestock grazing, burning, and/or nitrogen fertilization in the baseline scenario.
- In the baseline scenario, more than 95 percent of animal dung from grazing animals deposited on grassland is allowed to lie as is, and is not managed, and in the project scenario no more than 5 percent of the animal dung from grazing animals within the project area is managed with alternative manure management systems.

According to the analysis in Section 3.1.2, all the conditions are applicable at the start of the project activity due to the baseline survey. During the following verification, the project proponent should monitor the possible change of the project boundary, if there is a change to the project boundary, the applicability conditions should be re-assessed for the changed project area.

#### **Step 1: Monitoring of boundary**

The coordinate of the project boundary should be measured and managed strictly in accordance with regulations and saved as GIS files. Boundary information such as original records, needs to

store in both electronic and printed archive in the project owner, and participants should keep a backup. Files need to be saved at least two years after the end of the crediting period.

In order to obtain valid and reliable boundary information, monitoring team need to use the GPS or other verifiable methods to verify the project boundary. Determine the actual boundaries of afforestation. If the actual boundary is larger than the boundary in the project design, the excess section is not included in project boundary; instead, if the actual border boundary is smaller than the boundary in the project design, project boundary should be based on the actual boundary. Any change in the boundary must be located by GPS or appropriate spatial data (eg satellite imagery).

During this monitoring time, two different management practices for project implementation and cover the project area measured as followed:

| No. | Management practice         | Description                                                                                                                                                                                                                                                                                 | Area(ha) |
|-----|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1   | Rotational and rest grazing | Grazing is suspended for 90 days when the grass returns to green every year and then the grazing time is halved by rotating grazing between spring pasture and summer pasture every yea                                                                                                     | 60,000   |
| 2   | Grass seeding               | Reseeding the grasses under the condition of fencing enclosure for 2 years. After that, under the premise of not affecting the normal growth of the improved grassland, the grassland should be used reasonably and sustainably according to the local approved livestock carrying capacity | 5,000    |

#### Step 2: monitor the applicability conditions

- Collect documented evidence to prove that the project area is grassland at the start of the project, which has been classified as “degraded”, such as local, regional, national or international land classification system or peer-review study, participatory rural appraisal, satellite imagery and/or photographic evidence in the last 10 years.
- Through documented evidence collection, questionnaire surveys and interviews proved that the project area is subject to livestock grazing, burning, and/or nitrogen fertilization in the baseline scenario.
- Through questionnaire surveys and interviews confirmed that animal manure treatment both in baseline scenario and project scenario.

#### Step3: Go through applicability checklist

If there is any change in the boundary happened, the monitoring team will go through a specific checklist of the applicability conditions, records all relevant results for each monitoring period.

In case any non-conformance of the applicability conditions, the expert group should evaluate the situation and submit the deviation or change to the methodology to Verra for approval.

## 2) Monitoring of Project Implementation

A record of the grazing agents (eg. herder households) involved the project.

- The project proponent and Burqin Forestry and Grassland Bureau should record each household involved in the sustainable grassland management project.
- Each household should be given a unique ID. Their name, location of their land, and date of entering into the agreement and leaving the agreement should be recorded.

A record of the geographic location of the project area for all areas of grassland;

- The geodetic coordinates of the project area (and any stratification inside the area) must be established, recorded and archived. This can be achieved by field survey (eg, using GPS), or by using geo-referenced spatial data (eg, maps, GIS datasets).

A record of grassland management

- The grassland management plan, together with a record of the plan as actually implemented during the project crediting period must be available for validation and verification.

## 3) Recording of Data and Parameters Monitored

The following parameters must be record and monitored during the project. When applying the equations provided in this methodology (VM0026/Version 1.1) for the ex-ante calculation of net anthropogenic GHG removals by sinks, the project proponent must provide transparent estimations for the parameters that are monitored during the project crediting period. These estimates must be based on measured or existing published data where possible and the project proponent must apply a conservative approach: that is, if different values for a parameter are equally plausible, a value that does not lead to over-estimation of net anthropogenic GHG removals by sinks must be selected.

As described in Section 3.2.2, no chemical fertilizer would be used in the project.

For the estimate of annual CH<sub>4</sub> emissions from enteric fermentation, population of livestock type *l* ( $P_{l,t}$ ) and grazing days of livestock type *l* ( $Days_{l,t}$ ) must be recorded annually during the project crediting period.

For the estimate of annual CH<sub>4</sub> and N<sub>2</sub>O emissions from manure deposition during grazing, grazing days of livestock of type *l* ( $Days_{l,t}$ ) and average grazing hours per day of livestock type *l* during the grazing season must be recorded in every grazing season, in each year during the project crediting period.

For the estimate of annual CO<sub>2</sub> emissions due to the use of fossil fuels for SGM, Fuel consumption by type *k*, machine type *j*, parcel grassland *p*, in year *t* under project ( $FC_{p,j,k,t}$ ) must be recorded at each time a management practice using machines is adopted and reported annually during the project crediting period:

To estimate project removals due to changes in SOC, the following parameters must be monitored at least once every five years during the project crediting period. The soil sampling, handling and storage, processing and measurement, and quality control procedures implemented in soil organic carbon analysis that follow a scientific peer-reviewed or nationally approved standard.

- SOC content ( $SOC_{mG,s,i,t}$ );
- Soil bulk density ( $BD_{mG,s,i,t}$ );
- Percentage of rocks with a diameter larger than 2mm, roots and other dead residues ( $FC_{mG,s,i,t}$ );

As mentioned in Section 3.2.2, the project uses direct measurement approach (Option 2) to determine the project removals due to changes in SOC, and the sampling procedures were designed such that the statistical significance of soil carbon stock changes between the baseline carbon stock and the carbon stock in time t can be determined with a 95 percent confidence interval. The Guidelines for sampling and surveys for CDM project activities and programmes of activities was followed to determine the sampling procedure and sample size.

For the estimate of leakage emissions, the monitoring parameters required in the VCS modules VMD0040 Estimation of Leakage Emissions from Displacement of Grazing Activity due to Implementation of Sustainable Grassland Management Activities must be recorded annually during the project crediting period. The following parameters were monitored and recorded:

- Total population of livestock of each type relocated to unidentified grasslands in year t ( $P_{GUI,t}$ );
- Days that the population of each type of relocated livestock of type l graze in unidentified grassland in year t ( $Days_{GUI,t}$ );

#### **4) Sampling Design and Stratification**

As mentioned above, the project removals due to changes in SOC will be determined by direct measurement approach (Option 2) by using soil sampling procedures according to nationally-approved standard (HJ/T 166-2004).

Due to the heterogeneity of soil carbon, stratification of the project area into relatively homogeneous units can either increase the measuring precision without increasing the cost unduly or reduce the cost without reducing measuring precision because of the lower variance within each homogeneous unit.

According to the methodology (VM0026/Version 1.1), four main requirements was met before the stratified sampling is chosen:

- Population must be stratified in advance of the sampling.

The project area was stratified before sampling.

- Classes must be exhaustive and mutually exclusive (ie, all elements of the population must fall into exactly one class).

For the project, classes were determined by two different soil texture within project boundary and the different management, which are exhaustive and mutually exclusive and all elements of the population fell into exactly one class.

- Classes must differ in the attribute or property under study, otherwise there is no gain in precision over simple random sampling.

The grazing situation in the project area is basically the same, but there are two different restoration measures in the project area. Also, different soil textures have a significant impact on soil carbon accumulation, such as, sandy soil has poor water and fertility retention, clay soil has strong water and fertility retention, and loam has moderate water and fertility retention. For the project, based on restoration measures and soil texture, the project ex ante strata are listed in the following table.

- Selection of items to represent each class (ie, the sample drawn from each class) must be random.

The location of sample sites were set by systematic sampling with a random start. For each strata, using GIS to set a random start plots, and then set the constraint boundary for the rest plots (within the range of the certain strata and the horizontal and vertical distances from the boundary should be no less than 30m).

Table 3-6 The Project ex ante Stratification for carbon calculation

| Strata | Area (ha) | Grassland type            | Management practice         | Soil texture | Project activities start date |
|--------|-----------|---------------------------|-----------------------------|--------------|-------------------------------|
| 1      | 5,000.00  | Desertification Grassland | Grass seeding               | sandy loam   | 25-May-2019                   |
| 2      | 10,666.67 | Mountain meadow           | Rotational and rest grazing | loam         | 5-Jun-2018                    |
| 3      | 49,333.33 | Alpine meadow             | Rotational and rest grazing | loam         | 26-Jun-2017                   |

### Updating of strata

The ex-post stratification must be updated due to the following reasons:

- Unexpected disturbances occurring during the project crediting period (eg, due to fire, pests or disease outbreaks), affecting differently various parts of an originally homogeneous stratum;
- Grassland management activities (planting) may be implemented in a way that affects the existing stratification.

Established strata may be merged if reasons for their establishment have disappeared.

## **Sampling framework**

According to the methodology, Guidelines for sampling and surveys for CDM project activities and programmes of activities (version 4.0) should be followed to determine the sampling procedure and sample size.

According to the Guidelines for sampling and surveys for CDM project activities and programmes of activities (version 4.0), the project proponents may use the sample size calculator available in the CDM website. See Sample Size Calculator Table for detail.

The mean SOC with the project boundary and the standard deviation of SOC in each strata were estimated from a preliminary sample, the project monitoring team has selected 3 preliminary sample sites for each strata and calculated the mean value and standard deviation of the biomass stock in each strata which were used to calculate the final number of sample sites based on the Sample Size Calculator Table as mentioned above.

The calculated sample size was 9 originally by using a precision of 15 percent at the 95 percent confidence level, considering the large area of the project boundary, the actual sample size has been increased into 31, by tripling the individual sample size of each strata with a minimum number of 8. Please refer to Sample Size Calculator Table for details.

For each strata, using GIS to set a random start sites, and then set the constraint boundary for the rest plots (within the range of the certain strata and the horizontal and vertical distances from the boundary should be no less than 30m).

## **5) Monitoring for leakage emission**

For the estimate of leakage emissions, the monitoring parameters required in the VCS modules VMD040 Estimation of Leakage Emissions from Displacement of Grazing Activity due to Implementation of Sustainable Grassland Management Activities were recorded annually during the monitoring period.

The Burqin Forestry and Grassland Bureau has conducted the Grazing Displacement Survey from August to September each year to monitor the grazing activities from 2017-2021, the related monitoring results of the grazing days ( $Days_{GUI,t}$ ) in the grazing area and the leakage area and the population of cattle and sheep rotating back and forth in the two areas ( $P_{GUI,t}$ ) have been summarized in the project grazing records.

## **3. Monitoring frequency**

The monitoring of the project implementation will take place at least every five years after the project registration in order to ensure the continuity of the benefits. Periodic verification and quantitative monitoring of the project will take place at least every five years.

## **4. Data management**

All data collected as part of monitoring is archived electronically. All information should be stored by the technology department of the project owner and all the material has a physical copy for

backup. And all data collected shall be archived for a period of at least two years after the end of the last crediting period of the project activity.

## **5. QA/QC procedures**

The following QA/QC procedures will be adopted:

- a) Training will be provided to the staff to guarantee the implementation of the monitoring plan, all the relevant staff is obliged to take the training course before the operation starts;
- b) The monitoring team will check the monitoring equipment regularly to make sure their normal operation before each monitoring activities;
- c) If the validated monitoring plan cannot be conducted during the following monitoring process due to some reason, an updated monitoring plan should be submitted to VVB during the corresponding verification by indicating the relevant deviation of the original plan and the reason for the deviation.
- d) All soil samples need to be backed up. If there is a problem with the testing equipment or the data is abnormal, retest the corresponding soil sample.

### **3.3.4 Dissemination of Monitoring Plan and Results (CL4.2)**

The monitoring plan has been published on VCS and CCB website which can be easily download by stakeholders. Also, the summary of project description in local language has been disseminated to local communities through Burqin Forestry and Grassland Bureau. At the same time, public notice boards in each village were used to publicize information regarding how to access to the monitoring plan and results through internet. Technical staff from Burqin Forestry and Grassland Bureau would also explain the monitoring plan to local residents, especially to illiterate or under-educated herders. Also, a contact person with phone number was published in case any stakeholders want to directly contact the project proponent and raise opinions.

The monitoring team will summarize all the comments received from stakeholders and corresponding responses regarding the monitoring plan and results, that will be published on VCS and CCB website along with the monitoring report for each monitoring period.

## **3.4 Optional Criterion: Climate Change Adaptation Benefits**

### **3.4.1 Regional Climate Change Scenarios (GL1.1)**

N/A.

### **3.4.2 Climate Change Impacts (GL1.2)**

N/A.

### **3.4.3 Measures Needed and Designed for Adaptation (GL1.3)**

N/A.

## **4 COMMUNITY**

### **4.1 Without-Project Community Scenario**

#### **4.1.1 Descriptions of Communities at Project Start (CM1.1)**

As mentioned in section 2.1.8 and 2.1.9, there are seven different community groups identified which will be affected by this project:

- Local residents
- Local women
- Local herders
- Local Kazakh
- Grassland guardians
- Village collectives
- Burqin Forestry and Grassland Bureau
- Local government

Among those community groups, local residents and village collectives are the most important groups who would be significantly influenced by the implementation of the project.

#### **Well-being information**

Total GDP of the county was 2.104 billion RMB in 2016, of which the added value of the primary industry was 348 million RMB, the added value of the secondary industry was 899 million RMB, and the added value of the tertiary industry was 857 million RMB. The total output value of farming, forestry, animal husbandry and fishery in the county was 767 million RMB, and the per capita income of farmers and herdsmen was 10,736 RMB.

The county has 18 primary and secondary schools. Among them, there are 4 ordinary middle schools and 14 primary schools with 1,285 teaching and administrative staff. The enrollment rate of junior high school is 90.6%, the enrollment rate of senior high school is 100%, and the enrollment rate and graduation rate of primary school-age children are 99.94% and 100% respectively.

The county has 11 health institutions, including 1 county hospital, 1 disease prevention and control center, 1 maternal and child health institutions, and 8 township health centers. There are 397 hospital beds, 147 doctors and 473 health technicians, including 98 practicing doctors. 42,348 people participated in rural cooperative medical care in the whole county, with a participation rate of 100%.

At the project start, grazing was the traditional livelihood for local residents, and there were not much other job opportunities offered. Local women used to stay at home doing housework, and most of them has no income. As mentioned in Section 2.1, the per capita disposable income of farmers and herdsmen is 10,736 RMB, which is much lower than that of developed areas. And overgrazing is the main factor leading to grassland degradation, which may reduce the grazing productivity, and is not conducive to increasing the income of local herders in long-term.

Natural grassland is an important part of ecological system in Burqin County, which has irreplaceable functions in improving regional ecological environment, maintaining soil and water, preventing wind and fixing sand, regulating climate and so on. At the same time, it is also an important means of production of grassland animal husbandry and plays an important role in promoting the economic development of pastoral areas. The natural grassland area of Burqin County is 10.151 million mu, accounting for 62.67% of the total land area. Animal husbandry is the pillar industry of the county's national economy, but the overloading rate of grassland is as high as 90%, more than 80% of grassland is generally degraded, grass coverage is reduced, and grass yield is reduced.

Increasing the income of farmers and herdsmen is the most prominent problem in the rural economic development of Burqin County. The natural grassland is the main economic resource of the pastoral area in Burqin County. Before the economic structure of the pastoral area has been fundamentally improved and the non-agricultural industry has not been fully developed, the grassland animal husbandry is still the primary source of income increase of herdsmen in a long period of time, but the grassland degradation has seriously restricted the economic development of the pastoral area.

### **Community characteristics**

Kazakh is one of the world's most famous nomads. This is mainly because the herders usually have to raise hundreds of cattle and sheep to survive, so they need to constantly choose pastures to meet the supply of cattle and sheep. When they settle down in a place, they check out the local pasture, water resources, etc. Herdsmen generally follow the natural and do not wait until the surrounding grass has been eaten up before moving. In order to resist the harsh winter, for the circulation of the grassland, but also for their own cattle and sheep to survive, they forage for water, grass and raise cattle. Moreover, such a traditional transition life has continued for nearly 3,000 years, the history of the Kazakh is written in nomadism.

The county got its name from the Burqin River, 'Burqin', Weilat Mongolian. In Weilat, the three-year-old male camel is called a 'bur', and 'qin' means herder. Burqin County is a place where nomadic peoples in western China have been living and multiplying since ancient times. According to historical records, Burqin belongs to Altai area, known as the grasslands of western Mongolia in ancient times. After 1919, people omitted the word "river" and called it "Burqin County". In August 1950, the first meeting of people's representatives of all ethnic groups and all walks of life was held in Burqin County, and the People's government of Burqin County was elected.

Burqin is a multi-ethnic county, including Han, Kazakh, Hui, Mongolian and so on. The local languages are mainly Mandarin and Kazakh.

### **Diversity within the community**

The Kazakh population of the county is 41,583, accounting for 57.45% of the total population, 21,473 Han people, accounting for 29.67%, the Hui population is 4,758, accounting for 6.57%, Mongolian 1763, accounting for 2.44%, there are 2,911 people from other ethnic groups, accounting for 3.87%. The total number of households in the county was 26,163, with 72,378 people. There are 37,362 males, accounting for 51.62% of the total population, and 35,016 females, accounting for 48.38% of the total population. According to age, the population aged 0-14 is 14,747,

accounting for 20.38% of the total population; the population aged 15-64 is 53,447, accounting for 73.84% of the total population, and those aged 65 and over are 4,184, accounting for 5.78% of the total population. The urban population is 22,218 and the rural population 50,160. Among the rural population, there are 6,411 farming households, 19,406 people. The per capita disposable income of urban residents is 27,173 RMB, and the per capita net income of farmers and herdsmen is 10,736 RMB.

#### **4.1.2 Interactions between Communities and Community Groups (CM1.1)**

The community groups of the project including Local residents, local women, local herders, grassland guardians, village collectives and other stakeholders were barely active. Some project land belongs to village collectives, before the implementation of the project, local residents lived by grazing, and most of the female rural workers have to stay at home with no income. And other community groups are far from the project area. So, the interaction between community groups was considered incipient and/or superficial due to the geographic distance and the absence of common activities to be carried out jointly by the communities.

#### **4.1.3 High Conservation Values (CM1.2)**

No HCVs was identified related to community well-being in the project zone.

#### **4.1.4 Without-Project Scenario: Community (CM1.3)**

At the start of the project, local herders lived by grazing, and the grassland will continue to degrade due to overgrazing. So, the local community will stay in the current well-being level with no potential income increase.

In addition, without the implementation of the project, the traditional livelihood of local Kazakh herding and grazing would be continuously threatened by the degradation of the grassland ecosystem, which will further affect the development of local animal husbandry and tourism. Due to the lack of new economic growth engine, local medical, educational and cultural undertakings cannot develop better. Therefore, the well-being of the community may deteriorate further.

### **4.2 Net Positive Community Impacts**

#### **4.2.1 Expected Community Impacts (CM2.1)**

The project provided job and training opportunities for local residents, which would enhance their ability, improve their family income, increase the interaction between communities, and benefit the protection and dissemination of Kazakh culture.

Also, the project would empower women and build community capacity in gender equity. With other employees participating in community activities, women may get more happiness than doing housework only, so their well-being would be significantly improved.

Furthermore, Burqin Forestry and Grassland Bureau guided herders to graze reasonably, which is conducive to the restoration of degraded grassland ecosystem and improve their living standard in long-term.

All of these could guarantee the long-term community benefits.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Local residents<br>Grassland guardians                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Impact(s)                 | Create 4,875 job opportunities (467 permanent jobs and 4,408 temporary jobs)<br>Enhance capabilities of local residents and improve their household income and living level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Type of Benefit/Cost/Risk | Predicted direct benefits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Change in Well-being      | During the project implementation, about 4,875 local residents participated in grass seeding and fences building, and about 467 local herders were employed as guardians. Over 57% of the employed local residents are Kazakhs and 40% are women.<br>The job opportunities provided by the project have increased local household income.<br>The local Forestry and Grassland Bureau regularly provides local residents with training on rodent control, grassland fire prevention and sustainable management of grassland. 4,875 local residents participated in the training, and their abilities were also improved. The project restored the degraded grassland and is beneficial to rebuild local pleasant and beautiful ecological system which has higher ecological aesthetic value of tour and sightseeing which improve their living environment. |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Local women                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impact(s)                 | Create 4,875 job opportunities, which is equally offered to local women and men;<br>Empower women and build community capacity in gender equity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Type of Benefit/Cost/Risk | Predicted direct benefits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Change in Well-being      | Without this project, local women mainly do housework at home and have no income. During the project implementation, 4,875 local residents participated in the project, about 40% of the employed local residents are women. This will contribute to empower women and build community capacity in gender and sustainable grassland management. By being trained with the sustainable grassland management skills and participating the community activities together with other employees, women may gain more happiness compares to doing housework only, thus positive welfare outcomes for local households are more likely to be expected. |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Local Kazakh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Impact(s)                 | 2,870 of the local Kazakh have been offered job positions and training opportunities for sustainable and scientific grazing skills, and the potential improvement of grazing productivity after grassland restoration would help to promote their traditional livelihood.                                                                                                                                                                                                                                                                                                         |
| Type of Benefit/Cost/Risk | Predicted direct benefits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Change in Well-being      | <p>The traditional livelihood of local Kazakh is herding and grazing which has been threatened by the degradation of the grassland ecosystem. The implementation of the project could restore the ecosystem of the traditional grassland for local Kazakh which is beneficial to conservation of the traditional culture.</p> <p>Furthermore, local Kazakh have more opportunities to work together and organize more social activities and hence increase the interaction within the community, which can indirectly promote the protection and diffusion of Kazakh culture.</p> |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Local herders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impact(s)                 | <p>Enhance capabilities of local herders and increase their household income;</p> <p>Improve grazing productivity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Type of Benefit/Cost/Risk | Predicted direct benefits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Change in Well-being      | <p>The project will not change the ownership of the project land, but some herders are affected by the project, due to grazing was strictly forbidden in the first five years after seeding. However, herders in the project area can receive corresponding subsidies for the prohibition of grazing and according to the stakeholder consultation, all of the local herders are satisfied with this subsidy policy, and the herders could conduct grazing outside of the project area under related guidance of local Forestry and Grassland Bureau. The related leakage emission from displacement of grazing activities has also been taken into account.</p> <p>In addition, after the first five years, controlled grazing will be allowed depending on the growth situation of the forage, and the Burqin Forestry and Grassland Bureau measured the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area. Therefore the project would not lead to reductions in the production of grazing, instead,</p> |

|  |                                                                                                                      |
|--|----------------------------------------------------------------------------------------------------------------------|
|  | the long-term production is expected to be increased significantly due to the restoration of the degraded grassland. |
|--|----------------------------------------------------------------------------------------------------------------------|

|                           |                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Village collectives                                                                                                                                                                                                                                                                                                                                                           |
| Impact(s)                 | Restore grassland productivity of village collectives; Provides more opportunities for village collectives from Kazakh nationality to transport their traditional culture in a positive way                                                                                                                                                                                   |
| Type of Benefit/Cost/Risk | Predicted direct benefits                                                                                                                                                                                                                                                                                                                                                     |
| Change in Well-being      | The ownership of grassland belongs to the collectives. The project restored the degraded grassland and improved the grassland productivity. The project organizes special village collectives' cultural activities and increase the connection between local Kazakh nationality herders and other members which could indirectly promote the diffusion of traditional culture |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Community Group           | Burqin Forestry and Grassland Bureau<br>Local government                                                                                                                                                                                                                                                                                                                                                                       |
| Impact(s)                 | Create local job opportunities, improve the local ecological environment.                                                                                                                                                                                                                                                                                                                                                      |
| Type of Benefit/Cost/Risk | Predicted indirect benefits                                                                                                                                                                                                                                                                                                                                                                                                    |
| Change in Well-being      | Burqin Forestry and Grassland Bureau is responsible for the supervision and management of local grassland and ecological construction, the project implementation could help them to improve local environmental situations.<br><br>Restore the degraded grassland and alleviated the grassland ecological crisis. Create 4,875 job opportunities (467 permanent jobs and 4,408 temporary jobs) which solve employment issues. |

#### 4.2.2 Negative Community Impact Mitigation (CM2.2)

According to the Chinese Grassland Law, the local government should carry out the construction of grassland fire prevention facilities, and once a fire disaster occurs, the local government should be responsible for relevant rescuing immediately. And the project proponent is experienced in local natural risk control and has established a Grassland Management Manual for the project which includes specific instruction in fire prevention.

As described in section 2.3.17, negative well-being impacts on community groups including fires, emergencies, and dangerous driving, this can be alleviated through technical and awareness training to local herders/communities, strengthening patrolling and monitoring. Also, the project proponent and Burqin Forestry and Grassland Bureau provided relevant skill training for local herders, to strengthen the safety awareness of herders. Also, local herders the local forestry and

grassland bureau was equipped with fire protection facilities, such as fire protection clothing, fire trucks, and fire water guns, etc., in addition, the local herders conducted daily patrols on the grasslands, which could prevent grassland fires. Furthermore, there is a first aid kit on the grassland patrol vehicle to prevent emergencies.

According to the Project Design Report, grazing was strictly forbidden in the first five years, and then controlled grazing will be allowed depending on the growth situation of the forage. Instead, Burqin Forestry and Grassland Bureau measures the grass yield of the surrounding grasslands in the project area, and guides herders to graze in a reasonable area, so the project will not reduce the grazing productivity. In addition, the local government issued subsidies to the herders in the project area who implemented the prohibition of grazing. As described in Section 2.3.7, all the herders agreed with the subsidy policy and were willing to participate in the project.

In addition, no HCVs was identified related to community well-being in the project zone.

Therefore, all the negative well-being impacts have been mitigated.

### **4.2.3 Net Positive Community Well-Being (CM2.3, GL1.4)**

As summarized in Section 4.2.1, the expected community impacts are all benefit, no potential cost or risk, therefore the net well-being impacts of the project are positive for all identified community groups compared with their anticipated well-being conditions under the without-project land use scenario.

#### **Improve grazing methods and increase household income**

As mentioned in Section 2.1.11, the project will offer some short-term and long-term job opportunities for local herders which could increase the income of the households. Also, sustainable grazing is conducive to the protection of grassland and could increase the total production of herding and maintain a long-term benefit for local herders. In addition, after the implementation of the project, local herders have more opportunities to work together, which will give them the motivation to organize more social activities and hence increase the interaction within the community. All these will significantly improve the well-being of local communities.

#### **Benefit to conservation of traditional Kazakh culture**

As mentioned in Section 4.1.3, The project is located in Burqin County where the local Kazakh comprise a large proportion (57.45%) of the total population. The traditional livelihood of local Kazakh is herding and grazing which has been threatened by the degradation of the grassland ecosystem. The implementation of the project will restore the ecosystem of the traditional grassland for local Kazakh which is beneficial to conservation of the traditional culture. In addition, the job and training opportunities provided by the project could bring more opportunities for local Kazakh to work together and organize more social activities and hence increase the interaction within the community.

#### **Improve gender equity**

There is evidence that when women receive income, positive welfare outcomes are more likely: gender equity can thus be key to wider poverty and equity impacts. Generally, women are more involved in subsistence activities like planting, protecting, or caring for seedlings, as well as in home orchards and public land. The project provided them job opportunities, which is equally offered to

local women and men. In fact, more than 40% of the local residents directly involved in the project are women. Which makes women gain more professional identity and higher happiness.

#### **Promote technical capability of local communities**

There is a workbook provided for each employee which includes technical advice for their work, and all the workers were offered the technical training immediately once they were hired. Such skills and knowledge include are useful for grassland management, such as fire prevention and forage supplementary sowing technology. These technical manuals were distributed to each household in the local villages, including the villagers who haven't participated in the project.

Besides the training on technical skills of grass planting, local workers were trained on relevant skills for their future livelihood, such as sustainable grassland management. These skills will benefit the long-term development of the local communities who participate in the project.

#### **4.2.4 High Conservation Values Protected (CM2.4)**

As No HCVs was identified related to community well-being in the project zone thus none of the HCVs related to community well-being will be negatively affected by the project.

### **4.3 Other Stakeholder Impacts**

#### **4.3.1 Impacts on Other Stakeholders (CM3.1)**

The project 'do no harm' to the well-being of other stakeholders. In contrary, it will provide valued experience of sustainable grassland management and carbon trading to other stakeholder, which in some way could encourage more followers to engage in similar projects for sustainable development.

#### **4.3.2 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)**

The project restored degraded grassland, provided sustainable grazing guidance for herders in the project area, and provided a demonstration for other herders outside the project area.

There are no negative well-being impacts on other stakeholders.

#### **4.3.3 Net Impacts on Other Stakeholders (CM3.3)**

The project will provide valued experience of sustainable grassland management and carbon trading to other stakeholder, which in some way could encourage more followers to engage in similar projects for sustainable development. So the project activities are not anticipated to result in net negative impacts on the well-being of other stakeholders.

### **4.4 Community Impact Monitoring**

#### **4.4.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)**

To in-depth track the social-economic changes resulted from the project activities in the communities and households, and understand issues raised and difficulties encountered during the project implementation, as well as their opinions and comments on the project activities, so as to adjust and improve the project activities in a timely manner, a PRA process will be conducted before every verification, as described below.

**Procedures:**

- a) Establishing PRA team: The teams will be set up to conduct the PRA process, which consists of social experts, project officers, local government officials and technical staff with various background (grassland, sociology and ecology) from county forestry and grass bureau;
- b) Developing SOPs for the field PRA process;
- c) Training: A training workshop will be held for discussing and training of PRA teams in order to ensure all PRA members fully understand the purposes, contents, procedures and specific methods of the PRA field survey;
- d) Preparation: Developing detail PRA field survey plan including responsibility of each member of PRA team; and contacting with relevant project counties, nature reserves, forestry farms and towns/townships and informing them PRA plan.
- e) PRA survey: conducting PRA survey following SOPs.

**Methods:**

- a) Village meeting: A meeting of herder representatives will hold in villages sampled. The general agenda are:
  - (i) Introducing PRA team members and the purpose, procedures, methods and time schedules of the PRA process;
  - (ii) Explaining the way of villagers' participation;
  - (iii) Collecting information regarding the project progress, social-economic and environmental benefits shared from the projects, existing problems/difficulties encountered by local communities during the project implementation, as well as comments and suggestions on improvement of the project.
  - (iv) Collect information on the impact of project implementation on HCV (hydrological services and Kazakh cultural dissemination).
- b) Semi-structured interviews: This includes VIP interview, herder household interview and group interview
  - (i) Interviewing of VIP: including villager leaders, distinguished villagers, elder villagers and head of ethnic minority.
  - (ii) Interviewing of household: Some herder households will be selected for the interview. The interviewed households shall cover rich household, poor household, new inhabitant household, etc.
  - (iii) Group interview: Villagers are grouped based on gender, age classes or land use types. The group interviews were conducted together with village meeting.
- c) Questionnaire: Questionnaire forms will be developed and distributed among different stakeholders, including herder households, village committees, forest farms, township governments and Forestry and Grassland Bureau.

The following key variables will be monitored during each verification of the project:

|          |                                                                                                                                                            |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable | Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |                                                                  |
|-----------------------------------|------------------------------------------------------------------|
| monitoring methods to be applied  | Training records<br>Questionnaire and interview                  |
| Frequency of monitoring/recording | Before every verification event                                  |
| Affected community groups         | Local residents, local herders, Local women, grassland guardians |
| Purpose of monitoring             | Evaluate the technical improvement resulting from the project    |

|                                   |                                                                                                                                                    |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable                          | Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities |
| monitoring methods to be applied  | Training records<br>Questionnaire and interview                                                                                                    |
| Frequency of monitoring/recording | Before every verification event                                                                                                                    |
| Affected community groups         | Local women                                                                                                                                        |
| Purpose of monitoring             | Evaluate the technical improvement resulting from the project                                                                                      |

|                                   |                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------|
| Variable                          | Total number of people expected to be employed in project activities, expressed as number of full-time employees |
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview                                             |
| Frequency of monitoring/recording | Before every verification event                                                                                  |
| Affected community groups         | Local women, local herders, Local residents, grassland guardians                                                 |
| Purpose of monitoring             | Evaluate the community benefit resulting from the project                                                        |

|                                  |                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Variable                         | Number of women expected to be employed as a result of project activities, expressed as number of full-time employees |
| monitoring methods to be applied | Working contracts and payment records<br>Questionnaire and interview                                                  |

|                                   |                                                           |
|-----------------------------------|-----------------------------------------------------------|
| Frequency of monitoring/recording | Before every verification event                           |
| Affected community groups         | Local women                                               |
| Purpose of monitoring             | Evaluate the community benefit resulting from the project |

|                                   |                                                                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable                          | Total number of people expected to have improved livelihoods or income generated as a result of project activities                                                      |
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview<br>Training records                                                                                |
| Frequency of monitoring/recording | Before every verification event                                                                                                                                         |
| Affected community groups         | Local women, local herders, Local residents, grassland guardians                                                                                                        |
| Purpose of monitoring             | Evaluate the change of livelihoods and household income due to the implementation of the project, such as increased job opportunities and improved grazing productivity |

|                                   |                                                                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable                          | Number of women expected to have improved livelihoods or income generated as a result of project activities                                                             |
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview<br>Training records                                                                                |
| Frequency of monitoring/recording | Before every verification event                                                                                                                                         |
| Affected community groups         | Local women                                                                                                                                                             |
| Purpose of monitoring             | Evaluate the change of livelihoods and household income due to the implementation of the project, such as increased job opportunities and improved grazing productivity |

|          |                                                                                                             |
|----------|-------------------------------------------------------------------------------------------------------------|
| Variable | Total number of community members whose well-being is expected to improve as a result of project activities |
|----------|-------------------------------------------------------------------------------------------------------------|

|                                   |                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------|
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview<br>Training records |
| Frequency of monitoring/recording | Before every verification event                                                          |
| Affected community groups         | Local women, local herders, Local residents, grassland guardians, Village collectives    |
| Purpose of monitoring             | Evaluate the change of well-being due to the implementation of the project               |

|                                   |                                                                                           |
|-----------------------------------|-------------------------------------------------------------------------------------------|
| Variable                          | Number of women whose well-being is expected to improve as a result of project activities |
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview<br>Training records  |
| Frequency of monitoring/recording | Before every verification event                                                           |
| Affected community groups         | Local women, Village collectives                                                          |
| Purpose of monitoring             | Evaluate the change of well-being due to the implementation of the project                |

|                                   |                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------|
| Variable                          | Area of degraded grassland restored                                             |
| monitoring methods to be applied  | Project records                                                                 |
| Frequency of monitoring/recording | Before every verification event                                                 |
| Affected community groups         | Burqin Forestry and Grassland Bureau<br>Village collectives<br>Local government |
| Purpose of monitoring             | Evaluate the environmental improvement resulting from the project               |

|          |                                                     |
|----------|-----------------------------------------------------|
| Variable | Number of Kazakh benefiting from project activities |
|----------|-----------------------------------------------------|

|                                   |                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| monitoring methods to be applied  | Working contracts and payment records<br>Questionnaire and interview                                                                            |
| Frequency of monitoring/recording | Before every verification event                                                                                                                 |
| Affected community groups         | Local Kazakh                                                                                                                                    |
| Purpose of monitoring             | Evaluate the conservation and diffusion of Kazakh cultural resulting from the project, such as organizing special community cultural activities |

#### **4.4.2 Monitoring Plan Dissemination (CM4.3)**

The community monitoring plan and results of first verification will be published on VCS and CCB website which could be easily download by stakeholders. Also, the summary of project description in local language will be disseminated to local communities through Burqin Forestry and Grassland Bureau. At the same time, public notice boards were used to publicize information regarding how to access to the community monitoring plan through internet. Technical staff from Burqin Forestry and Grassland Bureau would explain the community monitoring plan to local herders, especially to illiterate or under-educated herders. Also, a contact person with phone number was published in case any stakeholders want to directly contact the project proponent and raise opinions.

#### **4.5 Optional Criterion: Exceptional Community Benefits**

N/A.

##### **4.5.1 Exceptional Community Criteria (GL2.1)**

N/A.

##### **4.5.2 Short-term and Long-term Community Benefits (GL2.2)**

N/A.

##### **4.5.3 Community Participation Risks (GL2.3)**

N/A.

##### **4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)**

N/A.

##### **4.5.5 Net Impacts on Women (GL2.5)**

N/A.

##### **4.5.6 Benefit Sharing Mechanisms (GL2.6)**

N/A.

#### **4.5.7 Benefits, Costs, and Risks Communication (GL2.7)**

N/A.

#### **4.5.8 Governance and Implementation Structures (GL2.8)**

N/A.

#### **4.5.9 Smallholders/Community Members Capacity Development (GL2.9)**

N/A.

### **5 BIODIVERSITY**

#### **5.1 Without-Project Biodiversity Scenario**

##### **5.1.1 Existing Conditions (B1.1)**

In recent years, due to overgrazing, grassland in project zone has been degraded to varying degrees and even desertification, which has seriously damaged the growth conditions of plants and the habitat on which wild animals depend, resulting in the decline of biodiversity.

The biodiversity within the project zone at the start of the project are summarized as follows:

There are seven vegetation types in Burqin County including forest, meadow, steppe, shrub, alpine vegetation, stone vegetation, marsh and aquatic vegetation, and the vertical distribution law is obvious, which can be divided into five zones from bottom to top: zhongshan forest meadow zone, subalpine meadow zone, alpine meadow zone, alpine tundra vegetation zone and permanent snow mountain zone. The forest vegetation is mainly distributed in shady slope, semi-shady slope and gully below 2,800m. The forest-meadow belt is 1,300 ~ 2,300 meters above sea level. The forest vegetation is dominated by *Larch*, *Spruce*, *Abies* and *Pinus Chinensis*, followed by *Aspen*, *Betula Verruca* and *Salix*. River Terrace, forest clearing and sunny slope are mostly meadow grassland vegetation. In the valley between the mountains, Lake Mouth on both sides of the development of swamp vegetation swamp. The shrub vegetation composed of mesophytic and mesophytic shrubs was fully developed. From 2,200 to 2,300 meters, it is subalpine meadow zone, but it is not sufficient in many areas. It is well developed in the penneplain. Plant species to the middle grass, weeds composition. Subalpine meadow vegetation coexisted with forest vegetation from 2,100 m. 2,400 ~ 2,600 meters of alpine meadow belt. Forest vegetation gradually sparse, mesophytes and weeds composed of plant communities widely developed. Coniferous shrub is more common, in gentle slopes, valley areas with good moisture conditions, there is a large area of broad-leaved shrub dominated by *Betula* round leaf.

According to the Biodiversity Baseline Survey Report, in the project zone, there are 51 animal species, belonging to 13 orders and 26 families. Among them, there are 15 species of mammals, 36 species of birds, and 3 species of national level I protected species, 11 species of national level II protected species in the project zone. Furthermore, there are 3 endangered species (*Gulo gulo*, *Cervus canadensis*, *Tetrao urogallus*) and 1 critically endangered species (*Alces alces*) are listed in the IUCN Red List.

Table 5-1 Endangered and critically endangered species in the project zone

| Species                      | Red List of IUCN | National Protection level |
|------------------------------|------------------|---------------------------|
| (1) <i>Gulo gulo</i>         | EN               | I                         |
| (2) <i>Cervus canadensis</i> | EN               | II                        |
| (3) <i>Alces alces</i>       | CR               | II                        |
| (4) <i>Tetrao urogallus</i>  | EN               | II                        |

### Threats to the biodiversity

According to previous studies, the factors threatening biodiversity mainly include the following aspects:

#### Climatic factors

Project zone is located in the arid area of Northwest China, with obvious continental climate characteristics. With global warming, permafrost melts in a large area, permafrost activation, snow line rise and water conservation function decline. In addition, the increase of temperature is not conducive to vegetation growth and breeding, resulting in the decline of litter yield, the input of soil organic matter and biodiversity.

#### Insect and rodent damage factors

Serious insect and rodent damage is one of the important factors for grassland degradation in project zone. The main rodents include *Ochotona curzoniae*, *Myospalax fannieri*, *Meriones unguiculatus*, etc. These rodents directly destroy grassland vegetation by gnawing grass leaves and roots, and have the living habits of digging holes, burrowing and accumulating sand and soil, damaging grass roots, burying forage plants and destroying soil structure indirectly inhibited the normal breeding of forage. In addition, rats competed with cattle and sheep for forage, which further exacerbated the contradiction between forage and livestock.

#### Overload overgrazing

Long term overgrazing is the main cause of grassland degradation and desertification in project zone. Grassland overgrazing is mainly due to two reasons: one is the decline of the absolute amount of grassland suitable for grazing, resulting in a significant reduction in the area of grassland available for livestock grazing; Second, the animal husbandry population has increased, the total amount of livestock has increased, and the grazing intensity has increased. Specifically, the adverse effects of overgrazing on grassland ecosystem mainly include three aspects: first, it reduces the overall productivity of grassland by feeding a large number of plants; Second, selective feeding significantly inhibited the growth of high-quality forages, provided space for the invasion of inedible poisonous weeds and weeds, and the community tended to degenerate; Third, the high-intensity and high-density trampling of livestock leads to the increase of soil compactness, the decrease of porosity, and it is difficult to effectively retain water, which is not conducive to root growth and development. Grassland degradation and destruction lead to the loss of biological habitat and the reduction of animal population.

### 5.1.2 High Conservation Values (B1.2)

No HCVs was identified related to biodiversity in the project zone.

### 5.1.3 Without-project Scenario: Biodiversity (B1.3)

As mentioned above, the without-project land use scenario is continuing “degraded” of the current grassland ecosystem due to overgrazing. Without the implementation of the project, the conservation of the local biodiversity would not be achieved under the continued degradation of grassland ecosystem, which would be a serious threat to local climate conditions and ecosystem, especially for the endangered birds species mentioned above.

## 5.2 Net Positive Biodiversity Impacts

### 5.2.1 Expected Biodiversity Changes (B2.1)

|                         |                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Element    | Grassland coverage of the project area                                                                                                                                                                                                                                                                                                        |
| Estimated Change        | Positive, the coverage is estimated to be increased                                                                                                                                                                                                                                                                                           |
| Justification of Change | The project planted <i>Elymus nutans</i> , <i>Agropyron cristatum</i> , <i>Festuca rubra</i> and <i>Artemisia sphaerocephala</i> on degraded grassland, the grassland coverage of the project area will increase. The restored grassland is more suitable for the survival of animals and will increase the biodiversity of the project area. |

|                         |                                                                                                                                                                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Element    | Number of grass species in the project area                                                                                                                                                                                       |
| Estimated Change        | Positive, the number of the species is expected to be increased                                                                                                                                                                   |
| Justification of Change | Four native grass species ( <i>Elymus nutans</i> , <i>Agropyron cristatum</i> , <i>Festuca rubra</i> and <i>Artemisia sphaerocephala</i> ) have been planted in project area which will be maintained under long-term management. |

|                         |                                                                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Element    | Threats to endangered animals                                                                                                                                                                                                               |
| Estimated Change        | Positive, the threats are expected to be reduced                                                                                                                                                                                            |
| Justification of Change | The project prevented the continued degradation of the local grassland ecosystem and increased the natural habitats for the endangered animals, so the threats to endangered animals will be reduced as a result of the project activities. |

### 5.2.2 Mitigation Measures (B2.3)

The main measure of the project is rotational grazing and rest grazing through building grassland fences and planted grass seeds on the degraded grassland. Through scientific and sustainable management of grazing, relevant training about technical skills, scientific and effective management plan, alleviate soil desertification and restore grassland vegetation to improve soil carbon storage and local biodiversity. The management team are experienced with sustainable

grassland management as mentioned in Section 2.4.2 and has established an integrated management system for implementation of the project, including rodent control, fire prevention and technical training of employees, which will minimize the intensity and periodicity of required interventions. Also, the implementation of the project has improved the ecological environment of the project zone, increased the biodiversity and provided more habitats for threatened species. In addition, all grass species are native species, and no invasive species will be introduced.

Therefore, implementation of this project will not decrease biodiversity of project sites.

### **5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)**

As mentioned before, without the project, the project area will continue degraded with much threat to local climate and biodiversity condition. And the main object of the project is to restore the degraded grassland ecosystem, by planting with mix species of native grass, therefore the net with-project change of biodiversity is positive.

First, there are 4 native species of grass planted in this project, including *Elymus nutans*, *Agropyron cristatum*, *Festuca rubra* and *Artemisia sphaerocephala*. The mix planting of the species will have more positive impacts on biodiversity according to relevant research.

Second, through sustainable grassland management, including rodent control, grassland fire prevention and reasonable grazing guidance, the degraded grassland ecosystem is gradually restored. This will make sure the project can bring net biodiversity benefit compares to the with-out project scenario.

Third, the implementation of the project can improve grassland productivity and increase the coverage which is beneficial of water conservation, reduce drought and flood risk, promote soil nutrient cycle, improve local micro-climate and other ecological environment. Therefore, the population of animals will increase due to the restoration of the habitat.

### **5.2.4 High Conservation Values Protected (B2.4)**

No HCVs was identified related to biodiversity in the project zone thus no HCVs related to biodiversity are negatively affected by the project.

### **5.2.5 Species Used (B2.5)**

*Elymus nutans*, *Agropyron cristatum*, *Festuca rubra* and *Artemisia sphaerocephala* were planted on the degraded grassland in project area.

### **5.2.6 Invasive Species (B2.5)**

All grass species are native species and no invasive species were and will be introduced into any area affected by the project.

### **5.2.7 Impacts of Non-native Species (B2.6)**

No non-native species will be used in the project zone.

### 5.2.8 GMO Exclusion (B2.7)

No GMOs will be used in the project to generate GHG emissions reductions or removals.

### 5.2.9 Inputs Justification (B2.8)

According to the Project Design Report, there are no chemical fertilizer applied in the project area. In order to alleviate the pressure of grassland forage, artificial feeding grassland is built around the project area, but only farm manure is applied.

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                     | Chemical pesticides                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Justification of Use     | The chemical pesticides are allowed to be used only if there is a serious disease problem erupted in the project area, and the pesticides will be used in accordance with the National Pesticides Policy.                                                                                                                                                                                                                                                                                                                                               |
| Potential Adverse Effect | Improper pesticide application would be harmful to natural environment, including polluting soil, water and air conditions, as well as the habitat of the wildlife. But for this project, pesticide will be strictly managed by well trained staff to minimize the potential effect. Also, the environmental friendly measures will be adapted such as mixed species arrangement, seed and seedling quarantine. Especially the biological measures to control pests and diseases will be adopted. Therefore, the pesticide application will be limited. |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                 | Biological control agents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Justification of Use | <p>The biological control agents are environmentally friendly and do not have any side effects for humans. Upon routine overseeing, the pest will be treated by biological control once occurred according to local Pest Control and Prevention Policy.</p> <p>Different biological control agents:</p> <p>1) Fungus, as a biocontrol method, forms a biological method of pest control. Fungi as a biocontrol method are considered a rapidly developing method and do not cause any harm to the environment. Fungi as a biocontrol method have proved to be a very effective alternative to chemical pesticides. Fungi as a biocontrol method are gaining widespread popularity in recent times.</p> <p>2)The parasitoids lay eggs in the body of their hosts which ultimately leads to the death of the host. The dead host is then used by the larvae as a food source as is one of the most prevalent methods of biological control.</p> |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Potential Adverse Effect | Biological control may have potential adverse effects on the ecology of plants and animals if exotic natural enemies of insects are used. Since the project is planted with local species, there are local natural enemies for pest and disease control. Meanwhile, the project has established a risk evaluation mechanism to avoid the use of exotic natural enemies in the process of biological control. |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 5.2.10 Waste Products (B2.9)

The waste products resulting from the project activities may include:

(1) Rubbish: Local people will clear off the rubbish, such as plastics, metals, papers and other abandoned items from the project area regularly when they manage the grassland. Project owner will also carry out frequent visit to ensure the waste and waste products are well identified and cleaned.

(2) Human waste: There might be some human waste because there is no toilet in the field. However, the amount will be quite small and can be degraded naturally, so there is no particular treatment needed.

(3) Chemical pesticides waste: In order to prevent the pollution of pesticide waste, guarantee public health and protect the ecological environment, this project has strictly followed the management of pesticide waste in accordance with China Population Packaging Waste Recycling Management<sup>77</sup>. In the process of application, the pesticide in the packaging will be fully used by cleaning and other ways to reduce pesticide residues. At the same time, actively fulfilled the obligation of recycling and treatment of pesticide waste, set up a recycling station to recycle pesticide waste in time, and finally transfer the recycled waste to the waste disposal agency designated by the local government for subsequent treatment. The project owners will disseminate and train forest rangers in relevant knowledge to ensure strict compliance with the above-mentioned procedures.

## 5.3 Offsite Biodiversity Impacts

### 5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

As the project activities will increase the area of the habitat, as well as improve the habitats' quality, only positive biodiversity impacts can be identified. Therefore, there are no potential negative offsite impacts on biodiversity.

### 5.3.2 Net Offsite Biodiversity Benefits (B3.3)

As described above, there are no potential negative offsite impacts on biodiversity, the net effect of the project on biodiversity is positive.

<sup>77</sup> [http://www.moa.gov.cn/govpublic/ZZYGSL/202008/t20200828\\_6351145.htm](http://www.moa.gov.cn/govpublic/ZZYGSL/202008/t20200828_6351145.htm)

## 5.4 Biodiversity Impact Monitoring

### 5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

As shown in Figure 3-2, the project owner established a monitoring team to conduct biodiversity monitoring. The responsibilities of each role in the team structure are:

- Monitoring manager has the overall management responsibility, especially supervising the implementation of the monitoring plan, and assigning each member of the monitoring team their individual responsibility during the monitoring;
- Monitoring staff conducts the following monitoring process, measures the required parameters of the project as listed in the following table particularly, and collects all the original evidences and data and make relevant records;
- Auditing staff performs internal verification of the measurement, reviews all the monitoring records and documents, crosschecks evidence and calculates emission removals during each verification period.
- Expert group provide advises to monitoring manager to make sure the monitoring activities are in line with relevant requirement, and the expert group also review the monitoring results before each verification, in case any non-conformances founded, expert group will ask the monitoring team to take necessary compensation measures (redo some of the monitoring activities or calculation) until all the non-conformances been corrected.

A Monitoring Manual has been provided to each member of the monitoring team with a specific explanation to make sure they fully understand all the monitoring process and issues concerned.

As mentioned in Section 2.1.11, the main objective of the project is to restore the degraded grassland ecosystem, by planting *Elymus nutans*, *Agropyron cristatum*, *Festuca rubra* and *Artemisia sphaerocephala*. Also, grazing was strictly forbidden in the first five years after seeding, and then controlled grazing will be allowed depending on the growth situation of the forage. And based on the analysis in Section 2.1.18, the risks of fire, rodents, pests and overgrazing might threat the aim of the project and need to be intervened.

According to Section 5.4 of SBIA Manual-Part 3, the traditional monitoring protocols often require significant inputs of time, money, and scientific expertise, which are hard to sustain over long periods, while providing few benefits to local communities<sup>78</sup>. So-called “community-based monitoring” would appear to be a good fit for many carbon projects, its focus on practical issues of sustainability, such monitoring also has the potential to interact in a positive way with the social component of carbon projects. The involvement of local residents in monitoring programs can improve methods and results by incorporating their knowledge of the region’s biodiversity into protocols and can improve data quality by allowing programs to collect data year-round rather than during occasional expert visits. Likewise, local involvement in monitoring can empower communities by helping instil a greater sense of ownership of and responsibility for the biodiversity objectives of a project. Following the guidelines of SBIA Manual, the project chose multiple

<sup>78</sup> Gardner, T. 2010. Monitoring forest biodiversity: Improving conservation through ecologically responsible management. Earthscan Ltd., London. 360 pages.

indicators and Pressure, State, and Response (PSR) indicators for the monitoring of biodiversity, while vegetation and animals were both involved to be monitored and the threaten and risk factors such as fire and disease are included, therefore the monitoring indicators should be considered as reasonable, considering the balance of high-quality data, low costs, regular measurements, and community participation.

According to SBIA-Part 3, three types of monitoring indicators will be chosen, including Pressure, State, and Response (PSR). Since natural systems are extremely complex, and even variables that are carefully chosen to reflect the health of a system will sometimes fluctuate for reasons unrelated to the project. In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit. Usually, the abundance of endangered animals can accurately reflect the status of the local ecosystem. The greater the number of endangered animals, indicating the better the ecological environment in the region. And considering the cost efficiency, the indicators that can be monitored with relative ease and reflect local conditions should be chosen. Therefore, the project chooses “reduced threats to endangered animals” and “population status of animals” as indicators to monitor the project’s impact on animals which should be appropriate for a sustainable grassland management project.

Also, the indicators of “population status of animals” and “reduced threats to endangered animals” are used to monitor the quantity and quality of grassland in the project area (a state indicator), together with other indicators (“grassland coverage” and “species of vegetation”), therefore the general benefit of local biodiversity could be reflected by the overall monitoring results of the multiple indicators.

All the original monitoring results will be recorded by auditing staff and assessed by the expert group to measure the net biodiversity impact and the effectiveness of the measures taken by the project activities.

The detailed monitoring plan for biodiversity is listed in the following table:

Table 5-2 Monitoring indicators for biodiversity

| Indicator type  | Description                                               | Monitoring indicator                   | Indicator unit | Monitoring method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Monitoring frequency      |
|-----------------|-----------------------------------------------------------|----------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| State variables | The quantity and quality of grassland in the project area | Grassland coverage in the project area | ha             | Sample plots of the same size are installed nearby each SOC sample plots to monitor the coverage (totally 31 sample plots were set up, please refer to Section 3.3.3 for the detailed sampling procedures). Plot size is set to be a rectangle land with 5m*5m (25m <sup>2</sup> ). Calculate grassland coverage by estimating the projected area of vegetation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Before every verification |
|                 |                                                           | Grass species in the project area      | /              | Sample plots have been set to monitor the species of vegetation which were the same as the sample plots set for monitoring of climate (totally 31 sample plots were set up, please refer to Section 3.3.3 for the detailed sampling procedures). Plot size is set to be a rectangle land with 5m*5m (25m <sup>2</sup> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Before every verification |
|                 |                                                           | Population status of animals           | /              | A total of 36 monitoring lines would be set up, 12 monitoring lines (each of 3km) have been set in each strata to monitor endangered animals which were selected randomly from the sample plots set for monitoring of climate, and the monitoring team will walk along each monitoring line for at least one day (first monitoring was from 07:00 to 11:00 and repeated monitoring from 15:00 to 18:00) during the monitoring period to observe the occurrence of animals. And the set-up of monitoring lines is in accordance with the national standard ("Technical Regulations on Bird Biodiversity Survey and Assessment" and "Technical Regulations on Mammals Biodiversity Survey and Assessment" issued by the Ministry of Ecology and Environment of the People's Republic of China <sup>79</sup> ) which should be scientifically corroborated. | Before every verification |

<sup>79</sup> Ministry of Ecology and Environment of People's Republic of China, Publication of Technical Regulations on County Biodiversity Survey and Assessment, 28 December 2017. [https://www.mee.gov.cn/gkml/hbb/bgg/201801/t20180108\\_429275.htm](https://www.mee.gov.cn/gkml/hbb/bgg/201801/t20180108_429275.htm)

| Indicator type     | Description                                                                                                       | Monitoring indicator                                                                    | Indicator unit | Monitoring method                                                                                                                                                                                                                               | Monitoring frequency      |
|--------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                    |                                                                                                                   | Reduced threats to endangered animals.<br><br>(Reduced grazing days and wildlife theft) | /              | The grassland guardians patrolled the management and protection area regularly, once every 15 days, supervise and prevent wildlife theft, record the grazing days and report the protect situation to the Burqin Forestry and Grassland Bureau. | Before every verification |
| Pressure variables | The frequency or intensity of anthropogenic impacts that are directly harmful to biodiversity in the project zone | Number of fires occurred                                                                | /              | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Effected grassland area suffered rodents and pests                                      | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Overgrazing                                                                             | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Fertilizer and Chemical pesticides                                                      | t              | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
| Response variables | The frequency or intensity of project interventions relevant to biodiversity                                      | Grassland area under prevention control from fires                                      | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Grassland area under prevention control from rodents and pests                          | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Project area of sustainable grassland management                                        | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |
|                    |                                                                                                                   | Project area for restoration of degraded grassland                                      | ha             | Recorded by grassland guardians and confirmed by local Forest Bureau                                                                                                                                                                            | Once every year           |

**5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)**

The biodiversity monitoring plan and results of first verification will be published on VCS and CCB website which could be easily download by stakeholders. Also, the summary of project description in local language will be disseminated to local communities through Burqin Forestry and Grassland Bureau, as long as the summary of monitoring reports during first verification. At the same time, public notice boards were used to publicize information regarding how to access to the biodiversity monitoring plan through internet. Technical staff from Burqin Forestry and Grassland Bureau would also explain the biodiversity monitoring plan to local residents, especially to illiterate or under-educated residents. Also, a contact person with phone number was published in case any stakeholders want to directly contact the project proponent and raise opinions.

**5.5 Optional Criterion: Exceptional Biodiversity Benefits**

N/A.

**5.5.1 High Biodiversity Conservation Priority Status (GL3.1)**

N/A.

**5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)**

N/A.