

# Obstacles to Straw Bale Construction in rural China

*by Linh Vuong*

**University of Puget Sound**



# What is Straw Bale Construction?

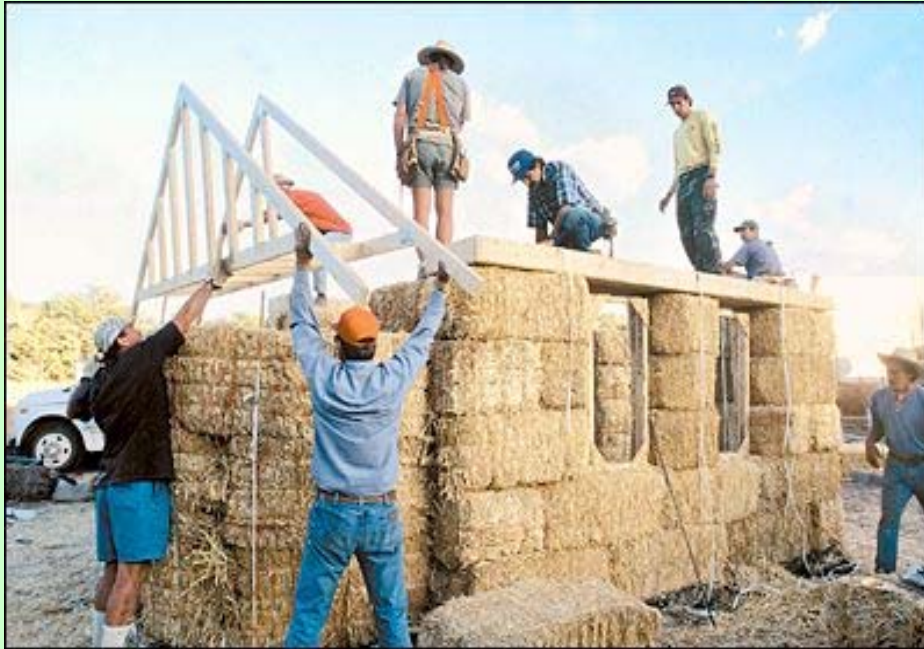


Photo by Bill Steen

- Use of bale straw from wheat, oats, barley, rye, or rice in walls of house
- Dry plant material left in field after plant matured or harvested for seed (dead waste product)



# Why build with straw bale?

- **Ecologically friendly to build**
- **Highly energy efficient**
- **Affordable**
- **Hypoallergenic**
- **Ideal for the do-it-yourselfer**
- **Simply beautiful**
- **Community oriented**

# Where ?

## Number of structures

Australia 20

Belgium 1

Canada 37

Chile 2

China 597

Croatia 1

Denmark 2

England 1

France 7

Hungary 1

India 1



Deana Bednar, Morning Glory Studio, Oxford MI

Ireland 2

Israel 2

Japan 1

Mexico 6

New Zealand 3

Norway 1

Peru 1

South Africa 1

Spain 2

Sweden 2

United States 325

Yugoslavia 1

# Inner Mongolia

- *desertification*
- *Herders are forced off the steppe*
- *local Chinese government, ADRA China and the Kodoorie Foundation*
- *68 houses*

# Inner Mongolia

- *Alashan - Inner Mongolia*
  - 300 families relocated/year
  - new large brick house (100 meters)
    - Cost 50,000-60,000 RMB
  - govt and ADRA subsidized house
    - Cost 21,000 RMB

# State of Environment in China

- Construction statistics
- Straw Burning
- Population
- Housing Needs

# Incentives

## Personal

Healthier Living

decrease respiratory disease

More seismically sound

## Economic

Affordable

Reduce Heating Costs

## Institutional

Trained builders

joint efforts

Provide housing for residents

Reduce Wood Consumption & Cement Use and CO<sub>2</sub>

# China

- Inner Mongolia
- Zhang Bei Housing
- Zhang Bei School
- Heilongjiang

# Straw Bale Potential

- Meet housing needs while reducing cement and wood consumption
- Implementing the building technology

# What are the barriers straw bale structures in China?



Lerner, Kelly. One World Design

**Personal**

**Economic**

**Institutional**

# Predicted Barriers

- **Personal**
  - stigma
  - cultural preferences
- **Economic**
  - financing
- **Institutional**
  - building permits
  - builders

# Site Statistics

- **Alashlan League**

13,307,000 people

temp: -8 degrees C

agriculture: 5074 tons grain output

1.12 tons wheat

7.93 tons cereal

8.04 tons grain

119,100 tons cement

2550 yuan net income per peasant & herdsmen

# Site Statistics

- **Alashlan League**

- Construction

- 1,593,200 tons SCE

- 301,000 raw coal

- Residential

- 2,516,500 tons SCE

- 1,305,000 raw coal



# Site Statistics

## Tian Quan, Ya'an County

- 100% house constructed with wood, concrete, brick, or combination of the materials
- 2000-120000 Yuan to build a house
- 10%-75% use energy heating
- Average cost of building house range from 1500-120000

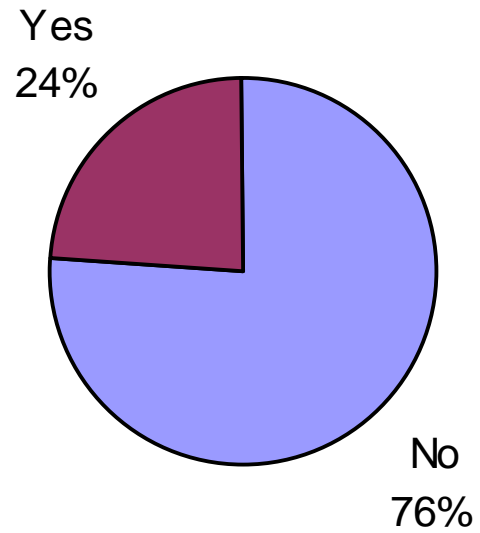
# Methods



- Site (Xian, Sichuan)
- Site (Alashlan, Inner Mongolia)
- Local surveys (30+)
- Economic Statistics
- Peer Conversation
- Interviews –farmers
  - contractors
  - agency (ADRA)
  - UNDP Program
  - county govt
  - relevant parties
  - Kelly Lerner

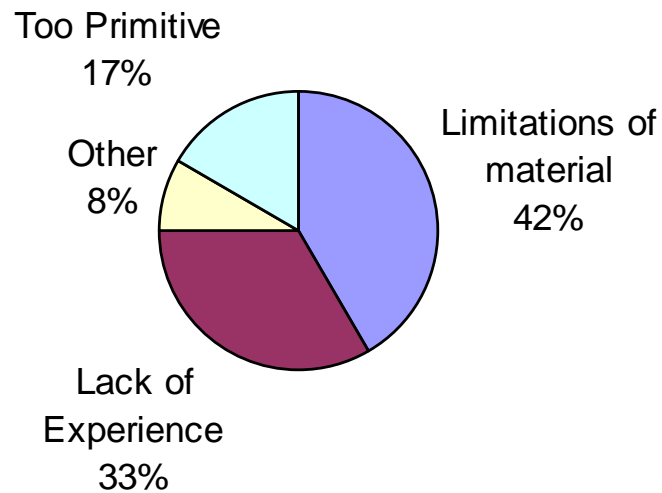
# Findings

## Personal Barriers



# Findings

## Personal Barriers



# **Economic Barriers**

- **Financial disputes county government and the contractors**

# Institutional Barriers

- Educational struggles with contractors and builders



# Conclusion

- \* Not Factors in China
  - Insurance
  - Building Codes
  - Government Acceptance
  - Agency Acceptance
  - Appraisal
  - Financing
- \* Straw Bale maybe more attractive in some areas than others

# Discussion

*Ways to Promote Straw Bale:*

- training builders
- joint efforts among different agencies
- community training
- government subsidies
- establish precedents
- guan xi

# Acknowledgements

- REU-NSF
- Dr. Yin
- Qing
- Zeidae
- He Sin
- Kelly Lerner
- Mr. Seong, the bee farmer
- Students (team China)
- Many other people I met along way that have enriched my experience of China



# Resources

- [Serious Straw Bale Building: construction in all climates](#)
- [Build it with Bales](#)
- [Straw Bale Building](#)
- [The Straw Bale House](#)
- [The Beauty of Straw Bale Homes](#)

# FAQ

*Source:*

[www.strawbalehomes.com/Strawbale%20FAQ.html](http://www.strawbalehomes.com/Strawbale%20FAQ.html)