

# Analyzing the Strengths, Weaknesses, Opportunities, and Threats of Animal Agriculture in the Commonwealth of Pennsylvania

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## I. Abstract

Animal agriculture is critical to the economy and livelihoods in the Commonwealth of Pennsylvania. Animal agriculture is directly impacted by feed production, weather, disease pressure, regulations, and trade. Few of these, if any, are easily predictable. Thus, thirty-five diverse stakeholders across the supply chain, including feed mills, producers, veterinarians, animal scientists, and policymakers, came together with twenty undergraduate students to scan how factors like political, economic, social, and technological issues impacted the current and future state of animal production in the Commonwealth. Stakeholders were grouped by sector resulting in seven groups (e.g., production, feed processors, meat processors, animal health, conservation, policy, and finance). Session One asked participants to answer ‘How will the changing outside world affect animal agriculture in the Commonwealth?’ While Session Two asked participants to answer, ‘Does the Commonwealth have the people, practices, equipment, etc. to fight threats and seize opportunities?’ All groups reported their discussions of opportunities and threats. The shared information was captured and then coded by issue type (e.g., political or social). Across groups (i.e. 100% of groups), the lack of agriculture literacy of the consumer base was identified as a major threat to animal production in the Commonwealth. Three of seven groups (43%) recognized the political and financial momentum for climate-smart agricultural research and practices as an opportunity for academia, industry, and farmer partnerships. Additionally, three of seven groups (43%) saw increasing markets and decreasing costs of alternative, cultured proteins as a threat to animal production. Groups were split on whether new agriculture technologies were an opportunity or a threat. Some saw new technologies as a threat given the aging farmer population in the Commonwealth, while others saw new technology as an opportunity for better resource use and combating labor shortages. Four major gaps in current resources and future threats and opportunities emerged. These gaps point to necessary changes in the education, technology, and climate-smart agriculture landscapes. Some recommendations are provided.

## II. Project Background and Rationale

Animal agriculture is critical to the economy and livelihoods in the Commonwealth. Animal agriculture is directly impacted by feed production, weather, disease pressure, regulations, and trade. Few, if any, of these are easily predictable. But, to plan without at least attempting to forecast future conditions is unwise and can lead to financial consequences. *Therefore, for the animal agriculture sector in the Commonwealth of Pennsylvania to thrive we looked at external trends and evaluated internal capacities.*

## III. Project Aims

The overarching project contained two Specific Aims. The *first aim* was to identify internal and external stakeholders and perform a formal stakeholder analysis. After the stakeholder list was established, the *second aim* was to engage these persons and entities through a daylong facilitated meeting to uncover their understanding of the Opportunities and Threats/Challenges facing PA animal agriculture in the next 3 to 5 years. Facilitated questions were also used to assess the collective Strengths and Weaknesses of the PA animal agriculture sector. Stakeholders were guided through a scan of the internal and external environment to include factors like Political, Economic, Social, and Technological (i.e. PEST).

## IV. Stakeholder Analysis

The project team, in collaboration with CPLE-board and PennAg, identified key stakeholders. After listing potential stakeholders for each livestock species, we used criteria like sector expertise to compile the key list. This process culminated in a list of key stakeholders, their roles and impact on animal agriculture in PA, and how we should include them in discussions moving forward.

We sent stakeholder meeting invitations to 52 identified stakeholders using mail, email, and phone calls. We received 38 RSVPs confirming attendance and 35 individuals representing animal agriculture stakeholders in the Commonwealth attended the daylong event.

## V. Stakeholder Meeting Design

### **Who Attended:**

Based on a formal stakeholder analysis we identified 52 diverse stakeholders to join, and 35 attended.

- A diverse representation of livestock species-focused people attended. We had five people representing the poultry supply chain, three representing beef, and three representing dairy. Seven people came that represented swine and two represented small ruminants.
- Four stakeholders represented the feed and milling sector.
- Six stakeholders were on the production side of the supply chain
- Three stakeholders represented animal slaughter and processing
- Four stakeholders represented financing like loans and grants for producers.
- Three stakeholders were experienced cooperative extension personnel.
- Four stakeholders were part of agriculture committees in the legislature or part of the PA Department of Agriculture.
- The remaining stakeholders represented a mix of the organic systems supply chain or allied industries like veterinary medicine and artificial insemination/genetics companies.

**Table 1.** List of Attendees, the livestock species they represented, and their sector expertise.

<b>Affiliation</b>	<b>Animal</b>	<b>Industry</b>
Joe Jurgielewicz and Son commercial Ducks	Poultry	Production
Carversville Farm Foundation	Beef/Poultry	Production
Hog Farmer/Farm Bureau	Hogs	Production/Industry
Poultry Production	Poultry	Production
Senior VP External Affairs		Horizon Farm Credit
ED PA House Ag & Rural Affairs Comm		Policy
USDA FSA		Loans and Programs
PSU Extension	Dairy	Dairy Ed
DelVal		Agribusiness/Econ
Founder of Farm to Family Table	Hogs	advocacy
PCO		Organic
USDA NRCS		Conservation Programs/Projects
PA House Ag & Rural Affairs Comm		Policy
PDA		Policy
Country View Family Farms	Hogs	Production/health
PSU Extension	Dairy	Dairy Ed
PSU	Hogs	Swine Specialist
Premier Select Sires	Cattle	AI/Breeding
PennAg		Policy
NorthEast Agri Systems	Hog	Hog Equipment
Browns Feed		Feed Sales
Susquehanna Mills		Feed
Browns Feed		Feed Mills
USDA FSIS		Processing/Food Safety
PennAg		Policy
Bell & Evans VP Food Safety & Quality	Poultry	Processing/Food Safety
Parkhurst		Food Service/Institutional Buying
JBS		Processing
Leidy's	Hog/Birds	Food Quality Assurance
PennState Ag Extension Ed	Small Ruminant	Extension
FSA		Loans and Programs
PA State Conservationist NRCS		Conservation Programs/Projects
PDA		Organic Initiative Manager
PennAg -- Poultry	Poultry	Production Data

## What we did:

- To assess the opportunities and threats/challenges on the horizon, thirty-five diverse stakeholders across the supply chain, including feed mills, producers, veterinarians, animal scientists, and policymakers, came together with twenty undergraduate students to scan how factors like political, economic, social, and technological issues impacted the current and future state of animal production in the Commonwealth. Stakeholders were grouped by sector resulting in seven groups (e.g., production, feed processors, meat processors, animal health, conservation, policy, and finance). Session One asked participants to answer ‘How will the changing outside world affect animal agriculture in the Commonwealth?’<sup>1</sup> While Session Two asked participants to answer, ‘Does the Commonwealth have the people, practices, equipment, etc. to fight threats and seize opportunities?’<sup>2</sup> All groups reported their discussions of opportunities and threats. These points were captured and then coded by issue type (e.g., political, or social).

## VI. Stakeholder Meeting Results

### **External Forces** – *How will the changing outside world affect Animal Agriculture in the Commonwealth?*

During the grouped stakeholder time, approximately 155 external forces were discussed across the groups, many being similar in scope. The majority (51.61%) of external forces discussed were economic or social (e.g., attitudes and/or demographic) in scope (Table 2). Across types of threats and opportunities, stakeholders perceived 50% more external forces as threats compared to opportunities (Table 3). This is an important distinction. If the external scan has more threats than opportunities, the policy mechanisms to combat threats are different from the tools to leverage opportunities. For example, one of the social forces raised included the lack of agriculture literacy (or increase of misinformation regarding animal agriculture) as a major threat to animal production in the Commonwealth. In fact, 100% of the stakeholder groups identified this threat. To address the lack of agriculture literacy in the commonwealth, some options include changing the k-12 curriculum and/or funding media campaigns. Here, incentivizing, or subsidizing mechanisms are not an option. However, to seize the social force of increased demand for local meat that was identified, incentivizing the production, slaughter, and sale locally is an option.

For identified economic threats like the increased cost of farmland, subsidizing the purchase of farmland to be used for farming is a viable tool too. Moreover, while k-12 curriculum changes may address agriculture literacy in the public, it would not address the threat of the lack of transparency in carbon credits that were identified by stakeholders. Instead, funding the development and implementation of an extension module for farmers would be better suited to

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<sup>1</sup> See Appendix C for Session Slide Deck

<sup>2</sup> See Appendix D for Session Slide Deck

combat this threat. These examples highlight some of the ways the results can be used further by decision-makers in the Commonwealth.

Other social forces included increased demand for urban agriculture, the Commonwealth’s proximity to millions of consumers, the increasing age of farmers, an increase in urban sprawl, and increased animal welfare concerns. Some economic forces that were highlighted in groups were inflation, increased volatility in commodity pricing, and the increased amount, and diversity of funding for livestock.

Topics like Climate Smart Agriculture (CSA) continually arose in discussion and spanned political and economic forces. Most viewed CSA as a favorable opportunity that should be leveraged. For example, three of seven groups (43%) recognized the political and financial momentum for climate-smart agricultural research and practices as an opportunity for academia, industry, and farmer partnerships. On the other hand, three of seven groups (43%) saw increasing markets and decreasing costs of alternative, cultured proteins as a threat to animal production.

Technological forces seemed to cause the greatest divide among stakeholders. Groups were split on whether new agriculture technologies were an opportunity or a threat. Some saw new technologies as a threat given the aging farmer population in the Commonwealth, while others saw new technology as an opportunity for better resource use and combating labor shortages.

**Table 2.** Distribution of Codes for External Forces Identified by Stakeholders

Code Type	Frequency of Codes (n= 7 groups)	Percent of Codes (n= 7 groups)
<i>Social</i>	43	27.74%
<i>Economic</i>	37	23.87%
<i>Political</i>	28	18.06%
<i>Technological</i>	13	8.39%
<i>Eco/Environ</i>	12	7.74%
<i>Legal</i>	22	14.19%
<b>Total</b>	<b>155</b>	<b>100.00%</b>

**Table 3.** Comparison of Threats and Opportunities Identified by Stakeholders

Code Type	Number of Perceived Threats	Number of Perceived Opportunities
<i>Social</i>	23	21
<i>Economic</i>	19	13
<i>Political</i>	21	10
<i>Technological</i>	6	6
<i>Eco/Environ</i>	6	4
<i>Legal</i>	12	4
<b>Total</b>	<b>87</b>	<b>58</b>

**Internal Resources** – *Does the Commonwealth have the people, practices, equipment, etc. to fight threats & seize opportunities?*

During the second session, stakeholders formed mixed groups with one person from each supply chain category being represented within each group. This allowed deeper discussion and knowledge sharing about how the Commonwealth was positioned to tackle the external forces discussed earlier in the day.

Here, technological concerns arose as major weaknesses in the current state of the Commonwealth’s animal agriculture sector to address the coming external forces (Table 4). As noticed in Table 5, no stakeholders thought technological use in the animal agriculture sector was a strength. Some technological weaknesses raised were current technologies are not designed for smallholder farmers, equipment upgrades are needed in the feed industry to meet capacity, and the lack of rural internet/connectivity. Moreover, technological concerns carried into other categories. For example, stakeholders noted that a large percentage of the workforce does not use much technology due to age or avoids it for religious reasons (i.e. social)—a weakness. Additionally, stakeholders mentioned inadequate government funds for tools and technologies for industry (i.e. political).

**Table 4.** Distribution of Codes for Internal Strengths and Weaknesses Identified by Stakeholders

Code Type	Frequency of Codes (n= 7 groups)	Percent of Codes (n= 7 groups)
<i>Social</i>	7	22.58%
<i>Political</i>	3	9.68%
<i>Economic</i>	7	22.58%
<i>Educational</i>	9	29.03%
<i>Technological</i>	5	16.13%
<b>Total</b>	<b>31</b>	<b>100.00%</b>

Stakeholders also showed a lot of concern with the weakness of the education infrastructure in the Commonwealth. For example, stakeholders commented on how expertise in colleges/universities fails to collaborate with each other (across institutions) and the industry. Moreover, stakeholders noted other linked weaknesses, like a shortage of agriculture teachers and the limited agriculture teacher training programs in the Commonwealth. All of these coalesce into the state having an aging food animal veterinarian population and no replenishment pipeline. That being said, stakeholders did recognize the strength of having a large FFA/4H network in the Commonwealth.

**Table 5.** Comparison of Strengths and Weaknesses Identified by Stakeholders

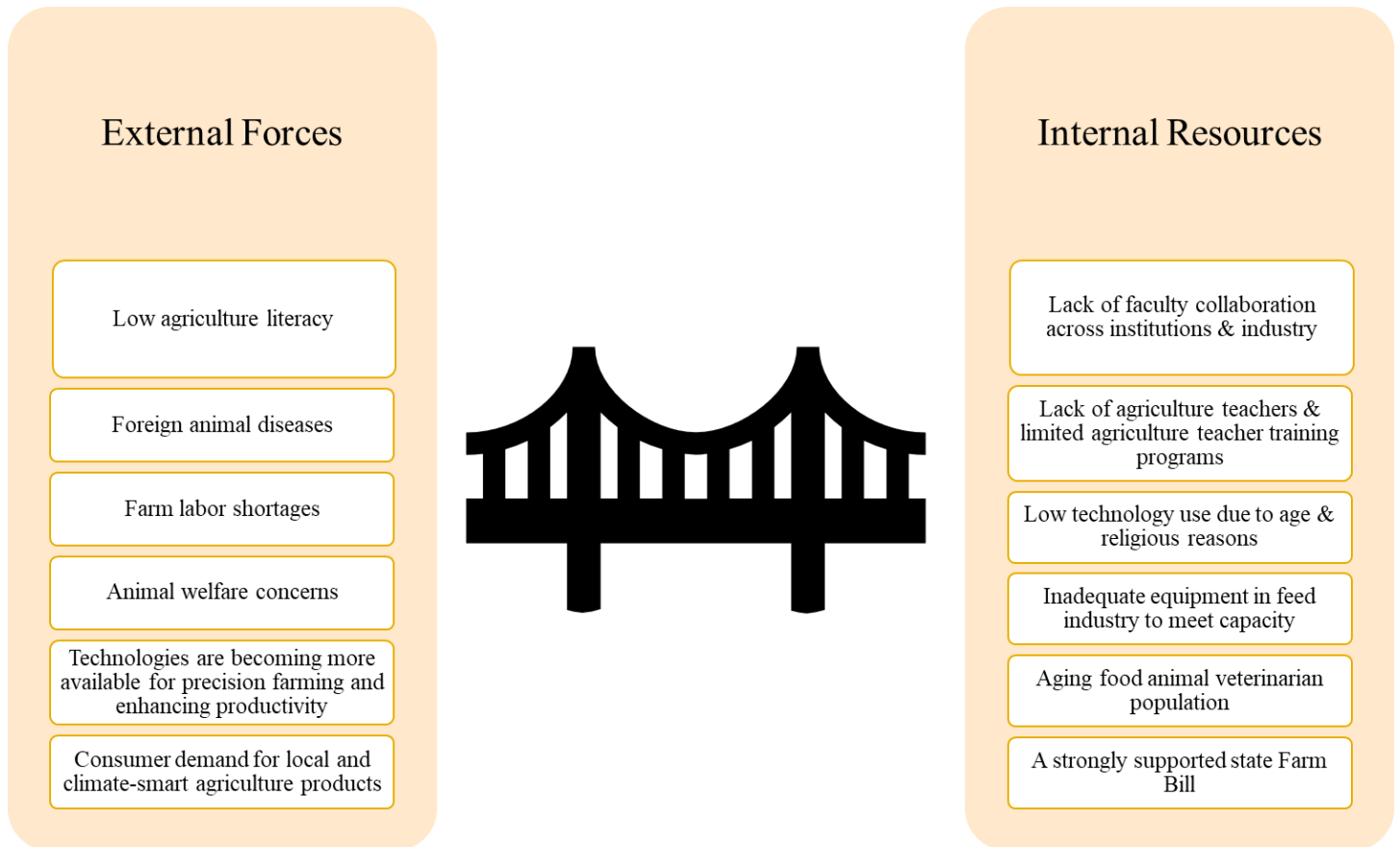
Code Type	Number of Perceived Strengths	Number of Perceived Weaknesses
<i>Social</i>	2	5
<i>Political</i>	1	2
<i>Economic</i>	3	4
<i>Educational</i>	3	6
<i>Technological</i>	0	4
<b>Total</b>	<b>9</b>	<b>21</b>

While weaknesses dominated discussions, there was a general consensus of the political strengths of having an engaged Secretary of Agriculture (Secretary Redding) and a state Farm Bill.



## VII. Summary

The desired outcome of scanning the external environment and looking at the present state of animal agriculture in the Commonwealth is to find the gaps between what exists as resources and what pressures will act on the industry in the future. When these gaps are uncovered, they allow for the prioritization of changes to occur.



**Figure 1.** The gap between major External forces and Internal resources

Four gaps or themes emerged:

- (1) **Education**—Pennsylvania needs to overcome the growing lack of agriculture literacy, but due to the lack of collaboration among faculty in higher education, the lack of agriculture teachers, and the limited programs available to train agriculture teachers this will be difficult without change.
- (2) **Education/Disease prevention**—Pennsylvania needs to be prepared with educated farmers and veterinarians if foreign animal diseases enter the state, but due to aging food animal veterinarians and an inadequate pipeline of trained replacements, animals may go undiagnosed or treated.

- (3) **Technology**—Agriculture technology and innovation continue to enhance animal welfare, replace hazardous jobs, and increase crop and livestock productivity, but the aging farmer population and large population of plain sect farmers result in little technology adoption that must be overcome to produce food efficiently and safely.
- (4) **Climate-smart agriculture/Diversified systems**—The demand for local and climate-smart agriculture products is a large opportunity to be met, and Pennsylvania currently has the mechanism in place to do so through the strongly supported state Farm Bill.

## VIII. Recommendations

1. **Enhance agricultural literacy programs.** Recognize the lack of agriculture literacy as a major threat to animal production in the Commonwealth. This will help to address the misinformation and build public support for the industry. Allocate resources to develop and implement educational programs targeting K-12 students, and adults, raising awareness about animal agriculture and its importance. This could include curriculum changes, farm visits, and educational campaigns to promote understanding.
2. **Strengthen agricultural education and collaboration.** Recognize the weakness of the education infrastructure in the Commonwealth and take steps to address it. Allocate funding to improve collaboration between colleges, universities, and industry stakeholders. This could involve establishing partnerships, funding research initiatives, and creating programs that facilitate knowledge exchange and practical training for students pursuing careers in agriculture education. Specifically, partnerships can lead to multi-institution proposals for “teach the teacher” grants. These collaborations will create a more efficient use of resources and reduce redundancy in work.
3. **Build a pipeline for the next generation of food animal veterinarians.** This will help to address the shortage of food animal veterinarians in the Commonwealth, which will only increase due to the aging population. With limited in-state schooling options many in-state students leave the state and do not return to practice. Moreover, the dwindling numbers of food animal veterinarians practicing creates large territories for existing or new veterinarians to cover—making work-life balance impossible and leading to a vicious cycle of burn out. In-state funding—including pre-veterinary school scholarships—and training programs are necessary to retain and recruit new talent to Pennsylvania.
4. **Increase climate-smart agricultural research and practices.** Leverage the political and financial momentum for climate-smart agricultural research and practices identified as an opportunity. Allocate funding to support academia, industry, and farmer partnerships in implementing climate-smart practices to reduce carbon emissions on-farm and adapt to the challenges of climate extremes. This could involve providing incentives for adopting carbon reducing farming methods, promoting research on climate-resilient animal

production, and facilitating knowledge transfer through extension services—especially on how to incorporate and manage diverse cropping and forage systems.

5. **Foster innovation and technology adoption.** Address the technological weaknesses identified in the animal agriculture sector by allocating resources to promote innovation—including educating farmers about use—and technology adoption. Provide grants, subsidies, and/or tax credits to support smallholder farmers in accessing and implementing technology suitable for their operations. Additionally, invest in upgrading equipment in the feed industry and improving rural internet connectivity to enable efficient and technologically advanced agricultural practices. This will help to ensure that Pennsylvania farmers have access to the latest technologies to improve their operations and remain competitive.
6. **Boost salience and availability of Pennsylvania agriculture data.** There is a lack of information available or being shared even with actively engaged stakeholders; as evidenced by the large difference in the number of external forces and internal resources, 155 and 31, respectively. This is problematic. To design goals and measure success, baselines are needed; yet, many invested stakeholders did not know these baselines across the state. An infrastructure for more, clearer, and more accessible data on the production systems in the state is needed. Additionally, efforts are required to regularly inform all stakeholders.

These are just a few of the policy recommendations to help support the state's animal agriculture industry. By investing in education, research, and workforce development, the state can help to ensure that Pennsylvania remains a leader in animal agriculture for years to come.

In addition to the state-level farm bill, the Pennsylvania Department of Agriculture could also work with other state agencies, such as the Department of Education and the Department of Environmental Protection, to implement these recommendations. By working together, these agencies can help to create a more supportive environment for the animal agriculture industry in Pennsylvania.

## Appendix A. Self-Summary of External Forces Discussion by Group Type

Feed Processors		Policy Group I		Production		Meat Processing		Policy Group II & Finance		Health & Genetics		Conservation & Organic	
<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>	<i>Issue</i>	<i>Opportunity or Threat</i>
Non-GMO	Both	Labor	Threat	CPLÉ	Opportunity	Labor Concern- covid	Both	Federal Farm Bill 2023	Both	Lacking education- public, new generation	Threat	Leading State of Preserved Ag Land	Both
Organic vs Natural	Opportunity	Consumer education	Both	Growth in ethnic community	Opportunity	Technology- new jobs	Both	Disconnection between Ag and policy	Threat	Workforce development	Both	Leading in organic- increased demand for animals	Threat
Public Perception	Both	Access to land and capital	Threat	Aging Farmer Population- higher taxes	Threat	Supply Chain	Both	Inflation/Interest Rates	Threat	Regulation in PA- Nutrient management	Threat	Climate Smart Funding	Opportunity
Race/Ethnicity change in PA		Regulatory changes	Threat	Education Programs - Poultry	Both	Biosecurity- HPAI	Threat	Workforce	Threat	Politics- lack of education	Threat	Resources/Services for Farmers	Both
Government funding	Threat	Legal changes	Threat	Robotics in Labor	Opportunity	Transportation- jobs	Both	Niche Markets	Both	Push for small/organic	Both	Urban Ag- availability	Both
Carbon credits				Increased Fuel Prices	Threat	Social Media	Both	Animal health/welfare improvements	Opportunity	Export/ Immigration	Both		
Local government				Environmental Permits	Threat			Feed Efficiency	Opportunity	Animal Health- genetics, efficiency, communication	Both		
New Zealand ag taxes				Lack of Communication	Threat			Robotics	Opportunity	Biosecurity- education	Threat		
								Legal integrated models	Threat				
								Chesapeake Bay Inflation Reduction Act	Both				
									Opportunity				

Mixed Group I	Strength or Weakness	Mixed Group II	Strength or Weakness	Mixed Group III	Strength or Weakness	Mixed Group IV	Strength or Weakness	Mixed Group V	Strength or Weakness	Mixed Group XI	Strength or Weakness	Mixed Group VII	Strength or Weakness
Communication-social media, with the Amish community	Weakness	Accurate information-demographic, legislation	Weakness	Population size large enough to serve	Strength	Proximity to population	Strength	Education- grade school, consumers, producers	Both	Workforce- lack of quality	Weakness	Education and Communication-between you and consumer,	Weakness
Aging and Diverse Workforce-willingness to use technology	Weakness	Technology-affordability, social media, accessibility	Weakness	A lot of value in PA ag expertise	Strength	Education programs	Strength	Resources to producers	Both	Lack of new ideas in ag-implementation	Weakness		
Gaps between relative and new salary and technology	Both	Efficient farming-contract vs. personal farming	Both	Support system: education	Strength	Technology available	Strength	Competition in Ag	Weakness	Diversity for consumer	Strength		
Villainize gov services	Weakness	Urban Ag	Both	Different organizations	Both	Technology accessibility	Weakness	Diverse Ag Sector in PA	Both	Technology-smarter and harder, cost efficient	Both		
Work towards common goal in PA Ag	Both			Extension programs- 4H, FFA	Strength	Lack of teachers and funding for ag	Weakness	Transition of old generation to new generation	Strength	Education	Weakness		
Climate Smart Initiative	Strength			Lack of communication-collaboration, industry to university	Weakness	Push to college	Weakness						
PA Farm Bill	Strength			Ed programs for ag	Weakness	Social media is not consistent-consumer education	Weakness						
				Education- labor shortage	Weakness								
				Need to improve diagnostic help	Weakness								
				Social media	Weakness								

## Appendix B. Self-Summary of Internal Strengths & Weaknesses Discussion in Mixed Groups

## SESSION I – EXTERNAL FORCES

# How will the changing outside world affect Animal Agriculture in the Commonwealth?

## SESSION I – EXTERNAL FORCES

### Environmental (i.e. External) Factors/Forces:

#### PEST(LE):

- *Political*
- *Economic*
- *Social (socials attitudes and/or demographics)*
- *Technological*
- *Legal*
- *Ecological/Environmental*

These external trends typically get grouped as favorable ones (**Opportunities**) that should be leveraged and negative ones (**Threats**) that must be overcome.

## SESSION I – EXTERNAL FORCES

### PEST(LE):

- Political
- Economic
  - *Key government funding for programs to be reduced*
- Social (social attitudes and/or demographics)
  - *Population growth in a region... shift in ethnicity/race in a region*
- Technological
- Legal
- Ecological/Environmental

\*\*\*Be clear and specific about which force you are characterizing.

## SESSION I – EXTERNAL FORCES

### **Format:**

- *5 minutes individual processing time*
- *5 minutes per person sharing (x6) 30 minutes, 1 minute warning cards*
- *20 minutes round table snowballing*
- *5 minutes per group report out (x6) 30 minutes*

## SESSION II – INTERNAL RESOURCES

Does the Commonwealth  
have the people,  
practices, equipment, etc.  
to fight threats & seize  
opportunities?

## SESSION II – INTERNAL RESOURCES

### Internal Scan (i.e. present state):

- Who are the people in the sector?
  
- What are the current practices in the sector?
  - *At what proportion?*
  
- What technologies are being used?
  - *At what proportion?*

Example: *An older workforce*. Do we expect to face the same problems in future as today? Are we expecting to face new, rapidly changing problems?



## SESSION II – INTERNAL RESOURCES

### **Format:**

- *5 minutes individual processing time*
- *5 minutes per person sharing (x6) 30 minutes, 1 minute warning cards*
- *20 minutes round table snowballing*
- *5 minutes per group report out (x6) 30 minutes*

**\*\*\*Be clear and specific about whether you are characterizing things as a strength or weakness.**