Costs Benifits Analysis of Conservation Efforts in Gahai Wetland Reserve, South Gansu

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Introduction of Gahai Wetland

Gahai reserve was constructed in 1982, its main protection object are wetland, grassland of high plateau, birds and other animal ant plants. Total area is 247,431 hm². It is listed in international important wetland list.
Gahai wetland has different type: lake, river, and peatland. They provide ecosystem service of maintenance water, regulation of climate, maintenance of biodiversity, husbandry for Tibetans.
Introduction of Gahai Wetland
Gahai lake
river area
Recognition Valuation of Gahai valuation

- total value
  - use value
    - direct use value
    - indirect use value
      - selection value
      - exist value
        - 遗产 value
  - non use value
    - direct goods valu
    - indirect service
      - ecological func.value
      - env. func. value
Protection Engineer
dam construction
ES Categories - maintenance of water(1)
more than 80 birds species, 20,000 individual
ES Categories-maintanance biodiversity(2)

- 9 fish species
ES Categories-Carbon storage(3)
in Peatland due to much water, high elevation 3400 m, lower temperature, it forms small hill.
ES Categories-Carbon storage
ES Categories-stock husbandry (4)
ES Categories - Scientific research - international peatland workshop (5)
Data collection

- Anual Statistic book from local government;
- Lokal experts consulting;
- Questionnaire survey;
- Exist research report;
- Sampling investigation.
Data collection
Plants investigation ——
sample
Data collection- Questionnaire survey
Data collection-Carbon investigation
Peatland investigation
Valuation Calculation——direct goods valuation

- Husbundary: gahai reserve is excellent grassland, rational capacity is **78,000 sheep unit. annual products valuation 13,10 Million Yuan**.
- medicinal plants 83 species, but we haven't surveyed the product amount, and can't calculate the value.
Tourism Value: 2007, tourist 220.6 thousand, of them foreign 60.7 thousand, income 67,850 million Yuan, Gahai is 1/3, 22,620 million Yuan.

Scientific research value: science 2007, 8 doctorate students, 20 master students research birds, peatland, carbon storage, more than 30 international experts, 20 national experts have excursion and research.
Education and cultural valuation: every year more than 50 students exkursion in Gahai wetland.

Every year 150 students from school come to Gahai wetland to learn birds, wetland popularization of education

Birds association from Beijing, Hangkong, Taiwan, Shandong, chengdu, Jiangsu to watch birds and take photos.

Hand book related with Gahai wentland, documentary.
Maintainence of biodiversity:

According to monitoring data, 21,000 on average, 2009, 24,000 birds, 13 birds/km², 500 Yuan/per bird, valuation: 6500 Yuan/km² (65 元/hm²) total valuation more than 10 Million.
Carbon storage

• Based on scientific investigation in 2007, peatland area is 10,429 hm² in wetland resource, and the thickness was about 1.94m in average among 14 monitoring stations, carbon storage was about 20 billion m³.

• Based on the carbon investigation by Gansu agricultural university, dry matter in peatland is 0.463 3 g/cm³, organic carbon in dry matter is 190.83g/kg.

• Dry matter is 9.3 billion t., organic carbon stock is 17.75 million t., according to the research from Fankhauser and Pearce, costs of carbon release is 20.4 dollar /t.
Environmental function value

Maintenance water source

• Gahai wetland is the head stream of one of the largest branch river of Taohe river.
• Area of wetland and watershed reached 141,861 hm², benefits of water maintenance was 56 billion m³, surface water reaches 41 billion m³, ground water reaches 15 billion m³, so the total value was 33.6 billion yuan/a
- **hydro power:** 5 hydro power, total 59.98Mil.kw
- Benefits per year 40Mil. yuan
we use CVM survey the pay willing of people near gahai. 300 questionnaire table, the result shows pay willing per peson/year 70元，pay willing rate higher than 70%．
Total valuation

- **Total valuation** = use valuation + non use valuation = direct goods valuation + direct service valuation + ecological service valuation + environmental function Valuation + non use valuation

- **initial assessed valuation** = 13.1Mil. + 23Mil. + 22.6Mil. + 10Mil. + 336Mil. + 40Mil. = 444.7Mil. Yuan
20 works, 40,000 Yuan/person year, 800,000 Yuan per year.

Since 2007, research project, 290,000 Yuan from province forestry department; 18.1 Million from SFA, 3.30 Million Yuan for wetland restoration. Total 21.69 Million, 3.1 Million Yuan per Year.

2001-2007, infrastructure, propaganda and education 91.461 Million Yuan, 13.06 Million Yuan per year.

Costs per year = 800,000 + 3.1 Million + 13.06 Million = **16.96 Million Yuan**
Costs per year **16.96 Million Yuan**

*use valuation per year** 444.7 Million Yuan*

*use valuation/Costs per year = 26.22 times!*

*non ues valuation more than 1 billion!*
this is just a rough research and was done in last week. some service such as soil maintenence, oxygen release, nutrition circle, not in count.

Tibetans have high pay willing. holy lake. but they think every thing shuld be nature! If the Lake is dry, it is the God's idea. human needn't disturbance nature!
Thank you for your attention!