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**EVIDENCE**

**Monday, April 28, 2014**

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**Chair**

**Mr. Bev Shipley**



## Standing Committee on Agriculture and Agri-Food

Monday, April 28, 2014

• (1530)

[English]

**The Chair (Mr. Bev Shipley (Lambton—Kent—Middlesex, CPC)):** Welcome back everyone. Welcome to meeting number 26 of the agriculture committee. We will be discussing innovation and competitiveness in agriculture.

I want to welcome to the committee today, from CropLife Canada, Dennis Prouse, vice-president of government affairs, and also Stephen Yarrow, vice-president, biotechnology. With us by video conference from Saskatoon, Saskatchewan, is Genome Prairie, and I want to welcome Reno Pontarollo, president and chief executive officer, and Daniel Ramage, director of communications.

I want to thank you for taking the time to be with our committee today as we go through the witness list.

With that, I will start with the video conference from Saskatchewan. You have seven minutes.

Thank you.

**Dr. Reno Pontarollo (President and Chief Executive Officer, Genome Prairie):** Thank you, Mr. Chair, and thank you to the members of the committee for allowing us to testify on the importance of innovation and competitiveness in Canadian agriculture.

Genome Prairie is one of six regional centres across Canada that develop, fund, and promote genomics across many economic sectors. Being located in Saskatchewan and Manitoba, Genome Prairie is very active in agricultural-based genomics, and supports university and private research entities in applying the approach to their challenges and opportunities. Public-private partnerships are a powerful model for Genome Prairie.

Suffice it to say that genomics is high-throughput, computer-powered genetics that accelerates research and development. Many believe it is the most important innovation biology has ever seen. Genomics is changing the way we think today and the way we will live tomorrow.

I will use a metaphor of wireless communications to highlight the impact and progress of genomics over the past few years. I will remind you of the two-way radio, the cellphone of a decade ago, and the smart phone of today, which is basically a hand-held computer that everybody uses.

The evolution of mobile communications from innovation to common tool took about 60 years. In the same way, genomics has evolved from a novel scientific approach to a common technology.

One can say that this began with the human genome project in 1986. When the human genome was completed in 2003, the total public investment was estimated at \$3 billion.

Today we are close to sequencing a human genome in hours, and at a cost of less than \$1,000. Genomics technology and affordability have progressed more rapidly than telecommunications. This rapid evolution in genomics has taken it from an innovation used in health research to a competitive tool used in agriculture in less than 20 years.

Innovation in agriculture today largely depends not on genomics itself, but rather on how the genomics technology is applied. For example, Genome Prairie has supported genomics research projects on wheat, rye, canola, and flax—our major crops.

In our flax genomics project, we originally planned to sequence a single variety of flax as a reference. Four years later we had sequenced the entire critical collection of flax varieties in the world—all 400 strains—and this is being used to help flax breeders identify new traits for future varieties.

Our rye project led to the approval of hybrid varieties of rye to be planted in North America. These varieties yield 30% to 40% higher yield than previous varieties. This makes farmers more competitive.

The dairy industry in Canada is leading the way in applying genomics to their breeding programs. Canada's contribution to sequencing the bovine genome in 2004 has resulted in a revolutionary change in dairy cattle selection and doubling of their mating accuracy. In economic terms, genomics-based genetic evaluation in the dairy industry has increased revenues by \$180 million annually. In 2010 Canada exported over \$100 million in dairy genetics to 98 different countries, and Canada's share of the global bull semen market sits at 20%.

This innovative approach is being developed in the beef, swine, and poultry industries as well, and will soon become a standard competitive business practice.

I want to change gears now and speak a little bit about how we invest in research and development, and how it relates to unlocking innovation and competitiveness in Canadian agriculture.

An article published less than two weeks ago in *The Western Producer* was critical of how public funding for agriculture is delivered. Short-term, low-risk, milestone-oriented projects dominate the R and D landscape. We feel this model impairs innovation and impedes competitiveness in the long run.

In the 1970s when two independent visionary research teams began thinking creatively about new crops for the Canadian prairies, they were not trying to change the world. They were merely being innovative and thinking long term. The results of these decade-long projects are a \$20 billion a year canola industry and the emergence of Saskatchewan as the world's largest producer and exporter of lentils.

• (1535)

Both of these major achievements were possible because these research teams had long-term, stable, programmatic funding. Accordingly, I submit to this committee that in order to accomplish strategic goals we need to revisit long-term public funding models for Canadian agriculture to achieve major breakthroughs and help us remain competitive on the international playing field.

Finally, reaching our full competitive potential takes an innovative ecosystem. I will let my colleague, Mr. Daniel Ramage, describe that and have the last word.

**Mr. Daniel Ramage (Director of Communications, Genome Prairie):** Thanks.

I'll just build on what Dr. Pontarollo has been saying about this innovation ecosystem. I'll touch on a few points about education and the importance of communication in agriculture.

From policy-makers and business leaders to the general public, people are really faced with tough decisions surrounding agricultural biotechnology. That's why education is so important—so that decisions can be based on scientific facts rather than myths, assumptions, or misinformation.

There was a recent public opinion survey developed by Ipsos Reid on behalf of the BioAccess Commercialization Centre in Saskatoon that highlighted some of the public perceptions regarding GM technologies. The survey really showcased the confusion and the high levels of misunderstanding among Canadian consumers regarding GM technologies.

The majority of respondents surveyed believed that our poultry and strawberries and other products are genetically modified, when that's not the case in reality. This underscores a key challenge that's at the heart of our ability to drive innovation and competitiveness, because the truth of the matter is that without public understanding of the value of biotechnology, our ability to achieve progress in innovation and competitiveness will be really hampered.

At Genome Prairie we invest a great deal in education and outreach, but it's clear that a lot more needs to be done. We need to strengthen the Canadian innovation system with stronger levels of public support and understanding. So we recommend that with stronger science-based communication and outreach initiatives, we can make sure that people have access to the information they need to make decisions based on facts rather than fiction. That's a major factor in ensuring that the power and promise of R and D is realized

for improved innovation and improved competitiveness in Canadian agriculture.

Thank you.

• (1540)

**The Chair:** Thank you very much for your presentation. I wonder if it might be possible to get the presentation, which we don't have but would get translated into both languages. There was a lot of information in it, so we would appreciate receiving it.

**Mr. Daniel Ramage:** Absolutely.

**The Chair:** I will now move to CropLife and Mr. Prouse or Mr. Yarrow. Mr. Prouse, for seven minutes please.

**Mr. Dennis Prouse (Vice-President, Government Affairs, CropLife Canada):** Thank you, Mr. Chair.

We appreciate your invitation to be here today.

As I say, with me is Dr. Stephen Yarrow, our vice-president of biotechnology. Dr. Yarrow is here to answer all the difficult questions.

CropLife Canada is the trade association representing the manufacturers, developers, and distributors of plant science innovations, including pest control products and plant biotechnology, for use in agriculture, urban, and public health settings. We're committed to protecting human health and the environment. We believe in driving innovation through continuous research.

Our mission is to enable the plant science industry to bring the benefits of this technology to farmers and to the public. Those benefits manifest themselves in many different forms, including by driving agricultural exports and job creation, strengthening the rural economy, and increasing tax revenue for governments. Increased production due to crop protection products and plant biotechnology generates \$7.9 billion worth of additional economic activity annually for farmers of field, vegetable, and fruit crops in Canada. Approximately 65% of Canada's food surplus can be directly attributed to increased yields as a result of modern farm practices, such as the use of crop protection products and biotechnology. Canada's canola industry, for instance, saw a 20% increase in yields between 2000 and 2009. This is largely due to improved genetics. The pace of innovation in the industry is increasing. Globally, CropLife Canada's member companies invest about 11% in research and development. About the same percentage is seen in the pharmaceutical sector.

This kind of innovation and growth, however, is entirely dependent on Canada maintaining its strong tradition of science-based regulation at the federal level. Canada relies on innovation and trade for prosperity and growth. Our members work in a regulated industry and they need the assurance that they are working in an environment where sound science, not political whim, is the final arbiter.

We are fortunate that at present the Department of Health's regulatory bodies, the Canadian Food Inspection Agency, Health Canada, and the Pest Management Regulatory Agency, are clearly science-based in their operations. We are pleased with the broader direction of science-based regulation at the federal level and see it as a model for other nations to follow. Science-based regulation is, however, under increased threat. Activist groups who do not like the results of science-based regulation would like to see it replaced with a more political, socio-economic lens. This would essentially be the model as seen in the European Union. Let us be perfectly clear: that is where this might lead Canada.

At present, Europe is the world's largest per capita food importer. European food production is decreasing as farmers are denied the tools they need to increase yields and grow new varieties. There are over 35 years of backlogs in approvals in plant biotechnology products that have received safety approval but are now awaiting political approval in the European Union. As one might expect, actions have consequences. In 2012 one of our member companies moved its entire plant sciences division out of Germany and over to the research triangle in Raleigh, North Carolina. Last year, another company announced it was withdrawing all pending approval requests to grow new varieties of genetically modified crops in Europe due to the dwindling prospects of these requests ever being heard.

However, it should be noted that Europe is one of world's major buyers of biotech grain, importing more than 30 million metric tonnes of mostly GM animal feed each year for its livestock industry. Therefore, Europe still embraces GM crops; they just don't receive the benefit of the innovation that goes into it. This is why it's so important that the federal government continue to defend science-based regulation both internationally and, increasingly, inside Canada's borders. It is the cornerstone of innovation and a vital component of modern agriculture. It is also key to our trade success.

Canada's economic prosperity is strongly tied to maintaining and growing export markets. There are exciting opportunities ahead for Canada to improve international trade in agriculture. As Canada looks for enhanced trade opportunities, it's important for all trade agreements to contain provisions for harmonized and science-based maximum residue limits of pesticides. This allows our farmers to use the latest pesticides without fear of a non-tariff trade barrier in the importing country.

CropLife Canada strongly supports the Canada-European Union trade agreement and we are encouraged by the provisions within the recently signed agreement on biotechnology. The global crop protection industry does, however, have concerns about the European Union's regulatory framework for plant protection products. Its approach moves the pesticide registration process away from a science-based regulatory system. This not only impacts trade and pesticides, current and future, but also the food, feed, and seed products produced using these pesticides. The import tolerance specified by the EU for these products is effectively zero, so even trace amounts of perfectly safe products could prevent the shipments from entering the EU countries.

● (1545)

The use of hazard-based cut-off criteria has the potential to have negative and far-reaching impacts on global commerce. This approach is not consistent with the World Trade Organization's sanitary and phytosanitary agreement, to which the EU is a signatory. We have concerns about the impacts of this action on Canadian farmers.

Here at home, fair, effective, and modern regulations are critical to Canada's future competitiveness, not only between Canada and other countries' agricultural sectors but also within the multinational companies that choose to invest in Canada. Science-based, predictable, and efficient regulatory systems will support competitiveness and continue to attract investment in Canada. Improvements through CFIA's current regulatory modernization initiative, while maintaining Canada's reputation as having one of the safest food supplies in the world, will be critical to sustaining and attracting investment in Canada. If there is one aspect of the current Canadian regulatory landscape that is causing a lot of issues with our members, it is the overly onerous livestock animal feed regulatory program, as it pertains to plants with novel traits and to novel feeds—products of modern plant breeding.

Intellectual property protection is essential to rewarding innovation. It takes seven to thirteen years to get a novel trait or active pest control product ingredient from discovery in the laboratory to full registration and use in the field. The cost to companies for each new product can be up to \$150 million for products of modern plant breeding, and \$250 million or more for new pesticides. In order for the Canadian economy to continue to grow and for Canada to be a centre of excellence in the knowledge-based economy, the support of intellectual property, patent protection, and protection of regulatory data must be robust.

To conclude, Mr. Chair, Canada's plant science industry has a proud history of encouraging and facilitating innovation that has been immensely beneficial to farmers, consumers, and the environment. Canada's climate of innovation at present is a very good one relative to other nations. There are, however, a number of opportunities for the federal government to undertake regulatory review and to take action on harmonization in order to ensure that regulations are as minimally prescriptive as possible. We support the need for regulations that safeguard the public and give them confidence in the safety of our products. At the same time, it is vital for governments to understand the role of regulatory reform in building a climate for innovation and investment.

On a broader scale, we encourage the federal government to stand up forcefully for science-based regulation. Our industry's ability to act as an engine for innovation and growth is entirely dependent on it.

Thank you for the opportunity to express our views, Mr. Chair. I'd be happy to answer any questions committee members have.

**The Chair:** Thank you very much, Mr. Prouse and both other presenters, for your presentations.

Now, we'll go to our witnesses.

I want to welcome Mr. Blanchette who is joining our committee today. I also know Mr. Toet was extremely excited about being here today.

I want to welcome both of you to our committee.

With that, I would like to start our rounds, with Ms. Brosseau for five minutes.

**Ms. Ruth Ellen Brosseau (Berthier—Maskinongé, NDP):** Thank you, Chair.

I'd like to thank our witnesses for being here.

Mr. Prouse, and Mr. Yarrow, I think we've seen each other quite often. It's not the first time you've come to committee in recent weeks, I would say.

I have a few questions for Genome Prairie.

I think this is the first time I've seen you at committee. You talked a lot about the accomplishments, innovations, and work you've done to improve yields of wheat and rye—I think you said by 30% to 40%. You even talked about dairy genomics. I think it was two years ago that I had the chance to go to Centre d'insémination artificielle du Québec, and we talked a lot about Starbuck and all the work that was done with artificial insemination when it came to bovine genetics.

I was just wondering if you could maybe comment more on how you see the federal government fostering innovation, and what kind of things or recommendations you'd like to see come out of this committee work.

• (1550)

**Dr. Reno Pontarollo:** Are you speaking particularly to the dairy industry on this one?

**Ms. Ruth Ellen Brosseau:** It could be dairy or anything in general.

**Dr. Reno Pontarollo:** Okay.

The good thing about the use of genomics in the livestock industry is that it is primarily being driven by the industry people and the industry players. They do this in partnership with government agencies and also with academic researchers, so the drivers on this are going to be consumer demand and producer profits. If there needs to be an active role in supporting that, it would be along the lines of making sure that Canadian producers and breeders have the ability to export their product to the rest of the world. There's great value in being able to do that. We wouldn't be giving away any of our advantage by doing that, because we would be a leader in the field. It would actually help address some of the security and food safety issues around the world.

**Ms. Ruth Ellen Brosseau:** Touching on that, how much do you think should be divided into public funding versus private sector funding, and how does it work? You seem to touch on so much. You mentioned the human genome, and how public investment was \$3 million and that right now it's less than \$1,000 and that you can do that work in under an hour.

**Dr. Reno Pontarollo:** That was "hours". It was \$3 billion, by the way, not \$3 million.

**Ms. Ruth Ellen Brosseau:** Sorry, \$3 billion.

**Dr. Reno Pontarollo:** The technology used when they started sequencing the human genome is 30 years old. The technology with genomics, particularly in DNA sequencing, has progressed very rapidly. It outstrips Moore's law of technology several fold. We've been able to bring the cost of sequencing and the time required to do it down by an incredible amount.

However, I would caution to say that does not necessarily mean the science part of it goes forward, as you have heard from our CropLife stakeholders in the room. It still takes seven to 10 years to get a variety developed. What the genomics can do on the front end of that is help them make better selections of breeding stock going in. But once you have that breeding stock done, it's still going to take seven to 10 years to get that moved forward. The plants only grow so fast, and so do the animals. We can't change that.

**Ms. Ruth Ellen Brosseau:** I'm sure you're aware of Bill C-18, which will be debated in the House. I guess both of you are very supportive, as the bill...plant breeder's rights and how that is...

Do you have any comments on the bill? It's something we're going to have in the House in the next few weeks, I imagine, before we finish for summer break.

**Dr. Reno Pontarollo:** My comment on that is that I'd like to see it move forward quickly.

**Ms. Ruth Ellen Brosseau:** So, as fast as possible.

How much time do I have left, Mr. Chair?

**The Chair:** You have one minute.

**Ms. Ruth Ellen Brosseau:** Okay.

I wonder, Mr. Prouse, if you could talk about recent examples of innovation and success stories in your department.

**Dr. Stephen Yarrow (Vice-President, Biotechnology, CropLife Canada):** Thank you very much.

I don't know where to start, actually.

If you think about crop plants in Canada, if you think about the field crops such as canola, soy beans, and corn as a measure of success, these crops have definitely benefited from plant biotechnology research to the point where about 90% to 95%—depending on how you count them—of the varieties grown today have enjoyed the benefits of plant biotechnology. In other words, farmers are choosing these crops over other varieties. The reason is that these varieties perform at a better rate than the previous varieties in better controlling weeds—and if you don't get ahead of weeds in fields, they'll choke away the yields and so on from the crop plant you're trying to grow—and insects, particularly in corn, with the Bt corn varieties.

In that sense, we view that as a great success. And that success has been built on by combining these different traits in these particular crops—in the industry they call it “stacking” of traits—to provide farmers with even more choice.

In terms of success for the future—I know you didn't ask this, but just glimpsing into the future—this is, in our view, just the tip of the iceberg. Touching on what our colleagues from Genome Prairie are talking about in terms of genomics, and marker-assisted breeding and other ways of creating new characteristics in crops, we're going to see an acceleration in how varieties are developed and in the range of new traits going into different crops, way beyond just insect and weed control. I think fairly soon we're going to be seeing successes in drought tolerance, which is going to be particularly important in certain parts of the country for corn.

Further into the future, maybe in five to 10 years, we're going to start seeing some traits that are going to be of direct interest to consumers, like reduction in allergens, different oil profiles. In fact, we already see that in canola.

I hope I've answered your question.

● (1555)

**Ms. Ruth Ellen Brosseau:** Thank you very much.

**The Chair:** Thank you very much.

I didn't read the clock right; you got a fair bit of extra time. It was a great answer, though.

**Ms. Ruth Ellen Brosseau:** Thank you.

**The Chair:** I want to now go to Mr. Payne, please, for five minutes.

**Mr. LaVar Payne (Medicine Hat, CPC):** Thank you, Chair. I'm sure you're going to give me the same amount of extra time.

**The Chair:** It was actually the witnesses that took that up.

**Mr. LaVar Payne:** Yes, right.

Anyway, I want to thank the witnesses for attending here, including by video conference. Obviously, innovation in research and development is very important. I know that CropLife is certainly looking at that. And there's the biotechnology.

Dr. Yarrow, you started to talk about that. I think you touched a little bit on canola. My recollection is that in the next number of years, I think in the next 10 years, they're talking about huge increases in canola.

Is that due to the biotechnology and the genomics?

**Dr. Stephen Yarrow:** As a quick answer, in part, yes, for sure....

**Mr. LaVar Payne:** What else would...?

**Dr. Stephen Yarrow:** Agronomic practices, better machinery, GPS, getting a better sense of the moisture content in the field in more precise ways, all these things contribute.

**Mr. LaVar Payne:** You touched a little bit on biotechnology and how it has increased. Do you have any other examples you would want to talk about specifically?

**Dr. Stephen Yarrow:** Not really, but I think we have to put this into the perspective of what plant breeding is all about, and what people have been trying to achieve for the last 100 to 200 years of plant breeding.

It's all about keeping ahead of nature, keeping ahead of the new insect pests and diseases, rusts in wheat, and all these sorts of things.

Plant biotechnology as we know it today has played a part in improving those things, and I think broadly speaking, with genetic technologies, including what our colleagues talked about on the genomic side, we're going to see tremendous gains in the future.

**Mr. LaVar Payne:** Thank you.

I have some questions for you, Dr. Pontarollo. It was interesting. You made a comment about long-term funding. My understanding is that we have already put in something like \$3 billion into Growing Forward 2, including a 50% increase for cost-shared initiatives.

I'm wondering how you see that. I mean, that sounds like a lot of money to me that's been put in by the federal government.

**Dr. Reno Pontarollo:** Yes, and believe me, I'm sure those who have received that money are taking it very happily. Three billion dollars is a lot of money. What we're seeing with the Growing Forward 2 program is a lot of consortium-based research initiatives that involve a number of different institutes and a number of different scientists.

These are still short-term projects of four to five years in length. They can apply back again for funding after this time period, but the type of long-term funding commitment I was thinking about or referring to was A-based long-term funding that a single scientist can work on, or a single group of scientists can work on, a single aspect of research for a long period of time.

This type of funding used to exist within the AAFC system and in some respect in other organizations as well, but this type of research support has dwindled in favour of short-term projects, for high impact, quick results, etc.

There is time to think about revisiting the former model and maybe arriving at some sort of a hybrid model to help us think not only about the short-term needs, but about the long-term strategic needs as well.

**Mr. LaVar Payne:** I understand that there was some \$65 million for Genome Canada in 2013. I don't know if you have any comments on that.

**Dr. Reno Pontarollo:** Yes, I do. We appreciate it. Thank you.

Genome Canada received \$65 million to fund future projects. Of that they are allocating approximately \$30 million to a call that's going to be launched in the next few days called "Feeding the Future." It's going to fund agrifood, aquaculture, and fisheries. It's split; it's not all for agriculture and livestock. Fisheries and aquaculture are there too.

Some of that money is going towards a competition to be announced next year in primary resources—energy, mining, and forestry. Again, all of those projects will be three-to-five-year projects, with large consortiums. I think the largest size of any one project will be \$10 million. Genome Canada will put \$3 million towards that. The other \$6 million has to come from a matching contribution either from the provinces or private industry, or some other form, including international partners, etc.

So that's the nature of that funding. It's very low-risk funding, for very low-risk projects, and it's milestone oriented. It's not as you would say "risky" in any sense or manner.

• (1600)

**Mr. LaVar Payne:** My other question would be how much other funding do you get from either private sources or some other matching funds from provinces?

**Dr. Reno Pontarollo:** Since I joined the organization, Genome Prairie has been successful in leveraging about 3:1. In some projects I can leverage 5:1 for the federal investment.

The provinces that I would deal with, Saskatchewan and Manitoba, like to see at least a 3:1 leverage on their investment.

**Mr. LaVar Payne:** Okay.

**The Chair:** You're well over two. I appreciate that.

Thank you, Mr. Payne.

**Mr. LaVar Payne:** Thank you very much, gentlemen.

**The Chair:** Now we'll got to Mr. Eyking for five minutes.

Actually I'll give you a little more, because we've given the other ones a little more for the first round. I didn't read the clock right the first time.

**Hon. Mark Eyking (Sydney—Victoria, Lib.):** The Liberals should get twice as much anyways because we have better questions.

Mr. Chair, thank you.

Thank you, guests, for coming here.

Doctor, I'll go back to you. When you look at the opportunity Canada has to produce food for the world with climate change and with consumers in Asia especially liking our products and with an increasing population there, I think you mentioned your growing future. How do we capitalize on that? Others, whether Brazil or Argentina or Australia, are going to be competing with us, and I'm sure they're investing in their industries also.

I'm very interested in what you said about looking at this ten-year strategy, looking way ahead of the curve and investing in projects that will position us to be one of the leading suppliers of food for around the world, and also in Canada.

Can you expand a little bit on that? I don't know if you can talk about some of the projects you'd like to see, if you're looking through a ten-year lens, or about how you would structure those with partnerships for the ten years. If, say, we were embarking on certain crops, projecting for climate change, and for consumers, where would we want to be in ten years to be number one in the world?

**Dr. Reno Pontarollo:** First, I'd just clean up a little myth about Canada feeding the world. The truth is that we produce a very low percentage of the amount of food produced in the world. Our significant advantage is that we export about 80% of the food we produce. That's probably always going to be the case even with our population growth, given the increase in yields that we're going to get in both our crop and our livestock production.

When you think about how we want to be positioned for the next few years, Dr. Yarrow talked about the increase in yields being attributed to genetics, and we can expect that incremental type of improvement for the next little while. He could probably talk more about some details with that.

When you're talking about the long ten-, fifteen-, twenty-, or twenty-five-year projects like canola—and the lentil industry was, because some thirty years ago there were no lentils planted in Saskatchewan, and now we're the world's leading producer—those types of projects are more game changers or game breakers.

Technologies like apomixis being brought into the fold, into the breeding systems, would be game breakers. Nitrogen-fixing wheat would be a game breaker. Some of this research is being done, but these things will take a long time to be fruitful. Those are the types of projects that I'm thinking about when you're talking about the long term.

We should partner appropriately, and we should partner with the best. In our flax and wheat projects we partner with entities in the United States and India. Partnering with India is very strategic because they are a significant trading partner for Saskatchewan. Almost all of the 50% of Canada's trade with India is done via Saskatchewan. You should do research with the people you are going to be trading with.

We're working right now on a partnership with Northern Ireland and with the Republic of Ireland. The expertise we will tap into there will primarily be in the livestock area, because that's what they do, and they also have good forage management as well. They also export 80% of their food, so there are a lot of similarities.

• (1605)

**Hon. Mark Eyking:** Thank you very much.

I'm going to try to get my last question to the CropLife people here.

We have a free trade agreement with Europe. Governments and, I think, all parties like to have science-based decisions. I think that's the right way to do it, but the reality is that a lot of the decision-making process—and you see this in Europe—involves emotion or is based on emotion or the information that one individual receives.

How can we as government work with stakeholders, besides just staying in our own box and making only science-based decisions, when there is concern about GMO foods and if we're going to be selling into Europe? We will have to do a selling job showing that our food is not "Frankenfood" or whatever you want to call it, because we can't just be sitting here making those decisions. What part can government play with your industries to get the word out there that Corn Flakes are still safe?

**Mr. Dennis Prouse:** I would say that in the short term—and Dr. Yarrow can certainly have more to say about this—the concern is low-level presence.

What we need globally is an agreement on low-level presence so that at least shipments that are containing trace amounts aren't being turned back, and that trace amounts of a genetically modified crop aren't being used as a non-tariff trade barrier.

In the immediate short-term, LLP would be a tremendous facilitator for trade, and Dr. Yarrow may want to add a number of things on that.

**Dr. Stephen Yarrow:** Actually, when I was listening to your question I had a slightly different answer in mind, but it touches on what our friends at Genome Prairie were talking about, and that's around education.

If decisions are being made for political and emotional reasons, as is happening in European countries, then that's something we need to address globally, by raising awareness about what this is all about, what plant breeding is all about, what farming is all about at a very basic level, and then build on that to try to explain what we're trying to do to improve varieties.

We're just an extension of plant breeding. That's all it is.

**Hon. Mark Eyking:** Shouldn't we be at that now, if we're going to be there in a few years with our products?

**Dr. Stephen Yarrow:** Absolutely.

**Hon. Mark Eyking:** What kind of program would you suggest we should be implementing if we are to get that information out, not only in Europe, of course, but also to our local consumers here in Canada?

**Dr. Stephen Yarrow:** I don't have an answer for you because it's going to take a big collective effort between government and the various parts of industry and research institutes.

I was at a meeting recently at the FAO addressing what my colleague was talking about, low level presence in plant biotech. There were a lot of developing countries there that were so confused about plant biotechnology and plant breeding. So it's extremely basic and some of that profound misunderstanding exists in developed countries, too, with the general public. We really need to start to address that before we can get past these issues.

**The Chair:** We'll now go to Mr. Zimmer, for five minutes.

**Mr. Bob Zimmer (Prince George—Peace River, CPC):** Thank you for coming to committee today.

I have just a few questions for you. To start off, we talked about some of the misinformation about the technology in agricultural innovation.

Can you briefly explain the differences between GMO and selective breeding, Stephen, and make it simple and brief? I know it, but could you explain what that is?

**Dr. Stephen Yarrow:** I'll have a go, and I'm sure that my colleagues on the other side in Saskatchewan may want to help me out as well.

Selective breeding is the very basic level of plant breeding. If you were doing some sunflower breeding in your back garden, you would be crossing different types of sunflowers and then from the seed produced from those crosses you would be looking for improved sunflowers: be they higher yielding, or different colours, and all those sorts of thing.

At a more sophisticated level you can start doing that analysis using genomics and micro-assisted breeding and all sorts of other sophisticated laboratory-based techniques to understand what the variation is in the first place, and to understand how to select the traits that you're trying to extract from breeding. That's selective breeding.

Plant biotechnology short-circuits that for very specific traits, such as insect resistance, herbicide tolerance for weed control, drought tolerance, and things like that. But you have to think of the two together, if you're thinking about plant biotechnology in general.

I'm not sure if I've helped you there.

● (1610)

**Mr. Bob Zimmer:** Yes, that's perfect.

I'll give the other guys some time to answer this next question. You spoke of myths in political arguments. You said that you want to keep this conversation out of the mythic atmosphere.

What are the myths out there about plant biotechnology?

**Dr. Reno Pontarollo:** It's kind of hard. I deal in the facts. I guess it's much easier for people to fear something they don't know. When you're dealing with superstitions, myths, and, in some cases, people would say, religion, you're dealing with faith and fear. Science has to be grounded in facts, so when a scientist speaks of whether something is safe, they speak in terms of "generally regarded" or "our evidence shows". People coming from the other side of the argument will be more forceful with the words they use.

As my colleague Daniel here suggested, in a survey done by a very reputable firm, over 70% of people thought the meat they were eating in Canada was genetically modified, more so in poultry than in beef and pork. Over 60% of them thought the strawberries they were eating were genetically modified. These products do not exist in Canada.

As far as I know, they don't exist anywhere, but once these myths are perpetrated, published by non-scientific journals, and repeated in the newspapers or on news media—much like some celebrities would like us to believe things like "vaccination cause autism"—that credibility they carry is damaging to the actual scientific facts. These are the types of things we fight on a daily basis. We need to engage these people in their own environment, and that's in the Twitterverse and in social media.

Two weeks ago, there was a great example in Berkeley, California. A very well-known scientist, Pam Ronald, a colleague whom I know quite well, was speaking in a very open dialogue and an engaged environment, with 700-plus students watching, about genetic modification and the need for it to be incorporated into the food system. These are the types of things we need to do and that I think governments should be supporting it, particularly the Canadian government.

**Mr. Bob Zimmer:** Can I get an answer to that from Dennis?

**Mr. Dennis Prouse:** Sure.

I was going to toss in a little bit of sunshine amongst all the doom and gloom, because despite what you may see in the Twitterverse, the number of nations that are planting biotech crops continues to rise every year. The number of acres being planted continues to rise. The yields continue to rise. Why is that? That's because they actually are shown to work.

I'll give you one small example. The nation of Burkina Faso in Africa started planting Bt cotton in 2012, I believe, and saw a 58% yield increase in one year. That's a real, meaningful benefit for the people of Burkina Faso, and you're now starting to see more uptake in Africa.

Notwithstanding some of the media and political pressures that we all may sit here and discuss, the reality is that uptake continues to go up, and it continues to go up on a very steady climb.

**The Chair:** Thank you very much.

Your time is up, Mr. Zimmer.

Now I'll go to Mr. Garrison for five minutes, please.

**Mr. Randall Garrison (Esquimalt—Juan de Fuca, NDP):** Thank you very much, Mr. Chair.

Thank you to the witnesses for being here.

If you'll bear with me a moment, I think you'll see where I'm heading. On April 14, the Intergovernmental Panel on Climate Change issued its fifth assessment report and talked very strongly about the impacts of climate change on food security. Even at its lowest levels, their lowest-increase scenarios show global warming of about 1.5 degrees Celsius by the end of the century. The other scenarios, at the other end, show four degrees. What they concluded was that at a minimum we're going to see crop yields declining by 2% per decade and a more likely scenario of about 1% a year at the same time as the demand for food is increasing by 2%.

What I think I heard both of you saying is that the tendency is for research to be microfocused on small projects. My concern is the role that your organizations could play in addressing this much larger challenge we have coming from the impacts of climate change on food security and food production. I'd like to ask both organizations whether you see the possibility of any kind of coordination of work in responding to the threat to food security from climate change and about what role you see for your organizations in addressing that challenge.

Maybe we'll start in Saskatchewan.

● (1615)

**Dr. Reno Pontarollo:** Sure, I'll start. Actually, in the call for competition for research that we're going to be announcing, one of the major tenets will be food security and food safety. Food security is different from food safety in this definition. Food safety is making sure that your hamburger doesn't have E. coli in it. Food security is making sure everybody has a good hamburger. With regard to climate change and its effect, that is certainly another one of the tenets and pillars of the competition. Again we're talking about projects that will last for five years. We will need to continue investing in this as we go along.

I have another anecdote. Driving through the Red River Valley in Manitoba 10 years ago, you would have seen flax, canola, and wheat. When you drive through that country now, you're seeing soybean and corn. I think the companies that Stephen and CropLife deal with would probably like to see more corn and soybean in Canada as well. They know the genetics of these organisms very well. Trying to get them to grow with lower heat units, in shorter photoperiods is within the realm of possibility for them to do. Climate change, in some ways, could have a very positive effect on Canadian agriculture.

**Mr. Dennis Prouse:** You are seeing research that is going on now—and my colleague Dr. Yarrow could speak in more detail to it—on things like drought tolerance and saline tolerance for crops. These are exciting possibilities in order to deal with climate change, and I guess further to the earlier question that was asked, there is a measure of frustration sometimes amongst our members when there is an ideological opposition to genetic modification when you are working on changes that could be that important to help feed the world.

**Dr. Stephen Yarrow:** Perhaps I can build on part of your question, if I understood correctly, regarding how the private sector and the public sector can work together more effectively to address some of the challenges you are talking about. I can't speak for individual companies that are members of our association. They are very highly successful but also highly competitive. But generally speaking, they are very interested in these types of public-private partnerships. There are conversations going on. I don't know the details of the connections between Genome Canada and so on with the public sector. I don't see the two worlds as being completely separate. I see quite a lot of integration going on into the future. And hopefully, if we get this all sorted out correctly, it will be for long-term types of projects rather than just the short-term ones that were referred to.

**Mr. Randall Garrison:** While I understand your emphasis on the long-term projects, the international panel on climate change said that we'll see significant impacts within the next 15 years. Therefore, maybe these short-term projects will have greater importance given that we will start to see these impacts very, very quickly.

**The Chair:** Thank you very much.

I'll now go to Mr. Dreeshan, please, for five minutes.

**Mr. Earl Dreeshan (Red Deer, CPC):** Thank you very much, Mr. Chair.

Thank you everyone for being here today.

I would perhaps like to start, Dr. Pontarollo, with the P3 model that you were talking about, the public-private partnerships. You said there were some examples that seemed to be working well. I'm not sure whether you had elaborated on that. Can you give us an idea of what you see as the best model to make these public-private partnerships work in the activities that you are doing?

**Dr. Reno Pontarollo:** We do have some good examples, not only just in the agriculture area, but in the oil and gas area as well.

We had a specific project called Prairie Gold that looked at taking two specialty crops called camelina and carinata—these are relatives of canola—and developing the genomics base for those two crops to help two companies move developed crops with a product specification for industrial oils and biojet fuel. For instance, in the carinata project, we were working with Agrisoma and helped fund the development and production of biojet fuel for them as part of that. This was a \$4.5 million project working with the University of Saskatchewan and Agriculture and Agri-Food Canada. So we helped them produce this biojet fuel and they flew a jet in Ottawa at the NRC facility on 100% biojet fuel. This was considered one of the top 25 science news stories in North America that year.

The other company that we're working with there is Linnaeus Plant Sciences. They were looking at taking the camelina oil and using it as a base for high quality, high value specialty biolubricants. With the meal from both of those projects, we were looking at trying to get them into feed studies. Dr. Yarrow referred to the difficulties we have in doing that. Interestingly enough, in the camelina project we had also partnered with Genome Atlantic. We were sharing the genomic information with that group and we were looking at trying to create a meal and oil that would help feed the aquaculture industry as well. So there were industry participants on that side.

These are the types of projects I find the most successful. They're driven by an industry need or a consumer pull, and if we have those, they are probably our best short-term projects. But the long-term projects I referred to before regarding apomixis and other pie-in-the-sky type projects would maybe not be as suitable for private-public partnerships. However, if industry wants to do them, then the public sector has to listen.

• (1620)

**Mr. Earl Dreeshen:** Thank you very much.

I think the other topic—and both groups have talked about this—is the education portion and, of course, some of the concerns that you have when you seem to be fighting some ideological opportunism and so on. The concept of trying to pit physical science versus political science, of course, is something that I think everybody has to deal with it. A scientist is not going to say 100% that something can't happen, and that becomes the smoking gun for the other side. Unfortunately, we all have to deal with that.

Perhaps, Mr. Prouse, I could have you address this. Do you have some messages that you can give to the general public that give us that confidence we need, so there is a chance to embrace GMO technology?

**Mr. Dennis Prouse:** One of the things that we've done is to encourage the Canada Food Inspection Agency to continue to explain what it is they do and to stand up for Canada's regulatory system. We think Canada's regulatory system is excellent. We think

our food safety record is outstanding. We've seen some occasions when the CFIA has responded, for instance, to a letter to the editor with a just-the-facts approach about what they do. We were thrilled to see a third party simply describing the facts. There's no value judgment; there was no politics in it. It was just about how food inspection works in Canada and why we should have confidence in the regulatory system.

So that's certainly one thing we've done. We certainly have a role in doing that as well. We've become a much more outward, if you will, and more public organization in the last number of years. Our website is very much geared to the public now. We have a Twitter account and we have a YouTube channel, and we're certainly out there trying to explain ourselves to the public, because I'm not sure that's what happened in the early days of biotech. I think what happened is that the industry was busy inventing things and talking to each other but they didn't talk to the public very well. So we're playing catch-up on that a little bit, but I think we're doing our part and we're certainly encouraging regulatory agencies to, as I say, simply explain to the public what goes into what they do, because we think CFIA has an outstanding story to tell.

**The Chair:** Thank you, Mr. Dreeshen, for your time.

Now we'll go to Mr. Blanchette, for five minutes, please.

[*Translation*]

**Mr. Denis Blanchette (Louis-Hébert, NDP):** Thank you, Mr. Chair.

I also thank our guests for being here with us today.

Recently, a report on global competitiveness revealed that out of 148 countries, Canada came 27th and 29th regarding enterprises' research and development expenditures.

The Genome Prairie representatives told us that ecosystem innovations would have to be optimized if we are to reach our full potential. My question is addressed to them.

I would like them to tell us very explicitly how that ecosystem could be optimized.

• (1625)

[*English*]

**Mr. Daniel Ramage:** Sure, I can speak to that.

What we mean by “ecosystems” is really the whole community that revolves around research and development, including all stakeholders from the general public to the business community to our research scientists.

What we're really looking to do is to increase the cohesiveness among these partners, to make sure that people share the same values, and to get our messaging straight.

Some of the things we do at Genome Prairie, in terms of education and outreach, look to bring these partners together, to encourage dialogue, to share information, to make sure that people are on the same page and that they have access to high-quality information so that they can make their decisions based on facts rather than on the myths we're referring to.

For instance, we partner with organizations like Agriculture in the Classroom Canada—with the local chapters in Saskatchewan and Manitoba—to reach out and go directly to classrooms and teach the basics of genomics and DNA, to complement the existing educational curriculum and bring a higher level of information to youth.

We also have other programs, for instance, that engage directly with scientists, that help them recognize the importance of communication because it's not all about working in a lab and making discoveries. Researchers need to understand that a big part of their role is going out into the public and communicating their findings in a way that people can relate to and understand.

[*Translation*]

**Mr. Denis Blanchette:** Thank you.

There were several important words in your reply. You talked in particular about research, development and education. The word “innovation” is often used very loosely, but it really means, as you said, research and development.

There is a university in my riding and it has an agriculture faculty that conducts research. I am told that investments in research are going down. I would like to know whether you think that this should be changed, and whether this type of research should once again be increased so that it lines up more closely with basic research and is of benefit to Canadian agriculture.

[*English*]

**Dr. Reno Pontarollo:** I'll take this one.

Thank you for the question, Denis.

I absolutely do agree with that, yes. We still need project-oriented research. We still need short-term research projects, yes. But we still need to have a strong baseline in fundamental research that answers questions that maybe aren't important to industry or society now but could be important later on.

This is the type of research that was done as recently as 30 years ago, answering some fundamental questions about the science, about the biology, without necessarily having a commercial goal in mind.

So yes, I would absolutely support that, somehow, public funding goes towards that type of support for researchers. These are very creative people; they're highly intelligent, highly trained. We should let them have some free rein, to let their creativeness bear fruit for Canada.

[*Translation*]

**Mr. Denis Blanchette:** Thank you.

[*English*]

**The Chair:** Okay.

Thank you very much.

I want to thank our witnesses for being a part of today, and for your good participation and great answers. I appreciate that.

We'll break, and then we'll be back in a few minutes with our second round.

• (1625)

\_\_\_\_\_ (Pause) \_\_\_\_\_

• (1630)

**The Chair:** Members, we're into the second hour of witnesses. We have with us from the Canadian Cattlemen's Association, Andrea Brocklebank, research manager with the Beef Cattle Research Council. Thank you for coming.

By video conference, we also have from Canadian Livestock Genetics Association in Mississauga, Michael Hall, executive director.

Welcome to both of you to our committee as we look into innovation in and competitiveness of agriculture.

I would like to start off with the Canadian Cattlemen's Association. Andrea Brocklebank, for seven minutes, please.

**Ms. Andrea Brocklebank (Research Manager, Beef Cattle Research Council, Canadian Cattlemen's Association):** Thank you.

Hello, I'm Andrea Brocklebank, the Executive Director of the Beef Cattle Research Council, Canada's national industry beef research funding agency. It is responsible for the successful delivery of the first and second beef science cluster. I am pleased to be here today to speak about the role of innovation in our industry.

In 2012 the Canadian cattle industry contributed approximately \$26 billion to Canada's GDP. The industry has tremendous opportunities due to continued growth in global beef demand and record high beef and cattle prices. At the same time, our industry faces increased production costs and increased competition for land, water, and labour resources from other expanding agriculture sectors. These opportunities and challenges are expected to remain for the foreseeable future.

Innovation is crucial to ensure that Canada's beef industry successfully addresses these challenges. Innovation allows us to use limited resources more efficiently, while continuing to be a global leader in beef quality and safety. The benefits of research go far beyond simple productivity improvements. Research also supports the development of science-based regulations and trade agreements. It is critical to maintaining consumer confidence in our beef production system and the safety, quality, and nutritional attributes of the product we produce.

These additional benefits of research—that is, sound policy, regulation, consumer confidence, and international trade—provide broad benefits not only for industry, but also society as a whole. Consequently, research funding is viewed to be an essential industry and government investment that contributes to industry resiliency and reduced dependence on government's ad-hoc and business risk management programs.

Agriculture Canada has made considerable efforts to streamline and focus its research programs over the past several decades. Over the same time period, the beef industry has implemented a national check-off to support research and technology transfer programs. The industry has also developed and implemented a comprehensive national beef research strategy. The strategy informed the priority research outcomes targeted under the second beef science cluster and is working to guide and influence the funding decisions of other major research funding agencies across Canada. Significant industry effort has been placed on improving the efficiency and effectiveness of applied forage, cattle and beef research funding allocations with a focus on reducing duplication and facilitating co-operation among Canada's beef research funding community.

The industry has accepted the responsibility to develop and lead the beef science cluster and the national beef research strategy. This has and will continue to encourage greater industry investment in and adoption of research. By bringing together Canada's largest industry and public research funders, the science clusters program is significantly improving government-industry co-operation in research. The second beef science cluster is a \$20 million investment, \$15 million in government funding and \$5 million in industry funding.

Investments under the second beef science cluster have increased substantially and not only include the national check-off, but also additional funding from five provincial organizations. We are convinced that the beef science cluster is a very co-ordinated and efficient research model. However, the system can be refined further, beyond administrative details that can be addressed elsewhere.

Allocating research funding in discrete five-year blocks creates challenges for long-term projects. Research in animal breeding, perennial forages, and environmental field studies requires a much longer time frame in order to achieve meaningful results. Enhanced industry-government collaboration could also make research programming even more effective. More direct engagement of industry in the federal government's planning processes would ensure that Agriculture Canada's internal research infrastructure, staffing, and other programming decisions were aligned with the outcomes identified in the national beef research strategy.

Industry engagement is particularly important to ensuring that Agriculture Canada research staffing decisions are aligned with both industry and government priorities, and cuts are not made by attrition. Cuts through attrition gradually erode research programs. There is also benefit in working to transition the new replacement scientists prior to the retirement of the older, retiring scientists, thereby providing an opportunity for mentorship and ensuring that research momentum is not lost.

To take full advantage of the potential that research promises, we need to emphasize a few additional points. First, stable and, ideally, increased funding for federal research facilities, together with staff and programs, is essential to maintain the integrity of Canada's internationally renowned agricultural research system. Second, the federal government has a clear responsibility to continue supporting long-term, basic, high-risk research. This is the knowledge pipeline that ultimately leads to applied research that benefits industry and broader society. The fire station analogy is apt here: Fostering innovation and maintaining core research programs ensures that we

have the physical and scientific capacity to respond to issues as they emerge, not when they become emergencies.

• (1635)

Industry has made considerable investments in "public good" areas of research. Research supported by the beef science clusters is providing science-based information to inform the beef cattle code of practice, as well as the work under way at the global round table for sustainable beef, to confidently and factually address ongoing questions regarding antimicrobial resistance and food safety. However, this does not diminish the federal government role in these areas.

Social license issues, which pertain to the public's perception of industry, are increasingly important. In many cases, research generates the facts that can effectively address social licence issues. Environment, antimicrobial resistance, and animal welfare are prime examples. However, in order to be viewed as credible, relevant research data must be collected and evaluated by an independent, impartial body.

In closing, I would like to summarize our three main recommendations. First, continued federal government support of both basic and applied research programming is critical to supporting industry advancement in a sustainable manner. Second, further enhancing engagement of industry in Agriculture Canada's decision-making regarding critical research infrastructure, staffing, and programming will help to ensure the most efficient use of resources. Third, meaningful progress in both basic and applied research streams is contingent on long-term, predictable, meaningful funding commitments that are preferably 10 years in length.

I would be pleased to elaborate further on any of these points or to answer any questions you may have.

• (1640)

**The Chair:** Thank you very much for your presentation.

We'll now move to Mr. Hall, for seven minutes, please.

**Mr. Michael Hall (Executive Director, Canadian Livestock Genetics Association):** Good afternoon, and thank you very much for allowing the Canadian Livestock Genetics Association to make a presentation today.

For those of you who don't know, the Canadian Livestock Genetics Association looks into exporting live animal semen and embryos.

I'm going to outline some of the key challenges facing the Canadian genetics industry.

Basically, the loss of export markets for live animals is one of the key struggles we have been dealing with since BSE hit Canada. Of the live markets that are out there, Canada is no longer getting its share. The United States has really come ahead in marketing a lot of cattle, a lot more than we are in Canada have, percentage-wise.

With that comes a loss of the genetic and exporting infrastructure. We no longer have heifer growers. We no longer have exporters that do the marketing. Should we get a large market, we would be struggling to fulfill some of these markets with cattle, or otherwise

Canada is facing a high logistical cost for exporting live animals. We're not close to the markets anymore. The big market used to be the United States. It's no longer in North America, and it's very expensive to get cattle from Canada to other countries.

High-risk markets are becoming the norm. Those are markets like Kazakhstan, where they don't understand some of the current and modern animal health technologies—it's high risk for exporters doing business there—to working with countries like India, where they are developing also the same lines.

We see decreasing market development support, and that's becoming critical. We need to work hand in hand with our government to develop these markets. Industry is quite prepared to move forward in that direction, but we do need ongoing support from the government.

Capacity of the government agencies to accomplish technical negotiations in a timely manner is becoming very critical, and there are difficulties in negotiating health protocols to some of these emerging markets.

Those are some of the issue that we're facing.

I'm going to hit a couple of things to clarify and dig into them a little further, research being one of them. Research is a key to the long-term viability and seeing Canada as a leader in these markets. If we want to retain and regain that leadership role, we need to focus on research. We need a long-term commitment for funding to focus on genetic research and innovation. Our world-wide recognition that Canada is leadership is disappearing. The leading geneticists from Canada are now leaving the country. Where Canada used to be a magnet for genetic researchers, we're now seeing them move to other countries, like New Zealand and over to Europe. We're acutely aware of this and how it's going to affect our long-term viability. Other countries are basically building their research capacity using our best-trained people.

Moving to the Canadian Food Inspection Agency, we're seeing a growing lack of capacity to develop export certificates. Again, this is going to be critical in the future, as we work on new free trade agreements with countries. We seem to have a lack of capacity, less and less people to work on the details of some of these agreements.

We need to strengthen our focus on animal health issues and programs to lower disease prevalence. This is one of the key things. We have to be innovative in how we're going to do this, and we have to be out of the gate a lot faster than we have been.

Again, the Canadian Food Inspection Agency needs to be a partner with industry, and we need to make sure that our domestic animal health programs do not put our domestic industry at a global disadvantage. We can't make them too stringent, too tough, too hard for producers and exporters to be part of, and that's a concern.

We have to be able to utilize new technologies for disease testing and for export. These technologies are out there, but it seems slow to be adapted into government regulations.

We need a government that is ready to support industry by creating flexible programs to enhance our competitiveness through partnering and funding. I mentioned that earlier, and it's a big part of market development, but we need to be really innovative. Some of these smaller companies don't have access to the capital, so another item might be capital access for companies wanting to develop genetic exports.

We need to see our key negotiators travel to markets to support industry. Whether it's negotiating an animal health certificate, we need to be able to get them there to finalize these negotiations and get them completed.

We need a government that actively supports exporters in conflict resolution and defending its trade rules. We see that happening, and we need that to continue.

● (1645)

We need access to specialized funds and insurance programs for exporters that are now taking unparalleled risks. Some of these programs, through capital and insurance, can really make the difference in how we can see competitively around the world what we're going up against.

We would like to see the expanding of the much-needed funding in the AgriMarketing program—we have seen that decrease a bit over the years—and possibly more participants in it. It's a key program that our exporting industry uses to develop markets, so we have to be innovative in those new market developments and how we're going to get our share, how we're going to be the first in and get that market share.

We need supportive, innovative, leading research and development that focuses on improving the Canadian genetic products that other countries demand. I mentioned earlier that it's getting to the point where we're seeing our leading geneticists leave our country, so we need a long-term strategy for research.

Also, we need to reinvest in these key research platforms. Universities that want to cut leading researchers or not refill the positions when they retire are part of the problem. We need a long-term strategy on how to keep these key people.

We have to co-develop demonstration farms in key markets. I think this is a big part of what can really set Canada apart from other countries. We need to show our innovation and our genetics, but we need to profile them in the foreign country's conditions.

That kind of co-developing of a Canadian farm or of Canadian genetics benefits more than just the genetic industry. It also supports a broad group of Canadian agribusinesses that are involved in farm production. We see a lot of countries beating us out of the gate in these development strategies in other countries. Canada needs to be a little more innovative and a little quicker to get involved in some of these types of ventures.

All in all, the Canadian livestock genetics industry applauds the hard work done by the various governmental departments and Minister Ritz in aggressively opening new markets and promoting Canadian genetics around the world. The genetics industry has made excellent use of the AgriMarketing program for developing new markets and we would like to see this program strengthened. We also would like to see a long-term strategy to keep research in Canada and to regain our position as world leaders.

Again, the CLGA would like to thank the committee for letting us have this time.

Thank you.

**The Chair:** Thank you very much, Mr. Hall.

Now we'll go to our committee. We'll start with five minutes.

Madam Brosseau, please.

**Ms. Ruth Ellen Brosseau:** Thank you, Chair.

I'd like to thank both of our witnesses. I think you were very interesting. You had so much information, both of you, that my mind's kind of all over the place.

You've talked, Mr. Hall, about Canada losing its leadership role when it comes to scientists. You said that on the world stage we have a lot of work to do to regain that and that we're losing people to New Zealand and other countries. Can you explain how that has happened and what we need to do to regain and maybe have a retention of these scientists?

We all know that the research and development are very important, but it seems that we're not doing enough. Maybe we need to reverse some of the cuts to public research that we've had. I'm wondering if you could elaborate a little more on that, please.

**Mr. Michael Hall:** Thank you for the question.

I think it starts at the university level, where they'll take a 40% cut, say, and put it across the agenda or look for the savings. One of the easiest things to do in regard to some of these key research people, who they've had for years, is to not replace them when they retire. If you don't keep those senior positions, then you're no longer attracting graduate students from across the world to take part in your programs. That's what we're no longer doing in Canada.

Whereas we used to be the magnet for genetic research around the world and we saw some of the leading people do their post-doctorate work in Canada, stay in Canada, and then continue to research and work, we're now seeing our geneticists leaving. It has a lot to do with funding, for sure, and then a commitment to get it done.

• (1650)

**Ms. Ruth Ellen Brosseau:** We have programs and they do work, but they're kind of piecemeal. They're just for a few years. They're

not long-term programs. I think Andrea touched on how right now they're at about 5 years, but we need something that's about 10 years long.

Would you agree that 10 years is a good long-term vision plan that we should set up for these types of innovation studies? Would you agree that 10 years is a good amount of time?

**Mr. Michael Hall:** Well, like a lot of the genetic research, it's a very rapid field, but it's the training of the people and keeping the people in Canada that's key. If your strategy is long enough and you identify the key people you need, then you put in place—and have time to put in place—what they need; you're not saying that a person is done and asking, “What are we going to do now?” Often, industry gets looked at in regard to picking up the role. Industry can only do so much. We need strong leadership on the government side too.

**Ms. Ruth Ellen Brosseau:** Andrea, I think you had three recommendations. Can you just go over them again? I think one was for strong and stable increased funding.

As well, perhaps you could define “high risk research”.

**Ms. Andrea Brocklebank:** High risk research is research where you're looking at things that don't necessarily derive value to industry immediately. So industry struggles to sometimes invest in it.

But on the food safety file, for example, it's the long-term evolution of food safety issues—something like E. coli, where you need constant investment—which really speaks to having that capacity available as things emerge, so that you're not trying to address them reactively but proactively.

Basic research also includes things like feed grain and genetic development, and all of those types of investments. To some extent, especially in the beef industry and in western Canada, the profiles of the feed grains that we use are not easily integrated into private research programs, because of the fact that you can save seed on the farm. So public investment is necessary when you speak about barley, wheat, and those types of things. Those are long-term programs, 10 years plus, to get results.

Speaking to the second part of that question, you need continual funding. One of the things we see with the current programming of five years is gaps in funding, which is when you lose capacity because they're looking for that long-term funding to attract graduate students to their programs. It's that difference between project-based funding and program-based funding. Sometimes it doesn't always need to be 10 years in length, but sometimes for certain stuff it does. When you have gaps, that's when you see issues and the departure of individuals.

**Ms. Ruth Ellen Brosseau:** Thank you very much.

**The Chair:** Thank you very much.

Thank you, Madame Brosseau.

I'll now go to Mr. Hoback. Five minutes, please.

**Mr. Randy Hoback (Prince Albert, CPC):** Thank you, Chair.

I welcome the witnesses to the committee. It's very interesting when we talk about genetics and research in the livestock sector, for sure.

I'm just curious, Ms. Brocklebank, because you said there was \$15 million and \$5 million in funding, so that you receive roughly \$20 million in total. How do you leverage that? When we were listening to the other witnesses earlier today, they said they were leveraging up to 5:1 with the private sector. What are you doing to leverage that money to get the most bang for the dollar? Then how are you allocating that money? How are you deciding what projects should go ahead and what shouldn't?

**Ms. Andrea Brocklebank:** The leverage under the cluster is 3:1, so it's industry putting up \$5 million, and then government putting up \$15 million. The majority of that is from Ag Canada, but there is a small amount of other government funding.

In terms of how we leverage it further, I think it's very important to point out that in the beef industry it's cash on the table. We count no incoming contributions, or any of those things, and there are significant amounts in there. It's just easier from an accounting standpoint for us.

But, obviously, that specific program is underneath, and those researchers have much larger programs so they're getting investments from all of the other provinces. It's those types of things.

In terms of how we allocate the research, the clusters and the process and some of the issues that we saw absolutely revolutionized how we approached research. Previously we'd look at programs on an annual basis; we'd fund some proposals, and there we would go. What happened is that we weren't looking at a portfolio of research, so it was often the trend of the day that was addressed to the greatest extent. However, that's where you see the departure of research, because if food safety wasn't the highest priority, it didn't get money that year. That sent a signal to government that we weren't interested—and that's very much not the case.

We've made strategic allocations. Basically, we have beef quality and food safety getting a portion of investment. For feeds and forages, animal health and welfare, we've tried to identify very clear outcomes over the five years and develop priorities underneath. The exciting part about that is we're also working with the other funders to ensure that their programs are addressing the ones that the cluster isn't.

**Mr. Randy Hoback:** It's more the private sector, though. I'm not talking about the farmers and their contributions. How have you been able to attract the private sector to invest in the infrastructure and the research infrastructure here in Canada? I ask you this, because in the grains sector, for example, we're seeing huge participation from the private sector now, and we're curious about it. Are we seeing that in the livestock sector, and if not, why not?

• (1655)

**Ms. Andrea Brocklebank:** Under the cluster, we don't have any direct private sector involvement. We've done that strategically, knowing that the cluster really works on the applied research that benefits the broader industry and society as a whole. It also feeds

into the research that the private sector then adopts and utilizes to further implement, enhance, and basically get the technology to the farm.

The other part is that we have entered into some private agreements outside of the cluster with check-off dollars to do those projects outside of the cluster. So we're trying to optimize funds, basically, and some of that—

**Mr. Randy Hoback:** But why would you choose not to include the private sector? That confuses me. When you're looking at the participation of taxpayers' dollars, why wouldn't we also take advantage of private sector dollars?

**Ms. Andrea Brocklebank:** Well, to be honest with you, the biggest thing is the capital in the cluster. We were able to allocate check-off funds by strategically matching Ag Canada funds under the cluster, and we've developed other projects with check-off funds and private companies outside of the cluster.

I think it is important to emphasize that the first cluster was only national check-off dollars. This time we have five of the major provincial organizations contributing additional dollars, which demonstrates the value of the research and the feeling they have about this thing.

**Mr. Randy Hoback:** To go back to the grain sector, I guess the confusion I have is that we're seeing a lot of researchers and research moving into Canada because we've allowed the private sector to do that. They're actually taking a very aggressive role in the research side of things in the grain sector. Why wouldn't we copy that successful program? We heard your colleague here talk about how universities are losing these top minds to other countries, yet we're not providing a platform for them to come over.

So if the university isn't the platform, what are we doing to make it something else?

**Ms. Andrea Brocklebank:** About 60% of our funding goes into forage and feed grain varieties. That is somewhere where the private sector has not been able to capitalize to the same extent, basically due to the nature of forages and feed grains, especially with barley, where they can't capitalize upon that and develop and privatize those varieties. To some extent that's where the beef industry very much feels that there is a—

**Mr. Randy Hoback:** The proper patent protection, proper trade mark protection is very important.

**Ms. Andrea Brocklebank:** Yes, absolutely.

And the self-pollinating versus cross-pollinating crops—

**Mr. Randy Hoback:** And of course we've taken the handcuffs off wheat, so wheat is getting a lot of investment in research and development.

**Ms. Andrea Brocklebank:** Yes.

I think it's also important to point out that we've worked with the other clusters and are trying to coordinate across clusters as well.

**Mr. Randy Hoback:** How do you interact with VIDO in the University of Saskatchewan? How does that get into your cluster picture? Again, that's a lot of science and technology, not just in the livestock sector and I'd say the cattle sector, but right across the animal sector as well.

**Ms. Andrea Brocklebank:** We have ongoing relationships with them. We're doing a lot of work around vaccine development, TB. Work is under way, and that was actually funded under the CAAP program, not under the cluster. Again, it's a very important part of our animal health and welfare portfolio, and the long-term vaccine development—

**Mr. Randy Hoback:** The infrastructure came under a different program, but as a very key part of Canadian infrastructure—

**Ms. Andrea Brocklebank:** Absolutely.

**Mr. Randy Hoback:** Thank you.

**The Chair:** Thank you very much, Mr. Hoback.

We'll now go to Mr. Eyking, for five minutes, please.

**Hon. Mark Eyking:** Thank you, Mr. Chair.

And I thank the witnesses for coming.

What we've been hearing quite a few times, as we've embarked on this study, is that there's a shortage of long-term vision and long-term planning and strategizing for our industries to grow and prosper in technology and innovation. You see, not just with agriculture but any industries that have done well in the world, that government has played a key role. When you see in Israel all the technology that they're coming out with, or Germany, or wherever, and that it starts in schools or at very young ages and that it goes all the way through, you understand that this environment has to be there.

It's very disturbing to see that we spend a lot of time and have our brightest and best leaving us to go to other countries where they see that their skills can be used. They probably see that there is some commitment there. That said, if we as government at present are funding innovation and technology in an ad hoc way without really working with the industries and looking at the bigger picture, we'll keep falling behind.

Let's compare some of these other countries. What are they doing better than we are to foster better scientists, better research, better synergy between all stakeholders? How can we change what we're doing here? Is it that we should be working better with the provinces and other stakeholders within the government circles?

I'll start off with you, Mr. Hall.

● (1700)

**Mr. Michael Hall:** That's a tough question, due to the fact that it's hard to speak to what is being done in another country. I think in your opening comments you hit on part of it, and that's the long-term stability for the researcher. They see that commitment and know that they're wanted, that they need to be there, and that they're not fighting to have a position, but are sought after and that there's a long-term plan in place. I think that's got to be very attractive for someone in the research profession. It's that commitment to basic level research that's really moved things ahead. It's hard for industry to fund, and it's hard for other co-funders to be involved in some of that base research. That's where that partnership with the government

is so important to move some of those items ahead. I'm not too sure we're there anymore.

As we get back to that long-term strategy.... And it may happen like what the other countries are doing, with their eyes open, and our seeing what's happening a little more clearly that we can try to match up and exceed....

**Ms. Andrea Brocklebank:** The beef industry understood that they had some work to do and, frankly, the clusters helped their becoming more coordinated by having that consistent strategy. But now it's also about getting not only participation beyond.... The cluster is part of it, but so are other AgCanada programming, other Government of Canada programming, and also our provincial research programming.

I remember talking to one researcher about the fact that he had a really strong program and he had adequate funding, but it was coming from 15 to 20 different funding sources, each of which has an annual report and a final report. Researchers become inundated by that administration, and they are not allowed to do their research to the greatest effectiveness.

That's where we've tried to work as an industry, so we'll say to another funder, "If you're going to play in that arena, we'll focus here", knowing that as long as the work is being done, that's the objective. We're trying to give our researchers a bit more time to do research and not to have to grapple with finding adequate funding for their programming. So we're trying to be more strategic with our allocations.

I think there's some continued work to be done in terms of the federal-provincial arrangements, because each province has its own research funding and possibly several pots of it. That's one of the challenges. Adequate funding is part of it, but so are the consistency and number of funders that you have to access.

**Hon. Mark Eyking:** I recently returned from Taiwan, and they announced that they were going to buy Canadian beef. One of the things they mentioned to me was that they sent a delegation over, and they were not only very surprised but also very glad to see what we are doing in Canada.

The beef industry has been down a hard road here in the last 10 to 15 years. We know all the things that have happened, and there's been a lot of finger pointing, whether about inspectors or otherwise, but the reality is we got through it and we're in a great position right now to capitalize on that.

How can we get that message out there to our buyers, to our customers around the world, that we are moving ahead and we're using the right technologies and innovation to have the best and safest beef in the world market?

**Ms. Andrea Brocklebank:** I think it goes back to communicating the science and, of course, to using science as that base, and to having credible people within industry but also outside of industry to bring that science and those people forward when we're going to have those discussions.

At the end of the day, it's also about having relationships so that if they have a question, they'll come back to those people, instead of speculating or going to people who aren't using science. It's about always having that credible, fact-based approach. That's really the approach our industry has taken.

**The Chair:** Thank you very much. Your time is up.

I'm going to go now to Mr. Dreeshen, but just before we do, we've lost Mr. Hall. So could you maybe direct your first questions to Andrea? That would be great, and hopefully we'll get him back in a few seconds.

Thank you very much.

Mr. Dreeshen, go ahead for five minutes, please.

**Mr. Earl Dreeshen:** Thank you very much, Mr. Chair.

I will go into some of the discussion and the things we've talked about.

A few moments ago, Mr. Hoback talked about the difference as far as being able to get researchers into certain areas goes. As he was suggesting, in the grain sector, where it looks as though there are many different opportunities, for various reasons, for the products we're looking at, I think that's an issue. Of course, if you're looking at being able to bring industry in, you can bring in these researchers we were talking about. I see the dilemma we're in under the circumstances there.

One of the other things that were discussed was how wheat research is able to move forward, but in one of your answers earlier, you spoke about a concern or an issue with feed barley and the profiles that were expected from there. You said one of the issues was with farm saved seed. I'm just wondering if you could expand on where you were going with that, so that we can see how we can maybe fit this into some of our discussions.

• (1705)

**Ms. Andrea Brocklebank:** I apologize for using that term, but basically it's the difference between non-hybrid and hybrid crops. Barley is a self-pollinating crop, so it's very difficult for a private company to capitalize and to have you come back to purchase seed every time.

In essence, when you have opportunities, through corn and those types of things, to invest in research, the private companies are more likely going to go with that. There is an increase in opportunities, I think, but the biggest thing we've seen over the last 20 years are breeding programs through the provincial and federal governments. There have been declines in capacity and transitions in capacity. I will emphasize that, because there's a large number of researchers who are retiring or about to retire. The point we made was that great efficiencies can be gained by ensuring that you're training people underneath those people, which is one of the things we're trying to do under the clusters, to ensure that we're transferring that knowledge before it's gone.

**Mr. Earl Dreeshen:** I guess one of the other things, too, when we were speaking earlier...and I believe Michael was talking about it as well. I certainly lived through this as well with BSE and so on, and of course with the SRMs. There are the concerns that we have here, if we have one market in Canada, and the issues that are related to

what we have in our neighbours to the south. A lot of this has been blown out of proportion.

Of course the Canadian agriculture industry and the beef producers have had to suffer with this for a long, long time. It was a case of someone taking an issue, which of course was significant, and looking at all the potential negatives they could find from it to, in my opinion, make a good news story. Unfortunately, it devastated the industry.

I know that Michael talked about this and about the health protocols in emerging markets and expanding in that particular area, and also about some of the concerns we have with high-risk markets and how they are becoming the norm. Do you have something you could comment on in that regard?

I see that Michael is back again, but perhaps you could just comment on that and then Michael could address my question on health protocols with emerging markets.

Andrea, perhaps you wouldn't mind going first.

**Ms. Andrea Brocklebank:** I think to speak a bit broadly about it, the biggest thing we need to be able to do when negotiating trade is to have science to back it. That's often around animal health and food safety, but there's even the code of practice around animal welfare and the increasing attention being paid to that.

One of the big things we've seen with antimicrobial resistance in animal transport particularly, but animal care broadly, is that we have to be able to explain what we're doing confidently, which involves research, and then identify areas where we need to improve and move forward. If we don't have that baseline, benchmark research that we're constantly monitoring, basically that's when we run into the questions. To start doing that reactively takes years, obviously.

To some extent, that's what instills confidence in the Canadian beef industry: when you can provide that factual data up front and have the people to talk to about it.

**Mr. Earl Dreeshen:** With that thought in mind, of course we do have company businesses that have certain marketing strategies that somehow reflect some of the non-science bases that are there, which is unfortunate.

Michael, I wonder if you could expand somewhat on your thoughts with regard to the health protocols in emerging markets, something that you'd spoken of earlier.

**Mr. Michael Hall:** Right. It goes right back to the heart of the matter, which is the lack of a science-based approach from the emerging markets and their own interpretation of OIE regulations and guidelines and lack of understanding of what some of the issues are—the way the diseases work, and the testing, their prevalence, and the scope of our country.

It really comes back to the lack of a science-based approach. I know that the OIE has their regulations and guidelines, but they are just that, guidelines, and countries can take it to the next level.

**The Chair:** Thank you very much.

Thank you, Mr. Dreeshen.

Now we'll go to Mr. Blanchette for five minutes, please.

[Translation]

**Mr. Denis Blanchette:** Thank you, Mr. Chair.

I thank our witnesses for their presence here with us. What I have heard today is very interesting.

There seems to be a common thread in your respective statements. What I mean by that is that one gets the impression that up till now there has always been research and patchwork programs, and that we are always lagging behind reality somewhat, so that we are having trouble keeping up the enviable reputation we used to have within the international community.

Do you think we should be changing the way we do things, and creating a type of agile research and development ecosystem that could sustain your various fields of activity? This could be supported by public and private research in certain cases—it seems difficult to obtain the support of the private sector in certain areas of activity—which could also integrate all of the university and educational sector.

I would like to have all of your comments on that. Ms. Brocklebank, please, you could begin.

• (1710)

[English]

**Ms. Andrea Brocklebank:** Thank you.

To start, I guess sometimes it does sound like we're behind in what we needed, but I want to emphasize that we've made significant gains over the last 30 years, and continue. We've seen in the beef industry a 14% reduction in water use, a 34% reduction in land use, and the list goes on in terms of what we've been able to accomplish. We are changing.

[Translation]

**Mr. Denis Blanchette:** I wasn't criticizing industry; I'm just talking about how we do things.

[English]

**Ms. Andrea Brocklebank:** I think the biggest thing is that we are changing the way the funding system has evolved. It's really positive where we've gone with the clusters, because you do have more direct industry-government engagement in planning. We need to continue that. It's about tweaking the system at this point and ensuring that we continue down that road with longer-term funding. The first cluster was about three-and-a-half to four years in length; the second one is five. We need to see that continue and move forward, and also recognize how to complement other programs around it where there is that high-risk basic research on an ongoing basis.

So I wouldn't say revamp it totally at this point, but tweak it such that you have even greater collaboration between industry and government, especially when it comes to the capacity planning within Agriculture Canada but even, as Michael spoke about, at the university level as well.

[Translation]

**Mr. Denis Blanchette:** Mr. Hall, what do you have to say on this?

[English]

**Mr. Michael Hall:** I think a lot of good things are working, but there's also room for improvement and for recognizing where and why we're losing the people.

Part of it is also, I think, an overall regulatory reform that makes it easier to do business and research, so if you're a researcher, as mentioned earlier, you are not having to filling out a million reports to different avenues for small sectors of funding, but are spending your time doing research. That regulatory reform impacts our competitiveness in our markets right across the world.

I think that's a prime one that will impact a lot of this and allow that innovation to come forward, but it's got to be part and parcel, and I think we need to focus on an overall long-term strategy.

[Translation]

**Mr. Denis Blanchette:** Very well.

[English]

**The Chair:** You have a minute and a half.

[Translation]

**Mr. Denis Blanchette:** How do you see the evolution of that ecosystem? As Ms. Brocklebank was saying, we have to tweak things, but we also need a vision of the future. Even if we are talking about food, as is now the case in all areas, high technology and research are major components in industry's development. Do you have any suggestions in that regard, aside from long-term funding, that would support you as well as the development of your products, and, especially, re-establish Canada's reputation internationally?

Mr. Hall, what would you have to say?

[English]

**Mr. Michael Hall:** Yes, that's a good question.

It goes right back to the commitment and a lot of it has to do with that basic research and making sure that Canada as a whole is committed to having researchers in place who do that basic research and get that done.

I'm not sure that's there anymore. When it gets down to that university level, they do the cuts, and then we're losing our key people and no longer have that continuum. I think it goes back to that long-term strategy to committed funding—not just funding, but knowing exactly what you want in place and how you want to achieve it. Those are the key parts, but how you get there is obviously open for discussion.

• (1715)

**The Chair:** Thank you very much, Mr. Blanchette.

Now we'll move over to Mr. Payne, for five minutes, please.

**Mr. LaVar Payne:** Thank you, Mr. Chair, and thank you to the witnesses for coming in on video. It's good to see that you're back, Mr. Hall.

You both mentioned funding and the researchers having to do so many reports. To me, this seems fairly simple: You should be able to get all these organizations and do one report and copy everybody. It would seem to me that would be quite simple to do and getting those organizations on side. What's your comment on that kind of a process?

**Ms. Andrea Brocklebank:** It should be simple. We've tried to assume some leadership from an industry standpoint, but when we looked at it across Canada, there are over 30 research funding agencies. That's among industry and the provincial and federal governments. Everybody has their different priorities, those types of things.

We are trying to be more strategic in our allocation, so instead of our trying to invest a bit in everything and another group trying to invest a bit, we make sure that we understand what they're investing in and what we will then strategically invest in. First of all, that reduces duplication but also makes it a bit easier on our researchers to facilitate that greater coordination and try to be more efficient with their time and ours.

**Mr. LaVar Payne:** Mr. Hall, do you have any comment?

**Mr. Michael Hall:** Not really. For the most part, it should be simple; but again, different funding bodies have different requests, different forms, different things, and it would be nice if it were as simple as sending things out.

The dairy industry is very well organized on the research side and they've been utilized in the cluster for the last few years with the genetic research split up. Again, our biggest concern is why leading genetic researchers are leaving our country, be they in the beef or dairy sectors.

Why are they taking that step? It's about having a long-term viable plan and commitment by government to being a partner, because right now it's being totally downloaded to industry.

**Mr. LaVar Payne:** Certainly I understand the funding requirements and I know that we're putting a lot of funding into research and development. However, one must certainly look at the universities, who are the ones I presume you're making those kinds of cuts and decisions based also on the funding levels they might get from the provinces.

There's one thing I'd like to ask both of you in terms of research and development. If you had your choice of two or three specific research projects, which would be your top two or three, and why?

Funding is limited.

**Ms. Andrea Brocklebank:** I will tell you this: we have tried to actually stop doing that because that's when we run into issues of not focusing on food safety as much, so we have taken a portfolio approach instead. That said, our industry right now is faced with competition for limited resources, specifically for acreage. The margins between canola versus beef production are the deciding factors. It's not necessarily profit; it's the margin between those, and so we have to increase productivity.

That can be done on major fronts: forage production, forage utilization, feed utilization, and feed efficiency, so those are the areas we are very much focusing on. Given the fact that animals spend 80% of the time on forage, and we know that if we can increase one

more day on grazing and have an animal out one more day, that's \$3.6 million to cow/calf producers right there. That's the area we're focusing on, very much so, as well as genetic improvement around feed efficiency and quality.

**Mr. LaVar Payne:** Mr. Hall, do you have any comment?

**Mr. Michael Hall:** Probably the primary aspect would be genomics, genomic research, and what that translates into.

Taking it even further, there's an animal health component using genomic research for healthy animals so that you have to spend less on antibiotics and you have animals that are more naturally resistant to certain diseases. There is also an aspect of that that will translate over to human health; for example, we can see some of the health benefits in DHA milk. There's an opportunity to do research and further applied research that can extend from meat, milk, and the various products into health benefits for humans as well. Those are going to be the leading things going around the world: animal health and the human health side of the component.

● (1720)

**Mr. LaVar Payne:** In terms of your primary focus—

**The Chair:** You have 15 seconds.

**Mr. LaVar Payne:** —Mr. Hall, is it bio-security or livestock identification?

**Mr. Michael Hall:** Pardon me, what was your—

**Mr. LaVar Payne:** Is your primary focus bio-security or livestock identification?

**Mr. Michael Hall:** As to our primary focus, I think Canada is on the path for livestock identification. We've had it for a while now, and it's just a matter of completing it, which needs to be done.

For us, bio-security and that whole animal health issue really impact our exports and trade.

**The Chair:** Thank you, Mr. Payne.

We'll now go to Mr. Garrison for five minutes, please.

**Mr. Randall Garrison:** I won't be following up that line of questioning.

I think my questions are going to be primarily for Ms. Brocklebank.

You may have been in the room among previous witnesses when I was asking about the impact of climate change on food production and food security.

As far back as 2008, the UNFAO talked about the inevitable impacts of global warming on food security. I was interested hearing you talking about things like the margins for canola and beef production. If we see major changes in access to water and arable land, they are going to have very big impacts on beef production.

I was wondering whether in your research portfolio there's a consideration being given to try to do some of the research that might be needed now before we hit the crisis of climate change.

**Ms. Andrea Brocklebank:** Absolutely. Although a lot of our research, you could say, is directed towards improving productivity for producers, ultimately, if they're using less water and are more feed efficient, there are fewer days on feed and they produce less manure. All of those things are ultimately part of your sustainability as well.

Because I've been around these discussions before, I think it's important to point out that often the beef industry is the first that's sought to go, but over 50% of land in Canada cannot be sewn into crops at this current point, and if water is an issue, that's likely to continue.

Frankly, there we have an advantage as to some of the other protein sectors, but that's where we need to look at how we extend grazing so that we can keep those animals, because it's currently about 80%. How do you do those things, how do you improve water use? We're doing sustainability assessments right now to establish those benchmarks, to figure out where we are relative to the global framework, but then also how we move forward to identify opportunities for improvement.

It's very much positioning ourselves with benchmarks, but also then optimizing that through improved feed efficiency, water use, manure management, and those types of things.

**Mr. Randall Garrison:** Is that a particular focus of one part of the research agenda? Or are you asking across the board for people to be looking at that?

**Ms. Andrea Brocklebank:** We have particular studies in that area but to be honest with you, that's the cross-sectoral approach because that engages your feed efficiency, your forage and grazing utilization. When we're doing that, and you're looking at improvements in genetics and genomics, you have to ensure that you're not compromising quality—tenderness, those types of genetics. That's where a lot of our programs and research projects are. They are very much across multiple sectors and multiple areas, and they have to be to ensure long-term economic sustainability.

**Mr. Randall Garrison:** If we're looking at the impact of climate change, for instance, on grain production, that's certainly going to have some large impacts on the economics of beef production. Is any look being given to that, other than, as you were talking about, the efficiency parts of it?

**Ms. Andrea Brocklebank:** I think it speaks to the fact that we're ultimately trying to optimize how we feed our animals, and as that evolves, making sure that we can still produce at the end of the day, but in a manner that uses the least amount of resources. And that's done partially by improving the productivity of the feed grains we use, but also by reducing the number of days that the animal has to be on feed. That's through feed efficiency, that type of thing. But also, as I indicated, animal health is part of that and plays a huge role. The healthier your animals are, ultimately the better they perform.

**Mr. Randall Garrison:** I have...?

**The Chair:** You have a minute and a half left.

**Mr. Randall Garrison:** Okay.

When you're talking about animal health and welfare, as somebody who represents primarily an urban and then hobby farm riding—I have both ends of this—I was wondering if you would tell us a little more about the kind of research that's being done in the animal health and welfare areas.

**Ms. Andrea Brocklebank:** The industry is challenged by this, particularly when we talk to our global trading partners, as well as with our public. To be honest, producers know they're doing a good job, but sometimes it's about demonstrating that and having independent people to do that. So the first work was very much focused on transport, and it was a cross-collaborative initiative between university and federal researchers.

The good news story about that is that we found that 99% of the animals getting off trucks were healthy and good. Actually, the place where urban people most likely see animals is on trucks. But what that research also allowed us to do was to figure out where the vulnerable animals were. And we saw them. They were the cull cows and your feeder animals.

So how best can one improve transport in those situations? Sometimes we see regulations—and I'm not saying within Canada—imposed, say, on transport, because of perceptions. In this case, if animals have to be stopped to water because of our perception, unloading them and loading them again can actually cause more stress. That's the type of thing we're trying to address with research. What's the impact of having to unload and load more frequently versus going a couple of more hours to the destination?

● (1725)

**The Chair:** Thank you very much, Mr. Garrison.

I'll now move to Mr. Zimmer for five minutes, please.

**Mr. Bob Zimmer:** Thank you for appearing before the agriculture committee today.

I had a question I wanted to ask of even the previous witnesses and now you as well. If we're to invest a million dollars as an example, in your estimation, dollar for dollar in terms of investment for innovation and competitiveness, what would the return be, based on the results that you've seen? I'd like to hear both of you comment.

**The Chair:** I think, Mr. Hall, you're first. Go ahead.

**Mr. Michael Hall:** Right. I don't know if I can actually answer that question, dollar for dollar. I know that the dairy industry has done tremendous work with the partnership with the government, through NSERC funding, and various avenues, including Ag Canada. I can't really speak to the actual dollar for dollar value.

**Mr. Bob Zimmer:** I think it would be beneficial because we represent the taxpayer and I think they want to know that, for every dollar that's being invested—

**Mr. Michael Hall:** Absolutely.

**Mr. Bob Zimmer:** —there's a return.

**Mr. Michael Hall:** Absolutely, but the mandate of my organization isn't actually research, so I can't speak to it. I'm not involved. The Dairy Farmers of Canada would know more on the dairy side of the value of the research, as compared to the Canadian Livestock Genetics Association.

**Mr. Bob Zimmer:** Okay.

Andrea.

**Ms. Andrea Brocklebank:** We're challenged with answering that question every day by producers who pay check-off. It's a very difficult valuation, by the way. But what we have done over the last 10 years is to look at the reductions that we've seen—say a 34% reduction in land use to produce the same amount of product—and at the investments in research. What we know from a check-off investment standpoint is that for every dollar invested of check-off, there is a \$40 return to research. That indicates, because of under-investment of research from industry...and that's part of the impetus for what we've seen with the over tripling of investment in research in the last five years. I think that also speaks to the government's investments in research. I can't say that for every dollar there's a \$40 return, but when you look at the spin-offs, I think you could confidently say that it's up there.

**Mr. Bob Zimmer:** Yes. Thank you for that.

I think one of my colleagues here asked about this, but what are some of the new things you're seeing in the future in regard to some of the innovations we're seeing and the potential that's out there? We've heard about a few examples, but it seemed like you didn't have enough time to answer more fully, because there should be a lot, I'm assuming.

I'll give you some time here to tell us what we can see coming on the horizon for Canadian producers in terms of potential, especially with CETA, the new agreement we've worked on, and the potential that it really holds for Canadian producers. Please speak to that, if you can.

We'll start with Andrea this time.

**Ms. Andrea Brocklebank:** I think the potential is large. We know there's a growing beef demand in the world, and we know consumers are wanting a safe product and a high-quality product, and Canada can provide that.

I think the big thing we see as a challenge from a production standpoint—because right now we're short of animals—is that decision between whether you're going to produce beef or produce crops. What are you going to produce? That's where, in terms of our margins, we need that improvement in profit. Really, it's about improvements in productivity moving forward and being able to produce that product in a sustainable manner.

I think it's important to point out—and it speaks to previous discussions—that there are a lot of questions being raised about the use of new technologies. At the same time, consumers want a relatively cheap product. They want it to be safe, and they want it to be sustainable—all of these things. Those technologies are ultimately what allow us to do that. We need to have greater communication about them and discussion of what the benefits of those technologies are. If you want environmental sustainability, we do need to see enhancements in feed efficiency and those types of things.

It's very much the investment in productivity improvements, but also, then, communication as to the value of technology to the broader public.

● (1730)

**Mr. Bob Zimmer:** Thank you, Andrea.

Michael.

**Mr. Michael Hall:** Again, we see genomics as a big aspect of where the industry is going on the genetic side and applying that to human and animal health. Europe is definitely a leader; you mentioned the agreement, CETA, with their health herd protocols. I think it puts us in a spot where we really have to take a hard look at ours and then make sure we're up to the task.

But again, with new technologies going forward, it's definitely going to be about how to use genomics to the maximum and how we breed animals that are going to be healthier, with less interventions, producing a healthier product for consumers.

**Mr. Bob Zimmer:** That's perfect.

That's all I have, Mr. Chair.

**The Chair:** Thank you very much.

The time's up. I appreciate that, Mr. Zimmer.

I want to say thank you to Andrea Brocklebank for joining us today and also to Michael Hall for joining us by video conference. We appreciate it very much. These were very good presentations.

Committee members, I want to thank you for sticking to your times and for your good questions.

With that, we'll adjourn.

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