Agricultural adaptation to climate change in the news

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Abstract: Canadian researchers and policy makers dealing with climate change adaptation in the agriculture field frequently point to an apparent lack of interest from producers when the topic is raised. This attitude may be the result of several conditions, including the fact that adaptation, as a term, is poorly understood and rarely recognised and that adaptation strategies are not separable in practice from existing business risk management. Producers' attitudes play a significant role in instituting successful policy and programmes for climate change risk management and need to be acknowledged when conducting applied research into the topic. Many factors influence producers' attitudes and perceptions, among them are news media reports. This paper documents and assesses news media coverage of climate change adaptation issues relevant to the agri-food sector in Canada and shows there are similarities between media portrayal and producers' perceptions of the topic of climate change adaptation.

Keywords: adaptation; agriculture; climate change; media.

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1 Introduction

Reports from the IPCC (2001) detailing increasing average global temperatures and subsequent changes to climatic conditions world-wide elicit two distinct responses from those in the research and policy communities. One is to call for lessening the greenhouse gas concentrations that are affecting climate through actions generally referred to as 'mitigation' (Smith et al., 2003). Another response is to work to improve the ability or capacity of individuals, communities and nations to handle the impacts from altered conditions. Academics and policy-makers often refer to such actions as 'adaptation measures, options or strategies' (Burton et al., 2002; Smit et al., 2000). Developing and implementing adaptation strategies for climate change is a specific commitment in the United Nations Framework Convention for Climate Change (UNFCCC, 1992). However, despite the growing awareness that many regions and groups are increasingly vulnerable, the research, policy and programmes necessary for facilitating climate change adaptation have been slow to develop (Burton et al., 2002; Pielke and Sarewitz, 2003; Peilke et al., 2007).

Canada, like many other countries, has sectors and regions where climate change appears to be having detrimental effects already. Negative impacts from a changing climate have been documented in the Arctic and the Prairies (Hassol, 2004; Kerr, 2002; Sauchyn et al., 2005). Agriculture is especially susceptible to weather and climate conditions and has recently experienced costs related to recurring and persistent droughts, flooding and other extremes (Wheaton et al., 2005). Despite the fact that weather and climate related challenges appear to be more frequent, many agricultural producers in Canada seem to be somewhat disinterested in the topic of climate change (Brklacich et al., 1997b; Bryant et al., 2004; Chiotti et al., 1997; Holloway and Ilbery, 1996; Reid, 2003; Smit et al., 2000). This situation is problematic for those communicating climate change research results and developing policy and programmes based on those findings. To date, there has been little exploration of producers' perceptions of climate change and whether these views are related to their knowledge of climate change or their confidence in their adaptive capacity to deal with effects of climate change.

This paper examines how news media report agricultural adaptation to climate and weather conditions and compares that with how Canadian agricultural producers appear to view the same topic. It begins with a review of climate and weather impacts on agriculture and a brief examination of possible influences on producer opinions, including the role of news media messages. Coverage of climate change adaptation issues in farm and nonfarm news media is then documented and discussed. The paper concludes with possible implications for research and policy on climate change adaptation in the Canadian agri-food sector.

2 Climate change adaptation and agriculture

Weather and climate are generally considered key determinants for success in agriculture. As a Prairie grain farmer notes: 'We harvest water and sunshine' (Meinert, 2003). Producers identify weather as one of the main factors contributing to their financial risk (Angus Reid Group, 1998). Variations in conditions such as length of growing season, timing of frosts, heat accumulation, precipitation, evaporation and moisture availability

all influence production and therefore economic returns to producers and agribusiness. With climate change, alterations in growing conditions and climate related risks and opportunities are expected and may already be happening (Belliveau et al., 2006a; Bryant et al., 2000; Wall et al., 2007). A southwestern Ontario producer commented:

> "Weather is getting to be more sporadic and unpredictable each year. In the last three years with any luck, you probably get the best crops your farm has ever seen and if you are the other people your crops have been disastrous. Weather has been extreme and it seems to be tough to get that gentle rain that you need. Lots of areas are getting almost nothing and other areas are getting what we call hundred year storms. Something is wrong when you get three, hundred year storms in five years." (Oke, 2006)

Impacts from drought conditions across Canada in 2001 and 2002 caused agricultural production to drop an estimated $3.6 billion CDN. In addition, the drought was responsible for net farm income being negative or zero for several provinces for the first time in 25 years (Wheaton et al., 2005). Besides these complications from droughts, variations in growing season norms such as warmer night time temperatures, more frost free days and more intense storms have led to several indirect impacts including the over-wintering of pests, increases in invasive species and declines in product quality (Kling et al., 2003). Future climate change scenarios suggest these conditions will continue and become more pronounced (Brklacich et al., 1997a; IPCC, 2001).

Studies confirm that current conditions appear to be changing and raising increasing concerns among producers (Stroh Consulting, 2005; McKeown et al., 2005; Wall and Smit, 2005). The Canadian Senate hearings on climate change and agriculture also documented producers' challenges from altered weather conditions and what the future will mean (SSCAF, 2003). For instance, a fruit grower in British Columbia included this observation in his address to the Senate:

> " . . .many farmers, including myself, see hail as a big problem for us. Twenty or 30 years ago, hail events occurred maybe once every eight or ten years. My farm has been hailed seven times in the last 10 years. That is fairly typical. It is quite substantial . . .. All I see is that weather events are more intense, and the frequency of these weather events is increasing. This is coming at a time, unfortunately . . . where our crop insurance premiums have just doubled. We have a big problem with this because with increased weather events that affect our crops and our ability to grow good quality crops, we want affordable crop insurance . . ." (Patton, 2003)

Despite these challenges, agriculture has a strong tradition of adapting to a wide range of factors including environmental conditions related to soil, water, terrain, technological developments and market pressures (Sauchyn et al., 2005). None of these elements remains constant and their effects are interdependent (Bradshaw et al., 2004). Their changes over time represent stimuli that affect the success of farming activities and that prompt adjustments to altered circumstances. Agricultural history is replete with examples of adaptation to changes in multiple factors, external and internal, to farming systems (Rosenberg, 1986; Winson, 2003).

Adaptation to a changing climate has been treated in various ways in the climate change literature. Most often, studies follow a top-down approach based on climate change scenarios focused on changes in temperature (i.e. global warming)

(Dessai and Hulme, 2004). These are then used to generate estimates of future climate conditions, mainly temperature norms and some moisture attributes, at a rather coarse spatial scale (Bootsma et al., 1994). Researchers downscale the climate model outputs to estimate future local climate and to predict agricultural impacts, most commonly yields under climate norms, sometimes connected to economic value. Adaptations are introduced at this stage as a response to the projected impacts. Among the adaptations considered in the scenario-based approach are altering the location of production, using different crop types and varieties, installing irrigation and producing different commodities (Smit and Skinner, 2002). The adaptation options used are assumed by the researchers to be reasonable or logical strategies for managing climate risks.

By contrast, studies focusing on actual, as compared with hypothetical, adaptations for managing climate and weather risks tend to follow a bottom-up research approach (Dessai and Hulme, 2004) and document a large number of adaptations that are inevitably tied to a host of additional factors (namely market pressures, environmental regulations and crop insurance availability) (Stroh Consulting, 2005; Belliveau et al., 2006a,b; Bradshaw et al., 2004; Reid, 2003; Wall and Smit, 2005). Such findings demonstrate the highly integrated nature of agricultural production where the decision-making environment includes a large number of factors and where adaptations are rarely considered in response to climate change alone.

Shackley and Deanwood (2002) point out the highly practical nature of resource managers (including agricultural producers) who seek response options within established and familiar sets of institutions and processes. Impacts from climate change are integral to economic, environmental and other risk management issues routinely dealt with in agricultural production. One study, for example, reports that:

> "When asked what triggers new management practices most participants said economic drivers. Economics send a stronger signal [than climate] to farmers although some had a hard time separating economics, the environment and climate. Farmers said they would not implement changes [to reduce climate risk] unless there is a bottom line and an economic payoff." (Stroh Consulting, 2005, p.10)

That climate change adaptation is embedded in ongoing risk management strategies is, likely, one reason why producers do not acknowledge climate change as a discreet risk requiring separate adaptive responses in their farming operations (Belliveau et al., 2006b; Bryant et al., 2004).

3 Producers' attitudes to climate change adaptation

Besides managing climate and weather risk in terms of their environmental and economic effects (Belliveau et al., 2006a,b), there are a number of additional factors leading researchers to conclude producers do not recognise their actions as climate change adaptation. Since none of those factors has been subject to critical examination, a number of assumptions are made as to why the situation exists. Among the possible explanations is that there is a certain amount of confusion over what climate change means, whether it is, in fact, occurring and what is responsible for it. For example, when asked his opinion of climate change, an Ontario farmer noted:

> "Well, what I hear about climate change, global warming, this year I don't know if we are getting any global warming, it's a weather cycle. You can look at it in different ways. I am more of a believer of it being a weather cycle, rather than global warming. There are things that we can do that they say will change the ozone layer. There are emissions that we have to look at. I call it weather cycle, not global warming." (Reid, 2003, p.132)

It may be that uncertainty about the nature and implications of climate change influences producers' responses to anything associated with it (such as adaptation).

With the release of the IPCC Report (2007), the Stern Review (2006) and other recent climate change information, such misunderstandings will likely be reduced. However, there remain several barriers to 'lifting the taboo on adaptation' as Pielke et al. (2007) point out. In some circles, adaptation is considered diametrically opposed to mitigation and therefore negative; promoting adaptation means mitigation will fail (Pielke et al., 2007). Although there is no evidence to suggest such an attitude has influenced Canadian agricultural producers' views on climate change adaptation, there has been an overwhelming emphasis in agriculture-climate change policy on greenhouse gas mitigation initiatives and programmes. From 1998–2003, the Canadian federal government apportioned $2.815 billion for climate change mitigation activities and $45 million for work on climate change impacts and adaptation in all regions and sectors (Spencer, 2005). Furthermore, since 2004 and for agriculture alone, there are several programmes addressing greenhouse gas mitigation: the $110-million Greencover Canada program (designed to improve grassland-management practices, protect water quality, reduce greenhouse-gas emissions and enhance biodiversity and wildlife habitat); the $100-million National Farm Stewardship programme; the $10-million Environmental Technology Assessment for Agriculture programme and the five-year, $21-million Greenhouse Gas Mitigation programme (AAFC, 2005).

Canadian agricultural producers are more likely to think of climate change in terms of long-term warming, rather than increased variability and extremes (Belliveau et al., 2006b). Adapting to a gradual change in growing conditions related to temperature and other environmental conditions is precisely what the agriculture sector has accomplished throughout its history. Most producers are confident in their abilities to adapt to changing conditions, while noting that government plays an important role in assisting them to do so (Angus Reid Group, 1998). Thus producers' low key response to climate change may be reflecting their trust in the agricultural sector as a whole to develop new technology for future conditions. Included in their expectations may be improvements in irrigation systems, equipment for soil and water resource management, livestock facilities and crop varieties, among other developments.

The Canadian public is aware of the potential impacts of climate change. A recent poll on perceptions of climate change indicates 87% of the population is somewhat to very concerned about the issue and more than 70% think the effects from climate change are already evident and overwhelmingly negative (EKOS, 2005). Figures for American and European public opinion on the topic also indicate a growing level of interest and concern about 'global warming' and its potential impacts (Brewer, 2005). Despite the increasing apprehension about the consequences for Canada from climate change and for the need to manage associated risks, climate change adaptation (as a logical response) seems to be largely ignored by the agricultural industry and policy-makers. For instance, in the latest version of the *Canada-Ontario Environmental Farm Plan* (*EFP*), a section on climate

change has been included as an 'emerging issue' (OFEC, 2004). The opening statements for this section review likely impacts on agricultural production as more drought, severe weather, changes in cropping patterns and increased need for irrigation. The segment that follows (entitled 'What can you do?') does not present information about adapting to the impacts or risks, rather, it refers *only* to greenhouse gas reduction strategies (OFEC, 2004, A1–A3). Adaptation to altered weather and climate conditions do not appear to be addressed in the *EFP*, despite the clear statements indicating it will likely have serious consequences for the industry.

The foregoing discussion presents several factors underlying producers' apparent indifference to climate change adaptation. Research findings support the idea that adaptation strategies for climate change are not readily distinguishable in practice from existing risk management for agricultural production. Also, the general issue of climate change has been presented in an inconclusive and somewhat confusing manner, while climate change adaptation maintains a very low profile in government policy and programmes, especially compared with mitigation. Another factor limiting interest in adaptation is the tendency to consider climate change as long term gradual warming that producers will adapt to with government support and new technology.

Producers' apparent predisposition to discount climate change adaptation will be influenced by conditions in the broader public sphere. Of particular interest here is how the news media portray climate change adaptation for the agricultural sector.

4 Role of media in shaping 'public opinion'

Individuals develop their understanding, perceptions and attitudes in the context of their larger social world. Although the number and type of influences vary widely across cultures and through time, communications remain a constant in the process of forming opinions. In North America, messages from mass communications media (internet, television, radio and newspapers) and those from personal contacts affect what people consider to be the important issues of the day and may contribute to conformism (Wright, 1965). News media 'frame' issues and convey messages about their relative importance (Sonnett et al., 2006).

Debate continues over the power of media messages to influence public opinion. For some, mass media are thought to manipulate attitudes to suit the needs of those in power (Herman and Chomsky, 1988). As Fowler (1991) notes, 'news' is not a natural phenomenon but a product that reflects the bureaucratic and economic structures of the industry producing it. Also influential are the relations the news industry has with political organisations, governments and other market forces (Beam, 2003; Fowler, 1991). For others, news media messages are one of several factors forming public and individual opinion, which must therefore be understood in light of other attributes (for example, individuals' level of awareness, interpersonal communications and the role of leadership) (Crespi, 1997).

Among the topics covered in news media are environmental concerns regarding climate change (often presented as global warming), which has become a frequent subject for discussion. Sonnett et al. (2006) note a general increase in coverage for extreme weather events on US network television news from 1968 to 1996. More recent news media interest in climate and weather issues appears to parallel the signing of the United Nations Framework Convention on Climate Change in 1994 and, later, the Kyoto

Protocol in 1997. From Sept 1998 to July 2004, more than seven per cent of the items in *Reuters Daily World Environmental News* referred to global warming[1]. Devastation from the European heat wave of 2003, severe weather and variability throughout 2004 and the 2005 hurricane season have all ensured prevalent news coverage of the risks and impacts from climate and weather conditions. The need to manage those risks through various adaptations (e.g. improved emergency preparedness systems) is also often noted, reflecting the level of concern in the general public (Brewer, 2005).

Producers, as members of the public, have their opinions influenced by many sources, including the news media. Wheaton et al. (2005) note that media articles can reflect the intensity, timing and types of issues and concerns regarding serious climate conditions such as drought. Their media survey of Canadian press coverage (July 2000–January 2003) indicates that a majority of articles about drought conditions focus on impacts and adaptations rather than the climatological aspects of the drought. While media reports are frequently seen as gauges or reflections of public opinion, media can also serve to mould public opinion (Crespi, 1997; Soroka, 2003).

As members of that general public, Canadian agricultural producers have been exposed to many news items on climate change, global warming and the need for a response. There are also a number of agricultural industry-related publications providing news to producers. Information from both farm and non-farm sources is one of several factors that influence producers' levels of understanding and, therefore, their response to the topic of climate change adaptation. An examination of the content of news messages regarding climate and weather conditions could facilitate an assessment of how the messages correspond to producers' perceptions of climate change issues.

5 Analysis of news media

A content analysis of news media, available in print and through the internet, was undertaken to determine if climate and weather issues are portrayed in a manner consistent with producers' attitudes toward climate change adaptation. Broadcast news media (television and radio) were not examined, in part due to the difficulty in compiling and reviewing news items from these sources. Stories found in the 'non-farm news media' and 'farm news media' from January 1, 2002 to June 30, 2004 were entered into a database for analysis. The appellation 'non-farm news media' refers to national and international print and internet news services widely available to the Canadian public (for example, the *Globe and Mail, Canada NewsWire, Reuters, TIME Magazine*, Yahoo News and many more). 'Farm news media' items were found in farm and agriculturally orientated online news services, newspapers, newsletters and magazines (for example, *Western Producer*, *Ontario Farmer*, Organic NewsWire, *Agri-news* for Eastern Ontario and many more). These resources were reviewed on a daily, weekly and/or monthly basis depending on how often the publication appeared. Items were selected in the course of a comprehensive media survey designed to find news items relevant for all aspects of the Canadian agri-food sector.[2]

'News Items' were put into the databases if they contained any references to the agri-food sector in conjunction with climate and/or weather conditions, related impacts and adaptation strategies (even if the latter phrase was not used to describe them). Thus the specific mention of climate change was not necessary for inclusion in the

database. Items referring to greenhouse gas emissions, carbon sequestration and Kyoto Protocol were excluded unless they were mentioned in conjunction with climate and/or weather conditions, related impacts and/or adaptation strategies. Entries were checked for consistency and relevance, resulting in 474 farm news media items and 496 for non-farm news media available for the content analysis.

Content analysis has been recognised as an investigative tool for social scientific inquiry since the 1960s (Krippendorff, 2004) and is designed to systematically analyse texts, images and other symbolic material to determine how a specific topic or issue has been conceptualised and presented. There are several types of content analysis. Krippendorff (2004) notes researchers have used semantics (i.e. how meaning is conveyed), function (i.e. how the results are used) and empirical domain (i.e. which disciplines employ the technique) to distinguish various approaches. The content analysis used for the research reported on here can be labelled as semantic attribution and assertions analysis (Krippendorff, 2004). In other words, assessments were made of the factual elements in a news item and the meaning they conveyed. Material was extracted from articles and categorised in a spreadsheet according to media type, source, title, authorship, location, commodity, climate/weather condition, keywords and focus of content. The assessment used several functions available with *Excel* spreadsheets, including filters, sorting, enumerating and chart creation.

6 Findings and discussion

Both farm and non-farm news media items were analysed relative to factors identified earlier as possibly influencing producers' apparent indifference to the topic of climate change adaptation. These were summarised in terms of climate change adaptation being poorly understood and rarely recognised and adaptation strategies not being separable in practice from existing business risk management.

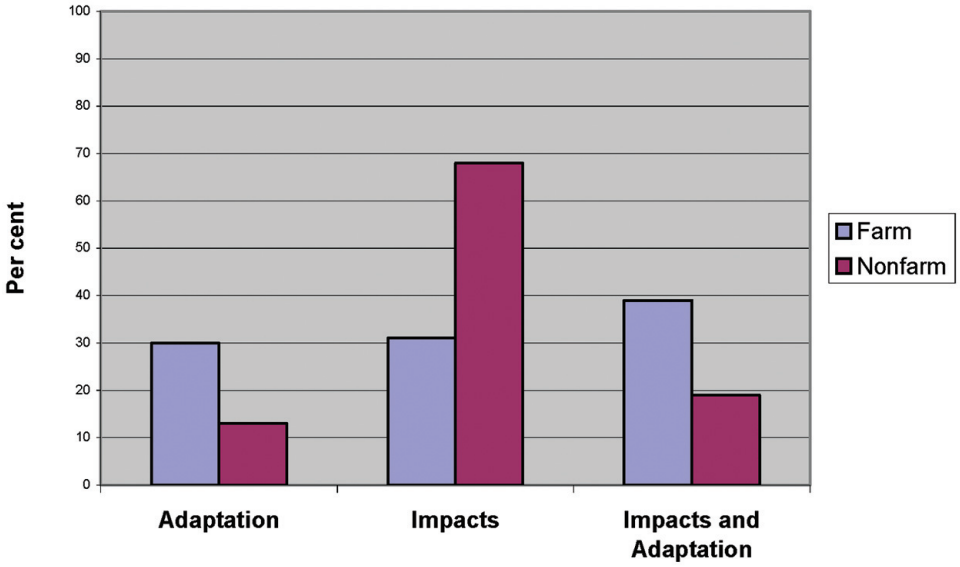
6.1 Understanding 'adaptation' to climate change

Results from the content analysis suggest that the term adaptation is largely ignored in news media stories regarding agriculture and climate and/or weather conditions. Headlines and text were reviewed to determine how often a word or phrase with 'adapt' (e.g. adaptation, adaptability, adaptive) appears. For headlines, farm and non-farm media items each had only two references out of 474 and 496 cases respectively. Thus, at the broadest level of analysis, namely headline content, it appears the terminology used to attract readers to items containing information about adaptation to climate and weather conditions does not favour any term directly referring to 'adapt'. A similar situation was found in the body of the text of the news items. In this case, farm news media appear to use words containing 'adapt' more often than non-farm (eleven and four times respectively). In the farm media cases, six references were related to biophysical adaptation, referring to plant changes in response to new conditions. Another four cases referred to government documents or conferences where farm adaptation was a focus. The remaining example was from a leading Canadian meteorologist who said: 'The challenge for the future is to try and adapt and innovate' when commenting on the altered weather conditions and their impact on prairie farming systems.

The idea that adaptation is not discussed in the news items on climate and weather conditions for agriculture appears to be true only for the *explicit* use of the term. To determine if and how adaptation is an *implicit* feature of the news items, a search of keywords was undertaken. If, in the context of climate and weather conditions, items mentioned an adaptation strategy as identified in the literature, then it was considered a reference to 'adaptation'. This included strategies such as using crop insurance, improving water resource management, diversifying crops grown and so on (Smit and Skinner, 2002). If the item mentioned a climate or weather impact, risk or vulnerability for farming, such as flood or drought damage, intense heat effects and so on (without including references to adaptive responses), then it was counted as a reference to 'impacts'. A third category, namely one for items that referred to both impacts and adaptation was also created.

Analysis shows that the idea of adaptation is, indeed, a topic in news items regarding climate and weather conditions for agriculture (see Figure 1). The results also reveal that farm and non-farm media differ in some respects.

Figure 1 Per cent of news items referring to adaptation, impacts and impacts and adaptation (farm, $N = 474$; non-farm, $N = 496$)



As shown in Figure 1, approximately 68% of the non-farm news items in the sample mention impacts only while 31% of the farm sample refers to impacts only. By contrast, items where adapting to the climate and weather conditions of interest (e.g. drought or flooding) is discussed are more common in the farm news media (30%) than the non-farm media (13%). It would appear that the non-farm news media give more attention to climate and weather impacts whereas the farm news media give more attention to adaptation to climate and weather effects. This is confirmed with the third category of reporting, namely items where both impacts and adaptation are mentioned together. In this case, 39% of farm news media reports provided information about adapting when reporting on a climate or weather impact. Non-farm news media did this in only 19% of such news items.

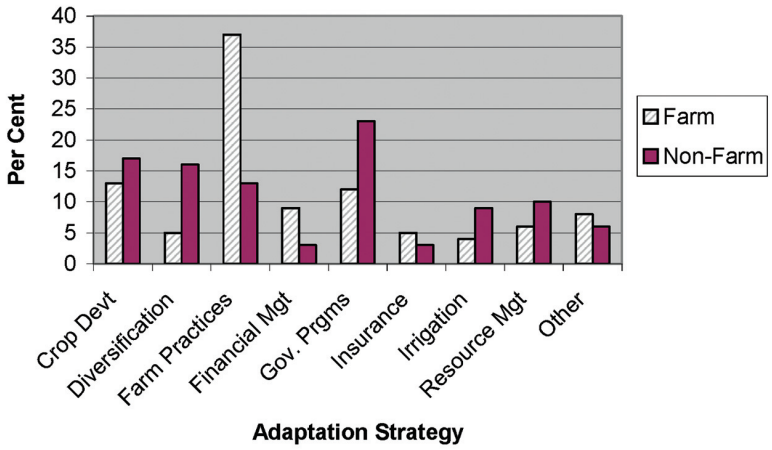
Combining the two categories of articles, those reporting on 'adaptation' and those referring to 'impacts and adaptation' further substantiates a difference between farm and non-farm news media. For farm items, the total percentage with adaptation content becomes 69, while it is 32 for the non-farm. The explanation for such a difference may lie in the newsworthy quality of impact stories (over adaptation stories). The popular non-farm news media might have more interest in reporting on a weather or climate 'disaster' such as a violent storm or intense heat wave. Media orientated to the farm population could have more interest in considering some solutions or at least commenting on them in some manner (i.e. the story may have offered advice about how some have dealt with the impact or it may have been critical of the lack or quality of response to the impact from government institutions).

Regardless of the factors leading to the different emphasis on adaptation or impacts, the analysis shows how information about climate and weather related adaptation strategies is communicated without having to use the term 'adaptation'. This is consistent with producers' apparent disinterest in the topic of climate change adaptation when that phrase is used. Yet, they do seem to have an interest in technological and economic production risk management strategies, including those that address climate and weather risks.

6.2 Incorporation of adaptation strategies

As noted in the foregoing section, agricultural adaptation strategies for managing climate and weather effects or impacts are not necessarily recognised as 'adaptations' but they exist and can cover a wide range of initiatives such as crop development, diversification, farm practices, financial management, government programmes, insurance, irrigation and resource management. These categories were employed in further analysis of farm and non-farm news media items referring to climate and weather conditions and agriculture (see Figure 2).

Figure 2 Per cent of news items referring to specific types of adaptation strategies (farm, $N = 369$; non-farm, $N = 181$)



All of the strategies listed are useful for managing a range of business risks in farm operations, not just those related to climate or climate change. From a producer's perspective, there is no distinction between purchasing crop insurance as a way to protect income as opposed to purchasing it to offset the reduced crop yield from a season with drought. Likewise, there will be no benefit to pursuing diversification into different commodities as a way to manage climate risk, if the corresponding market is unreliable or if the costs associated with diversification are significant.

With respect to the farm media items, the main focus for dealing with climate and weather conditions is on alterations to farm practices (37%). These include activities such as adopting intensive grazing for livestock operations and using conservation tillage to protect against drought impacts. Also, farm practices are roughly three times as prevalent as technological solutions related to crop development (13%) and relying on government programmes (12%) such as disaster relief. The most commonly referred to adaptations in the non-farm news media are government programmes (23%) followed by crop development (17%) and diversification (16%). Non-farm news media give diversification approximately three times the emphasis that farm media do, while non-farm news items give farm practices less frequent coverage than farm news items do.

These differences between the coverage of adaptation strategies in the two types of media are likely to reflect differences in readership. The farm news media give many more examples of adaptation strategies (369) than do the non-farm sample (181). It seems logical that items detailing how to deal with climate and weather impacts will have more appeal to the agricultural readership than to the general public.

Figure 2 indicates a tendency for the non-farm news media to refer to government programmes while the farm news media make more frequent reference to farming practices. Government programmes that assist producers with climate and weather related impacts are supported, in part, through general tax revenue and, therefore, are of interest to the Canadian public. The fact that government programmes rank fairly low for the farm news media may reflect the agricultural community's preference to be seen as independent business operations not in need of government support. It makes sense that the farm news media would give predominant attention to farm practices as an adaptation strategy. What is of significant interest to the audience for farm news media are practical adaptation options tied into soil and water conservation, more effective use of inputs during weather stressed conditions, how to deal with impacts from new pests and invasive species and so on.

Crop development is an adaptation response that is common in both types of news media (17% in non-farm and 13% in farm news media). This strategy is often quoted as a technological response to changing conditions and is recognised by both farm and non-farm news media. Approximately one third of news items on crop development include references to genetically engineered crops. This is a topic of considerable public interest and may explain the relatively high profile crop development receives in the non-farm media. Its relevance for the farm media is also evident. In this case producers are likely interested in the implications from genetic engineering for the varieties and hybrids suited to their expected growing season conditions.

Overall, there is considerable similarity in the farm and non-farm media coverage of adaptation options for climate and weather impacts. In particular, they both portray adaptation initiatives as wide-ranging and integrated into established risk management techniques. The options are rarely treated as something discrete for climate change alone. Such a view parallels the manner in which producers approach the topic.

7 Conclusion

Results from the content analysis on farm and non-farm news media items offer insights into the perception that Canadian agricultural producers are disinterested in the topic of climate change adaptation. The findings demonstrate that the apparent indifference may be in 'name only'. Although the term adaptation is rarely used explicitly in news items about climate and weather conditions and responses to climate change, it is an integral part of the message in such articles. For instance, there is frequent reference to the use of crop insurance, water and soil conservation techniques, altering some farm practices and planting different crops, all relative to adverse climate and weather conditions. The media tend to frame climate and weather related adaptation in a manner that is consistent with the way producers deal with risks and impacts and with the way they perceive adaptation in their farm businesses. Without using the term adaptation, producers continue to employ a wide array of well-tried and innovative strategies for managing climate and weather related risks. Media reports implicitly endorse producers' attitudes and actions regarding climate change adaptation.

The findings presented in this paper have implications for researchers and policy makers working in the field of agricultural adaptation to climate change. When interacting with the farming community it is advisable to limit using the term adaptation and focus instead on the substance of adaptation strategies, using the methods and terms familiar to the community. For policy-makers, rather than attempting to generate a new package of climate change adaptation programmes and policies, it will be more effective to work within existing risk management initiatives, pointing out the value-added aspects of certain features for managing future risks from climate change. Employing this 'mainstreaming' technique acknowledges that the farming community operates in a highly integrated, multiple risk environment where most decisions are based on economic consequences. Representatives of the agricultural sector want to build on what has worked in the past. If their accumulated knowledge about farming systems and their proven capability to manage risk are recognised, support for policy and programmes designed to improve risk management for future climate change and variability is much more likely.

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Notes

[1] The figure 7.4% represents 1947 of the 26,056 environmental news releases from *Reuters.* Searches for these items are available through PlanetArk: http://www.planetark.org/dailynewshome.cfm

[2] A substantial part of the news survey was provided by those compiling stories for *AgNet*, a daily digest of top news stories relevant for Canadian agriculture, available from: http://www.foodsafetynetwork.ca/en/.