FOOD SECURITY & VETERINARY RESEARCH
Total NIH support to the Nation’s 28 veterinary Schools =
~ $165 million
= 0.005% of the NIH budget or less than
½ the NIH budget to one of the Nation’s leading medical schools

Are there enough veterinary students in research training to meet the needs of the new NBAR Facility in Kansas?
GLOBAL FOOD SECURITY
provision of an abundant, affordable, available and nutritious food supply globally

Veterinary medicine has unique opportunities & responsibilities
Number of undernourished people in the world

= 200 million people

Source: Nature, 466, 531; 2010
Food must be affordable
Has strategic importance for the industrialized world

Price of corn increased x 80% in 2007-08
Food riots in 30 countries including Haiti
Population Growth


*Steinfeld. The livestock revolution—a global veterinary mission*
Growth of cities will be the most important factor reshaping life in the 21st Century.

Eugenia Birch, Director PIUR

By 2050, 70% of the world’s population will live in cities. Demand on global resources will increase.

Cities projected to consume 80% of the world’s resources.
Urbanization is fundamentally changing agriculture in the developing world. You can’t provision mega-cities from informal rural wet markets! Large scale farming will come to predominate.
Five purposes of cities:
To create wealth
To maximize exchange & minimize travel time
To build the middle class
To foster creativity & innovation
... to advance the public good
Almost all of the population growth to 2050 – 2.3 billion will be in cities of the developing world where urbanization is proceeding at an unprecedented rate.

1.3 million per week for the next 40 years

Asia is presently the epicenter of urban growth.
Epicenter is shifting to Sub-Saharan Africa that is expected to add 395 million people to its cities by 2030.

54,100/day; - 2,254/hour - for 20 years

In Asia, young people migrate to cities for opportunity.

In Africa, people are pushed to cities because the land can’t support them.
Asia

Average Annual Growth Rates: Urban 3.54%  Slum 2.2%

Projected
Source, Black & King, 2009
Mapping the World’s Most Critical Resources
Latin America

Average Annual Growth Rates:   Urban 2.32%   Slum 1.29%

Source, Black & King, 2009
Mapping the World’s Most Critical Resources
Africa

Average Annual Growth Rates:  Urban 3.56%  Slum 4.13%

Projected
Source, Black & King, 2009
Mapping the World’s Most Critical Resources
The World Bank estimates that by 2030 there will be 1.2 billion middle class people. In the developing world, 1.2 billion is larger than the total population of Europe, Japan, and the United States combined. Rise of 200% from 2005.
Population growth is not the most important factor controlling the price of food.

Growth rate of the GDP in the developing world will outstrip the rate of population growth and force up food prices.
As people gain more spendable income they move up the food chain
How does a 10-percent increase in income affect food spending?

Low-income countries make greater overall food spending adjustments, and all countries spend more on high-value foods.
The “livestock revolution” in S. Asia is driven by urban growth
Changes in total meat and milk production in millions of tons in the developing and developed world 1980 - 2030

<table>
<thead>
<tr>
<th></th>
<th>Developing world</th>
<th>Developed world</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1980</td>
<td>2030</td>
</tr>
<tr>
<td>Meat prod.</td>
<td>45</td>
<td>255</td>
</tr>
<tr>
<td>Milk prod</td>
<td>112</td>
<td>491</td>
</tr>
</tbody>
</table>

Source, FAO stats
The global food supply is "the livestock challenge of the 21st century"

What role will veterinary medicine play?

Quote from the UN
How do you meet demand for animal protein without further damaging the environment?

Available arable land/person
2000 = 0.23 hectares
2050 = 0.15 hectares

Produce more from less!
Sustainable intensification of production
“Since the way to feed the world is not to bring more land under cultivation but to increase yields, science is crucial”

(The Economist; The Silent Tsunami, 19 April, 2008)
The reaction against intensive farming is a luxury of the rich. Traditional and organic farming could feed Europeans and Americans well but it can not feed the world.

(Economist, 2/26/11 Special Issue)
Sustainable intensification
The dairy industry in the U.S. & China’s Premier, President Wen Jiabao

“I have a dream, to provide every Chinese especially children with sufficient milk each day”

Xinhua News 2006

## Milk production, South Asia

<table>
<thead>
<tr>
<th>Dairy cow population</th>
<th>Milk per cow Lbs/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>17,243,008</td>
</tr>
<tr>
<td>China</td>
<td>506,557</td>
</tr>
<tr>
<td>Thailand</td>
<td>2,000</td>
</tr>
</tbody>
</table>
Food security & China

- 20% of world’s population
- 7% of world’s arable land
- 7% of the world’s water resources
- 94% of land is already cultivated

Huge #s of small farmers

Demand for animal protein is growing because of rising prosperity
80% of increase in animal protein production is from intensive peri-urban operations growth of integrated, contract farming super-markets growing at ~ 20%/yr social tensions - small farmers at a disadvantage
100% of milk, 80% eggs, 45% pork consumed in Shanghai are produced within the city limits. Large consequences for disease transmission, waste removal, contamination and the environment.
According to the World Bank, the "extraordinary proximate concentration of people and livestock poses probably one of the most serious environmental and public health challenges for the coming decades."

Veterinary profession in the U.S. can provide technical assistance to China:

- Building veterinary capacity, Entrepreneurial
  - Improving efficiency, production medicine
  - Disease control, bio-security
- Regional and city planning; multidisciplinary projects
  - Transfer of livestock operations to environmentally responsible areas.
  - Sustainable use of natural resources, impact of climate change, water conservation
  - Infrastructure development, transportation, marketing
    - Locating cold chain, abattoir facilities etc
Food security in Sub-Saharan Africa

- Livestock account for 50% of the agricultural capital stock in Sub-Saharan Africa.
  - For most smallholders, livestock are the primary household asset
  - Involves poor, illiterate, women
- 30% of population is undernourished
- Proportion of people living on less than US $ 1.00/day increased from 47.6% in 1985 to 59% in 2000
80% of the arable land in Sub-Saharan Africa is degraded.
There is no fertilizer plant in all of Sub-Saharan Africa.
By 2015 estimates are that Sub-Saharan Africa will be unable to feed ½ its population.
Food imports are increasing.

African Statistical Year Book, 2009
### Cattle stocks, head of animals

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USA</strong></td>
<td>0.98</td>
<td>97,003,000</td>
<td>97,000,000</td>
<td>214.9</td>
<td>357 (+ 166%)</td>
</tr>
<tr>
<td><strong>Burkina Faso</strong></td>
<td>3.4%</td>
<td>1,800,000</td>
<td>8,764,100</td>
<td>110</td>
<td>110 (0%)</td>
</tr>
<tr>
<td><strong>Cameroon</strong></td>
<td>2.2%</td>
<td>1,750,000</td>
<td>6,000,000</td>
<td>140</td>
<td>140 (+0%)</td>
</tr>
<tr>
<td><strong>Tanzania</strong></td>
<td>2.04%</td>
<td>8,063,658</td>
<td>18,000,000</td>
<td>98.7</td>
<td>107 (+8%)</td>
</tr>
</tbody>
</table>

### Carcass yield kg per animal

<table>
<thead>
<tr>
<th>Country</th>
<th>1963</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USA</strong></td>
<td>214.9</td>
<td>357  (+ 166%)</td>
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*Source: Gapminder / FAO Facts*
The global food supply is "the livestock challenge of the 21st century"

Veterinary medicine has large opportunities and responsibilities. Should be more involved in helping to sustainably increase efficiency of food production
In SS Africa agriculture must be made profitable & sustainable.
Drift to cities must be reversed.

How should veterinary medicine Participate?
1 Developing nations must be committed to aid projects

2 Build veterinary capacity

3 Disease control
4 Research
To feed 9.2 billion people, there has to be technical innovation.
Veterinarians must participate in purpose driven, multidisciplinary research projects focused on sustainable development.

This is new to the profession.
Is academia prepared?
Do we have a strategic plan?
Feed the Future
www.feedthefuture.gov/documents/FTF_research_strategy.pdf

President Obama’s global initiative to relieve global hunger and poverty
U.S. pledge of $3.5 billion
Additional pledges from G 20 countries for a total of $21 billion
Administered through USAID
Goals of FTF

• Focus is on research
  – Advancing the productivity frontier
  – Transforming Production Systems
  – Enhancing nutrition and food safety
  – Includes statement:
    – “Research on livestock, poultry, and fish has been included because of growing demand for these foods and the demonstrated importance of animal source foods on preventing under-nutrition in children.”
FTF Research themes
A  Crop Improvement
B  Animal Source Food
1 Control of infectious diseases of livestock some of which are zoonoses
2 Developing management approaches for improved aquaculture productivity
3 Improved quality of animal feeds
4 Livestock genetics and breeding for improved productivity
Veterinary medicine not mentioned!
One Health

A “big idea” that can change the way society views veterinary medicine.

Veterinary medicine should develop a strategic plan that bolster its research priorities in order to compete for funds from FTF & other sources.