Participating Assessment and Analytic Hierarchy Process to prioritize adaptation in Xilingol, Inner Mongolia, Northern China

For

Asia-Pacific Climate Change Adaptation Forum

By
Fenglian Du & Liguang Zhou
Inner Mongolia University, China
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Outline

- Backgrounds
- Introduction of Climate Change Adaptation of Grassland Livestock Industry in IM
- Participating Assessment and Analytic Hierarchy Process
 - Multi-level assessment:provincial/city/individual level ()
 - Multi-agency:management/research ()
 - Multi-sectoral:livestock industry/water/infrastructure (×)
- Results and Discussion
- > Policy implications
- Further research

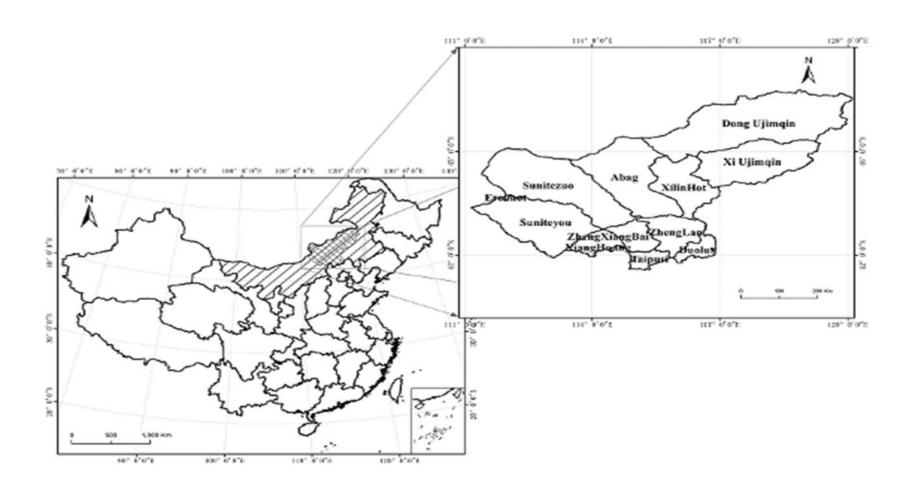
1. Backgrounds of research

- ➤ Livestock husbandry system is globally important (Freeman et al. 2007, David et al. 2009, Xu et al. 2012)
 - for the human populations it supports
 - the food and ecological services it provides
 - the economic contributions
 - and the long-standing civilizations it helps to maintain
- Climate can affect livestock both directly and indirectly (Thornton et al. 2007, Rowlinson et al. 2008)
 - Direct effects on livestock performance: growth, milk production, wool production and reproduction
 - Indirect effects on the quantity and quality of feedstuffs :pasture, forage, grain and the severity and distribution of livestock diseases and parasites
- The availability and implementation of adaptation options will influence the ability of the grassland industry to ameliorate the impacts of, or potentially benefit from, CC(Stokes et al. 2008, Huntsinger et al. 2010).

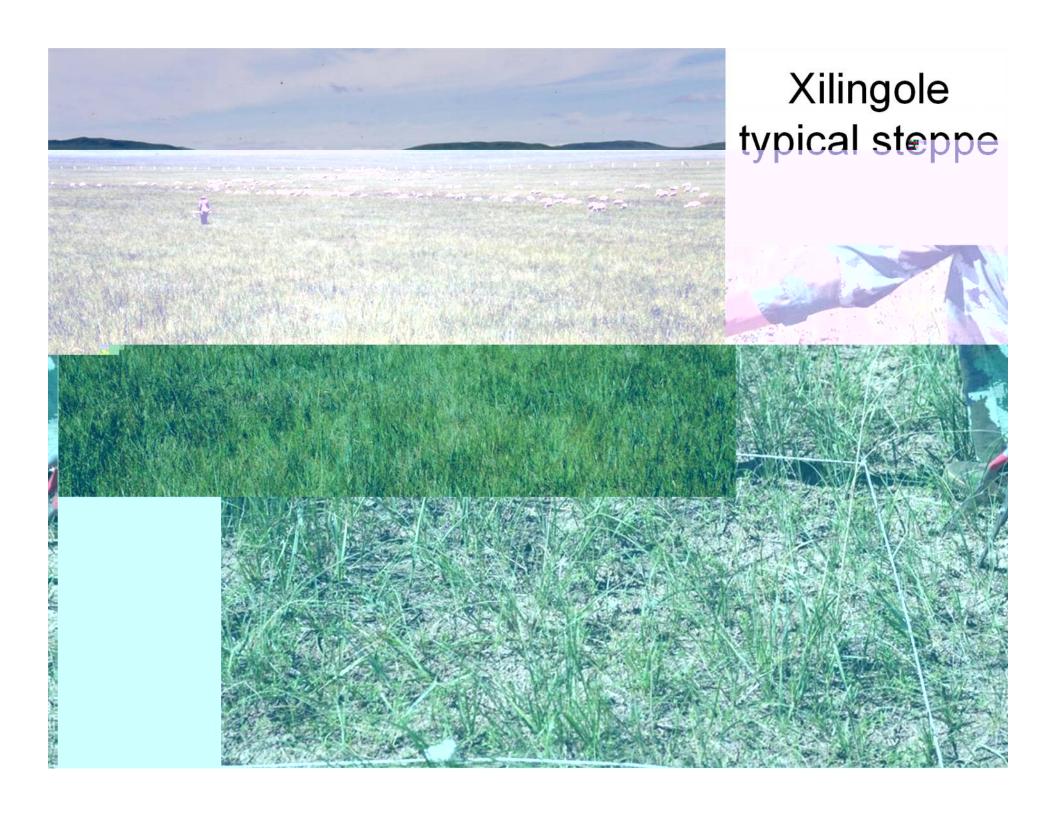
1. Backgrounds:research

- Purpose of climate adaptation policy assessment
 - To collect and prioritize the adaptation strategies: tops down & bottoms up
 - To detect what are the potential adaptation strategies to climate change
 - > To improve the policy effectiveness by facilitating multi-level cooperation
- > IM as a pilot province
 - Grassland livestock industry as one of the most important industries
 - Drought is one of the most threatening CC
 - Grassland livestock industry is more vulnerable to CC than other industries

Research area

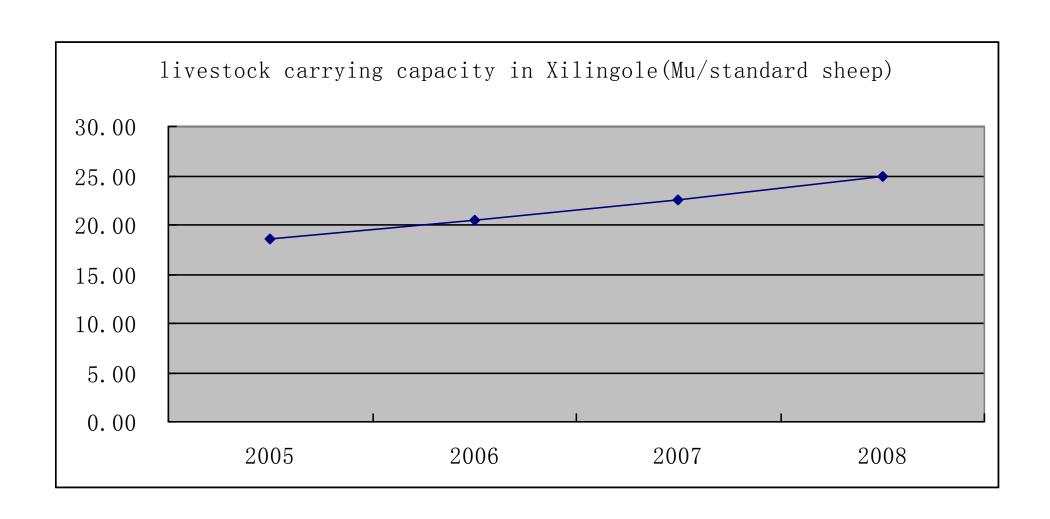


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Livestock carrying capacity



2. Adaptation to CC, Grassland Livestock Industry in IM Average Temperature in summer Total precipitation in summer Temperature (°C) Precipitation (mm) Year b d Per capita net income of herdman (100 Yuan) Per capita net income of herdman Total of pastoral population (100 people) \$250 00 200 01 Annual quantity of harvested grass Total of pastoral population 1975 1980 1985 1990 1995 2000 2005 2010 Year Year C e Small livestock and sheep (1, 000 heads) Large livestock and cattle (1,000 heads) Total of small livestock Electromechanical well (100 units) Electromechanical well Total of sheep Ordinary well Total of large livestock Ordinary well (100 units) 1975 1980 1985 1990 1995 2000 2005 2010 Year Year

Biological adaptation?-a traditional wisdom





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Participating Assessment

Table 1. Composition of stakeholders

	Туре	Number	Gender		Nationality		Title	
Level			Male	Female	Han	Mongolian	Director /Professor	Vice Director /Associate Professor
Provincial	Official (IM)	9	6 (66.7%)	3 (33.3%)	8 (88.9%)	1 (11.1%)	5 (55.6%)	4 (44.4%)
	Expert (IM)	14	8 (57.1%)	6 (42.9%)	10 (71.4%)	4 (28.6%)	11 (78.6%)	3 (21.4%)
City	Official (XGL)	7	6 (85.7%)	1 (14.3%)	6 (85.7%)	1 (14.3%)		
Individual	Herdsman	10	8 (80%)	2 (20%)	1(10%)	9 (90%)		

Note: at the Provincial Level, the participants are divided into two categories: officials and experts, which represent different agencies

Participating Assessment by stakeholders at provincial level: officials and experts





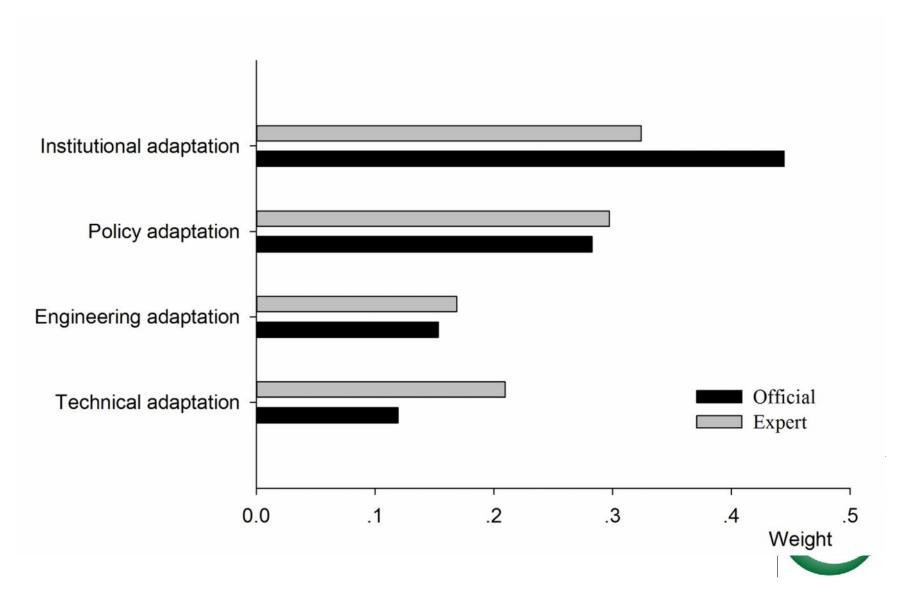






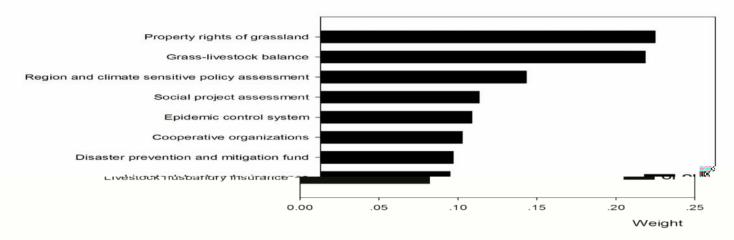


Participating Assessment & AHP: officials and experts-the primary categories

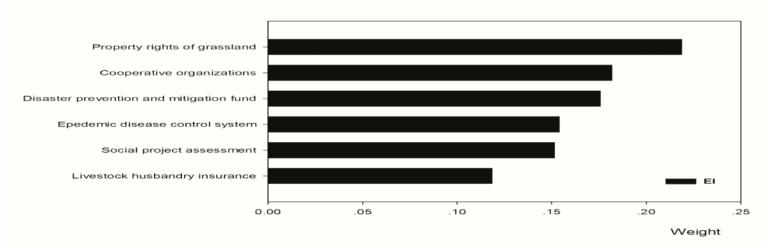


PA & AHP: Institutional adaptation priorities by officials and

Official Institutional adaptation



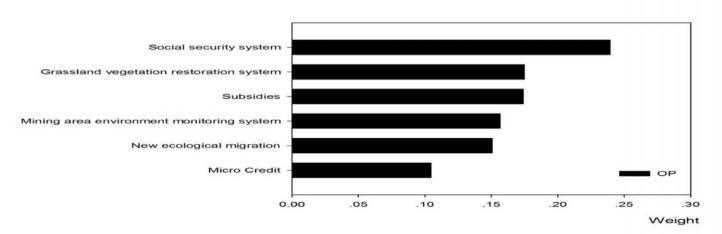
Expert Institutional adaptation



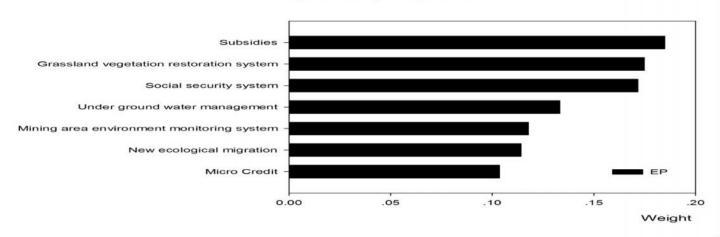


PA & AHP: Policy adaptation priorities by officials and experts

Official Policy adaptation



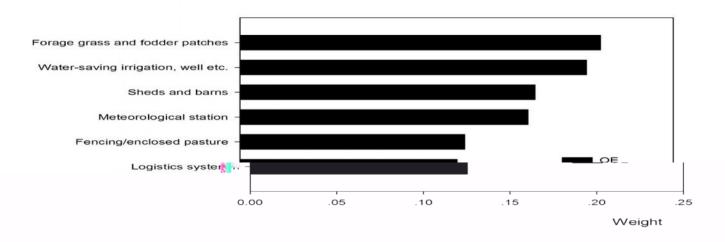
Expert Policy adaptation



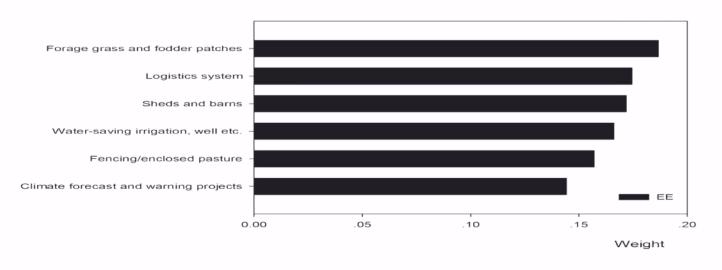


PA & AHP: Engineering adaptation priorities by officials and experts

Official Engineering adaptation



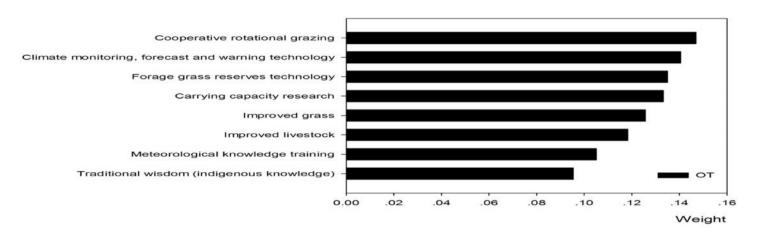
Expert Engineering adaptation



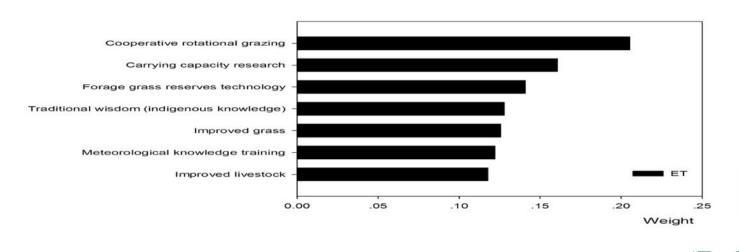


PA & AHP: Technical adaptation priorities by officials and experts

Official Technical adaptation



Expert Technical adaptation



Participating Assessment by stakeholders from Xilingol League



Participating Assessment by stakeholders from Xilingol League

Table 2. The Adaptive Policies Ranking by Stakeholders at City Level

Rank	1 Institutional adaptation	2 Policy adaptation	3 Engineering adaptation	4 Technical adaptation
1	Grass-livestock balance	Subsidies	The project of Wind and Sand Source Area Control around Beijing—Tianjin regions	Meteorological knowledge training
2	Property rights of grassland	New ecological migration	The project of Returning Farmland to Woodland or Grassland	Improved grass
3	Cooperative organizations	Forbidden grazing, break-grazing	Infrastructure construction, Forage grass reserves station	Carrying capacity research
4	Disaster prevention and mitigation fund	Mining area environment monitoring system	Artificial grassland	Climate monitoring, forecast and warning technology
5			Artificial rainfall	energy conservation and emission reduction
6			water and soil conservation	Improved livestock 20

Participating Assessment by herdsmen







Participating Assessment by herdsmen

Table 3. The Adaptive Measures Ranking by Herdsmen

Disaster Rank	Drought	Snow storm	Sand storm	Extremely High Temperature	Extremely Low Temperature
1	Forage grass reserves	Forage grass reserves	Sheds and barns construction	Sheds and barns construction	Sheds and barns construction
2	Rotational grazing	Sheds and barns construction	Climate forecasting	Climate forecasting	Climate forecasting
3	well	Decreasing livestock	Meteorological knowledge training	Meteorological knowledge training	Meteorological knowledge training
4	Forage grass and fodder patches	Meteorological knowledge training	Planting trees		
5	Decreasing livestock numbers	Climate forecasting			
6	Sheds and barns construction				
7	Meteorological knowledge training				22

4. Results and Discussions

- AS priorities by stakeholders at different agencies
 - The primary category
 - > Both officials and experts consider the I and P are of most important
 - The officials emphasize engineering instead of technical adaptations
 - The second class categories
 - Institutional: officials prioritize the property right and grass-livestock balance to other strategies; the experts think that grass-livestock balance is ideal but not practical, they prefer the cooperative organizations; experts propose the disaster prevention fund; both propose the insurance
 - Policy: keep the income increasing; vegetation restoration and mining area monitoring; propose the micro credit; experts care about more about the under ground water
 - > Engineering: infrastructure; experts propose the anti-drought reserve water
 - > Technical: rotational grazing, meteorological knowledge; forage reserve technique; propose to integrate the traditional knowledge into modern livestock industry
 - Experts prefer the preventive adaptations more than the officials.

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4. Results and Discussions

- > AS priorities by stakeholders at different levels
 - The primary category
 - > The officials at both provincial and city levels share the same ranking
 - > The herdsmen depend on more engineering and technical adaptations
 - > The secondary class categories
 - Institutional: besides the property right and grass-livestock balance, the officials at the city level emphasize the cooperative organizations
 - Policy: keep the income increasing; vegetation restoration versus ecological migration
 - > Engineering: infrastructure; fencing and enclosed pasture
 - > Technical: rotational grazing vs meteorlogical knowledge
 - The herdsmen care more about the livestock instead of themselves. specific

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5. Conclusions and policy implications

- ➤ Consistant with each other
- ➤ Region and climate sensitive policy
- ➤ More specific and practical adaptations
- ➤ More measures to be taken
 - **≻**Insurance
 - ➤ More meteorological stations
 - ➤ Improved grass and livestock
- >preventive adaptations to be taken
 - ➤Under ground water
 - ➤ Prevention fund, especially for secondary climate disasters
 - ➤ Anti-drought water reserve





Further researches

- ➤ Multi-sector PA
- Further research on matching the AS to climate disaster
- ➤ How to moderate the disagreements?





Thanks for your attention, any comments and suggestions are welcome!

Fenglian Du



