

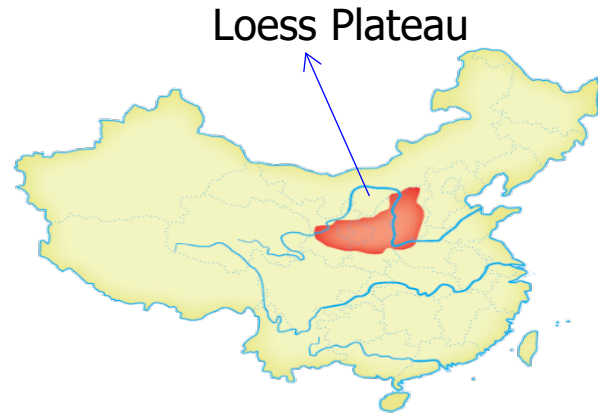
Leveraging on ecological restoration to establish a robust silage industry in Dingxi, China: A poverty alleviation model for developing regions

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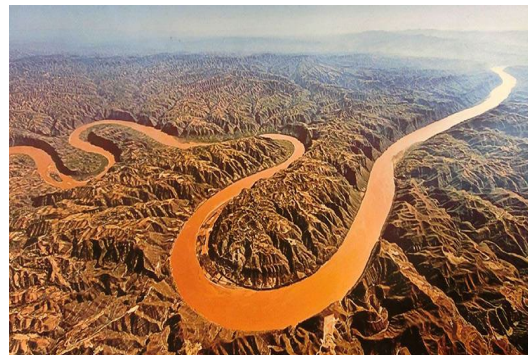
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Background of the semi-arid and hilly region of the Loess Plateau and the Dingxi City



- ◆ Area: about 640,000 km²
- ◆ Annual rainfall: 300-700 mm
- ◆ Characterized by dry weather, drought and serious soil erosion
- ◆ About 1.6 billion tons of sediments flow into the Yellow River per year



Typical landscape of the Loess Plateau

Yellow River

Dingxi City:

The typical place of the semi-arid and hilly area of the Loess Plateau

Located in Gansu province, one hour driving from the capital of Gansu province, **Lanzhou**

Dingxi is known as one of the poorest areas in China



- ◆ Annual rainfall: 300-400 mm
 - ◆ Evaporation amount: 1400 mm !
 - ◆ Frequent drought
 - ◆ Rainfall depended arid agriculture--major income
 - ◆ Plastic film covered cropping system
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- ◆ Until year 2013, the poverty people was 842400, 31.7% total population (net income below 2800 yuan/year).
 - Before year 2000, most of hills were reclaimed for more cropland by local farmers

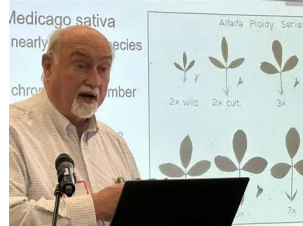


- In order to restore the ecology and prevent water and soil erosion
- Since year 2000, a huge ecological restoration project called “**Return hilly farmland to forests and grassland**” was launched by Chinese central government in the whole Loess Plateau
- All farmlands in gradient $>25^{\circ}$ hills were returned
- **Alfalfa** was extended for establishing grassland
- Until year 2010, about **200,000** hectares of alfalfa grassland in Dingxi area. 2/5 total farmland.



Initiation of silage industry in Dingxi City: silage research and extension

- Originality of the idea of silage research and extension in Dingxi City----one year visiting scholar experience in University of Wisconsin-Madison in year 2011

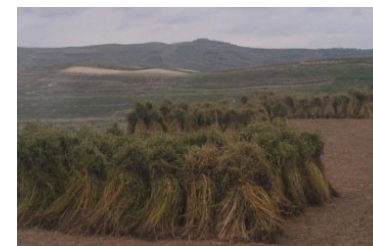
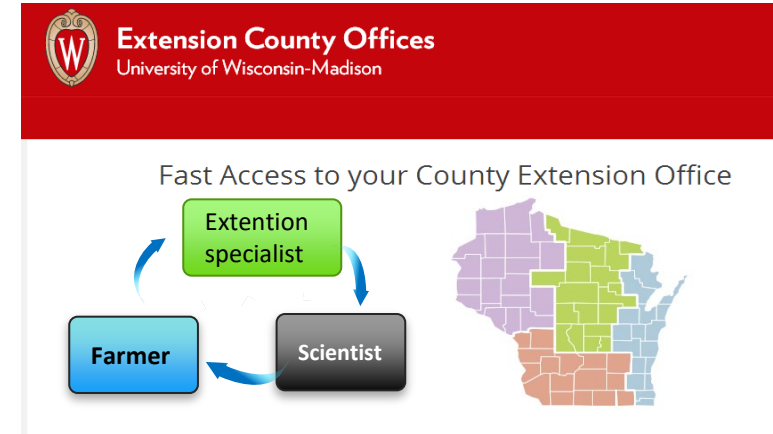


Dan Undersander

- Year 2012, had well discussion with the head of the Animal Husbandry and Veterinary Bureau of Dingxi City

Developing silage industry to:

- ① utilize the huge area of alfalfa grassland
- ② increase local farmers income
- ③ produce high quality forage to animals
- ④ alleviate poverty of the whole society



Silage research and extension

Alfalfa resource



Year 2013, the first baled silage manufactory was established



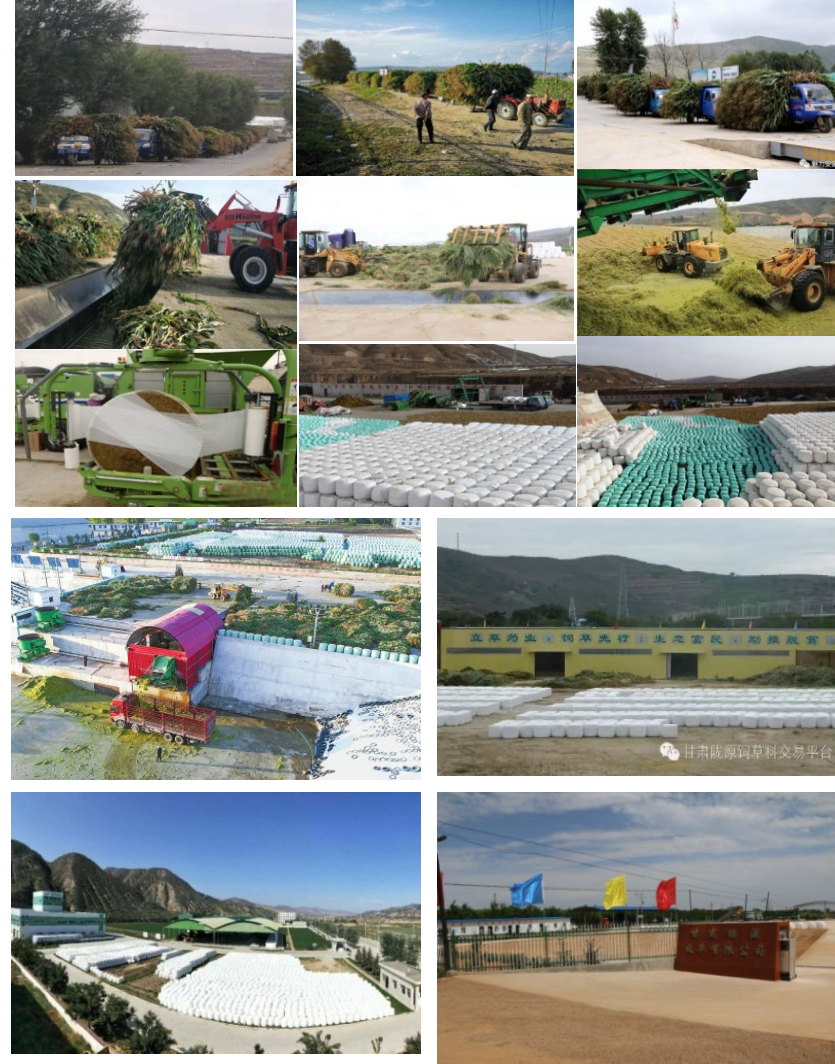
Farmer level



Industrial level (silage producing company)

Quickly expanding of silage industry in the Dingxi City

- ◆ Silage types: from the initial alfalfa silage to alfalfa silage, whole crop corn silage, oat silage, sorghum silage *etc.*
- ◆ Silage manufactories: expanded from 1 silage production company to 29 companies and rural farmers cooperatives in year 2017.
- ◆ Territorial scope: expanded from 1 county to 7 counties of the whole Dingxi City
- ◆ Production: about 2 million tons per year
- ◆ Sale value: 1.2 billion yuan per year



Reasons for the quickly expanding of silage industry

◆ More benefits than traditional crop production

- *Profits from planting crops in the past*

Wheat: 150 kg wheat grain/Mu, 450 Yuan/Mu;

Corn for kernel: 400 kg/Mu, 800 Yuan/Mu

- *Profits from planting alfalfa or forage crops*

Alfalfa: 800 Yuan/Mu, less labor, can harvest at least 6 years

Whole crop corn: yield about 4 tons/Mu, 1200 Yuan/Mu; less labor



◆ Local government supports

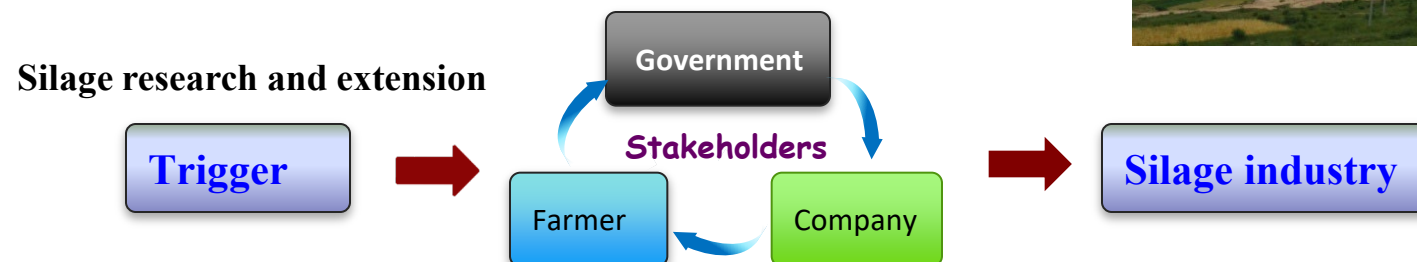
Such as seed funding, preferential policies.

- Developing silage industry has double win benefits of ecology and economy.
- Promote the development of animal husbandry by providing high quality forage
- Play an important role in alleviation of local poverty. Chinese central government stated that the poverty in China must be eliminated in 2020.



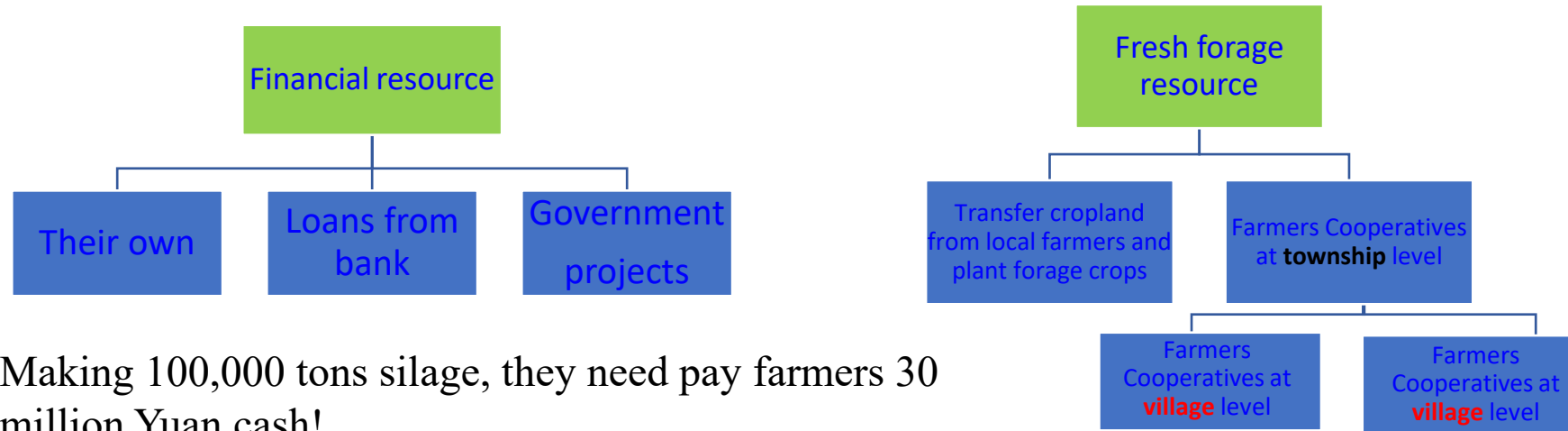
◆ Cheaper transfer of the large areas of discarded cropland in rural area to silage industry

- Most of the youth labors go to cities to find job
- Large areas of discarded cropland in rural area have been reutilized for planting forages



Developing models of silage industry in Dingxi City

◆ Large scaled commercial silage producer



Making 100,000 tons silage, they need pay farmers 30 million Yuan cash!

◆ Small scaled commercial silage producer



Don't have enough or extra money to purchase fresh forage for making silage

Even old people in the village they can lease their cropland to earn money

Multiple effects of silage industry in the semi-arid and hilly area of Dingxi City

◆ Obviously increased the income of local farmers

- Year 2010, net income from agriculture 1554.35 yuan/person
- Year 2017, net income from agriculture 2626.00 yuan/person
- Year 2011, net income from forage production 598 yuan/person
- Year 2017, net income from forage production 2000 yuan/person

(Cited from <http://dx.gansudaily.com.cn/system/2018/09/07/017041580.shtml>)

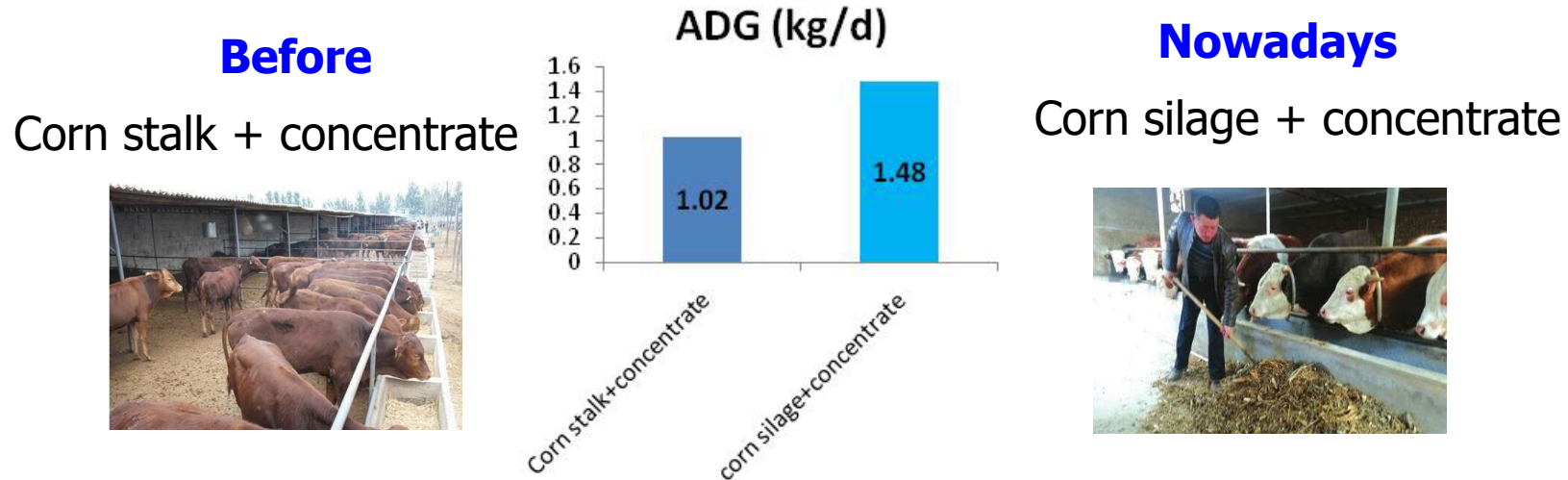
In china, the standard of net income for poverty people is 2800 yuan/person.



※ In year 2015, the government of Dingxi City declared that developing silage industry and herbivorous animal husbandry as the leading industry of the city's economic Development and as the first industry to eliminate poverty.



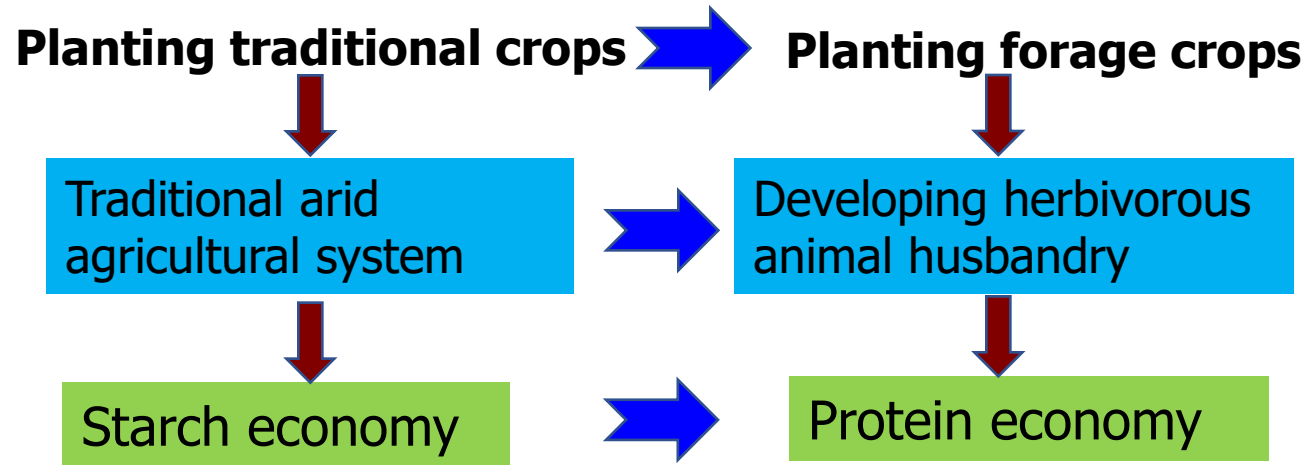
- ◆ Provide high quality forages to animals and promote the development of local herbivorous animal husbandry



Changes of animal numbers and meat production

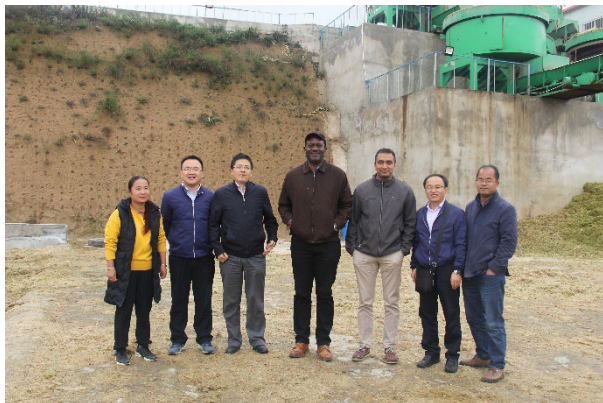
Item	Year 2013	Year 2018
Cattle (× 10,000 head)	20.78	39.35
Sheep (× 10,000 head)	166.13	258.07
Total meat production		
(× 10,000 tons)	5.96	8.84

◆ Changed the agriculture structure of Dingxi City



◆ Reutilized the discarded cropland and better for local ecology







Thank you for your attention