# WHAT'S GOING ON OUT THERE?<sup>1</sup> BY HUGH L MOORE PH.D

As you drive the highways of Indiana you will notice some subtle physical changes in the landscape such as old barns falling down, fewer fences, bigger tractors and combines, newer one story white buildings and new farm grain storage tanks. There are many other dramatic changes that you don't see.

My talk tonight is about the major changes that have taken place over the last 50 years in Midwest agriculture and where we are today in areas such as population changes, farm sizes ,mechanization, concentration in farm ownership, livestock production, land values and rents. Also, risk avoidance, the importance of genetics and the downsizing of the rural populations centers.

<sup>&</sup>lt;sup>1</sup> Presented to the Indianapolis Literary Club on November 2, 2020

I will start with changes in farm numbers and populations. Nationally the number of farms peaked in 1935 at 6.8 million. Now that number is down to about two million , but half of these farms have less than \$10,000 in sales, so aren't commercial farms as we think of them. In 1950, there were 7.6 million people on farms. By 2019, this figure had dropped to about two million, or about 1.3 % of the total labor force. In 1940, one farm would feed about 18.5 people. By 2018 this number had increased to 168 people per farm. Allow me to retitle my paper to "The Dynamics of Midwest Agriculture with Emphasis on Indiana"

How many of you grew up on a farm? I did back in the 30's and40's. It was hard work.Farm mechanization was just coming in. Most plowing was done with horses.Cows were milked by hand. Hay was made by hand. We hand carried feed and water to the animals.Many farms did not have electricity or running water. That way of farming has all changed. Indiana has about 13 million acres in crop land. The two major crops are corn and soybeans.They are about evenly split in acreage planted. Corn is planted on about 6.3 million acres while soybeans are planted on 6 million acres. Grain farmers still generally rotate these crops.

The big story is how yields per acre have grown over time with out a great deal of change in input. Back in the 1950's , if you could grow 100 bushels per acre of corn in a test plot, you were honored by a banquet sponsored by the local bank.

When I was on the Purdue staff in the early 1960's the head of the Agronomy Department stated that we could not exceed 135 bushels per acre of corn because of the limit of sunlight. Little did he know.

Today, Indiana farmers on good land expect to have corn yields of 200 plus bushels per acre. This year, Indiana's corn average yield is estimated at 189 bushels per acre. Total Indiana corn production this year is estimated at 992 million bushels while nationally corn production is projected at 14.7 billion bushels, a national record. In 2005, national corn production was 11 billion bushels. Nearly all of the increased production over the last 15 years has gone into ethanol production.

Soybeans tell the same story. Indiana soybean yields have improved dramatically. In 1965, the state averaged 28 bushels per acre compared to 60 bushels per acre this year. Indiana bean production is now at the 340 million bushel level. Nationally, soybean production is estimated at 4.3 billion bushels.

What has brought about these big increases in yields and output? There are several major contributors. Most important is genetics. Purdue estimates that continued genetic improvement will add about two bushels of corn per acre per year. Plant breeders continue to produce seeds that are more resistant to drought, insects and weed controls such as Roundup. As result, farmers can now sew up to 35,000 seeds of corn per acre compared to 20,000 seeds when corn was planted in hills for ease of cultivation. Other factors improving yields are more sophisticated farm equipment and better educated farmers.

Nationally, corn and soybean production have increased because of increasing demand. Where is that demand coming from? For corn, the big demand growth has come from Ethanol and its byproduct, dried distillers grain for animal feed.

Percentage
37%
33
11
11
8
100%

Obviously, the big increase in corn demand has been from Ethanol. It is a fairly new market. How stable is that market with electric vehicles coming along? It is no wonder that there has been a push to increase the percentage of Ethanol in gasoline above the 10 percent level.

Our biggest export markets are China, Canada and Mexico. How stable are these markets?

The demand for soybeans is a similar story. Indiana produces about 340 million bushels of soybeans for their oil and meal. We rank third in production among the states.The major Indiana soybean processors are Cargill and ADM.

Soybean meal is by far the major protein source for animal agriculture. The big demand for whole beans is exports, mostly to China.

SOYBEAN USAGE	Percentage
Export	50%
Domestic usage	50
Total	100%
Domestic usage	
Soybean meal as feed	d 97%
Soybean oil	
food	68%

bio diesel	25
industrial	7
total	100%

Both corn and soybean prices have shown major strengths in recent weeks after a slow start.

#### FARM MECHANIZATION

Most notable changes in farm production over time is the size and complexity of the machinery farmers use. When I was growing up,as mentioned, most of the farm work was done by horses. They have long been replaced by ever larger and more sophisticated tractors and combines.

When tractors replaced horses it freed up millions of acres nationally for crop cultivation. The first tractors were rather simple. Out first tractor was a Farmall 14, meaning it had 14 horsepower. It's maximum speed was 4 mph. It was hand cranked. Today's farmers operate very sophisticated tractors that can be up to 300 horse power with airconditioned cabs and radios with access to current markets. They have GPS which tells them where they are in the field and can immediately adjust fertilizer applications based on prior yields.



The tractor shown is a John Deere model 8330 with 225 hp. It will cost the owner used, about \$125,000 . Note the big tires reduce soil compaction.

Combines are a similar story. They have become highly sophisticated, growing wider with greater capacity. Combines harvest both corn and small grains, including soybeans. I have seen a twenty row corn combine. Compare that with our shucking out the rows of corn by hand.



The Combine shown is a John Deere 9770 model They sell for about \$135,000 used. If you buy the largest combines new, they will cost you about \$500,000.

Hay making has also become more sophisticated. We used to make hay by hand. Now they have one man bailers that make round bales that can be picked up by a fork lift.

#### **GROSS FARM INCOME**

So how do farmers afford such costly equipment? It is from their gross sales of corn and soybeans. Currently farmers are enjoying a surge in corn and soybean prices. Midwest corn prices are now about \$3.70 per bushel while soybean prices have topped \$10.00 per bushel.

Good Indiana farm land is producing close to 200 bushels per acre of corn and 60 bushels per acre of soybeans. A farmer farming 1,500 acres (there are many larger farms) who splits his land equally between corn and soybeans and includes government payments of \$60 per acre, will gross about \$1,000,000 annually. Of course he has a myriad of expenses including any rent, labor , fuel, seed, fertilizer, equipment, herbicides, storage and property taxes among others.

10

### SOIL PREPARATION

The moldboard plow's day has passed. It was a slow and expensive process requiring great amounts of horsepower. There are now two major ways of seedbed preparation, low till and no till. The low till method uses large heavy discs to break up the soil. This is followed by a second attachment that rakes and drags the soil to even out the seedbed.

The no till method does even less seedbed preparation and is mostly used for soybeans. One machine attached to the tractor breaks up the soil with chisels. The beans are planted and covered up at the same time.

### LAND TENURE

Farm land has been a good investment since World War11 as land rents have appreciated with time. Land values heavily reflect productivity and crop prices.The more productive the land, the more it is worth. Purdue records Indiana land values and land rents by area each year. This year, Indiana farm land values averaged \$7,200 per acre. Land values in the more productive West and Northwest sectors averaged \$8,500 per acre. Most Southern Indiana land values were somewhat less.

Land values have appreciated greatly since 2000, peaking in 2014 when commodity prices were at their highest. Land values have tapered off since then. In 2014, average land values were \$8,000 per acre while top land values averaged \$9,300 per acre.

Currently about 40% of Indiana's farmland is owned by absentee landlords so rent is important to them. Top rents in the North and West sectors run about \$260 per acre. State average rents are about \$220 per acre. Rents run about 3% of total land value.

Indiana farms are nearly all family operations. Farm numbers continue to dwindles as farm sizes continue to increase. In1987, there were about 70,000 farm operations in the state with average acreage of 229 acres. Thirty years later in 2017, Indiana farm numbers were down to 56,000 farms with average size of 264 acres. The big growth in farm sizes has been in the 1,000 and 2,000 acre farms. Farms in the 900 acre and below size group have decreased.

Many large farms expanded by renting more land. Once a farmer has made a major investment in equipment, the pressure is on to make better utilization of it.

## LIVESTOCK PRODUCTION

Indiana is a major producer of chickens, turkeys, hogs, eggs and ducks. Indiana rank by livestock category among states:

Commodity	Indiana rank
ducks	1
eggs	2
turkeys	4
hogs	5
dairy	not close

These rankings are not bad for a state as small as Indiana



Typical turkey grow-out facility

# TURKEYS

Indiana has three turkey processing plants, processing about 20 million birds annually. Farbest Foods has plants located in Huntingburg and Vincennes. their primary owner is Boarshead, a large producer of deli products which show up in the supermarket deli case.

Purdue has a turkey plant in Washington. Most Indiana birds are grown for further processing with some going into bags for retail sale.

Birds for further processing are raised to about 40 pounds. Total live weight tonnage of all birds in Indiana is about 900 million pounds. Nearly all birds

are raised under contract with local growers, where the plant takes the market risk. The contract grower furnishes the buildings and labor and are paid so much a pound with bonuses for good performance. Turkey production has been a big boon for Southern Indiana for some 600 contract turkey growers and for grain farmers. Indiana turkeys consume about 8,000 acres of corn.

#### BROILERS

Indiana has two broiler plants. They are Tyson Foods at Corydon and Miller Poultry at Orland. Like turkeys, the birds are grown by contract growers. Indiana is not a big factor in broilers.

# EGGS

Indiana ranks second in egg production with about 26 million layers on farms. Some of the big operations are Rose Acres, Seynour, Wabash Valley Produce, Jasper, Creighton Brothers and NPS Egg Farms, North Manchester. Some eggs are packaged for retail. Others are broken and sold to food processors. Eggs are partially produced by contract growers and some by company- owned facilities. I visited one company- owned house that contained a million chickens. Most layers are housed in cages. Others are grown cage free.



Large cage layer operation, eggs roll out of cages unto conveyor belt

# DUCKS

Indiana is the largest producer of ducks split between two operations, Maple Leaf Farms and Culver Farms.

### HOGS

Hogs have always been popular among Indiana farmers and are often referred to as mortgage lifters.There about 3,000 herds in Indiana Traditional hog production has changed dramatically over the last twenty years. In the past, hog enterprises were limited in size because of fear of various diseases. Most hogs were raised outdoors. That attitude has totally changed.

Modern hog production has moved indoors into specifically constructed buildings. Many farmers require visitors to shower in and shower out when they visit a facility.

Typically now a farmer will have up to 1,200 sows which will produce about 2,000 pigs annually. These pigs are grown up to about 280 pounds each. Some farmers have chosen to operate only a farrowing



Typical hog grow-out facility

operation, shipping the young pigs to another farmer who will grow them out.

Indiana has two major pork processing plants. The plant at Delphi is owned by the Japanese. The Logansport plant is operated by Tyson. Some Indiana hogs are shipped to plants in Louisville and Michigan . For the most part, Indiana farmers take the market risk. However, there as some contracting where the plant takes the risk on a cost plus arrangement.

# DAIRY



Dairy milking parlor. Cows enter merry-go-round. Exit when done. 24 hour operation.

Milk production has gone through some major changes in my life time. In the 1940's and 50's there were many dairy farmers in Indiana. A herd might run from 10 to 20 milking cows, most milked by hand twice a day, seven days a week. Now Indiana is down to about 850 dairy herds with 180,000 cows. Most herds are located in Northern Indiana.

The big pressure on Indiana dairy farmers are the two multiple farm dairy production corporations in the state. Fair Oaks Farms (which you pass on your way to Chicago)has some 20,000 dairy cows at multiple locations. There is another similar sized operation located near by. The two operations account for about 25% of all the dairy cows in the state. They milk their cows three times a day in a very controlled environment.

Nationally, milk prices have been depressed for several years due partially to the many new large scale daily production units, but also to falling demand for fluid milk. Recently, two of the largest milk processors ; Dean Milk and Bordens have declared bankruptcy.

#### THE DOWNSIDE

There is a downside from all the changes that have taken place in agriculture. The small rural towns are hurting because of shrinking populations. Excess labor has moved to larger towns and cities. Many small towns have closed store fronts and empty houses. I'm sure towns such as Thorntown have not escaped the pinch.

Some of the small communities have tried to revitalize themselves by trying to attract new manufacturing businesses but with limited success,. These town's best hope is to be located near a major manufacturing center with good highways so the people can commute to work.

#### Summary

Indiana agricultural production has changed dramatically over the past 50 yearsThe horses are gone , replaced by highly sophisticated tractors, combines and hay bailers. Farm numbers continue to shrink through consolidation. Grain farm sizes continue to grow. The fastest growing farm sizes are over 1,000 acres. Much of the expansion is through farm rental as about 40% of Indiana's farmland is owned by absentee landlords.

The big risks faced by grain farmers is what happens to ethanol demand and grain exports, particularly to China. The independent dairy farmer continues to be squeezed by large mega operations and a falling demand for milk. The poultry industry has already been converted from independent growers to contract growers.

What does the future look like for Indiana Agriculture? More of the same. Fewer and larger operations. More market risk, but also tools to protect that risk through contracting, hedging and government

programs.