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Ukraine, 7: Animal Agriculture

Can Ukraine regain its reputation as the breadbasket? Improving dairy cattle efficiency on former collective farms in Ukraine

“Razom nas bahato, nas ne podolaty” means “Together we are many! We cannot be defeated!” This Ukrainian saying arose from a popular hip-hop song written in response to corruption in the country. Ukraine was once known as the breadbasket of the Soviet Union due to its rich, dark soil and suitable grain-growing climate. If Ukrainians work together, they may regain their reputation as the breadbasket.

Ukraine is a mid-sized country in Eastern Europe, sharing a border with Russia, Belarus, Poland, Slovakia, Hungary, Moldova, and Romania. Its 603,500 square kilometers are comparable to the size of the United States’ Texas. It is home to 45 million people who enjoy a climate similar to Michigan’s where I live with hot, dry summers and severe winters. Ukrainian culture is heavily influenced by the Soviet regime and Catholicism.

Ukraine’s history is that of turmoil, from the 10th Century all the way through the 20th Century. Ukraine was tossed around from government to government. The most brutal part of the turmoil happened after the collapse of czarist Russia in 1917. Ukrainians enjoyed a brief three years of sovereignty; however, that ended in 1921 when they were recaptured by the Soviet Union. Once again under Russian rule, they endured two forced famines killing more than eight million people. They lost seven to eight million more people in World War II. Having been a part of the former USSR, Ukraine still has quite a bit of recovering to do. There continues to be turmoil in Ukraine involving legitimate rulers and between Ukraine and Russia involving recent annexations by Russia of Crimea, a part of Ukraine. (Ukraine: World Factbook, 2017)

As of 2011, 52.6% of rural Ukrainian household consist of one or two adults. Most rural Ukrainians live without children; 63.3% of rural households do not have children under 18 living with them. Most do not enjoy hot water or central heat, and only 27.7% have a bath or shower system. Each household generally has a small parcel of land, in fact very few own more than one hectare of land. In rural Ukraine, 25.5% of households have one or two cattle and 27.8% have one or two pigs. They rely on manual labor for land cultivation. Only 14.6% have any type of large farm equipment for efficiency. Most do, however, have buildings for farm uses. Most have a building for harvest storage and just over half have buildings for keeping livestock and poultry. (Moroz, 2017)

Rural Ukrainian households produce the majority of Ukrainian grains, legume crops, sugar beets, sunflower seeds, potatoes, vegetables, and fruits and berries. (Moroz, 2017) Rural Ukrainian diets vary by region and season; however, a few staples remain. They eat plenty of root vegetables, mainly potatoes, and lots of flour-based foods such as breads. (Long, 2015)

The stated nationwide adult literacy rate is 99.7%. (*Ukraine Education Facts & Stats*, 2017) Rural children attend school at a slightly higher rate than urban children. (“Ukraine: National Education Profile,” 2014) Healthcare in Ukraine is funded almost entirely by the government. The healthcare system is neglected. In theory, healthcare is free for all long-time citizens. In reality, doctors are poorly paid and often ask for a fee, defeating the purpose of a government-funded healthcare system. (“Healthcare in Ukraine: Europe-Cities,” 2017)

This paper focuses on corporate farms that employ these rural residents, which as of 2004 are on average 1,000 hectares each. (Lerman, & Sedik, 2007) Specifically, emphasis is placed on corporate dairy farms as these farms are key influencers of dairy in Ukraine as a whole. These large corporate dairy farms have 500–2,000 cows each. Dairy farms in Ukraine have potential due to the abundance of corn, sunflower, wheat, and soy to be used as feed. (Koeleman, 2015)

Meat animal agriculture on large corporate farms is virtually nonexistent, due to the rise in price and drop in consumer demand of meat after the fall of the Soviet Union. Winter wheat, spring barley, and corn are Ukraine's main food crops, with sunflowers and sugar beets following as industrial crops. Crop farmers use a variety of crop rotations, including two all the way to four or more crops. Types of rotations vary based on region and growing conditions. In one region where growing winter grains is common, farmers use a six-year rotation with two years of wheat and one year of fallow, or letting the ground rest and replenish moisture. Sunflowers or corn will sometimes be included in a rotation to replenish nutrient levels and reduce weeds, but wheat almost always follows fallow. Some rotations include a perennial forage, usually alfalfa. Farmers can get three or four cuttings of alfalfa per year. In Southern Ukraine, rotations including fallow ground are not common. Rotations include wheat, barley, sunflowers, sugar beets, and corn. Irrigation is used mainly on forage crops and vegetables, and less often on grain crops.

In Soviet times farms were government-owned collective farms. Today a quarter of farmland is still in the hands of the government. (Strubenhoff, 2016) As of 2004, 58.7% of agricultural land was owned by corporate farms. (Lerman, & Sedik, 2007) This plays a large role in some of the obstacles preventing agricultural efficiency.

Due to the expense of imported herbicides, while farmers do utilize them to some extent, application rates are far below recommendations. Therefore, farmers still rely heavily on mechanical weed control methods. Another main barrier to improved agricultural efficiency is a lack of machinery and storage. Without sufficient equipment, it can take twice as long to complete harvest as it did in Soviet times, and crop quality is significantly decreased during this time. Even once the crop is harvested, there is little storage space, driving farmers to sell the crop quickly after harvest when prices are lowest.

Most rural Ukrainians farm gardens to provide food for their families. Food makes up 49.7% of a family's spending and undernourishment is at only 5%. ("Global Food Security Index," 2017) ("Ukraine Unemployment Rate: 2003-2017," 2017)

This paper will emphasize agriculture on dairy farms as a major challenge for farmers in Ukraine. In Soviet times, sustainable practices became unimportant as fulfilling a quota was most important. That attitude remains among Ukrainian farmers and is prevalent in their practices. Farmers have focused on new technology in some areas without focusing on the basics of crop and animal management. With high-tech milking equipment—even robotic milkers in some cases—found inside poorly ventilated barns, it is evident the focus could be shifted. (Durst, 2017)

Right now, the milk market in Ukraine is poor. (Infagro, 2016) After losing the ability to sell to Russia and Crimea, Ukraine lost most of its market. Ukrainian milk was fulfilling its previous market needs, but farmers need an increase in milk quality to compete in new markets. While productivity and quality are on the rise, they need to rise much faster to compete in European and Asian markets, which is Ukraine's goal. (Koeleman, 2015) Milk production in Ukraine is improving, but not quickly enough. The average milk yield on all Ukrainian farms in 2010 was 4 metric tonnes per cow annually (Improving milk supply in Northern Ukraine, 2015), compared to 9.2 metric tonnes in the United States. (Dairy Facts, 2017)

Three issues this paper will cover are cow nutrition, barn ventilation, and genetics. These problems are not complicated to fix, but can have positive effects. Increasing per-cow production in Ukraine will allow

for less land to be used to produce more milk. More nutritious feed can be raised on the same amount of land, which will lead to more efficient milk production and greater farmland sustainability. Being able to get greater production from the same amount of land will directly benefit the farmer, which will in turn benefit the rural farm employees and lead to more prosperous economic times for the country.

Improving dairy production will, of course, lead to more milk available. Milk is a highly nutritious food, with benefits not as easily found in other foods. Milk is a source of high-quality protein. It is easily digestible and contains amino acids needed for building and maintaining muscle mass. Milk also contains nine nutrients essential for life in one beverage. Getting these nutrients from other sources may mean eating many different foods. Milk is not only important for children, but for the elderly, as well. As we've seen, the rural population in Ukraine is aging. Milk is important in the diets of the elderly as a protein source, as many lose teeth and find it hard to chew meat. The calcium in milk can also help prevent osteoporosis.

Other factors that affect this issue are climate change and urbanization. Climate change may affect the harvest times and growing seasons for Ukrainian crops. With urbanization happening, the rural population is aging. There will be fewer farmers left to produce milk, therefore improved dairy farming efficiency is greatly needed.

In 1986 about 110 miles north of Kiev, the capitol of Ukraine, the Chernobyl nuclear reactor accident devastated the surrounding areas of Ukraine and Belarus. The disaster continues to affect Ukrainian agriculture today, in soil damaged by the disaster. (Marples, 2017)

In Soviet times, buildings were built out of concrete. Ventilation wasn't considered. They were built to be strong and to last for years. Little attention was paid to how suitable the barns were for the use which they were intended. Improving ventilation on Ukrainian dairy farms can have positive effects on calf health, cow comfort, and milk quality. Poor ventilation can lead to health problems in any animal. Little air flow can lead to high moisture levels, ammonia gas, disease pathogens, and high dust concentrations. Stale air also adversely affects milk production and milk quality. This poor environment is not only bad for milk production, but also for the health of calves whose growth can be severely stunted by poor conditions in the early stages of life. (Cow comfort: Ventilation, 2007)

The second aspect affecting animal agriculture in Ukraine is poor cow nutrition. According to Phil Durst, a Michigan State University Extension dairy educator who visited Ukraine through the United States Agency for International Development (USAID), Ukrainians understand the importance of proper cow nutrition. They don't understand how to obtain it. Forages are usually tough, fibrous, and therefore low in nutrients to the point that it negatively affects milk production. The reason for this woody, overgrown alfalfa is straightforward. In Soviet times, farmers were rewarded for volume of alfalfa grown, not quality. As alfalfa grows taller, it increases in volume, but decreases in nutritional value as fiber converts to lignin. Durst went on to say that proper knowledge is the small push Ukrainians need to improve sustainability. Ukrainians need knowledge such as when to harvest forages to preserve nutrient content and palatability, and how to properly balance a dairy cow ration for optimal production. (Leep, 2016) This paper will focus on alfalfa as a forage because of its high nutritional value when harvested correctly. It not only provides fiber, but high-quality protein, and is highly palatable. Ukrainians already grow quality alfalfa, but lose that quality when it's harvested late.

Ukrainian farmers utilize artificial insemination, but use poorly matched semen from bulls with poor genetics. (Haskell, 2017) It's an issue of national pride that Ukrainian farmers are unwilling to import semen from anywhere other than former Soviet countries. In most of the world, dairy cattle are some of the most genetically advanced production livestock there are. That advancement is simply not there in Ukraine, but is much needed.

Another issue in Ukraine, and one that is much more complicated to tackle, is the lingering Soviet mindset and tensions with Russia. The dairy industry in Ukraine is growing, but tensions between Ukraine and Russia mean exports are limited. The desire to keep things the way they've always been is human nature. Where this becomes a problem is that the way it's always been done for Ukraine is the Soviet way. The Soviet way means producing as much bulk product as possible, regardless of quality, because if you don't the government will be after you. The way farmers were forced to go about producing the most possible product was not the most sustainable then, nor the best way for Ukrainian farmers to go about production today. The obstacle that will need to be overcome is for farmers to realize that despite unsustainable practices being the way they've always been done, there are benefits to be found with new practices. Young farmers may develop a different mindset. Perhaps if new practices can be implemented, young farmers who have grown up in a post-communism society (26 years old or younger) will begin to see them as the norm.

These factors are an issue not only for Ukraine's dairy industry, but for the entire country. Improvements in sustainability will open new job opportunities and help to ease the 10% of eligible Ukrainians who are currently out of work. Ukraine's economy is in turmoil as strains with Russia are putting a damper on Ukrainian imports and exports. Without addressing sustainability of Ukrainian dairy farms, the issues cannot improve and do their part to ease this turmoil in Ukraine.

To address the top three changes Ukrainian farmers need to make to improve dairy farming—nutrition, barn ventilation, and genetics—I propose:

- 1) Farmers learn how to use a Predictive Equations for Alfalfa Quality (PEAQ) stick.

A PEAQ stick, about the size, cost and simplicity of a meterstick, measures the height of an alfalfa crop, indicates to the farmer whether it is ready to harvest, and helps prevent late harvesting. Other options for measuring the same thing include calendar dates, Growing Degree Days (GDD), scissor clipping for lab tests, and visual assessment. Harvesting alfalfa on the same calendar date each year is inaccurate as it doesn't consider changes in growing conditions from year to year. GDD requires a system for measuring the accumulated heat in each region of the country. Sending samples to a lab costs time and money. Visual assessment requires an understanding of the developmental stages of alfalfa.

Visual assessment is often used in other parts of the world, and is something use of a PEAQ stick could teach. If farmers learn to understand what alfalfa looks like when the PEAQ stick says it's ready, they may even graduate beyond using the PEAQ stick.

Using the already existing USAID programs that send professionals to teach farmers how to implement a variety of new practices, I propose we expose farmers to a PEAQ stick. USAID is a US program that sends professionals to developing nations to teach them new practices. In Ukraine, most of the milk produced is marketed through farmer-owned cooperatives. These co-ops have field representatives for training farmers and ensuring quality milk. I propose equipping Ukrainian field representatives with these PEAQ sticks to teach farmers how to use them on their routine visits.

- 2) Farmers learn to use computer software to properly balance nutritious rations for their cows.

There exists accessible software used in the US that can be used to balance a proper dairy cow ration using feeds a farmer tells the program are available. If this software is translated into Russian and made available to Ukrainians, this program can be used by Ukrainian farmers and can greatly improve dairy farm nutrition. I also propose introducing translated software through milk co-op field representatives. Ukraine has a Consulting Center of Association of Dairy Producers (ADP) that sends representatives to

all regions of Ukraine with software used for comparing farms to each other. This would be an appropriate avenue for attaching feed ration software to get it into the hands of farmers.

3) Farmers renovate barns to improve ventilation.

Improving barn ventilation is surprisingly simple for the positive effects it has on cattle. USAID professionals can train Ukrainian field representatives how to improve ventilation by adding working windows to already existing barns, and installing fans in the barns. Improvements in this area can be measured by testing with a hand whether air is felt flowing through the barn. Ukraine also has a high-quality veterinary service program, and feed cooperatives whose professionals could be trained in the importance of proper nutrition and barn ventilation and help educate farmers.

4) Farmers improve dairy cattle genetics.

Improving dairy cattle genetics in Ukraine would help in boosting milk production. Farmers can achieve this one of two ways: implement breeding as a science and develop higher-producing cattle over years of intentional breeding, or import semen from anywhere where this has already been done. Importing semen is significantly quicker, but improving breeding from within the country could be more culturally acceptable. The same lingering Soviet mindset that keeps popping up leads to a resistance to doing either. However, if Ukraine could look to its neighbor Belarus, which has set up intentional breeding programs over the last 15 years that have dramatically improved dairy genetics, it may increase willingness. (Neilser, 2017) Ukraine can to import semen or follow Belarus's lead, and could receive resources and assistance in doing either.

5) Utilize younger generations as a resource for changing mindsets.

Younger generations are more likely to be hopeful and enthusiastic about new ideas. For this reason, young farmers are the perfect avenue for outreach. USAID and Ukrainian field representatives can be partnered, and focus resources on younger farmers. Seeing more sustainable practices be successful can help in changing the mindset of older farmers also.

USAID is the ideal organization to pair with in implementing these solutions, by sending experts to Ukraine. The organization is based on making connections between developing countries and experts in the field where that country needs assistance, as well as connecting with businesses and non-governmental organizations (NGOs) to help. They have already existing programs that are making these connections in agriculture. USAID also partners with World Food Programme, which may also have a role in implementing some of these solutions. Other partners could include: Ministry of Agrarian Policy and Food (MINAGRO), National Extension Center of Ukraine, Ukraine Academy of Agrarian Sciences, farmer member associations, agricultural universities such as National Agricultural University, CGIAR, Archer Daniels Midland, and the John Deere Foundation.

According to the Global Food Security Index, Ukraine's biggest weakness is their spending on agricultural research and development, receiving a score of zero out of 100. The cost of the individual tools I've suggested is affordable for the corporate-size dairy farms this paper targets. The education needed for farmers to use these tools is simple, but comes at a cost. I suggest that it would be a small burden for the above-mentioned government organizations and NGOs to share. This funding may be used for approximately three to five years until Ukrainian farmers understand new techniques and no longer need to be taught or are teaching each other. My hope and expectation is that by teaching these techniques to corporate farmers, the smallholder farmers who they employ will learn as well.

These are all practices that must be ultimately implemented by the farmers themselves to improve animal agriculture in Ukraine. I expect that farmers will be more susceptible to these new practices if they are able to see them and use them for themselves.

Communities can accept and carry out these changes and practices. NGOs can play a key role in translating dairy nutrition software. The Ukrainian national government must be open to continued partnership with USAID, and to changes that may arise as a result.

Ukraine has endured many difficulties at the hands of the Soviet Union and Russia. Russia regards Ukraine as its little brother, which is extremely fitting. (Bates, 2014) Russia and Ukraine have always been closely tied. Without Ukraine, Russia loses much of its power. Russia has held Ukraine under its thumb since its independence in 1991, mainly for its agricultural benefits and natural gas exports.

Before the fall of the Soviet Union, Ukrainian farmers produced for bulk instead of quality. It is partially because of Russia that Ukrainian farmers still farm the way they do, and it is because of Russia still that Ukraine's economy is in the poor state that it's in. Unfortunately, it doesn't look like Russia will anytime soon be giving Ukraine breathing room, but with just a few improved practices Ukraine may be able to reclaim its title of "breadbasket" on its own.

With just a few steps to improve animal health and overall efficiency of Ukrainian dairy farms, progress can begin. The steps proposed are relatively simple and inexpensive, but can make a difference. If we teach farmers how to access high-quality feed by harvesting alfalfa at the right time, teach them how to use this high-quality feed with ration balancing software, and improve barns with proper ventilation, cows will be healthier and therefore more productive. Improving genetics will also increase productivity. It will take a strong partnership between the USAID and Ukrainian co-op field agents to implement these changes, but it can be done. And with just a little luck "Razom nas bahato, nas ne podolaty," "Together we are many! We cannot be defeated!" will once again ring true.

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