

## **PROGRESS REPORT**

North Central Region

Sustainable Agriculture Research and Education (SARE) Program

Progress Report Year: 2016

Project Title: Investigation into a year round complimentary broiler and vegetable farm enterprise using mobile high tunnels

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### **WORK ACTIVITIES 2015 and early 2016**

This year we used grant funds to build a prototype of the coop house I outlined in my proposal and then hired a crew of two to build 7 more houses. We used grant funds to pay for the labor on the houses as well as the materials to build them. We were able to use these to raise chickens and turkeys through the summer and are now using 6 of them to raise winter vegetables and two to house laying hens for the winter (grant funds paid for half of the cost of the chicks and poults) (see Fig. 1 and 2). So far, we have been very pleased with the design and I am able to move them myself across pasture through the summer, with the help of a lever system utilizing a hand operated trailer mover. Our chickens and turkeys both thrived in the houses and were able to access fresh pasture ground every day. I have taken soil tests for our baseline and will test again in spring to see the impact of the chickens and turkeys on the soil, although it is already visibly improved. You can see exactly where the coop houses tracked through the summer as the pasture is much greener there (fig.3).



fig. 1



fig.2



fig. 3.

Having the birds all in the same type of housing and lined up across the pasture also reduced our watering time by making it easier to access the coops to refill water and feed each day. The Cornish cross chickens, which are not always very ambitious foragers, were forced to move each day onto new grass, so they seemed to increase their forage intake over previous years in which we would use a fenced in area and a mobile shelter only moved once a week. They also had excellent weight gain and feed conversion as compared to previous years. This was true of the turkeys as well. Our turkeys in previous years were fenced in with a shelter and would frequently fly out of the fencing, requiring us to herd them back into their shelter each evening. Having them enclosed in the coop house reduced that labor time without losing their access to fresh forage each day. The turkeys also showed a slightly better feed conversion this year compared to last year. This may be due to slightly less activity and close proximity of their feed and water. The breed of turkey and type of feed we utilized was the same both years. Further studies would be needed to confirm this feed conversion difference.

After the last butcher date for the chickens and turkeys, we used a power washer to clean the coop houses and converted them to hoop houses for the winter. Grant funds were used to purchase additional greenhouse plastic for the connection between the two houses as well as vegetable seeds for planting these houses. Temperatures this winter have been very mild, so the houses were essentially left open with frost covers on the crops until our first real cold spell in January. Since then, I have been monitoring daily highs and lows in the houses compared to outdoor temps. The hoop houses have performed pretty well with the addition of straw bales to help insulate them near the ground and sandbags to help anchor down the plastic at the bottom.

We have had several days of strong winds, requiring some repair and adjustment as we go. We have salad mix, arugula, kale, and spinach growing in three connected structures right now (which would be 6 of the coops connected end to end). I planted these crops in August and September and moved the coops over these plantings as we started getting frost (fig.4). Agribond is over the crops themselves as well, to help insulate them from the cold. We have had some crop loss due to freezing on the outer edges of the houses, but the crops in the center have done well in spite of subzero night time temperatures (fig.5). I have been able to get more than one cutting from all of the beds we planted and will be replanting the outer portions of the houses in February for an early start on spring crops. The lowest recorded air temperature in the hoop house so far is 1 degree at night. The ground inside the house has not frozen, however. I think the temperature under the Agribond fabric is warmer than the air temperature, much as described in Eliot Coleman's "Winter Harvest Handbook" but I have not been measuring the temperatures at crop level. The left over/imperfect greens from the salad operation have been a great winter supplement for the laying hens.



fig. 4 Salad crops with agribond moved aside for harvest.



fig. 5 – installing plastic over the connected houses. Baby winter kale is under the agribond in the center of the house.

We decided to use two of the coop houses for the laying hens for the winter. There are approximately 35 hens in each house. We moved these to a winter pasture, which we fenced in with our existing electrified chicken netting. This allowed us to rest the permanent coop on the property for the winter and get it thoroughly cleaned, reducing the possibility of disease build up. Each of the winter hen houses are covered with greenhouse plastic, just like the vegetable houses. We added roosting bars to the back of the coop house and installed movable nesting boxes on the sides. The floors are insulated with several bales of alfalfa hay, which we renew as needed. This serves as a source of greens supplement (in addition to the full feed we provide in hanging feeders) when it is too cold for the hens to be outside most of the day. We also modified the coop door to make it a dutch door design with a chicken door at the bottom so that when we let the hens out each day, we aren't losing as much heat inside the hen house (see fig. 6).



fig. 6. Hens exiting bottom door of coop house.

This design has worked out quite well. The coops are located in a pasture that is sheltered by woods and the slope of the hill to help keep them warmer. We have added straw bales on the outside of the coops to help insulate them as well and installed a temporary plywood wall on the back to help hold the greenhouse film in as well as for added warmth near the ground. The solar gain from the greenhouse film on the roof has helped keep the hens laying through the depth of the winter. We usually supplement with electric lighting on a timer in our traditional coop, but didn't need that this year. Instead, we installed a solar spotlight in one of the coops that provides enough light to keep the hens laying. This light turns on automatically at night and is charged by a solar panel through the day. The greenhouses have stayed warmer than our traditional coop so far, not needing any supplemental heat. Between the composting hay on the floor (we clean the houses by removing soiled hay and adding fresh to the top periodically), the warmth of the hens and the sunlight, we have managed to weather some of the coldest days this year without even having their waterers frozen completely.

Their laying has stayed much more consistent this winter than we have seen in our previous system because we are able to give them more natural light and keep them warmer when the days are cold but sunny. In a very cold year, we might still need to have some form of supplemental heat, but so far this year, we have not needed it. The additional production at lower heating and lighting cost makes the small hoop house option for overwintering hens a very attractive one.

## **RESULTS SO FAR**

Using mobile coops for meat chicken and turkey production increased our efficiency, allowed us to target specific pasture areas for fertilization improvements and reduced labor by reducing the distance between flocks of birds while still keeping them separate. We are pretty happy with the design of the coop house, although the movement has been hard on the structure, so it needed some reinforcement by the end of the season. We were able to strengthen the joints of the house with the addition of small plywood squares at the end of this season. After another year of moving, we'll know if this solution is adequate. The toughest balance is having the structure be light enough for one woman to move and strong enough to withstand movement over multiple years, which we have achieved so far. Our first season with these has been very successful. Using them as hoop houses over the winter has also decreased the time it will take to get a return on our investment for building them as well as allowing us to offer a locally grown winter crop in Indiana. The small size of these houses has some disadvantages when protecting them from the cold, but we also don't have the pest and disease buildup problems that larger stationary hoop houses have because we can move locations for these each winter. Sliding them over the August planted crops worked very well.

## **WORK PLAN FOR 2016**

For the second year of the project, we plan to start early spring crops in two of the hoop house structures and early spring laying hens and meat chickens in the third structure (we can divide areas in the house and hang heat lamps from the structure as needed). By the time that it is warm enough to separate the two hoop house structures and use them for broilers, it should be too warm for the early spring crops to have protection, so we will move the houses off of those crops, harvesting them until they are done and then rotating those beds into a summer crop. The house that serves as our brooder will then be separated and moved as the chicks get older and need more space. The brooding chicks can then be moved to the hoop houses as coops and divided into their movable pen. We will test the soil fertility before the chickens are put on the pasture and then run them in the same areas they were last year to build some more fertility this year before turning those areas to cover crops and vegetable beds for the winter crops at the end of 2016/beginning of 2017, testing again before we plant vegetables at the end of this year. The vegetable beds we used for the winter last year will rest this coming winter under a cover crop, helping reduce any pest or disease build up from this winter. The rotation plan is vegetables, chicken feed cover crop (pasture legumes), chickens, cover crop (either growth of existing or changing to one that better feeds the upcoming vegetable crop), sometimes a second rotation of chickens and cover crop when turning new ground or needing additional fertility, then vegetables, etc. When planning timing between the chickens on an area and planting vegetables, we consider the hoop house to be the same as a manure application, separating our vegetable crops from the chickens by at least three to four months and a cover crop in order to address any food safety issues and use the cover crop to scavenge nutrients left by the chickens. These

houses are moved each day during the growing season, so the chickens are not in a given area for a long time, minimizing excess manure that would be likely to run off into areas adjacent to the coops. We also use these coops between rows of berries on the farm to help supply extra nutrients to the brambles and strawberries we grow. Rows of berries are separated by the same distance as the width of the coops so that we can fit them between beds without any problems.

## **OUTREACH**

So far, I have posted periodic updates on the construction and utilization of the coop houses as we made them on our farm's Facebook page (reaches around 100 people per post). I have also shared this project with members of the Hoosier Harvest Market and with Michael Morrow, our market master for the Hoosier Harvest Market, who is also involved in farmer education in Indiana and even used the following picture in a presentation he gave to farmers in Brazil (fig.7). My kids have been helping me work in the hoop houses this winter, sharing what they learn with their friends at school.



fig.7

In March, I will be presenting a poster at the Indiana Small Farms Conference to introduce the system we have been using and field questions about what we have done so far. I also received an email from a farmer in Wisconsin who saw the SARE grant proposal on the SARE website and asked questions about the project. I sent him what we have done so far.