Sheep, Black Swans, and the Future of Agriculture

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THIS IS THE PROBLEM!

Breeding Ewes (1,000 hd)

U.S. Sheep Inventory

Year
Theories for the Decline in U.S. Sheep Numbers

- Predator
- Money
- Efficiency
- Labor
Predation

• Somewhat special problem of U.S. Sheep Industry.

• Some producers are able to cope with predation.

• Ultimately, it is a labor problem.
"If a problem has no solution, it may not be a problem, but a fact - not to be solved, but to be coped with over time."

Shimon Peres
President of Israel.
Response of Stock Sheep Retention to Lamb Prices

1924 - 1983

Trend in ewe numbers

Source: Wipple & Menkhaus, 1989
Response of Ewe Numbers to Lamb Prices

1961 - 1995

Trend in ewe numbers

Source: Jones & Schroeder, 1998
Ewe Inventory Is Less Responsive to Lamb Price Than in The Past

Wipple & Menkhaus, 1989
1924 - 1983

Jones & Schroeder, 1998
1961 - 1995
Profit

Source: Stillman et al., 1990 & USDA-NASS
Effect of Economic Returns on Sheep & Cattle Inventories

Data adapted from: Stillman et al., 1990 & USDA-NASS
Increasing Demand
U.S. Per Capita Lamb Consumption

Boneless per capita consumption (lbs)


WW I
WW II
Korea
Vietnam
Lamb Demand: Price-to-Quantity
1975 - 1995
Money/Economics

That’s all I’ve got to say about that.
Production Efficiency
Improving reproductive efficiency has not increased ewe numbers.

Source: USDA, National Agricultural Statistics Service, 2013
Breeding Ewe Inventory Is Not Related to Percent Lamb Crop

Source: USDA, National Agricultural Statistics Service, 2013
Liebig's Law of the Minimum
Production is controlled by the most limiting resource.
Labor or Lifestyle Norms

U.S. Sheep Inventory

Breeding Ewes (1,000 hd)

Year

Labor Intensive vs. Mechanized Corn Production

Source: Pimentel, 2009
Compared to most other agricultural enterprises, sheep have had fewer opportunities to mechanize and reduce labor.
Future of Agriculture

DRIVERS

• Food production & population growth
• Environmental conditions
• Farm policy
Growing Concerns About Food Production & The Environment

What’s for Lunch: Under Pressure from Climate Change, A Global Tour of Our Changing Lunchscape

A meal prepared by Joyce Kayonge in Uganda, with native maize and greens from a low-tech aquaponics system designed by her husband, Charles Ilumwata. Although they live in the city, nearly all the ingredients were sourced from the neighborhood.

(Photos: Jon Miller/Monumenta Productions)
Meals to Come
A HISTORY OF THE FUTURE OF FOOD
2006

WARREN BELASCO
1790

Antoine-Nicholas de Condorcet

Outlines of a Historical View of the Progress of the Human Mind

[Image of a book cover]

Thomas Malthus
1776-1834

An Essay on the Principle of Population

[Image of a book cover]
1890

Jeremiah Rusk
Secretary of Agriculture

W. O. Atwater
Nutritionist

Sir William Crookes
Chemist
1920

Sir William Crookes
Chemist

Too Many Farmers
The Story of What Is Here and Ahead in Agriculture
by Wheeler McMillen
W. Morrow & Company

Mankind at the Crossroads
by Edward M. East
Charles Scribner

The Shadow of the World's Future
in the Light of Recent Phenomena, if the Consequences of the Present State of Affairs Shall Have
Sir George Henderson

Standing Room Only?
1930
1940 – 1950

The Road to Abundance

Road to Survival

Our Plundered Planet

The World’s Hunger

The Challenge of Man’s Future
1960 – 1970

Famine 1975!

America's Decision: Who Will Survive?

Population Control, or Race to Oblivion?

The Population Bomb
1990 and beyond
The Environment
Environmental policy is about politics!
“Prediction is very difficult, especially if it's about the future. - Niels Bohr

Many of one generation’s great fears are remembered by the next generation, if they are remembered at all. As quaint curiosities. Surely some of the concerns that we feel for the transformation of the biosphere or for the fate of its elements will baffle future generations. Predictions are not falsified only because the concerns were ill-founded or the hypothesized relationships were wrong. On the contrary, the gloomiest of forecast may not be realized because society takes them seriously and acts upon them.

Kates, Turner and Clark 1990
The Black Swan

'The Impact of Highly Improbable Events'

Nassim Nicholas Taleb

'Strong fun ... brash, stubborn, opinionated, curious, cajoling'

Stephan J. Dubner, author of Freakonomics
Federal policy now is driving fencerow-to-fencerow farming again, just as it did in the 1970s.

Source: Environmental Working Group Losing Ground, 2011
A farm policy where the top priority is conservation and sustainability.
In all developed countries, the strategy of all institutions will have to be based on the assumption of a shrinking population, and especially of a shrinking young population.
The New Labor Pool

Source: Population Research Bureau, 2011
2 Potential solutions to declining sheep numbers

• More conservation oriented farm policy.
• Engage a growing labor force.
Contribution of the different size operations to animal numbers is similar in sheep and cattle.

<table>
<thead>
<tr>
<th>Size of Operation (hd)</th>
<th>Sheep</th>
<th>Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheep &lt; 100</td>
<td>36%</td>
<td>28%</td>
</tr>
<tr>
<td>Cattle &lt; 50</td>
<td>20%</td>
<td>17%</td>
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<tr>
<td>100-499</td>
<td>31%</td>
<td>38%</td>
</tr>
<tr>
<td>50-99</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>500-4,999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5,000 Sheep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 500 Cattle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: USDA, National Agricultural Statistics Service, 2013
The sheep industry has a much higher percentage of small operations than the cattle industry.

Source: USDA, National Agricultural Statistics Service, 2013
A few sheep operations produce a much higher percent of the sheep than cattle operations.
Percent of Sheep Operations by Size & ASI Survey Respondents

Do family members plan to take over the sheep operation when you retire?

Source: ASI 2010 Survey
Percent of Breeding Sheep Inventory in Large and Small Operations

Source: USDA, National Agricultural Statistics Service, 2013
2012 Change in Breeding Sheep Relative to 2000

Increase avg. = 130%
Small decrease avg. = -9%
Large decrease avg. = -37%
2000 - 2012 Breeding Ewe Population Dynamics

Change in Breeding Ewes

Percent of Total Breeding Ewes

-60.00%
-40.00%
-20.00%
0.00%
20.00%
40.00%
60.00%
80.00%
100.00%
120.00%
140.00%

Increase
Small Decrease
Large Decrease

Increase
Small Decrease
Large Decrease

2000
2012
That’s My Story

Well that’s my story and I’m sticking to it!