COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON PRIMARY INDUSTRIES AND RESOURCES

Reference: Assisting Australian farmers to adapt to climate change

WEDNESDAY, 27 MAY 2009

CANBERRA

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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON PRIMARY INDUSTRIES AND RESOURCES

Wednesday, 27 May 2009

Members: Mr Adams *(Chair)*, Mr Schultz *(Deputy Chair)*, Mr Bidgood, Mr Champion, Mr Forrest, Mr Haase, Ms Livermore, Mr Perrett, Mr Sidebottom and Mr Windsor

Members in attendance: Mr Adams, Mr Bidgood, Mr Forrest, Mr Haase and Mr Perrett.

Terms of reference for the inquiry:

To inquire into and report on:

- Current and prospective adaptations to the impacts of climate change on agriculture and the potential impacts on downstream processing.
- The role of government in:

  - augmenting the shift towards farming practices which promote resilience in the farm sector in the face of climate change;

  - promoting research, extension and training which assists the farm sector to better adapt to climate change.
- The role of rural research and development in assisting farmers to adapt to the impacts of climate change.

WITNESSES

BLUMENTHAL, Dr Martin, Program Manager, Agronomy, Soils and Environment, Grains Research and Development Corporation 2

HELY, Dr Sara, Project Manager, Varieties, Grains Research and Development Corporation 2

PAULSEN, Ms Kylie Melissa, Communication Manager, Grains Research and Development Corporation 2

THOMAS, Dr Stephen, Executive Manager, Practices, Grains Research and Development Corporation 2

Committee met at 5.11 pm

CHAIR (Mr Adams)—I declare open this public hearing of the House of Representatives Standing Committee on Primary Industries and Resources for its inquiry into Australian farmers and climate change. This is the first public hearing of this important inquiry. Today the committee will hear from the Grains Research and Development Corporation.

Although the committee does not require you to give evidence under oath, I should advise you that this hearing is a formal proceeding of the parliament, and consequently it warrants the same respect as proceedings of the House. It is customary to remind witnesses that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. The committee has received submissions from the organisation. If there are any corrections or anything you would like to add to your submission before we start, the communications officer will take care of that.

[5.12 pm]

BLUMENTHAL, Dr Martin, Program Manager, Agronomy, Soils and Environment, Grains Research and Development Corporation

HELY, Dr Sara, Project Manager, Varieties, Grains Research and Development Corporation

PAULSEN, Ms Kylie Melissa, Communication Manager, Grains Research and Development Corporation

THOMAS, Dr Stephen, Executive Manager, Practices, Grains Research and Development Corporation

CHAIR—Welcome. Would you like to make a brief statement and then the committee members will proceed to questions?

Dr Thomas—Thank you, Chair. We would like to thank the committee for the opportunity to make a submission and to appear before you this afternoon. We have done the preliminary introductions. I will now provide you with a little of the background about the GRDC, our climate change initiatives and then Dr Hely and Dr Blumenthal will provide further details and answer any questions.

The GRDC was established under the PIERD Act. We are funded by the Australian government as well as from a compulsory levy on grain growers. We use those funds to strategically invest in R&D that GRDC manages on behalf of its stakeholders. We intend to invest over $100 million this year in research, development and extension to improve profitability, competitiveness, sustainability for grain growers in an increasingly competitive international market. As you would suspect, the investment portfolio of GRDC is very broad. It covers a wide range of issues. That really reflects the complexity of the grains industry.

We are structured into three lines of business. Dr Hely is from the varieties part of the business that looks after varietal development and genetics, but with a wide range of experience in climate change matters. Dr Blumenthal looks after agronomic soils and the environment. He is within the practices line of business, which is the line of business that I head up. Ms Kylie Paulsen is the communications manager. We also have a line of business on new products.

One of the priority issues of R&D investments that has been identified by GRDC in its five-year strategic plan is addressing farmers' capacity to adapt to climate change. To this extent we have a climate change team within GRDC, which has representatives from each of those lines of business. They meet on a fairly regular basis and provide recommendations on strategic investments that are to be developed for the climate change strategy for grains RD&E, looking at assisting growers in adapting to climate change and in mitigating on-farm greenhouse gas emissions. The climate theme, as I said, runs across all the lines of business. It is investing approximately $18 million over three years, with an additional $6 million of new investments currently being contracted.

GRDC recognises that the issue of climate change cuts across a large range of rural industries. We are working in partnership with multiple stakeholders, which include the government, research establishments and private industry. We are a key participant in CCRSPI, the Climate Change Research Strategy for Primary Industries, which consists of the Primary Industries Standing Committee members as well as the Rural Research and Development Corporation. CCRSPI, as you would be aware, has made a separate submission as a commission. We are also a major partner in the Managing Climate Variability Program, which is an investment across RDC to develop better seasonal climate forecasts and assist growers in making those kinds of seasonal climate decisions. Dr Blumenthal is the GRDC rep on both CCRSPI and the MCV Program.

When it comes right down to it, GRDC recognises the capacity of Australian grain growers to adapt. Our role is to provide data and tools to growers that enable them to facilitate that adaptation, as outlined in our submission. I will invite Dr Hely to give you a brief overview of that submission and take questions following that.

Dr Hely—Thank you. I would like to draw attention to a few key points from the submission and begin by saying that GRDC recognises that farmers have adapted and will continue to adapt to climate change. We do, however, recognise that the farming sector needs to remain profitable in a changing climate. Through providing continued strong leadership, strategic focus and effective research, this will be possible. GRDC has identified some key priorities for investment in research to adapt the farming sector to climate change. These are well aligned with our corporate strategy in the climate change area. The key areas we are investing in are centred on managing risk on-farm, improving farm management practices, improving seasonal forecasting to allow growers to be able to pre-empt seasons and spreading risk to other farm enterprises to better adapt the whole rural sector to climate change.

There will also be investments in the future, as Steve mentioned, to generate better data to validate the decisions for tools and forecasting and modelling developed in climate change. We are also looking to invest further in farming system adaptation, as mentioned before in risk management but also by developing agronomy packages or practices and in developing crop varieties to be well adapted to a climate change scenario. Biotechnology and infrastructure are also key elements of our investments.

GRDC sees the role of government in this process to be in the form of allowing the farming sector to adapt, through providing support for research and development and extension coordination, and of implementing appropriate regulatory frameworks where required. As a general statement, GRDC is dedicated to supporting the grain growers through the communication and extension of information to allow them to adapt to climate change and to make informed decisions.

Ms Paulsen—I think it is important to point out that communication and extension is integrated throughout the whole corporation and GRDC places a really strong focus on ensuring that communication and extension is actually a key component of all of our investments. We have a strong priority in that area.

CHAIR—That is an emerging process that we have failed a bit in the past—not in your area so much but in the agricultural sector.

Ms Paulsen—A significant proportion of our investment on extension adoption and identifying the most appropriate channels to ensure we have effective adoption of research results.

CHAIR—The science is being done, but getting it out there is one of the key things. Martin, are you going to comment now?

Dr Blumenthal—No, I have no prepared statement, other than to support everyone in answering questions.

CHAIR—Thank you for that. We will just stay on the soils for a minute because what is emerging is that we have put a lot into increased productivity over recent years. We have used the soils, put the products in, used more fertiliser, more water or whatever is needed and increased production. Maybe with the climate change debate now we are going to have to look at how we have done that and how to maintain profitability. That is going to be a tough ask. Do you feel we can achieve that with new products?

Dr Thomas—I might ask Martin to address that question. There is a key collaborative program on soil.

Dr Blumenthal—Historically, we have invested quite a lot in soil heath and improving soil quality, physics, nutrition and, importantly, biology as well. I think the key link to all those properties of soils is soil carbon. I think that links in with climate and soil carbon sequestration. I believe that managing carbon in our systems is going to be crucial into the future for the sustainability of agricultural systems. We are certainly investing with DAFF and the climate change R&D carbon component, which CSIRO are leading. We have a whole suite of other investments in what I would broadly call the soil health area and certainly a lot in crop nutrition.

Mr PERRETT—Ms Paulsen, you mentioned communication in terms of some of the programs. I imagine the communication is with grain growers where they are. How do you communicate with grain growers where they are not? How do we get them to the places where they are currently not growing, which will be where many of the climate change opportunities are of the future from the presentations we have had so far? How do you move people and production to areas where your stakeholders currently are not? I do not want to quote the member for Kennedy too often, but there is a lot of water in the north and not too many people.

CHAIR—Black soils.

Dr Thomas—The GRDC actually has a range of investments that are already in Northern Australia. It may not be a question of how you communicate where growers are not, but how you communicate with a different set of growers. That might range from, as you said, direct grower to grower interaction, but it might also range through private agronomists that are increasingly providing advice to a range of growers. We certainly attempt to try to capture all of that gambit of extension activities within our programs.

Mr PERRETT—If you talk to the stakeholders inside your circle, they will say, 'Yes, we're doing this,' and it is all a great big thumbs up, but obviously in terms of the future we need to change perceptions.

Dr Thomas—We are certainly not averse to negative comments to the GRDC. Everyone can do what they do better. No-one pretends to have all of the answers, so we attempt to make sure that we try to get as broad a feedback as we possibly can in order to inform how we actually undertake our activities.

Ms Paulsen—Following on from that, I think it is really important to point out that we think one of the strengths of the GRDC system is that we obviously have our GRDC board, which governs the organisation, but also a really strong network of panels. We have a panel in the northern region, a panel in the southern region and a panel in the western region. They comprise grain growers—throughout the whole supply chain, including marketers and agribusiness—as well as researchers and scientists.

Mr PERRETT—So they cover the nation?

Ms Paulsen—They cover it right through. The tip of Queensland to northern New South Wales is our northern region; the bottom of the east coast, including Tassie, is the southern region; and there is also a panel in the western region. Those panels are on the ground continually engaging with a whole range of cross-sectoral issues—not just within the grains industry but looking at working with other industries. GRDC works with the cotton industry as well as the sugar industry, because increasingly those growers are diversifying into crop rotations. Obviously over the last few years there has been diversification with cotton. So GRDC has strategic investments with our R&D partners as well—our other R&D corporation cousins, if you like to speak that way—to look at where those synergies might lie. So we are not just communicating with grain growers.

Mr PERRETT—Yes.

CHAIR—You might send us a sheet; would you?

Ms Paulsen—Absolutely. I would be happy to.

CHAIR—I guess they will be enterprise-based decisions about people maybe wanting to move to the north or to another region to do that. That will be an enterprise decision made by corporations, farmers, a group of several farmers or whatever.

Mr PERRETT—Yes.

Ms Paulsen—We have a strategic investment in looking at opportunities in northern regions as well.

CHAIR—Yes—Sydney. Thank you.

Mr SIDEBOTTOM—You make a number of comments about climate change and seasonal variations or variability and knowing which is which. I suppose the first point on which I want to get an observation from you is: to what extent are your members convinced by the argument that there is climate change going on as opposed to seasonal variations and variability? Secondly, you have a climate change team. Are the adaptive processes that you are promoting irrespective of whether it is climate change or seasonal variabilities—if you get my drift on this—and how

do you deal with that? I notice you have here 'decision support tools' for growers to adapt. I will be very interested in some of these—how you go about that.

The other thing that really interested me too—without getting too broad for you—was your downstream impacts and particularly the way you can reorganise in the new investment and infrastructure that is required to meet the challenges. The first question is: to what extent is there a belief that there is climate change—you obviously believe there is something there—and variability? Does it matter anyway in terms of what you are offering? The other thing is the downstream infrastructure changes that you see as being needed.

Dr Thomas—I will hand over to Martin in a second, but I will make an opening statement. When it comes down to it, we are trying to provide as robust data as we possibly can on variability—that includes rainfall and it might include temperature and carbon dioxide values—and on how this might impact different farms, farm enterprises and agri-ecological zones so that farmers can make informed decisions. Whether we need to go out there and bang the door about whether farmers believe in climate change or not, we need to provide the data and the best possible tools for them to make decisions.

Dr Blumenthal—We certainly have not surveyed all our 27,000 growers on their perceptions of climate change. Certainly there would be no question from Victorian grain growers that climate change is occurring and has had impacts on their business, and it is likewise in south-western Western Australia. In other parts of Australia the impact has probably been less obvious to growers.

Irrespective of whether it is change or variability, in communicating about climate to growers they really do engage much better if you are talking about recent events such as the more severe frosts in Western Australia last year, heat stress, high temperatures in October or the lack of autumns in southern New South Wales for the last six years. They do relate to those issues. Whether it is variability or change, in terms of adaptation in their business and the time frame that they make decisions in their business, it does not really matter all that much. It will obviously matter for their children and it really does matter for the industry. When you are talking about adaptation in terms of infrastructure, where the industry might be located, where new rail or road infrastructure goes, silos or grain businesses, those sorts of decisions and the climate change in the 2030 type scenario time frame are very important.

But to really engage with growers, it is what is happening now and in the next five years that will really engage them. I think that is why the variability issue is so important to us. Each season, as it plays out, they are the tools that growers are using to make business decisions. As climate change plays out, managing variability within season variability is the best tool that they have to adapt in the longer term. Internally, we do not have such a strong distinction between weather, seasonal climate or climate change. We really do try to integrate our activities in those areas. Once there may have been a differentiation between variability and change. I think people are now seeing variability very much fits in to a change in climate.

Ms Paulsen—We are currently in the process of developing a communication strategy specifically on climate change to try to engage with growers better about what we are doing.

CHAIR—On that matter, we have not gone to infrastructure; we have not changed from building concrete silos to having portable silos or some other form of storage. Those sorts of things will start to appear some time into the future.

Dr Thomas—I think we can probably expect more on-farm storage. That can be associated with climate change. That can also be associated with how you manage risk within your business.

CHAIR—Marketing too.

Dr Hely—Some of the facts of climate change are quite relevant to the rural industries in terms of elevated CO2, which we know is increasing and does have quite a significant response in crop production. This is something that we are addressing independently of dealing with natural variability. We are making investments in assessing those solid facts of climate change on crop performance. We have an investment in a free air CO2 enrichment facility, which is looking specifically how wheat will respond under an elevated CO2 environment.

CHAIR—It might do better.

Dr Hely—We might get more.

CHAIR—In some places.

Dr Hely—That is right, and this is the question.

Mr HAASE—Will you clarify that for me? I thought you said the increased carbon dioxide in the atmosphere was giving you a reduced production. Did you say that or was I hearing it?

Dr Hely—No, I believe I said that elevated CO2 is a scientific fact that we have that is increasing in the atmosphere. As to its response on crops, it is still quite based on environmental conditions and the science is still quite young in that area.

Mr HAASE—The jury is out?

Dr Hely—The jury is out.

Mr HAASE—Good show. Martin, perhaps you commented about biochar. Do you have any findings so far about what volume of—

CHAIR—You mentioned carbon.

Dr Blumenthal—I mentioned the importance of carbon.

CHAIR—There is a little difference.

Mr HAASE—Charcoal returned to the soil for enhancement of productivity and the storage of carbon. Would you like to comment on what sorts of volumes, ratios, could be run as a

maximum per whatever you like—cubic metres of charcoal per hectare at a given growing depth? Do you have something on it?

Dr Blumenthal—In short, no.

Mr HAASE—Let us move on if you do not know.

Dr Blumenthal—We are certainly investing in biochar. We have two projects. Really there is not a lot known about biochar. Biochar is not biochar. There is at least one manufacturer in Australia that does do the biochar job. Char does depend a lot on the source material. In fact some chars can be toxic.

Mr HAASE—Why do we not just call it charcoal?

Dr Blumenthal—It is because the process is made by pyrolysis, which is a low temperature—

Mr HAASE—But if you are turning in burnt stubble, that is not biochar that is just carbon—is it not?

Dr Blumenthal—Yes, that is just charcoal.

Mr HAASE—But it has the same impact. If we could measure it we could credit it, because my next question is heading in this direction. I am not trying to corner you and you are not here for us to criticise you about your performance either. I have a sense that you might have thought that that was the case. What is the greatest concern for your grain growing members? Is it their fear of impacts on productivity as a result of climate change or is it their fear of the impact on profits as a result of the imposition on them of some sort of carbon capture system or carbon credit system?

CHAIR—This is a research organisation not the farmers federation.

Mr HAASE—They have members and they research for cockies, so let them answer the question.

Mr PERRETT—I think the multiple choice has to be expanded, Barry, with respect.

Mr HAASE—I know you would not agree, but let us hear the answers from the witness.

CHAIR—Order! Would you like to answer.

Dr Blumenthal—We are investing in gathering good data on the industry's emissions and also getting good data on soil carbon sequestration, and what opportunities there might be for growers if soil carbon is included in an ETS. We are very much in the business of collecting good data and certainly growers see those issues as of equal importance. Our strategy is climate change and the mitigation of greenhouse gas emissions.

Dr Thomas—I do have to point out that it is not GRDC's role to comment on what government policy might or might not be.

Mr HAASE—I was not asking you to comment on their policy; I asked you what the fear of farmers was.

CHAIR—It is not their role; they are a research organisation. Martin said that they do not survey people on that.

Mr FORREST—I am representing the Victorian grain belt—the Mallee, Wimmera and western districts. We see an enormous benefit from GRDC's work down there, so thank you for that.

CHAIR—Make sure the levies are paid.

Mr FORREST—My questions build on the positive statement you made that it is not all despair and gloom. I see a lot of that happening in my part of the world. For example, research has been done on low-yield varieties. It allows us to grow good productive profitable crops off 4½ inches of rain in an, allegedly, nine-inch rainfall area. I do not see the despair about having to move up to the north. It is about managing things and ensuring that that research is going on. I would like to ask a question about grain crops other than the traditional ones—barley, wheat, legumes and so forth. There is opportunity for mustard, for example. My growers have been living with climate change since 1975. I think they have realised that it is upon them. They had a little bit of an argument about the cause, but they have been living with it for nearly 30 years. They are looking for other opportunities. Mustard, for example, has very low-precipitation demand. The other thing I wanted to say is that I am very worried about the removal of research facilities that is occurring out there. For example, we have just recently lost a facility in the Northern Mallee and we have lost another facility at Merbein, which is more related to horticulture. The government seems to be walking backwards and expecting commercial reality for growers; that they should be paying for their own research. There are a few comments there, but what about looking at this positively and developing other grain options?

Dr Thomas—Thank you for the compliment for the Mallee stuff. It probably has a lot to do with the re-selling up some Mallee farmers as well.

Mr FORREST—I had the Birchip Cropping Group here yesterday.

Dr Thomas—You are right; there are some options for other crops. Mustard is certainly one of those, but we also have investments within the Future Farm Industries CRCs that looks at perenniality within farming systems and how that might fit into different farming systems in different areas in order to address the climate change, productivity and enterprise mix.

Mr FORREST—What about the withdrawal of infrastructure and the potential for GRDC to work with private entities running Walpeup or one of the—

Dr Thomas—I would not want to comment on Walpeup specifically. What I would say is that we have a large number of stakeholders and a large number of research partners and we will invest with those people that we think are best to deliver the outcomes that we need.

Mr FORREST—On your comment about the carbon, there is a terrific carbon dioxide research project being done at Walpeup that showed yield increases as high as 20 to 30 per cent. GRDC probably funded it; I do not know.

Dr Hely—We are in partnership with the University of Melbourne and the Victorian Department of Primary Industries in that project. Walpeup has been running now for 12 months. We have the first season of data and we are looking forward to seeing consequent years to see if these effects are real.

Ms Paulsen—Sara, did you want to comment further about other crops?

Dr Hely—I wanted to address an earlier question which was about the challenges facing the grains industry. I think we do in GRDC have a fairly good understanding of the things that farmers are going to be most concerned about. I just want to say that the priorities, we feel, from the grain growers are about: identification and management of risks; maintenance and flexibility of the farming systems, which is really the key way that they can adapt to climate change; having that information, which we refer to time and time again, 'the tools' available for them to adapt; and, finally, the data on the environment associated with climate change, which will be factored into how we respond in terms of breeding varieties and on-farm practices. I just wanted to mention those points.

Mr FORREST—I just want to make an anecdotal comment on the biochar: even the Incas knew about biochar. They had an enormous source of carbon. They used human beings, but it is a pity—

Mr BIDGOOD—No wonder they died out.

Ms Paulsen—Maybe not a good model to follow.

Mr FORREST—Could you let me know a bit more about that project you are investigating? What is involved with it? To me, the whole outcome will depend on the cost, the economic reality of getting the source in the right location and then carting it all the way back to the farm properties.

Dr Blumenthal—The key question for grain growers is: it is useful to grain production? So, if all biochar was just a way to sequester carbon in the form of charcoal, then you could make the biochar and store it in old mine sites or mount it up somewhere. We are interested because there are indications that it can improve cation exchange capacity and improve crop nutrition and have some benefits to crop production. That is the focus of our two projects. We are looking at about 12 different source materials for chars—making them through a number of processes and looking at their functionality and their benefits to crop production through a series of trials, both for glasshouse and in the field, and seeing if there is real benefit for crop production. If there is no benefit for crop production, then you might as well stockpile it or find alternative uses.

Mr PERRETT—John asked a question about the relationship between the market and you guys, or people like you. I take on board John's comment that there have been some scientific centres closing down. Certainly the Member for New England has talked about being the one in Glen Innes that was under pressure. It seems that, in relation to climate change, science is our

biggest hope. Yet we are combining that with the fact that the scientific hand of government is getting smaller and smaller. You mentioned the fact that you were having lots of collaborations. Could you just tease that out a bit more? Is it over the last—I am not sure how long you guys have been around—

Dr Thomas—Almost 20 years.

Mr PERRETT—Twenty years? Okay. CSIRO would have played that role a little bit. The market obviously comes in and out, and there are still lots of big agribusiness companies that invest in science, I assume, trying to get a market edge. Can you tease that out a bit more?

Dr Thomas—Yes, certainly. We will still continue to collaborate with state and federal governments in order to undertake research, development et cetera.

Mr PERRETT—And with universities and private industry?

Dr Thomas—Yes. We fund state government organisations; we have projects with CSIRO; we have projects with most universities in Australia. We have a large range of projects with farming groups, which are groups of farmers—some are incorporated; some are not incorporated—that are running trials and demonstrations on farm.

Mr PERRETT—With a view to making a buck for themselves.

Dr Thomas—With a view to informing themselves, providing data and demonstrating technology at a local level to their farmer constituents. We will also invest with the private sector where we need to.

Mr PERRETT—Okay. So it is not some government scientist sitting around and saying: 'Oh, God! In the good old days, we had lots of people in this facility and we did lots of work.' In this committee, we have heard of a declining drip-feed of government funds—at all three levels of government, for that matter.

Dr Thomas—Without commenting on how government treats its funding, I would come back to the fact that we have a wide range of collaborators, and we are not going to say, 'No, we're not going to research for them,' or 'We're not going to play with whoever else.' We will collaborate with whoever we think we need to collaborate with to get the results that we believe we need.

Ms Paulsen—And we are increasing our direct expenditure in research and development. We have some figures on R&D expenditure from a GRDC point of view.

CHAIR—The argument is that there is a lot of science, but is the science applied? Can we apply it? Have we got the tools? Have we got the extension streams to get it down there? I know that what you were saying, Stephen, is occurring and has occurred, and it has served us pretty well. But there is pressure in that area and people want to know, and I think that will continue to emerge—probably through this inquiry. I think in the Senate inquiry, which had just a short report, that certainly emerged—that this is a problem area.

Dr Thomas—If those streams change, we have the maintain flexibility to be able to change with them.

CHAIR—It is this philosophical debate, I guess, about commercial risk versus public good in the exemption process that we have to work through as well.

Ms Paulsen—GRDC has an extension manager and also a manager for grower groups and collaborations. So we have two people, besides the communications manager, specifically focused on looking at the most appropriate channels and partnerships to engage with. We have a formal process of looking at all the delivery channels that are available in terms of extending our R&D and utilising a variety of channels to ensure we are getting good cut-through. GRDC takes a very scientific view on how we undertake our extension and communication.

CHAIR—If you have any publications, our members would probably be interested. You could provide them through our secretariat.

Ms Paulsen—We also have a publications manager, so we will get a package together for all of you. You can just tell me how many members there are, and we will get a package of information together for you. It will be a big box.

CHAIR—That is all right. James, have you got any questions?

Mr BIDGOOD—My apologies for being held up with other things. Have you already asked the question about a holistic approach?

CHAIR—No. You might like to ask that.

Mr BIDGOOD—Basically, I would like to know the aims of your research activities. Do you have a holistic approach to climate change or are you focused on one particular area—say, fertiliser or something like that?

Dr Thomas—Certainly we have an holistic approach. We have a very, very wide range of projects; either Sara or Martin can give you a brief rundown on those if you wish. Alternatively, we can provide them in a written statement to you. But, no, it is very much across the whole gamut of what kinds of tools and data we need. It is very much a holistic approach.

Mr BIDGOOD—Okay; that is good to hear.

CHAIR—I think you will read it in the transcript.

Mr HAASE—Does your research into crop adaptation for different climatic conditions or changing soil conditions—necessitated as a move of rainfall bands—include genetically modified products? Do you research GM crops to better adapt to new climatic zones?

Dr Thomas—Certainly biotechnology is a tool. I do not know that there is a specific program on GM for climate change, but there are various aspects of climate change for which there very well may be not so much a GM answer as a GM tool that might be of value.

Mr HAASE—Are there any breakthroughs that you are able to share with us?

Dr Thomas—None to my knowledge at the moment, but there is certainly ongoing research.

Mr FORREST—There is a frost program, I understand—because frost is a very significant factor in what is happening with climate change. The use of some Arctic gene—

Dr Thomas—Arctic hairgrass?

Mr FORREST—Yes. Is that one of your projects?

Dr Thomas—That was, I believe, a Molecular Plant Breeding CRC project, of which GRDC is a member.

Ms Paulsen—We were at Senate estimates last night representing GRDC, so some of this is fresh in my mind. We are funding approximately $6 million of investment in biotechnology more broadly. Some of the research undertaken includes looking at potential traits of wheat for a whole range of different issues, as well as water use efficiency and frost, which is quite complex, in terms of looking at the genetics and the more complicated farming practices issues which have an impact. Mr Bidgood's question related to the breadth of our portfolio. We look at genetics, specifically on drought, frost and heat, as well as adaptation on-farm, which is looking at management of soil carbon, management of nitrous oxide emissions and free air carbon exchange and enrichment. We have a really broad scope and that $18 million investment is spread across all of those activities.

Mr HAASE—Have you done anything on dry root rice, non-irrigated rice cropping or non-flood rice?

Dr Thomas—Rice is not one of the leviable crops of GRDC.

Ms Paulsen—It is under the RIRDC portfolio.

Mr HAASE—What are the parameters of your grains?

Dr Thomas—We have 25 crops that are leviable, but they do not include rice.

Mr HAASE—I have a question in relation to the changing of areas that will grow certain grains. I hark back to a question that was asked earlier about your work in researching crops that may be grown in what are considered presently to be tropical areas. Is that something you are involved in? More importantly, is the research motivated by a belief that we may be growing wheat crops in areas that are now considered to be tropical and not suitable for wheat? Are you looking at strains that might handle that high humidity et cetera?

Dr Thomas—We certainly have investments with some farming system groups that are as far north as the Burdekin and the Atherton Tablelands, looking at things like rotations that might involve sugar cane, cotton and possibly a grain legume or a cereal. There is certainly work going on in that area exploring that kind of potential.

Mr BIDGOOD—That is my electorate and I am well aware of that as well, particularly with the cotton development. I have met the farmers who are involved in looking at that.

Mr FORREST—I have a question on the engineering end, if you like—the productive end. There is something that I have noticed happening. Particularly in my part of the world, I would estimate that at least 80 per cent—it is probably even higher—are now going with direct drilling, which creates the opportunity to leave more of their chaff in their soil; it is carbon, after all. Is your work more on the yield end? Do you let the Birchip Cropping Group drive those other arguments?

Dr Thomas—No, we certainly fund Birchip Cropping Group to a large extent to look at exactly those kinds of practices. It is about having that kind of integrated farming system: 'Do I keep my chaff? What does that mean? Should I have standing stubble? What does that do to my water use efficiency? Can I keep water across the summer period? How do I control summer wheat if I do that?' To use Mr Bidgood's approach, it is a holistic thing.

Mr FORREST—That is good.

CHAIR—Thanks very much for your time. We appreciate it. We will certainly be working through our work, and we might want to ask you some questions later or whatever. I think grain and beef are probably two big issues in what we are looking at, but I think the soils are probably some of the key areas. So thank you very much for your time; we appreciate it very much.

Resolved (on motion by **Mr Perrett**):

That this committee authorises publication, including publication on the parliamentary database, of the transcript of the evidence given before it at public hearing this day.

Committee adjourned at 5.58 pm