

Supplementary materials



Fig. S1 Wet meadow

Habitat in the figure is wet meadow in our manuscript, also called as drought marsh in the Zoigê wetland. The dominant species in this community are *Elymus nutans*, *Ranunculus tanguticus*, *Leontopodium nanum*, *Polygonum viviparum*, *Taraxacum maurocarpum*, *Aster tataricus*, *Trollius ranunculoides* and *Geranium pylzovianum*. The height of plants ranges from 10 cm to 30 cm, and the plant coverage is more than 90%. The soil of the wet meadow is peat soil. The swampy meadow distributes widely in the Zoigê wetland.



Fig. S2 Grassland meadow

Habitat in the figure is grassland meadow in our manuscript, which develops from wet meadow because of water running off. The most common species are *Festuca ovina*, *Kobresia setchwanensis*, *Ranunculus tanguticus*, *Carum carvi*, *Stellera chamaejasme*, *Anaphalis lacteal*, *Anemone trullifolia*, *Trollius farreri*, *Elymus nutans*, *Poa pratensis*, and *Oxytropis Kansuensis*. The height of plants ranges from 20 cm to 40 cm and the plant coverage is more than 90%. The soil of the grassland meadow is sandy loam. The grassland meadow is also distributes widely in the Zoigê wetland.



Fig. S3 Moderately degraded meadow

Habitat in the figure is the moderately degraded meadow in our manuscript, which develops from grassland meadow because of effects of climate change and heavy grazing. The dominant species in this community are *Potentilla ansrina*, *Kobresia bellardii*, *Ligularia virgaurea*, *Taraxacum lugubre Dahlst*, *Ranunculus tanguticus*, and *Oxytropis Kansuensis*. The height of plants ranges from 0 cm to 5 cm, and the plant coverage is approximately 50%-70%. The soil of the moderately degraded meadow is sandy loam. The area of moderately degraded meadow is increasing in the Zoigê wetland.





Fig. S4 Severely degraded meadow

Habitat in the figure is severely degraded meadow in our manuscript, which develops from the moderately degraded meadow because of climate change and heavy grazing. The dominant plant species in this community are *Elymus nutans* and *Carum carvi*. The plant height ranges from 0 cm to 20 cm and the plant coverage is less than 10%. The soil of the severely degraded meadow is sandy soil. **The thicker root layer can indicate that this area was once a wetland.** The area of severely degraded meadow is stable in recent years because of many measures was used to prevent the grassland from desertification in the Zoigê wetland.