It's Not Easy Being Green:
People, Potatoes, and Pesticides on Prince Edward Island

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A Thesis

in

The Department

of

Sociology and Anthropology

Presented in Partial Fulfillment of the Requirements
for the Degree of Master's of Arts (Anthropology) at
Concordia University
Montreal, Quebec, Canada

March 2004

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ABSTRACT

It's Not Easy Being Green:
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Jamila Abassi

Agricultural pesticides are used in increasing quantities and frequency on potato crops on PEI. In 1995, many Island residents began asking questions about the impacts of these chemicals on their human and environmental health. However, what soon became apparent to Island residents, was that speaking out and presenting counter-perspectives about agricultural practices and the Island's agroeconomy resulted in social and economic marginalisation.

Through the application of two complementary theoretical frameworks, discourse analysis and historical materialism, I reveal *how* and *why* pesticides continue to be used in increasing quantities on PEI, despite scientific evidence pointing to their detrimental human and environmental health effects. The methodology pursued - internet based research, is an attempt to stretch the place setting of anthropological inquiry and to demonstrate that by using the internet, anthropologists can perform holistic research and make significant contributions to the discipline.

ACKNOWLEDGEMENTS

I have been privileged to work and surround myself with exceptional individuals who have made significant contributions to my professional and personal development. I would like to thank the professors at Concordia University and my peers in the program for creating an open environment that fostered intellectual development. I would also like to thank the graduate secretary, Jody Staveley, for providing me with support and wonderful insights.

To my supervisor, Dr. Sally Cole, you inspire me to continue to explore the curve of my visions. This project would not have been possible without your involvement. Thank you for standing beside me, for encouraging me, and for allowing me the freedom to re-discover the multiple applications of anthropological inquiry.

Dr. Chantal Collard, thank you for participating in this project and for offering your insights into anthropological theories and methods.

Lance Evoy, you have played such a critical role in my learning. You taught me how to ask questions, and your support enabled me to move beyond my comfort zone to match my practice with my convictions. Mireille Landry, working with you at the IMCD opened up a whole world filled with exciting opportunities, questions, challenges, and most of all, friendships. The line of questioning pursued in this research was due in part to the experiences I acquired while working with you and Lance.

I wish to thank Sharon, Samantha Aiton, Uncle Dave, Helen, Gary, Marsha, Jamie, and many others who asked to remain anonymous. Through your contributions, this project came to fruition. I am grateful and incredibly humbled by your commitment to creating healthy and sustainable communities.

To my dear friends who saw me struggle back from a time of loss, thank you for believing in me and for encouraging me to pursuit my dreams.

Ryan, Lulu, and Tofino, you are my three rocks. You ground me, empower me, and reassure me. Through your love, I am reminded daily of the essence of life. Thank you for being with me through this journey.

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INTRODUCTION

This thesis is an exploration and discussion of competing discourses around agricultural development and local knowledge in the regional economy of Prince Edward Island, "the Island", a province located within the advanced industrial nation of Canada. I explore what happens when multinational corporations, foreign trade agendas, regional development strategies, and community organizations debate practices and ethics that place precedence on economic gains rather than on local human and environmental health.

I locate this anthropological project in discourse analysis and historical materialism and through these frameworks I explore how the "potato culture" has been created, and how the issue of pesticides and their deleterious impacts to human and environmental health are topics that have been constructed and guarded to only be approached, contested, and discussed by accredited "experts" and institutions. I discuss the impact that kin-ties have in organizing social labour. In particular, I question how the social relationships bound up in various kinds of kin-ties impact how people farm, what people have to say about farming on the Island, and how people oppose the dominant methods. Acknowledging the importance of writing a history of the present as a history of power, specifically, power inequities (Wolf 1982), I discuss how activists, although purposefully marginalized from the dominant discourse, are presenting counter ideas and are using multiple methods of community organizing to spread these ideas to effect positive social, economic, and environmental change. In doing so, this thesis reveals how dominant discourses only reflect a portion of the story, that a large part of the story and history is omitted. Bhabha (in Escobar 1995:11) cautions that constructing and locating

power only within the dominant elite leads to the reproduction of the dominant discourse. To avoid this, the variety of forms which people use to resist interventions in their daily lives, must be unveiled. Equally, it is important to reveal how people struggle to create alternative ways of doing and being, how people retain their own sense of power despite being constructed and peripheralized in and through discursive practices.

In light of the scientific evidence that points to the deleterious impacts of pesticides to human and environmental health (refer to chapter 4, Managing Pesticides and Regulating the Environment), in light of the evidence that indicates that pursuing monocrops in place of polycultures reduces the quantity and quality of yields and places the crop at an increased risk of devastation by blight, disease, and pests (cf Shiva 1989, 2001), in light of the damage to local markets, and social relations, in light of the number of fish kills on PEI in recent years - the frequency of which correlates with the increase in pesticide applications and the increase in acreage devoted to potato crop production - the question remains: why are pesticides applied to the potato crops up to twenty -four times in a growing season?

Pesticides, and their use in voluminous quantities and in increasing frequency, are at the core of the debate between activists and people involved in agricultural processes both on and off the Island. As potato yields increase, so too do the use of pesticides. As the quantity of pesticides increases, so too do the visible environmental and human health effects. I argue that although anthropogenic substances are applied to the potato crops upon which PEI's economy depends, it is not the agro-chemicals per say that cause illness, it is human behaviour: it is social relations, designs for capital accumulation and power, and designs to create and enforce class distinctions that support expert knowledge

and that dismiss other types of knowledge. In suggesting this, I am not advancing the argument that pesticides are not a massive, global problem. The scientific data stands firm that persistent organic pollutants, pesticides, are immunosuppresants, are carcinogenic, teratogenic, and mutagenic; they are biocides that effectively kill target and non-target organisms. My intention in focusing on discourses, competing discourses in particular, is to understand why and how certain people on PEI who are acting to ban pesticide use are being silenced? Who serves to benefit from the dissemination of a certain narrow definition of pesticides as crop protectants and not as biocides? How is the topic of pesticides constructed, approached, and/or dismissed?

This thesis will unfold in six chapters. The first chapter is a literature review of works by scholars who have used discourse analysis and a materialist perspective to reveal how social reality is constructed and orchestrated by elite individuals or groups. In joining these two frameworks, I simultaneously engage in an explanation and exploration of why particular methods of farming on PEI are advocated and how institutions and experts involved in the control of social labour and in the production of discourses are able to frame the everyday actions of Islanders. Additionally, I provide a summary of the defining characteristics of corporate agriculture. The second chapter, *Research Methods*, provides details of why I initiated this study and the methods I used to perform this research. I highlight the important role that internet-based research and activism played in the research. Engaging in "activism at a distance" and "witnessing at a distance", enables the most vulnerable populations to speak out with power and with dignity and with the political and social safety of remaining anonymous. Chapter three, *PEI: A Case Study*, highlights what is happening on PEI with regards to the agroeconomy, the human and

environmental impacts from pesticides, the economic role of potato production in sustaining the economy of PEI and in advancing Canada's portion of the international agricultural market. I also describe how two environmental organizations on PEI operate within and counter to the dominant discourse. Chapter four, *Managing Pesticides and Regulating the Environment*, is a review of the five classes of pesticides – what they are, how they function, the health and environmental concerns about pesticide use; and presents an overview of the legislations and governing agencies that regulate the release of pesticides into the environment. This provides some background information and helps contextualise why, globally, activists are seeking to ban the creation and use of pesticides. Chapter five, *Competing Discourses* is a discussion and analysis of how pesticide use on the Island is constructed and legitimized through discourse and structural power. I reveal how discursive processes and strong kin ties that shape social labour, frame people's actions, visions, and everyday life experiences on the island. Additionally, I explore the effects – ecological and social, of discursive practices that construct pesticides as crop protectants. The final chapter, *Reflections for moving forward*, reviews the contents of the thesis and suggests areas for further inquiry.

CHAPTER ONE: LITERATURE REVIEW

I locate this anthropological inquiry and analysis within two important and complementary analytical frameworks: discourse analysis and historical materialism. Discourse analysis reveals that unequal access to sources of power impacts and dictates the types of ideas, behaviors, values, approaches to life, and ways of living, that are permissible and marginalized. Equally, paying attention to historical materialism, particularly modes of production as advanced by Wolf (1982), reveals the social, political and economic relationships that underlie, orient, and constrain social interactions in addition to highlighting key relationships through which social labour operating within the mode of production is brought to bear upon nature in the creation of commodities.

Discourses of Power:

Discourse is a means through which and by which a certain idea, lifestyle, behaviour is spoken about, constructed, and circulated (Foucault in Rabinow 1984, Said 1979). Discourse construction, and the access to the creation thereof, reinforces inequality among classes, races, and genders. Thus, the production of discourse is consistently done under conditions of unequal power. Through an analysis that reveals how discourses of power are created, supported, and advanced, it becomes possible to see the processes by which discourses of power are created. In this light, steps can be taken to change the way that social privilege and subordination is constructed, assigned and maintained. Discourses are "a group of statements which provide a language for talking about….a particular topic at a particular historical moment" (Hall 1997:44). For example, Said (1979) states that through discourse analysis scholars can come to understand how

the Orient was constructed, hence colonised by Western peoples during the Enlightenment era. Said writes,

> *Orientalism can be discussed and analyzed as the corporate institution for dealing with the Orient- dealing with it by making statements about it, authorizing views of it, describing it, by teaching it, settling it, ruling over it....[W]ithout examining Orientalism as a discourse we cannot possibly understand the enormously systematic discipline by which European culture was able to...produce the Orient politically, ...ideologically, ...and imaginatively during the post Enlightenment period* (1979:3).

Hence, according to Said, discourses are tools that are created and used by a dominant group to construct the world around them in terms that make sense to them. In essence, discourses used by a dominant elite to describe another group of people, or culture, really only reflect the ideas, values, and understandings of and by the individual and groups doing the constructing. The result is not actually reflective of what it is, but of how it is interpreted to be.

The application of discourse analysis particularly related to performing a social analysis of power relations within and between communities and institutions, as advanced by Foucault and as reflected in a number of works by anthropologists (cf. Stoler 1997, 2002, Escobar 1995, Mohanty 1991), has been important in helping me understand *how* social reality is created and re-presented. Meaning, I wish to determine what processes are used on PEI– what social frameworks such as institutions, policies, divisions and social parameters based on class, race, or gender-, are constructed to support the privileged position of people involved in agriculture and pesticide use? Resistance and power, knowledge construction and its circulation through accredited people and institutions are dialectical and underscore the visions of those who have power. In this light, one of the important keys to understanding contested discourses is to

place relationships and power at the center of the analysis. Wolf suggests that power is an aspect of all relations among people (1999:4), and that it operates in relational terms, working differently in interpersonal relations, in institutional relations, and on the level of whole societies (1999:5). Power of one group creates social structures such as rules that govern how people in that society experience everyday life. Gal's (1991) historical analysis of how women have been silenced in public life and of how women have worked to create a space for their voices in politics and literature illustrates that public space is an engendered space, that protects, supports, and advances the views, values and voices of an elite group of men. What is revealed by Gal's (1991) discourse analysis is this: public spaces, institutions, and systems have been structured to support the silencing of one group and the privileging of another. The result has been the creation of an exclusive culture that mirrors the views and needs of the dominant group. Regarding PEI, I wonder, what is the public and popularized discourse? Whose culture is created by the circulating discourse, and whose is silenced by discursive practices?

Gal (1991) reminds us that institutions have been structured along gendered lines to lend authority not only to reigning classes and ethnic groups but to men's linguistic practices (196-197) – methods of communicating, linguistic codes - which ultimately serve to marginalize women because women's methods of communicating are neither acknowledged nor empowered. Hence, the control of discourse and the form it takes, frames and presents a view of reality that continually asserts itself in and through social interactions (Wolf 1999). Bourdieu (in Wolf 1999:55) suggests that we think of communication "as operating within linguistic fields or 'markets'". Within these fields not all participants exercise the same degree of control over the processes of

communication. There are inequities and power differentials. Language therefore, in addition to being a method of communication and knowledge dissemination, is an instrument of power because, "one seeks not only to be understood but also to be believed, obeyed, respected, distinguished" (Wolf 1999:55). Discourses that are supported in and through institutions are empowered and in turn, frame society. Consequently, much of the discourse in circulation has systematically been one that has favored the domination of more powerful groups over less powerful groups.

Gal (1991), Outram (1987), Stoler (1997, 2001, 2002), and di Leonardo and Lancaster (1997) have advanced research and analytical frameworks which have revealed that categories such as gender, race, and class are structured by discourses and by relations of power. These relations of power favor certain groups and or individuals over others and these relations of power dialogue and intersect with politics, culture, and economics – all of which are social constructions in and of themselves. Of central importance for Gal (1991) and Foucault (1984), is determining the mechanisms of power – *how* it operates and frames society ? Foucault asks, *How does power operate in our society* (Rabinow 1984:6)? For Gal (1991) the urgency in determining the operatives of power lies in the fact that "power is more than an authoritative voice in decision making; its strongest form may well be the ability to define reality, to impose visions on the world" (1991:197). How do the visions of one group or one individual gain weight and power? How do these ideas become "fact" and become defining characteristics of a society and or of a nation? Discourses are socially constructed by a group of people. Just as literature, visual art, food and music, they become the markers of a society, they help to define that society. But, as Wolf (1982) argues, the histories we read are not the entire

story, they are representative of the experiences of a very particular group – the socially dominant. The culture of society is rendered visible through a dominant discourse. Culture is a combination of ideas and power (Wolf 1999) and thus is material evidence of the social philosophy of the dominant group of people who have the social "voice", the power. Concerning PEI, I wonder about the statement that was expressed to me on a number of occasions that PEI is the "culture of potato, it is a potato culture"...Who suggests that PEI is the "potato culture"? What are the implications of this?

Discourses of power spread a dominant discourse and shape reality. Sachs (1992) argues that in development discourse the descriptive words and terminology that are specifically chosen are done so with the intent of underscoring how backward, impoverished, and illiterate people in the "Third World"[1] are with the purpose of highlighting the need for skills, expertise, and knowledge from people and institutions in developed nations. Sachs (1992) argues that the concepts behind the terms used to define the social realities of people in developing nations are culturally, economically, historically, and politically specific and damaging.

Foucault (1965/1973), Escobar (1995), Stoler (1997), Sachs (1992), Petchesky (1997) and Gal (1991) are a few anthropologists who have emphasized the role that institutions and accredited individuals – "experts"- play in supporting and disseminating discourses; in elevating the currency of a certain statement, idea, "truth" that then impacts others, elsewhere who are positioned differently.

Accordingly, Foucault suggests that the "real political agenda" for the individual in western society is to,

> *"criticize the working of institutions which appear to be both neutral and independent; to criticize them in such a manner that the political violence which has always exercised itself obscurely through them will be unmasked, so that one can fight them"* (in Rabinow 1984:6).

Similar to Sachs (1992), and Foucault (in Rabinow 1984), Escobar (1995) explores the way discursive practices and institutions such as the IMF and World Bank have constructed the "Third World". These discourses have homogenized all people, cultures, and communities in the "Third World", and they have also created and legitimized a system of development that has empowered members of "First World nations" to bring "The Third World People" out of economic ruin and into modernity. Escobar (1995:106) argues that as long as institutions and accredited experts successfully reproduce themselves materially, culturally, and ideologically, then very particular relations of domination will prevail. In addition, as demonstrated through Gal (1991) and Escobar (1995:105), institutions contribute to formalizing and producing social relations, divisions of labour, gender "ideals", and cultural forms.

Importantly, Foucault asks, *how* does knowledge become "truth"? *How* does knowledge become accepted, repeated, and embedded so that it eventually becomes part of people's unconscious world? The synchronous analysis of knowledge and power is important because, "knowledge of all sorts is enmeshed in the clash of petty dominations, as well as in the larger battles which constitute our world" (Foucault in Rabinow 1984:6-7). Foucault asks these questions because they point to a line of inquiry that leads to performing the ultimate work: altering power relations (Foucault in Rabinow 1984:6).

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[1] an equally charged word representing social hierarchies of power and dominance by "First World nations" over people who are not from these nations.

Escobar writes, "science and expert discourses…produce powerful truths, ways of creating and intervening in the world" (1995:20). Smith (in Escobar 1995:107), Hall (1997), and Petchesky (1997) advance that not only do professional discourses provide the categories with which "facts" can be named and analyzed but they also outline the way that these "facts" can be talked about, thus suggesting what is permissible even within the discussion of the topic. Just as discourses can emphasize a point of view, a value, an idea, they can equally dismiss an idea, a knowledge, a statement. Therefore, discursive practices construct the *topic* that is permissible for discussion by defining and producing the objects of knowledge/truth. Taken in this light, according to Hall (1997:44), discourses govern the manner in which a topic can be spoken about and reasoned about. Most importantly, all meaning giving (when an idea is empowered) occurs in and through discourse. Significantly, nothing – scientific "fact", data or analysis- has meaningful existence outside of discourse. Discourse creates and obliterates. Facts become standardized and presented with the support from an "expert" who uses an "expert" discourse to reinforce the "truth". Knowledge is a product that is socially constructed and people in positions of power structure the social conditions and relations or modes of production so that their knowledge becomes represented in the everyday reality that surrounds them.

According to Foucault (1980), human understanding about topics exists within an economy of discourse. Having knowledge, creating and disseminating knowledge means being in a position of social privilege whereby the individual(s) can create/make a statement about something and because of their place in a position of privilege, they can have the statement/idea circulated and through this process, the statement/idea becomes

"fact", "truth"; as something that is known. The act of speaking involves passing intersubjective ideas to others, the receiver in turn repeats the process by further disseminating the ideas. The knowledge that is created and passed along to others as "truth" becomes an economy of statements- the currency, while the dialogues are monetary exchanges. This economy of discourse is inherently arbitrary. The power of dominant classes and the power that separates social groups based on race, gender, class, or age is highlighted and has the effect of giving credibility to the ideas – the ideology – that is being disseminated from those in positions of privilege. In doing so, they underscore that they are the leaders, that they are knowledgeable. An analysis of discourses accentuates the systemic and constructed nature of power and knowledge, or as Foucault presents, power/knowledge. Foucault (1970) emphasizes that the "will to truth" is very much about excluding discourses, it forges very particular discourses and knowledge that underscores the privileged position of a particular dominant group and overpowers and constrains other discourses that are often seen as secondary and not as "truth". Foucault suggests that the "will to truth" is really about power, a desire for power over people, to limit any alternative forms of knowledge from gaining momentum and becoming truth.

According to Foucault, discourse then is a complex and strategic tactic that is used or exploited as a modality of power. It impacts and influences social relations between different levels of society – the State, Institutions sanctioned by the State, elites, subjugated groups, and individuals. Knowledge, "truth" that is created and disseminated, is power and of high currency as long as it is continually disseminated and accepted. In order to have certain knowledge received and taken as "truth", the speaker needs to be

endowed with the title of expert. Hence, expert knowledge is of supreme value in the economy of discourse. This is a critical point in Foucault's power/knowledge concept. Further adding weight, power to expertise, is when the individual is accredited by a state-sanctioned institution. What is of importance and what is emphasized in Foucault's social theories is the intersection and wedding of the production of knowledge in and through the exercise of administrative power. Institutions and knowledge creation and dissemination are dialectical and binary, each positively promotes, supports, and influences the other. For Foucault, the dialogue between the production of knowledge and the exercise of administrative power supports the circulation of a very particular type of knowledge – created by the dominant group- and behavior, again favoring the dominant group, determining how people can be in their society.

The system of accrediting individuals with identifying labels or with the title of expert establishes and reinforces the haves – the knowledge brokers- and the have nots- the subjugated. In labeling people, this sends a message of who has the right (that is the social power) to produce knowledge/truth, - power/knowledge, and what type of knowledge is "truth", power/knowledge. Of equal importance, this system establishes and reinforces who does *not* have the power to create knowledge: the subjugated. These individuals and groups within society are created and marginalized according to discourses of power.

Foucault (1965/1973) emphasizes a need to locate social theory within a research agenda that considers history because doing so reveals how discourses reflect the particular ideas, perspectives, behaviors, and rituals of the ruling classes of the day (cf. Foucault 1970, Stoler 1997, 2001, Gal 1991, Said 1979), and importantly, it reveals that

these ideas change over time. Foucault argues that *what* can be constructed and accepted as truth and knowledge during one historical era can be flipped upside down and re-positioned as fallacy in another period depending upon how favorable the discourses underscored the privileged position and ideas of the ruling classes.

Foucault's analysis of psychiatric illness between the 16th and 20th centuries illustrates this point. Elite Europeans and Americans viewed insanity as a supernatural gift that was bestowed by the Divine upon people with psychiatric illness. This idea was reflective of larger Medieval assumptions that the universe and the earth operated under the will of Divinely powers. In this light, people who were declared mad were very much accommodated in society and the discourses of the day reflected this. The European Renaissance of the early 16th century however significantly impacted how people with psychiatric illness were viewed and understood. The Renaissance emphasized classical antiquity and there was a rekindling of interest in the rational order of the universe. The strength and rationality of the human mind to understand, interpret, make sense and bring order to the universe was underscored. In this light, older explanations of what psychiatric illness was (possessing of supernatural powers) were dismissed because the dominant discourse emphasized the rationality and intellectual capacity of the human mind. Under this discourse, psychiatric illness was no longer interpreted and accepted as a gift from the Divine, it was constructed and understood to be a deficit of intelligence that diminished a person's "humanness". Henceforth, people with psychiatric illness were not considered to be fully human because they lacked that which made humans human: the faculty of reason.

Between the 17th and 19th centuries, as explanations and ideas were increasingly grounded in discourses of science and positivism, and as individuals suffering from psychiatric illness did not reflect the behaviors that were admired and allowed within this general discourse, people with psychiatric illness were placed in asylums. The physical segregation of people with psychiatric illnesses within institutions served several purposes. First, it reinforced and underscored the (constructed) danger that people with psychiatric illness posed to those with rational minds. Rational people needed protecting from the irrational beings. Second, the insane became a new class of people that needed to be understood. Subsequently, this led to the development of fields of medicine such as psychology and psychiatry. Individuals placed within asylums were subject to scientific inquiry, to the critical gaze of the expert; people in asylums were effectively penetrated, colonized, and controlled.

What is highlighted in this example is that ideas are social constructs that reflect the visions of a dominant class. Once circulated and reflected in actions, as was the case with the segregation and control of people with psychiatric illness, ideas become accepted as "truth". Madness was not suddenly new in the 16th century, nor were the individuals with psychiatric illnesses suddenly very different from individuals with psychiatric illness in earlier historical eras. What changed was the way psychiatric illness and people with psychiatric illnesses were constructed, accepted and understood. Ideas about psychiatric illness reflected in the discourse of "unreason" and "folly" was more about how scholars and the elite were conceptualizing themselves and working to position themselves as leaders in their own self-created society. The class of privileged elite created and nurtured a discourse that underscored values and ideas they regarded as

important: a rational mind, scientific explanations, a dismissal of reference to the Divine as any possible explanation. Any idea, value, way of being that challenged or could have prohibited their position and vision from coming to fruition, that could have trumpeted the creation of a society that reflected their view, was dismissed. In sum, the histories we read reflect the changing dominant discourses and are not necessarily reflective of the way it was for the majority of people.

Essential to this anthropological project is demonstrating that ideas are dynamic and charged with power. Through time, ideas change because peoples' ideas and ways of seeing themselves and how they interact with their social network changes and equally, so too do the relations of power and the economies of discourse within which these powerful people are situated. These emergent ways of doing and being and their associated social rituals and practices mimic the discursive practices that are created to support very particular types of knowledge, truth, and ways of being. In sum, history, truth, and objective knowledge are socially constructed by social groups in power and these discourses have been created and disseminated with the intent of underscoring the creation of social rules that dominate and subordinate all the while underscoring the importance and privilege, power and knowledge, of the individuals or groups in power. In light of this, Escobar (1995) suggests that it is important to determine and reveal how people resist interventions and how they struggle to create alternative ways of doing and being (1995:11). This is exactly what will be examined later in the thesis, in chapter five, Competing Discourses, where I explore the ways that two environmental organizations on PEI are working to present their alternative discourses in a climate that does not foster public voicing of alternative visions.

Constructing Farming, Understanding Agriculture:

The agroindustrial food system has been defined by the Organization for Economic Cooperation and Development (OECD 1981) as the set of activities and relationships that interact to determine what, how much, by what methods and for whom food is produced and distributed. The processes involved in the industrial production of food - increased mechanization and deskilling of labour, reduction in the number of small farms, increased influence of transnational and multinational corporations (TNCs/MNCs)-, are reshaping local methods of food production and consumption, and they are adversely impacting ecological and human health (Shiva 1998, 2002; Whatmore 1995; McMichael 2000; Chibnik 1987; Grossman 1998).

The cause for concern is a result of the fact that Agriculture, and its related processes, is the largest and most important industry in the global economy; it is fundamental to any national economy, and food production is the lifeblood of rural communities throughout the world (Shiva 1998, 2002; Norberg-Hodge 1991; Norberg-Hodge, Merrifield, and Gorelick 2002; Kimbrell 2002; Tompkins 2002; Harris 1990; Merrington et al 2002; and Murphy 1990). Agricultural production occupies 35 percent of the world's land surface with 11 percent under direct cultivation and 24 percent managed as permanent pasture (UNEP 1992). Socio-culturally, biologically, economically, and aesthetically, farming communities have changed dramatically in the post war years. In North America, and increasingly, globally, locally adapted, small-scale diverse family farm units are being replaced by large-scale industrial farms. These large corporate run farms offer local farmers production contracts which stipulate the type of crop planted, when they are planted and how they are planted (Murphy 1990; Tompkins 2002; Kimbrell 2002). The strain to maintain or increase yields has led some farmers to

clear ecologically significant areas that once provided habitat for various species (Murphy 1990; Tompkins 2002; Kimbrell 2002). Furthermore, the transformation in farm production from polycultures[2] to monocultures has exacerbated the scope and pace of environmental degradation. The contract regulations are created with production quotas in mind, ecological impacts of, for example, pesticide use, are often secondary considerations. Pesticides are viewed as a necessity in corporate industrial farming. As 'crop protectants' (PMRA 2001) they safeguard the farmer's or the corporation's financial investment. The concentration and centralization of farming from the hands of many into the hands of a few parallels the Fordist or Post-Fordist industrial system which similarly involved the centralization and concentration of products and methods and the deskilling of labour. The ecological implications of relentless monocrop farming, the cultural and human health dis-ease that result from this farming practice, in addition to the decreasing number of farmers who actually own the land they till, are some of the points being highlighted by people advocating a move away from the present corporate industrial agricultural system to a system that builds on local practices and operates to meet the needs of a localized community (Shiva 1989, 1998, 2002, Norberg-Hodge et al 2002).

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[2] Polycultures/polycrops: growing a diversity of crops in one area enables a symbiotic relationship between plant varieties and species to develop. The result is less dependence on chemical inputs such as pesticides. Polycrop farming methods are aligned with principles of how ecosystems operate optimally when biodiversity is encouraged.
Monocultures, or near monocultures: the growing of a single plant species, usually in one area. The same type of crop is grown over a number of consecutive years. Typically, monocrop farming methods are used when producing food commodities for consumers in distant markets. Monocrop production methods do not benefit from natural ecosystem processes that come with intercropping, crop rotations. Consequently, there is an increased use of synthetic chemical pesticides and mechanical irrigation systems. Monocultures threaten local and regional food security, environmental, and human health (Thrupp 1998: 79; Shiva 1993, 2001). Industrial agriculture implies the simplification of biodiversity and reaches an extreme form in crop monocultures. The end result is the production of an artificial ecosystem that subsequently requires constant human intervention and vigilance.

My understanding of what constitutes the industrialization of agriculture is that it is a series of processes that involve the production and distribution of goods and services and that these are grounded both within localised negotiated social relations and distanced social networks, each operating, responding, and being framed by unequal access to power which itself underscores the vision of a very particular dominant group of people and institutions. My understanding has been shaped by Wolf (1966, 1982, 1999), Mintz (1985), Wells (1996), McMichael (2000), McMichael and Friedmann (1998), Atkins and Bowler (2001), Harris (1990), Shiva (1989, 1998, 2000, 2001), Norberg-Hodge et al (2002), Grossman (1998), and Goodman and Redclift (1989). Each scholar has advanced a framework for analysis that has pushed beyond mere description of what agroindustrialization is, to present *how* it operates, and the consequences of these modes of operations. In doing so, the analysis unveils the processes – the political economic, the social relations, the constructions of ideas and the power-, that make the whole system take a certain shape. Of importance, Wolf (1966, 1982, 1999) and Mintz (1985) emphasize how social relations have determined the course and the development of a global industrial food production system. There are numerous types of social relations. They are dynamic, negotiated, contested, and they are temporal. Important to note, social relations are always rooted in power, particularly in circumstances of unequal access to power (Wolf 1990 in Schneider 1995). Wolf (1999:4-5) urges us to think of power as an aspect of all relations among people. Taking power as relational, reveals that it works differently in interpersonal relations, in institutional arenas, in working relationships, and on the level of whole societies. Therefore, social relations demonstrate, establish, and reinforce who has power over whom. In this light, when analyzing methods

of food production, distribution, and consumption, it is important to determine which individuals and institutions, governments and corporations, are forging relations of dominance and subordination, relations of reciprocal exchange and relations that exploit. Equally, it is important to ask *why* certain social relations and modes of production are developed? This is done to complement the search for *how* certain social relations and modes of production are developed and how and why these change over time.

I draw upon McMichael (2000), McMichael and Friedmann (1998), Atkins and Bowler (2001), Harris (1990), and Goodman and Redclift (1989) because they work with the organizing concept of food regimes and through this concept they discuss the overarching characteristics of agricultural development and change in North America and Western Europe. Importantly, Harris (1990) outlines the ecological implications of this new and aggressive form of agriculture. While honoring the contributions made by these scholars, I pay particular attention to Wolf's (1982) discussion about capitalist development and the social relations inherent in modes of production that transform nature into commodities. I apply Wolf's (1982) concept of modes of production because these emphasize that social relations and relations of power impact who trades what with whom and why. Additionally, I pay attention to Wolf's (1999) concept of structural power. Structural power is the "power manifest in relationships that not only operates within settings and domains but also organizes and orchestrates the setting themselves…" (Wolf 1999:5). Wolf's concept of structural power enabled me to come to greater understanding of the complexities that frame the political, social, and economic climate on PEI.

While there are many scholars outside of anthropology who offer good descriptions of what the agroindustrial system comprises, they tend to reflect the dominant discourse themselves by discussing agricultural processes, changes, and impacts in relation to the U.S. and Britain (cf. Atkins and Bowler 2001, McMichael 2000, and McMichael and Friedmann 1998). In light of this, I again turn to Eric Wolf (1966, 1982, 1999) whose work highlights that histories are empowered stories that reflect the events and views of a dominant group. My intention is to open up this space to create a forum for an analysis of the multiple histories/stories that are being lived in the present but that because of the dominant discourse, are being dismissed.

Critical to any analysis of social relations in a global world is remembering that individuals and communities are not isolated in local dominions of power, rather, they interface with distant communities and diverse domains of power. Societies, notes Wolf (1982), emerge as changing alignments of social groups, segments and classes, without fixed boundaries or stable internal constitutions (1982:387). In Peasants, Wolf (1966) brings to light how social relations that are aligned with and through particular kin-ties and trade relationships involve unequal access to power, and that these inequities impact local and network communities. Phillips (1998) suggests that anthropology's main task is to develop a global vision within which to situate the creation, differences, and similarities of localities (193). In effect, in considering the numerous multidirectional relationships that are at play between the local and the global, it becomes possible to understand why and how people come to make decisions about the way they interface with their world. Analytically, this requires a historical materialist approach as it has been advanced by Wolf (1999). More specifically, in approaching culture as a combination of

ideas/discourse and power – structural power, it becomes clear that when relations of power change, the culture will also change. When local and global networks of trade fall apart or are undertaken, the impact on both communities is felt. The power that is created or that shifts from one group to another creates new cultural forms. It is important to keep in mind that being able to control the social relations of labour means also controlling some aspects of society and this subsequently also influences the construction of certain types of discourse, hence a certain cultural production.

Because the events beyond the farm-gate impact decisions made on the farm, and vice versa, we need to look at the world as a whole, a totality, as an entire system, instead of looking at it as if it is comprised of a sum of self-contained societies and cultures (Whatmore 1995, Grossman 1998, Wolf 1982, 1999). In understanding the world as a unit, it becomes possible to see how the causes and effects of any one particular population or level of society which is steeped within their own dynamic social relations, interfaces with the trajectories being extended from other populations (1982:385; and cf. Mintz 1985). Equally, it is important to consider how designs for power by individuals or institutions within one community extend and impact other communities, and how this can be conceptualised as an integrated system of forces constantly acting upon each other to influence each other (cf. Mintz 1985; Wolf 1966, 1982, 1991). Regarding farming on PEI, in addition to examining the discourses being constructed and disseminated, it is important to explore the social relationships that frame peoples' actions in their everyday lives as farmers or as activists. Doing so might lead to a better understanding of the social relations and processes of modes of production that contribute to *how* and *why* farmers use pesticides even though the inherent toxicity and danger to humans and the

environment is known. Additionally, an inquiry into the link between social relations and modes of production might reveal why people do not speak out and present an alternative discourse.

Particularly related to trade in food commodities, Wolf (1982:310) suggests that it is possible to understand how people and social behaviour become drawn into and impacted by the market if we conceptualize the market "not only as a means for the exchange of goods and services, but also as a set of 'mechanisms of social articulation'" (Mintz 1959 in Wolf 1982:310). This means that the market is material; it is a construction by members of society who stand to win from its existence. The market is negotiated through social relations and these relations involve differential access to power. Wolf (1966, 1982) makes the important point that the market existed in precapitalist societies. In effect, goods and services were traded symmetrically and asymmetrically long before the rise of capitalism. How the commodities produced under either kin-ordered modes of production or tributary modes of production (Wolf 1982, 1966) were traded depended upon whether the trade network was locally organized (Wolf 1966:3), or whether the trade network was dominated by an elite group, as was the case in some peasant societies (Wolf 1966: 4). In this latter case, elites sustained and reinforced their position of power and dominance in their community by ensuring that peasants produced a surplus of food commodities. This was encouraged not to support or surpass the caloric needs of the people in the community; rather, the surpluses would be centralized, administered, and controlled in and by the ruling elite. The surplus foods were redistributed first to other members of the society that supported the elite and second to ensure that people involved in commodity production other than food were fed.

In this sense, food distribution was used to underscore the social and privileged positions of the dominant group and had nothing to do with caloric requirements (Wolf 1966).

In symmetrical exchanges, the labour of producing commodity "A" was on par with the labour for producing commodity "B"; the exchange was equal. As capitalism emerged, an increased quantity of commodities entered the market which competed with commodities that were produced under other modes of production (Wolf 1982:310, 1966). The consequences of the asymmetrical system of capitalist modes of production and trade extended into and transformed peoples' lives both from a distance - through the mechanisms of the market, and directly, as in the outcome of investment or disinvestment in, for example, food producing enterprises (Wolf 1982: 311).

Wolf (1982) draws attention to three particular modes of production: kin-ordered, tributary-ordered, and capitalist ordered, and outlines how each mode gives rise to certain types and forms of social groups. Wolf (1982) uses the analytical concept of mode of production because it contributes two important perspectives: 1). it reveals the political-economic relationships that underlie, orient, and constrain social interaction (76); and, second, it reveals *key relationships* through which social labour is brought to bear upon nature (386). Social labour, social relations were mobilized under the governing relations of the particular mode of production. For Wolf (1982:386), "production" is neither synonymous with "work", nor is it identical to "society". Rather, the term, "mode of production", brings to light the forces that guide social alignments in society, it illuminates the ways in which human beings "confront their world in order to modify it in

their favor" (Wolf 182:386)[3]. Here, Wolf is referring not only to confronting and modifying nature in order to produce commodities for exchange but also to the construction of society. Through the relationships inherent in some particular modes of production, people exert force and create systems of inequality that serve to favor the particular dominant group, while marginalizing others based on either race, gender, or class (cf. Wolf 1966). Of importance therefore is considering the association between power and relationships (Wolf 1982, 1999). In particular, the *key relationships* of a mode of production empower human action, informs human action, and, human action is carried forward by them (Wolf 1982:386).

For my purpose, I draw attention to the kin and capitalist ordered mode of production. Briefly, the kin-ordered mode of production clarifies "who's in and who's out", who belongs either through descent or through affinity. Kin-ordered modes of production engender distinctions between gender, rank, and privilege; it favors some kin over others. It is beyond the scope of this thesis to discuss the varied definitions of kinship (refer to Wolf 1982:89-92 for a good summary). I refer to Wolf's (1982) notion of kinship in the context of political economy whereby kinship can be seen as a means of committing social labour to produce for example, Russet Burbank potatoes. Drawing from Wolf, this means that through kin-ties, "through appeals to filiation, marriage, consanguinity, and affinity" (91), social labour can be committed to performing the "right" type of farming. Labour practices are locked-up or embedded in particular

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[3] Wolf makes use of terms that are related to physics such as forces and vectors. This is because Wolf envisioned relations as vectors, as forces that are ever dynamic, being affected by, and effecting change. In this way, Wolf draws attention to how convergence, dislocation, cohesion, and disintegration, happens at intersecting points. Important to note, these dialoguing forces occur universally at micro and macro levels (Wolf 1977 in Ghani 1995:32-33).

relations between people who then are called upon and required through those very kinship ties to perform a certain type of labour. Again, for Wolf (1982), this is in relation to the transformation of nature, and in this light, I apply it to my analysis of farming practices and pesticide use on PEI.

Essential to the capitalist mode of production is acquiring and maintaining a means of production and denying labourers access to this means of production. The exception occurs when the capitalist creates terms of accessibility that are amenable to the capitalist's vision and plans for financial accumulation and social power. Those who control the means of production, similarly control the commodities produced. The individual labourers who are employed to produce the commodities must then buy them back from the owners of the means of production. The means of production circulate only among those who have the wealth to acquire them (Wolf 1982:77). Hence the individual who controls the means (this is the capitalist), also controls the relationships between themselves and the labourers. By denying access to the means, the capitalist also controls the resources and controls the commodity production. In a sense then, the capitalist retains his/her position by increasing his/her capital and by denying the labourers any access to the means of production. In doing so the capitalist creates and supports a division of classes and within those classes there are internal divisions based upon race and gender. These divisions ultimately serve to underscore the capitalists' position of privilege. However, the division is not only at the level of the labourers, there are social divisions which create layers or levels of and amongst capitalists. There are those who constantly improve upon their means of production, increase commodity production and, thus accumulate capital and social power, and then there are those who do not. Wolf

(1982) suggests that the continuous socio-economic movement between being "victors" and "losers" forces owners of the means of production to seek out cheap and plentiful labour and to constantly create new products (78-79).

In adopting elements of this framework, in addition to examining how discourses are constructed and contested I hope to bring to light how kin affiliations in modes of production can silence and or empower some people. I also hope to reveal the relationships and modes of production that exist and thus divide or pit potato processing corporations, agricultural extension officers, the PEI agricultural board, the Pesticide Management Regulatory Agency, against both farmers and the community organizations working to ban the use of pesticides on PEI. Placing importance on how key relationships frame human actions or inactions, demonstrates that, "men make their own history but not under conditions of their own choosing. They do so under the constraint of relationships and forces that direct their will and their desires" (Marx in Wolf 1982: 386).

It is important to situate the production of food and the current system of agricultural production that is being used in Canadian farming communities within the global political economy because it reveals that, increasingly, food is used as a tool by corporations and governments (the U.S.) in their quest for power. Many scholars outside of anthropology have used the organizing concept of food regimes (cf. Friedmann and McMichael 1989; Kinney et al 1989; McMichael 2000; Aglietta 1979; Atkins and Bowler 2001; Magdoff, et al. 2000, Whatmore 1995, and Le Heron 1993) arguing that this analytical framework enables them to organize complex and interrelated pieces of information. Placing aside the variation in national contexts, the concept of food regimes focuses instead on the entire chain that links economics, politics, power, and designs for

territorial accumulation. In this light, the food regimes concept offers a simultaneous examination of agriculture at the nation-state and international level, thereby also leading the inquiry into the implications of political economy in food production, distribution, and consumption. It further outlines how the Western European and North American development of a global system of food production, distribution, and consumption emerged under capitalism. Finally, the analysis highlights once again the role Britain and the United States in particular, have played and continue to play in the development of the current global agricultural system. Of importance for my purpose is understanding the *characteristics* of the second and third food regime precisely because the changing social relations and processes of agroindustrial farming that are occurring on PEI reflect the characteristics described in the second and third food regimes.

Premised upon the French school of regulatory theory, capitalist development is interpreted broadly as a sequence in time periods defined as *regimes of accumulation.* Each regime of accumulation was founded upon modes of social regulation - particular institutional forms and procedures through which a society organizes and conducts commodity production and reproduction, and through which social class relations are created and re-produced (Kinney et al 1989). The food regimes concept examines three time periods: 1). 1890 - until pre WWII; 2). 1947-1970 (Fordist period); and, third, 1980 – present (Post-Fordist period). Each is characterized by very particular farm products, by specific food trade structures that link production and consumption, and by regulations that govern capitalist accumulation (Noel 1987 in Atkins and Bowler 2001).

The first food regime, 1870-1914, draws attention to the impact that new technology had on Western European and North American capitalism and forms of

agriculture. Refrigerated cargo ships facilitated the scope and breadth of agricultural exploration and extended the lines of trade. Cooling systems on ships enabled the long-range transport of large quantities of tropical products and perishable goods from equatorial colonies to metropolitan economies (Europe) (McMichael and Friedmann 1989, LeHeron 1993, Atkins and Bowler 2001). With the increased movement of food and products, the existing European trading monopoly of the colonial system was replaced by an international economy. Occurring during this time and further complicating trade relations of the new global economy, family farming of food commodities was relocated from Europe to settler states (Canada, United States) where it flourished. This shift in emphasis from Old World to New World, according to Friedmann and McMichael (1989), spawned and supported new and significant relations which dramatically altered and shifted the balance of power from Europe and Britain to the United States. These new ways of relating intra-regionally, inter-regionally, and internationally, created and maintained developing agricultural economies in three significant ways: first, a symmetrical system of trade was replaced by an asymmetrical system; second, in the U.S, industrial capital began to appropriate parts of the agricultural labour process such as chemical inputs and specialized machinery, which were then resold to farmers; and, third, local markets were reorganized into national economies and into agroindustrial complexes. These new economic and social relationships significantly impacted the rules that governed trade and the cultivation of agricultural products.

The second food regime (1947-1970's) has been likened to Fordism. The industrial style of agricultural production that emerged during this period paralleled industrial-style factory production, there was an accelerated mechanization and

industrialization of farming practices. The food regimes research of this period focuses exclusively upon how the American political economy and socio-cultural climate impacted the global trade in agricultural food products. Consequently, by failing to mention how the social stratification and divisions within the colonies also shaped global trade the discussion is decidedly narrow (see Mintz 1985 for a good discussion).

Agrobusinesses are defined as the sum total of all operations involved in the manufacture and distribution of farm supplies, the production operations of the farm; and storage, processing and distribution of farm commodities and items made from them (Davis and Goldberg 1957:3). Agrobusinesses first emerged during the second food regime. In more recent periods, the term has been applied to describe particular business configurations wherein, through subsidiary companies, a transnational corporation coordinates industrial activities in each of their operational spheres. This is known as vertical integration and allows for a company to be involved in literally every aspect of the farm production process from the selection of seeds and pesticide products, to selling farm machinery, to owning food processing plants, to marketing products. Vertical integration characterized the agricultural food system in America throughout the 1960s and 1970's (Whatmore 1995: 38). On PEI, two corporations have integrated vertically and horizontally and in doing so, they have entered into new and dynamic relationships with Islanders.

There are several key characteristics from this twenty year period that continue to resonate today: small scale family-operated agricultural enterprises have been restructured by agro-food capital (industry); and locally grown foods that once supplied local and regional markets now supply international markets. As the need for external

inputs (chemicals, farm machinery, genetically modified seeds, etc) increased, so too did the need for capital. Land and labour were replaced by capital as the most important agricultural input. Food went through a value-added period and was altered mechanically from raw materials to processed goods, ie: from Russet Burbank potatoes to McCain super-fries. Farm communities and activities within the farm-gate were impacted by the new value-added foods because this meant that some foods were more amenable and malleable to processing, and were therefore more in demand by processing plants. While farm sizes increased for the few farmers who had sufficient capital to purchase additional lands upon which they could grow these high demand crops, the restructuring also resulted in a large rural out-migration by farmers who could no longer afford the costs of inputs. The division of labour and participation in on-farm site labour was impacted by the restructuring, large numbers of labourers –usually women- were employed beyond their farm-gate as they attempted to gain revenue which was then contributed to cover the costs of inputs. The treadmill cycle of working to purchase more inputs, to grow more food, to afford new inputs, began during this period. The root causes for many of the contemporary concerns brought about by the present state of the global agroindustrialization process have been traced back to some very particularized relationships and aspects of the global political economy that occurred between 1950 and 1970 (McMichael 2000; Grossman 1998). Between the 1950's and the 1970's, US agrobusinesses flourished, this process encouraged former US colonies to produce food commodities for export markets (Atkins and Bowler 2001). Atkins and Bowler (2001) and Friedmann and McMichael (1989) argue that an analysis of several key processes undertaken by the United States reveals how food can, was, and is, used as leverage by

the Unites States in order to control the agricultural industry. The once U.S specific model of the agricultural industry was transformed into a global model (Atkins and Bowler 2001; Shiva 1998, 2002). Atkins and Bowler (2001), Le Heron (1993), and Friedmann and McMichael (1989) further suggest that the economic development associated with food production and consumption were interrelated with global political developments. The re-organization of the world economy under US hegemony was evidenced in and through supranational agreements such as the 1945 Bretton Woods agreement which governed the stability of exchange rates between national currencies based on the US dollar/gold standard-; the 1947 GATT rules governing international trade; and the 1947 Marshall Plan. Atkins and Bowler (2001), Gronemeyer (1997), Le Heron (1993), and Friedmann and McMichael (1989) further suggest that de-colonization was a political-economic move undertaken to prime and support trade. In essence, notes Gronemeyer (1997), US economic expansion was the reason for de-colonization because it was the decolonizing process that enabled newly independent states (NIS) to pursue industrialization, and by extension therefore, import food and receive food aid from America.

The third food regime (1980's to the present), labeled Post-Fordist, (Ibery and Bowler 1998; Lowe et al 1993; see Grossman 1998 for a good summary) has its origins in several key political and economic events beginning with the 1973-1974 OPEC crisis and the 1973 grain crisis between the US and the former USSR. Of further significance was the collapse of the Bretton Woods agreement with the parallel emergence of the European Union (E.U) as a power block that challenged American geopolitical hegemony. The result was that agricultural export competition between the U.S and the

E.U began and at times, teetered on a trade war. Adding an additional level of competition was the increased commercial, political, and cultural power of multinational (MNCs) and transnational (TNCs) agrobusinesses such as McCain Foods of Canada, and Pepsi. These corporations were and remain a cause of tension between nationally organized economies and transnational capital.

Within the 1990's some of the MNCs began to develop a global structure and some of the larger transnational corporations began to assume control over the entire production and distribution chain of the food production system, involving themselves in everything from agricultural inputs to farmland, from labour contracts to the distribution and retailing of food stuffs (Atkins and Bowler 2000:43). Under this system, independent farmers and local food processors are thrown into global rather than local or national competition and are required to restructure their businesses into larger and more economically efficient units. Bonanno et al (1994:2) argue that transnational corporations have become the defining element behind the configuration of new capitalist accumulation.

As it is still in its period of development and evolution, the third food regime has not been examined with due reflection and depth (Atkins and Bowler 2001). Nonetheless, LeHeron (1993) suggests that there are clear transitional features: throughout the mid-1980's to the present, there has been an obvious increase in the global trading of food commodities (McMichael 1994); there continues to be a consolidation of capital in food manufacturing (Friedmann 1995); research, development, and use of biotechnology pervades and so too do the debates regarding agricultural dependence on biotechnology (Friedmann 1995; LeHeron and Roche 1995; McMichael 1992, 1994; Shiva 1998;

Norberg-Hodge et al 2002; Grossman 1998); and finally, there has been a decrease in food subsidies in developed and developing countries (Kimbrell 2002; Grossman 1998).

CHAPTER TWO: METHODOLOGY

Faleolo Airport, Samoa, August 18, 2000:
As I stepped off the plane onto the tarmac, oppressive heat clung to my shirt and dampened my hair; a pearl of sweat ran down my face...the sky transformed from a fire-engine red to a bright, vibrant blue. It was a sky full of hope for the coming day.....

VGH, Vancouver, June 12, 2001:
People keep telling me that there is still hope but I didn't know what they're referring to or what this means. She lies sleeping, I do not feel anything anymore. The long gray faces of the people who surround me offer encouragement and support, but ask the same questions that I do and search out hope in every waking dream...she sleeps on and on and does not wake. I wonder, how can I have hope?

The research question and methodology pursued have been informed by two distinct experiences: the first was my initial period of field research in Samoa, August – November, 2000, and the second was my role as the care provider for my mother who was diagnosed with an aggressive form of brain cancer, in June 2001. These experiences left significant impacts on my life and have guided my anthropological inquiries, both in method and in praxis.

Been there, done that:

In the fall of 2000, I spent four months conducting research on the construction of fa'a Samoa, in three areas of Samoa. The experiences I had there made me reflect upon the rationale for conducting fieldwork in an increasingly complex world. As it turns out, in a post-colonial globalised world, as single, white, young woman, undertaking ethnographic research in Samoa, the Hollywoodisms that I embodied, without my consent, marred the way many Samoans saw me. The threat of physical violence and the climate of rape, made me fearful of the people who surrounded me. Nonetheless, while in Samoa I tried in vain to appease the dual(ing) personas and the dual egos within me that

competed for voice and representation, that of Ethnographer and that of Jamila, the Individual. I struggled to marry the professional and ethical values necessary for conducting research with how I was feeling. I was a polyvalent symbol and it became apparent to me that because of my age, suspected marital status (single), race, and gender, working and travelling alone in Samoa I was a billboard in the middle of a desert of suspicion; a curiosity, and an anomaly, a target toward whom innocent questions of one's origin, destination, status –single or married- duration in Samoa, frequency of visits to Samoa, were hurled forth from every possible angle. While these questions appeared to a large majority of travelers[4] to be fine examples of that marketed Samoan hospitality, on the eighth day of my visit, these friendly questions set a course that ultimately led to my decision to leave Samoa for New Zealand where I spent some time reevaluating the possibility of conducting the type of research I wanted to conduct in a country that looked disapprovingly and suspiciously upon single white females who roam around the capital city meeting people who usually turned out to be men.

I walked the streets with fists clenched with rocks; I transformed over time: the mutual gaze had become unidirectional. I ceased to return the inquisitive looks. I could no longer recognize myself: hunched over, head hanging down, hurried stride, I ventured from Point A to Point B and nothing – not the barking dogs, or the heckles and whistles, the propositions, nor the greetings, the "friendly" police escorts, nor the threats of confiscating my passport and drivers license – tempted me to escape the shell I donned. I was interpreted and constructed; I felt marginalized, stigmatized, and completely misunderstood. I wondered how I was to negotiate the feelings of wanting to release the

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[4] The majority of single travelers in Samoa during the period I conducted my ethnographic research,

frustration and direct it to the people who were causing me to choke on my own silence while at the same time being conscious of the reasons for my self-imposed presence in their cultural milieu? I wanted to confront the people who threw the beer bottles at me from their speeding jeep, I wanted to explain to the women that I was not a sex trade worker, seeking their husbands and preying upon their children, but I didn't. The silenced scream built-up within me and festered into resentment and daily I felt shame to be a graduate student in anthropology, the very discipline that publicly heralds alterity. I was at once an ambassador for the plight of anthropology in a society that has been misunderstood in part because of academic and travel writings; and I was a graduate student trying my hand for the first time at ethnographic research in a different cultural milieu; and I was also a young, single, white woman construed to have money based on the simple fact that I had traveled half-way around the world to see how an-Other group of people construct, preserve, and present, select aspects of their culture; and, relatively speaking, I was a wealthy young woman.

My time in Samoa made me reflect upon the types of research that are accepted by the discipline, and more specifically, the type of anthropology I wanted to practice. Indeed, borrowing from Todorov (1982:241), we know the Other by the Self, but also the Self by the Other. I ventured into the Other and found determining aspects of my being. I realised that I wanted to practice a type of anthropology that did not make me feel intrusive and yet a type that refrained from being decontextualised from the important happenings in the everyday lives of the people around me. I wanted to be engaged in applied anthropology, in advocacy. I wanted to marry my professional experiences as a

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August – November 2000, were men whose average age was 23.

community organizer with my graduate research. I wanted to take my research direction from Samoans, and not from my own understanding of what was happening and what needed to be done. But this required that I work beside the very people who were suspicious of me, and this created tensions that were highly problematic and proved to be quite dangerous for my personal safety.

In the short time that I was there, four months, I did manage to make some headway with a few people in a small isolated village, but my personal safety was often compromised when I was outside of the family parameters. Regularly, I fell into deep ruminations about the types of work that could be done at home, in "my own backgarden". I wondered why and how I had come to place a greater sense of importance on what was happening over There as opposed to what was happening at Home? The coveted rite of passage was what I was seeking. But I was filled with internal doubts as to whether this rite of passage was the right one for me. In anticipation of the research I was to conduct in Samoa, my year of grad school courses was streamlined to studying ecological development practices and issues of cultural conservation and commoditization. I placed aside any doubts about safety issues that might arise in the field. I discredited my inner voice which asked about the high incidences of rape in Samoa, which asked about being accepted and valorized…I had done a significant amount of independent travel already. I knew proper conduct and ethics and I was excited at the prospect of going to Polynesia. What I had not fully considered was how my gender, ascribed ethnicity, and age would impact my time there. When I was challenged, it was not Samoans I was angry with; in the end, it was my self. My inner voice of reason had hinted at the potential of problems, but my stubbornness of wanting to live the full

experience of ethnographic work overseas, resisted these whispers of wisdom. As soon as I realised that I was not needed or wanted or accepted, I wanted to leave and I struggled to complete the required length of time for my field work.

The personal becomes political:

This research is also informed by a very moving time in my life, when I became the primary care provider for my mother who was diagnosed at the age of 54 with a terminal form of brain cancer. I left my home in Montreal and traveled to Vancouver to be with my mother who defied the two month prognosis and lived for ten months surrounded by friends and family at home and in various palliative care facilities throughout Vancouver.

Late one Sunday evening I received a telephone call, alerting me of the news. I found myself a day later, with my suitcase and my dog, in a critical care facility wondering why this happened, and what on earth was to come next? This question of *why* serves as one of the basis for this research. My exposure to ailing families, confused cancer patients, confounded medical professionals, pushed me to ask questions about the increasing frequency of eco-cancers in relatively young adults. Brain cancer is one of the rarest and least understood cancers (Steingraber 1998). It is neither hereditary, nor can it be traced or linked to one particular habit (personal communication with Dr. Durety) as, for example, lung and throat cancer can be triggered by exposure to cigarette smoke. My interactions with oncologists, epidemiologists, nurses, doctors, palliative care social workers, art therapists, neuro- surgeons, physiotherapists, occupational therapists, nutritionists, and other patients and their families who queried, offered care, compassion, support, food, and tears, has significantly informed this research. My role moved beyond

primary care provider as I became involved in the hospice movement. A group of palliative medical care experts and citizens, informed by first hand experiences as care providers for palliative patients, met and developed online resources that would be easily accessible and useful for patients and families in BC and across Canada. Because I spent my every-waking moment with my mother as she moved through various care facilities in Vancouver, I met a large number of people whom I grew quite close to and from whom I learned a great deal. I cleaved to them and they to me as we exchanged experiences and shared stories and advice. These relationships were ever-changing and sadly temporal; when their loved one died or when we moved on to another care facility, the relationships ended.

Indeed, my central research question emerged from 10 months of day-to-day care-giving and five months of pondering and reflecting after my mothers death – wondering what happened and most significantly, what can be done? I wondered, what can we do together as a society to diminish the number of people being afflicted by debilitating illness that seems to be preventable?

I embarked on a journey of discovery. I picked up medical journals. I discussed diagnostic tools. I examined epidemiological reports detailing cancer clusters in BC and North America. And I inquired into homeopathic treatments and preventative lifestyles. My concern and curiosity met with the approval of many health care professionals who responded by allowing me open access to their information sources and their lecture notes; and they offered me their personal reflections on acute illnesses, treatments, and preventions. One day I mumbled, *what is in our environment*? And this one question, asked in passing thought to Dr. Yeomans, was critical. Dr. Yeomans is a palliative care

physician who specializes in neurology and in brain tumors. In addition to working as one of the physicians on the palliative care ward at Vancouver General Hospital, Dr. Yeomans is part of a community health care team who provides medical care for palliative patients who are living at home and being cared for primarily by their family. While I cared for my mother at home, Dr. Yeomans made weekly house visits and she was also my primary telephone contact when I had questions about medical conditions, methods of care, and medications. When my mother's health deteriorated and she required treatment on an acute care ward we moved to the palliative care ward at VGH. Dr. Yeomans was the palliative care physician we dealt with on the ward.

Dr. Yeomans and I developed a good relationship. We shared similar interests in outdoor activities, culinary tastes, concerns about balancing career and home life, and worries about the state of our natural environment and the impact that environmental contaminants have on people. I began wondering more and more about the types of pollution in our environment. I mentioned the suggested link between breast cancer and pesticides and how Nicole Bruinsma, a doctor, a mother, and a survivor of breast cancer[5] had been instrumental in the ban of cosmetic pesticides in Chelsea QC. To this, Dr. Yeoman's added that the District of North Vancouver was considering a similar ban and then told me about an article she had read recently in the North Shore News about a citizens group called STOP (Society Targeting the Overuse of Pesticides) who were heading up the movement. After this initial discussion, I began thinking about the links

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[5] Nicole Bruinsma was diagnosed with breast cancer at the age of 38. The diagnosis was not linked to any known risk factors. Nicole embarked upon a fact-finding mission about environmental causes of human illness which led to a petition that was signed by 6000 residents and which called for a ban on the cosmetic use of pesticides in their community of Chelsea, Qc. Sadly, Nicole Bruinsma died in February 2002 of

and about the collective actions being undertaken. For the first time in months, I felt something: Hope. I felt invigorated by the prospect that people were asking questions and then moving beyond thought to action. I was excited at the thought that people were empowering themselves to change practices that are harmful to humans and the environment, that people are lobbying municipal, provincial, and federal government agencies to adopt stricter regulatory testing and standards for toxic substances. I was hopeful and I remain hopeful that through collective action, there will be marked improvements in environmental and human health.

This research thus, emerged from life experiences, and my knowledge similarly emerged from these experiences. Indeed, the melting of my experiences working in community organizing, my ethnographic fieldwork experience in Samoa, and my experiences as a daughter caring for my terminally ill mother informs the research question and methods used. We are complex people, our experiences inform us, direct us, and empower us to pursue our unique ways of being in the world. I am at once a daughter, a sister, a niece, a partner, a friend, an outdoor enthusiast, a community organizer, a citizen, a student, a professional. I do not ascribe to compartmentalizing my multiple subjectivities to conduct research, for it is these very subjectivities that enrich this research. I decided to explore the possibilities of conducting research in Canada. I sought to explore a line of research that would recognize experiential knowledge.

From September until December 2002, I divided my time between conducting a literature review of works discussing agroindustrial farming, food security, social movements, on-line community building and activism, the social construction of

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metastatic disease. Her legacy of the Chelsea ban has paved the way for other Canadian cities to follow

knowledge, the environment, and health, and environmental contaminants and regulations in Canada. I also conducted a media analysis to determine how the pesticide and potato industries were presented in the print medias circulated on PEI. In addition, I conducted internet based research, and through the use of email, I established and developed connections with people who were involved in the pesticide and agroindustrial food production industry, farming, various government bureaus, and social movement organizations on PEI and in other areas of Eastern and Atlantic Canada. I attended lectures and book launches in Montreal, and I met with organizations working towards the creation of a more socially just society. I also explored visual and textual archive sources in addition to accessing current video productions and news shorts. In sum, I drew upon multiple sources to gain a holistic understanding of the pesticide and potato issue and industry on PEI.

This research project was an opportunity for me to explore the multiple uses of the internet, it was not only a source through which I could access information, but it was a method for performing research, for building on-line communities, and for engaging in what Ribeiro (1998) refers to as "activism at a distance", and "witnessing at a distance". I explored the uses of the internet as a strong tool for activism as I have come to learn through a review of the literature (cf. Ribeiro 1998; Garcia 1992; Wilson and Peterson 2002) and through correspondence with Mike Christie, Sharon Labchuk, Gary Schneider, and Helen Jones, that for activists involved in actions to reduce and or ban the use of pesticides, the internet is a means of increasing sensitization about the topic. Furthermore, the internet is an effective method for mobilizing community members in

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suit.

areas far from the actual conflict to pursue local actions that demonstrate their political leanings against the use of pesticides.

Benedict Anderson (1983) challenged the notion that a community was solely defined by face to face interactions. I concur. I developed and was part of a community of people that connected through the use of new technologies and that shared and cared, offered advice, encouragement, criticism, and support, through mediums that did not require face to face interactions. The sheer expansiveness, the cost efficiency, and the ease of connecting with people was amenable to me. Suggesting that only meaningful exchanges can occur in face-to-face circumstances leads to the alienation of other forms of communicating and rapport building. One need only think of the strong expressions of truths, dreams, and emotions in letter writing. Furthermore, this establishes a hierarchy of face-to-face exchanges as taking precedence above virtual experiences. Agre (1999 in Wilson et al 2002) urges a rethinking of the divisions and suggests,

> *in opposing so-called virtual communities to the face-to-face communities of the mythical opposite extreme, we miss the ways in which real communities of practice employ a whole ecology of media as they think together matters that concern them* (1999:4 in Wilson et al 2002).

Wilson and Peterson (2002); Agre (1999 in Wilson and Peterson 2002) posit that it is far more encompassing to discuss "communities of interest" and "communities of practice", rather than an immediate localised and bounded parameterized notion of community. In this light, the possibilities of creating wider communities and including more people, beyond the individuals in the immediate vicinity, can significantly enhance the effectiveness of collective actions and mobilizations to effect positive change. In social organizing, critical to collective action, is the involvement of as many people in

different milieus as possible. The Kuwaiti women's uses of the internet for political action is an example (Wheeler 2001), as is Ribeiro's (1998) study of the uses of the internet for environmental activism in Latin America (see also, "Photo Essays: Testimonies of Pain and Courage" by Nelly Plaza, www.interpares.ca/en/photo_essay/2/index.php).

Ribeiro (1998) ponders and explores the uses of the internet as a methodology of engaging in political activism at a distance. For Ribeiro (1998), the use of the internet is the perfect tool for environmental activists, arguing that, in particular, "these actors [environmentalists] above all other activists, are sensitive to new ways,...to new ideologies, that boost transnationalism" (1998:335). Ribeiro (1998) rationalizes that the work and explorations of environmental activists join a diversity of people across the globe working on particular localised issues but that are in chorus with the global movement to preserve and heal the environment. Because ecological concerns are not bounded by territorial demarcations and political borders, Ribeiro (1998) suggests that it is only rational that such an international and unbounded issue make use of a methodology for politicizing and generating action that is similarly boundless: the internet. This deterritorialised activism advances two powerful political dimensions: witnessing at a distance and activism at a distance.

Ribeiro's (1998) position on the importance of the positive uses of the internet opens an exploration into how people can be involved in actions without barriers. What Ribeiro (1998) suggests happens is that people read, witness, and or hear about oppressive tyrannies and systems that preserve and promote inequity, and then armed

with this information, people re-act, organize, and mobilize locally for the distanced infringements.

While the virtues of the internet as a tool for social organizing are extolled by Ribeiro (1998), Garcia (1992) and others, this system is not without its problems. Wilson and Peterson (2002) remind us of the multiple debates about the internet, on-line community building, cyberspace identities and imagined communities. Furthermore, the internet is in and of itself a cultural product, it is embedded in a society fraught with inequities. It is not isolated in cyberspace. The internet is in-fact grounded in political economy and hegemonies. The people accessing and using the web are embedded in particular ethnic, economic, political, and cultural milieus. This relatively young medium is a cultural construction just as much as any other medium of communication and it is subject to issues of control and power that can silence, censor, and or, sensationalize. Wilson and Peterson (2002) remind us that the majority of internet users are North Americans and that the internet can be a hegemonic tool for the Americanization and thus, colonization of more territories, and of more minds. Although there is a need to be aware of the mutability of the internet vis a vis (mis)information, it is a promising tool and the basic premise of using the internet as a tool for organizing is hopeful. Political action and demonstrations of support and solidarity at a distance can be a particularly important and effective method for individuals who are living and working in localised situations that prohibit direct actions. Information is circulated throughout an on-line community where responsive individuals receive the information and organize direct actions in their local arena. This activism at a distance draws attention to the challenges being faced by people who are not able publicly to demonstrate resistance, and this also

serves the purpose of raising awareness on a larger front which can further increase the network of resistance and solidarity. My research methods involved information gathering and sharing and in this latter way, I too became part of an on-line community. I was immersed in a series of relationships with people across the country who were all working and organizing around the same issue: eradicate the creation and use of pesticides.

My research project was constructed around a question, and I discussed the complexities of the issue through a case study as an example. While it did not involve immersed ethnographic research on PEI, I did engage and develop strong ties to the people I was working with around this issue. As we carve our way through the 21st century I wonder if we as a discipline are still susceptible to the actions of conducting salvage anthropology (cf. Maybury-Lewis 2000) even though politically and publicly we had voiced our grievances with such a concept and moved on. Numerous anthropologists have chartered new methodologies (cf Ribeiro 1998; Wilson and Peterson 2002; Garcia 1992) and have opened up dialogue into exciting research areas and writing methods (cf Savigliano 1995; Kincaid 1997; Behar and Gordon 1995). But what seems to constitute the determining factor of anthropological research, conducting ethnographic 'fieldwork' away from home, remains.

Offering important insights into this very question, Amit (2000); Knowles (2000); Norman (2000); and Caputo (2000) deconstruct the concepts of field and fieldwork. Caputo (2000) explores the key orienting principles of anthropology –fieldwork-, and posits that the antiquated understandings of what constitutes the field and fieldwork obscure the many realities that face anthropologists. Indeed, our multiple subjectivities;

the new and ever-changing technologies which facilitate and enable transnational and intra-national communication thereby decreasing the spatiality that demarcates the Other from the Self; and the changing political face of the globe, for example, have all impacted the types of questions and the methods of research that are undertaken by anthropologists. Reflecting on our practices is not new (cf. Phillips and Cole 1995, Bridgman, Cole and Howard-Bobiwash 1999, Behar and Gordon 1995). Feminist anthropologists have challenged a male dominated discipline that requires distant travel and immersion into societies that sometimes are not favorable or safe for women. There is a robust body of literature by feminist anthropologists who have contributed important work and who have opened up the discussion about the needs of women anthropologists to exercise caution, creativity, intelligence and common sense, in order to conduct research. A woman's race, age, class, and marital status also impacts the type of research questions pursued and the methodologies utilised. Real concerns such as personal safety do arise and are prohibitive for women, such was the case for myself in Samoa. While there, my research methods were adapted and did transform under circumstances that challenged my personal safety. Some of my peers in the graduate program elected to take along their partners into the field for added comfort, support, and, safety. Further confounding the requirement for strict immersion and for separation from ones' home community is the fact that even when in the field, the access to telephones, email, the internet, postal services, although perhaps only sporadic at times, ensures that the anthropologist can routinely be in touch with friends and family (Amit 2000).

Regardless of the continued reflexivity demonstrated by anthropologists to craft research that is amenable to an individual's personal needs, the spacialized understanding

of 'field' persists. Furthermore, it remains to be the evaluative marker used to determine whether or not the research undertaken is indeed *appropriately anthropological* (Caputo 2000:19; emphasis mine). This is an important point, there remain hierarchies of power within the discipline that categorically rate whether one type of research and research question is deemed to be more anthropological than another. The very strength of anthropology is its inherent malleability and reflexivity to adapt and to adopt new praxis.

My research methodology is my attempt to stretch the "place' setting of anthropological inquiry and suggest that the people I met and the community I engaged in is well within the definitions of what constitutes anthropological research and the construction of anthropological knowledge. For me, anthropology is about asking challenging questions related to issues of power and access to power: how can people empower themselves to challenge the dominant norms and that disempower them? How can individuals reach out beyond the social confines and territories that silence them and meet people in spaces of safety and support? Research and lines of critical inquiry and reflection into how issues of race, gender, class, power, and capital support or dismantle systems of inequity, can make important contributions that serve to support the efforts of activists working at different levels of action throughout the globe.

Accessing and entering the political field of pesticides:

Beginning in Vancouver in June 2002, I undertook a media analysis to discover what organizing and politicization of pesticides was occurring in Canada. Leading off from my discussions with Dr. Yeomans, I referred to the North Shore News, www.nsnews.com where I located current and archival articles related to the cosmetic ban of pesticides throughout the Municipal District of North Vancouver. It was through

this search that I came to learn about Halifax as a city that had organizations which were actively pursuing a ban of the application of cosmetic pesticides on private and public lands and about Dr. Elizabeth Guillette, an anthropologist who had conducted research on the toxicological impacts on preschool aged children in Mexico's Yaqui valley, the agricultural valley where a large percentage of fresh fruits and vegetables are grown for export to Canada and America (1998). Dr. Guillette examined children's cognitive functioning and behavioural development in two agricultural communities: one valley community that grew cash crops for exports and that applied an abundance of pesticides and one high-land community that followed more ecologically sustainable farming practices. The differences between the children in the two communities was startling: the children in the valley lagged behind their peers in physical coordination, energy, and learning capabilities. The anthropological work undertaken by Dr. Guillette reaffirmed in me the importance of pursuing advocacy oriented anthropology, particularly related to environmental contamination and human health.

Through perusing these articles in the North Shore News, I began learning of the contentious nature of advocating a cosmetic pesticide ban. While some people argued about civil liberties and rights to do as they please to their private property and while industrial interests made claims that pesticides were tested and declared safe by the Federal government, parents and medical practitioners cautioned against the use of pesticides citing the increase in environmental sensitivities amongst their children and patients. This provided a good starting point and the realities of this topic being a fiery public debate became extremely clear.

Upon my return to Montreal, I audited a geography course, "Epidemiology, Human Health, and The Environment". Among other things, I learned about the environmental and human health effects of persistent organic pollutants and, more specifically, about pesticides. I also gained insights into the history and importance of epidemiological studies particularly in analysing clusters of acute illnesses. I learned about morbidity vs mortality studies and as case studies, we examined illness clusters in several counties in the mid-western region of England during the 1960's.

I had initially set-out to explore three examples of communities organizing to effect a ban on the use of cosmetic pesticides. I wanted to have a representation of collective actions being undertaken across Canada in several different regions. Through a series of processes however, some of which involved serendipity, I decided that I would evaluate either Halifax or a community on Prince Edward Island. Through my communiqués with people working on the issue, I elected to approach the entirety of PEI as a community, particularly given the size, population, and strong kinship ties that influence actions on the Island.

Prior to beginning my case study research, in order to gain insights into which municipalities were considering a ban, I referred to The Green List: A Project of the Canadian Environmental Network: A Guide to Canadian Environmental Organizations and Agencies. This source provided the contact information for community organizations that addressed various issues related to social justice, and there I found the coordinates of people involved in environmental organizations across Canada. I also used the google.ca search engine and typed in "environmental organizations in Canada", this led me to the link for the Canadian Environmental Network: www.cen-rce.org.

The CEN is a non-partisan, not-for-profit organization that encourages and offers support to citizens and citizen-groups who are seeking to become more involved in public consultation processes that work to positively improve environmental legislation. The CEN is an umbrella organization that hosts a national database of Environmental Non-Government Organizations (ENGOs) and partners that are working in the environmental field. The CEN has regional chapters in each province and territory, and it is through this link that I accessed the coordinates for two provincial organizations: the Nova Scotia Environmental Network, www.web.ca/~nsen and the Prince Edward Island Environmental Network, www.isn.net/~network. The CEN site further provides links that direct one to newsletters, publications, action alerts, and also to national and international environmental non-government organizations. One of the most useful tools on the site is the "Green List Directory", a listing of more than 2000 environmental groups, international networks, industry associations, and government agencies; it was through this link that I became aware of sites that I then visited frequently: PANNA – Pesticide Action Network North America, www.panna.org, Earth Action, www.earthaction.ca, Alert Net's environmental health section, http://AlertNet.org, Canadian Environmental Law Association, CELA, www.cela.ca, the Pesticide Action Network Database, www.pesticideinfo.org, to name a few.

Finding these links opened up a world of current information, discussion groups, analysis of global political economic problems related to food security, hegemony, power, poverty and also links and information about collective actions. Of particular usefulness was the PANNA.

The PANNA is a non-profit, non-governmental organization that works on the international front through the use of internet action to politicize the deleterious human and environmental health risks of pesticides and to bring attention to the socially and environmentally just alternatives that can serve to replace pesticides. PANNA is one of five PAN Regional Centers worldwide, the other four include: PAN Africa, PAN Asia/Pacific, PAN Europe and PAN Latin America. Taken directly from their web-site, (www.panna.org), the mission of PANNA is to,

> link local and international consumer, labor, health, environment and agriculture groups into an international citizens' action network. This network challenges the global proliferation of pesticides, defends basic rights to health and environmental quality, and works to insure the transition to a just and viable society.

Using the internet as a tool for coalition building, PAN has registered close to 1,000 organizations in more than 60 countries, each organization working in their local milieu to reduce pesticide dependency and promote ecologically sound and socially just alternatives. Through the internet site of PAN, members of the coalition can learn about local success stories and about environmental and social injustices. In regards to the latter point, local demonstrations of actions and solidarity apply pressure tactics on the local political sphere to advance a global position and chant for processes of change and justice. I frequently visited this site on a daily basis, as the contents were extremely thought provoking and rich with scientific and policy oriented information.

In an effort to further my understanding of the processes involved in the development of legislation to ban the use of pesticides, I conducted some internet research on Chelsea, Qc., the first municipality in Canada to ban the use of cosmetic pesticides. The website, www.municipalite.chelsea.qc.ca provides details of By-law 488-98, which was passed December 7, 1998 effectively banning the use of pesticides for

aesthetic purposes on private and public property of the municipality. The citizens group, *Action Chelsea for Respect of the Environment* was pivotal in lobbying for this ban. I recorded the details of the ban, the regulations, the rules that governed when and how pesticides could be applied to private and public property. I was skeptical of the loopholes and curious to see how Halifax or PEI were going to address the loopholes or follow the direction taken by the Municipality of Chelsea.

To begin the research process, I used the coordinates provided on the CEN web-site and I contacted the Nova Scotia and the PEI regional chapters via email. In each of my initial email approaches to organizations or to people, I felt that if I provided the reason for my inquiry and the types of questions I was seeking to explore, then I might be able to help the receiving individual guide my query. As example, included below are a series of email correspondences:

Email sent to: nsen@web.net

Hello Veronica,
I am a graduate student in anthropology at Concordia University in Montreal. I am writing my thesis on environmental health and social justice. I am grounding my research in community activism that leads to the restriction or banning of pesticide use in urban or rural areas. I would like to examine three communities, of varying size and geographic locations, across the country. I am considering Chelsea Quebec and Kelowna BC. As my third, I would like to use Halifax as I understand that by 2003, Halifax will be the first cosmopolitan city in North America to have a complete ban on all cosmetic uses of pesticides. I am interested in acquiring information about this move ie:

- who proposed it?
- what community organizations have been and remain to be involved in this activism? Is there anyone you could direct me to?

I am grateful for any help you can offer.
Regards,
Jamila Abassi

To which, Veronica responded:

Certainly, I believe the best people to talk to would be the women I have indicated in this email. {**email addresses provided in the "cc" section of the email to me**} I have no doubt that they can help you.
Veronica

Veronica provided me with the contact email for two individuals, one of whom was Helen Jones, a woman working on the pesticide issue in Halifax. In my initial correspondence to Helen, I set out to describe who I am and why I am interested in the community process. I asked several questions, hoping to stimulate a series of communications. I had several more correspondence emails with Veronica who assured me that Helen Jones was a wonderful contact full of insight and energy to explore some of the questions I had:

> Hello,
> Veronica Sherwood of the Nova Scotia environmental network provided me with your name and email when I requested information from her regarding the current debates in Halifax re: pesticide legislation. I am a graduate student in anthropology at Concordia University in Montreal and I am conducting some research for my thesis on environmental health and social justice. I am grounding my research in community activism that leads to the restriction or banning of pesticide applications. Because I would like my study to be diverse in scale, I am examining three communities, varying in size and geographic locations, from across Canada. I would like to learn more about the processes being initiated in Halifax as I understand that by 2003 Halifax will be the first city in North America to implement a ban on all cosmetic applications of pesticides. I am interested in acquiring information about this legislative pursuit. Specifically, I seek to understand:
> - how and why this proposal was put forth?
> - are particular community organizations involved in this motion?
> - are there known cancer clusters, and if so, where?
> - What municipal agencies are supporting or opposing this proposal?
> - Is there a link between low income earners and illness, particularly among children in low income earning households?
> - I am wondering if epidemiological studies have been undertaken in Halifax?
>
> Essentially, I would like to understand *why* people in Halifax are mobilizing and *how* people in Halifax are mobilizing to safeguard their environmental and human health. If you know of people or organizations that you could refer me to, I would be most grateful. I look forward to hearing from you.
>
> Sincerely,
>
> Jamila Abassi; Tel: (514) 939 9406

To which Helen replied:

> Hello Jamila,
> Good to hear from you, and thank you for your interest in our community process. I think it might be easier to talk with you on the phone about Halifax's ban on cosmetic pesticides than it would be to write out a response.

I couldn't call last night, but hope to try your number [(514) 939 9406] tonight.
Don't stay home from an exciting party to get the call !!! - I'll try again if you're not there.
Looking forward to talking with you,
Regards,
Helen

Helen Jones MSc., EdD *(xxx) xxx-xxxx*

Member of the (previously active) Pesticide Bylaw Advisory Committee for the Halifax Regional Municipality (HRM)
Board Member, Real Alternatives to Toxins in the Environment (RATE),
http://www.chebucto.ns.ca/Environment/RATE/

My lengthy telephone conversation with Helen Jones initiated me into the political realm of pesticides, not just the legislative processes but the social political ties that clashed in support of or in resistance to a ban in Halifax. We spoke about the Chelsea ban and the loopholes of the legislation. We spoke of the potential loopholes in the suggested legislation in Halifax. We spoke of the processes of activism, we spoke of her involvement, her interest, and her work and the work of others in communities throughout Atlantic Canada. As a result of this conversation I became aware of the work being undertaken by one woman on PEI. Although Helen did not provide me with coordinates, she did encourage me to enquire about the work being done on the island suggesting that this could really provide me with an example of the politics of pesticides and the strong links between economics and activism. Back in June when I was contemplating pesticides and human rights, I had come across an editorial in the North Shore News speaking about how economics had taken precedence above the health and rights of locals on PEI. I was extremely curious about the potential of exploring the intersections of politics, economics, and collective actions, and I decided that PEI, if I could make inroads, would be a very interesting case study. I contacted Susan Hawkins of PEI Environmental Network.

jamila abassi wrote:

Hello, I am a graduate student in anthropology at Concordia University in Montreal. I am writing my thesis on environmental health and social justice. I am grounding my research in community activism that leads to the restriction or banning of pesticide use for cosmetic purposes. I would like my study to be diverse in scale. As such, I am examining three communities, of varying size and geographic locations across the country. I would like to use a community within Prince Edward Island. I am interested in the political and environmental health issues resulting from the large-scale application of pesticides to potato crops. I understand that there is a movement on at the moment to shift the farming practices to more organic methods and eradicate the use of pesticides. people are presenting with health complications and that these are suspected to be related to pesticide use. This may be a long-shot but I am wondering if you could direct me towards people and or organizations that are working around this issue? I am grateful for any help you can provide.
Regards, Jamila Abassi

Hi Jamila
Congratulations on choosing such an important topic for your thesis. (Master's or Doctorate?) PEI is a very good choice given all the recent (and continuing) concerns over rampant pesticide use in our agrarian economy. My suggestion is to be in touch with someone who is a veritable encyclopedia of information on this issue on the Island. The woman's name is Sharon Labchuk, her phone number is (xxx) xxx-xxxx, email: slabchuk@isn.net She is part of a very active environmental group called Earth Action. Our office fields calls for her from all over North America. Sharon is an exceptional choice of contact.
Good luck, let me know if I can help any further.
Sincerely
Susan

Susan Hawkins, Coordinator
Prince Edward Island Eco-Net de l'Ile-du-Prince Edouard
126 Richmond St.
Charlottetown, PE C1A 1H9
Tel: (902) 566-4170 Fax: (902) 566-4037
http://www.isn.net/~network
>"Providing information and resources to groups that care about our environment"

I responded to Susan:

Hello Susan,
Thank you very much for connecting me with Sharon Labchuk, I have been reading about Earth Action, I will let you know how things pan out. I am currently working on my master's dissertation which is truly a personal and political labour of love: my mom and my aunt both passed away from rare forms of brain cancer that made me stop and wonder what was in the environment. They both pursued very healthy lifestyles. My mom has only recently passed away (March 26, 2002). While I felt hopeless throughout her ten months of illness, what really gave me hope was knowing that people are actively pursuing environmental justice in their communities to safeguard their health and the health of future generations. In this topic and through the course of meeting people working on issues of environmental and social justice I have realised that the world is still full of wonder and beauty.
Thanks again for the contact. Take Care,
Jamila Abassi

I contacted Sharon Labchuk:

Dear Sharon,

Susan Hawkins of the PEI environmental network provided me with your name, email and telephone number when I requested information from her pertaining to the current debates on PEI re: pesticide legislation. I am a graduate student in anthropology at Concordia University in Montreal and I am conducting research on environmental health and social justice. I am grounding my research in community activism that leads to the restriction or banning of pesticide use. I would like to use a community within Prince Edward Island. I am wondering if you are familiar with a community that is currently undertaking the steps to ban pesticides? Specifically, I am curious to learn about the action local residents are undertaking to ensure that their rights to environmental health and social justice are secured/safeguarded? This may be a long shot but I am wondering if you could direct me to people and or organizations that are working towards a ban on the pesticides?
I look forward to hearing from you,
Sincerely,
Jamila Abassi, telephone: (514) 939 9406

Here are excerpts from Sharon's reply:

Hello Jamila,

Well, you've reached the right person for pesticide issues on PEI. I work with Earth Action, an environmental activist group. We are a working group of activists organized around the deep ecology philosophy. We do not accept government or corporate funding. Our money is derived from donations from individuals. We work on a number of issues but I have been involved in agricultural issues, and specifically pesticides, for the past 7 years. The issue is very complicated and of course involves the usual government and corporate players. But the social situation, particular to PEI and possibly other small places, plays a very important role in perpetuating the poisoning of the Island.

While it is true that individual growers do not have to let other people in the community know specifically what chemicals they are using. In fact, we do know which chemicals are used. The Province publishes an annual pesticide sales report, listing agricultural pesticide sales in 3 sales groups according to the weight of active ingredient sold. We would prefer to know exactly how much of each pesticide is sold rather than have them grouped the way they are. But it's not that big of a deal. All growers follow a similar spraying regime and it is no secret, so we do know what is sprayed and, generally, when it is sprayed. There is no one community trying to ban spraying. Agricultural pesticides are regulated by the Province. Only the 2 cities - Charlottetown and Summerside - have acts which allow them to regulate pesticide use. So communities have no jurisdiction in this regard. We are the only organization on PEI working to transform our industrial monoculture model to one that is 100% organic and focused on supplying local markets, first and foremost. You might want to look at the Island as a 'community' - it's small enough.

Sharon

Subscribe to Earth Action's Weekly Bulletin (it's free). Send an email to <majordomo@flora.org> with the following command in the body of your email message: subscribe earth-action. 'Something in the Air' - a new National Film Board of Canada

> documentary by= PEI filmaker Sylvie Dauphinais. Filmed on Prince Edward Island. Agricultural pesticide spray drift, children and the air they breathe. Available in French or English. In Canada call: 1-800-267-7710. In USA call: 1-800-542-2164

I reflected upon Sharon's advice about approaching the entire island of PEI as a community unto itself. This seemed rational to me, given the physical size of the island, the population, and the incredible layers of kin-ties, industry, government policies that all seemed to be converging on this one highly contentious issue.

I wrote Sharon back, thanking her for the information, the time she had spent answering my questions and I also shared with her my rationale and motivation for undertaking this topic. There had been a report on CTV's W-5 about pesticides, farming, and activism on PEI; a rather timely moment for this to be aired, and although I had seen it, I failed to mention this to her. About a month later, Sharon replied:

> Hello Jamila,
>
> Good to hear from you. There is nothing like having a personal stake in an issue to become passionate about it. Sorry to hear about your mother and aunt. I can imagine the air around Manchester is a toxic soup of chemicals.
> Did you see W-Five on CTV about a month ago? We have been trying to get them to do a story on PEI pesticides for years, and they finally did. Spurred on by the publicity surrounding the fishkills. It caused a huge uproar here. Both the Minister of Agriculture and the head of the PEI Potato Marketing Board were publicly demanding meetings with CTV officials because of 'biased' reporting. The program was excellent and presents a fair representation of all parties concerned. However, the potato industry defenders are used to controlling PR on PEI and they are outraged whenever outside media comes here. There were many letters to the editor both praising and condemning the show. The producers say they may come back next year to do another program. I think you can watch the show on the CTV website. If not, I can mail you a copy of the video if you can pay for the video and postage - maybe $8. The video has 2 other PEI pesticide documentaries on it as well - Paradise on Peril, and Something in the Air. I will definitely respond to your questions - it won't be for a couple of days though. Talk to you later, Sharon

I aspired to gain an understanding of the work being done by a number of community organizations on PEI, particularly because of the political nature of the topic. I searched through the PEI Eco Net web-site to determine whether I could find any links to other organizations working on the Island around environmental health issues. I

located a number of important web-sites: the Canadian Food Inspection Agency, www.inspection.gc.ca the Environmental News Network, www.enn.com, the government guide to PEI Government Fisheries, Aquaculture, and Environment, www.gov.pe.ca/government/index/php3, the PEI Government listing for Agriculture and Environment, www.gov.pe.gc.ca/af/index.php3, the Atlantic Canada Green Lane, www.ns.ec.gc.ca, EcoAction 2000, www.ns.ec.gc.ca/ecoaction/home.html, the Sierra Club campaign to reduce pesticides, www.sierraclub.ca/national/pest/index.html, and the Canadian Health Network, health information provided by Health Canada and other sponsors, http://Canadian-Health-Network.ca. I also searched the link, http://www.isn.net/~network/main.html and came upon the web-site for ECO PEI, the Environmental Coalition of Prince Edward Island, www.ecopei.ca. I read through the mission statement, I examined the funding sources and partnerships and I read through the names of the listed Board Members. I also read through the articles posted on their web site and I tried to ascertain what their angle was. I noticed that ECO PEI worked with other organizations and was a part of an 18 member organization, The Coalition for a Healthy Environment. I noted that Earth Action was not a member of this coalition. I wanted to see how a more mainstream environmental organization was tackling the pesticide issue and so I wrote an email to Helen Jones and asked her about other organizations on PEI and mentioned that I had come upon ECO PEI. At the same time, I had received an email from Sharon in which she suggested that I read two books that might be able to shed some light on the situation on PEI. The books, Watchdog and Gadflies: Activism from Marginal to Mainstream (2001) by Tim Falconer and Working the Land: Journeys Into the Heart of Canada (1999) by Alison Griffiths and Andrew

Cruise, not only discussed activism and the role of activists in sculpting the Canadian political landscape, but particular to PEI, the influences of community organizations on farming practices. Furthermore, I learned about ECO PEI and Gary Schneider.

Helen emailed me back and encouraged me to learn about ECO PEI, she provided me with the email addresses for two members of ECO PEI. I contacted them both individually and in my correspondence, I mentioned Helen's name. I wanted to learn about the organization and the work it does, information that was not necessarily available online. I also wanted to build a rapport with someone at the organization so that I could learn about their particular methods and practices of action.

> Hello Gary,
>
> I recently completed reading, Watchdogs and Gadflies...by Tim Falconer and came upon your interview. Furthermore, Helen Jones from Nova Scotia, encouraged me to contact you and provided me with your email. I am a graduate student in anthropology at Concordia University in Montreal. I am conducting research for my masters thesis on environmental health and social justice. I am grounding my research in community activism that leads to the restriction or banning of pesticides. I am using Prince Edward Island as a case study. Regarding PEI, I am interested in the delicacy of political and environmental health issues ¨I am curious about the local action that might be currently undertaken by environmental and social justice groups to address the tenuous situation on PEI. I would appreciate if you could take some time and share some information with me. Specifically, I am interested in understanding:
> -How ECO PEI came to fruition
> -What philosophy, if any, does your organization operate within?
> -Who participates in your organization?
> -What are your main issues as an organization?
>
> I have been communicating quite regularly with Helen and she encouraged me to connect with you. If in-fact I am misguided, please let me know. I am extremely grateful for any information you share with me.
> Regards,
> Jamila Abassi

As I became more involved in the events and the layered complexities of PEI, I decided to present just one case study, and not examine Kelowna or Halifax. Furthermore, as narrowing down contact information for people organizing around a

pesticide ban in Kelowna became ever more challenging, the ease of connecting with people on PEI grew. There is something to be said for serendipity in the research process.

While in Montreal, I had a flatmate, Sam, whose family was from Atlantic Canada. As it became more and more obvious that my research was going to focus upon the pesticide issues on PEI, she mentioned to me that her uncle had once been involved in potato farming on PEI and she offered to connect us via email. Sam's contact really opened up the analysis and research into avenues that would not have otherwise been possible. I had not known Sam while I was sketching out my research topic, so for me, it was incredibly fortuitous to have Sam and her family open up their lives and share their knowledge and experiences of not only working in agriculture, but also of having lived in agrarian communities. It was obvious from the beginning of my communications with her Uncle Dave that he was happy to be part of her life again and thus, by extension, part of mine. As a married man who never had children, he was excited about the prospect of having young people in his life and he took on the role of 'uncle', willingly. My flatmate led the initial discussion right to the heart of some interesting questions. I am not certain that I would have framed my email and questions this way, nonetheless, the door was opened for me and the two of them offered lively discussions about the important economic contributions of potato farming in Atlantic Canada in general and PEI in particular.

The rapport I developed with Dave led to my referring to him as 'Uncle Dave' and we soon communicated without going through Sam. Uncle Dave introduced me, via email addresses and cc emails, to a diversity of people working around potato production and issues of environmental sustainability of farming practices on PEI. Although neither

Sam nor her Uncle Dave ever made me feel uncomfortable about their connection to me, my research, and their involvement in my research process, I was aware that this was a delicate matter. My political leanings were favoring a reduction in the use of toxic chemicals and I did not want to insult Uncle Dave who, by his own testament, has been involved in just about every aspect of the potato industry. Extracted from an email correspondence between Uncle Dave and myself, Uncle Dave summarizes his experiences and thus established his "credibility":

> From 92 to 97 I supervised the Crop Insurance Corporation and we insured 30 000 acres of potatoes each year. From 97 until 2002 I was in charge of the Potato Quality Section for the PEI Dept of Agriculture and did potato extension and enforcement work. I now Manage the Farm Income Risk Management Section and supervise Federal Provincial programs - 90% of the program dollars goes to the potato industry here on the Island. SO - there is not much I haven't been involved with when it comes to the potato industry on PEI.. I think I can help!!!

Uncle Dave was entrenched in the potato industry on the Island and his insights and introductions to people involved in various facets of the potato industry really added a positive dynamic and perspective to my research. At the same time, I was a little worried about how this could all play out.

I was apprehensive as I walked the political tightrope that swung from discussing the deep ecology perspective pursued by Earth Action, to gaining a privileged insight into the minds of people working to enhance and further develop the potato industry. At this stage in the research, by mid October, when emailing and telephoning people who worked directly in the potato production industry, I did become more guarded. My feelings for wanting to create a sense of privacy arose because I was not absolutely certain about how I would negotiate this new field of inquiry and these new relationships. There were many links and ties and I was worried at times that I would expose people and what they had shared with me. At this particular time in my research, more than any

other, the use of email and telephone conversations was a very effective method for me. First, the email was confidential, meaning had I been on the Island, I would have fallen under watchful kin gazes and this could have inhibited some people from meeting with me. Second, I could pause and reflect on my practice, and on how I could frame an answer or pose a question.

My ascribed status as "Uncle Dave's nieces' roommate", enabled me to gain another perspective into the business practices of potato farming and beyond that, I was able to negotiate communications with farmers who were once implicated in contract farming practices on PEI. However, given the sensitivity and political implications of potato contract farming, and given the extremely strong kin-ties on the island, my contact with farmers will remain confidential. While my favored position as "kin of a colleague" facilitated my communications with farmers, I felt apprehensive about mentioning my research into the social activism and more to the point, I felt that my communiqués with other Islanders could potentially shut-out farmers from speaking about potato farming practices with me and cause strife for the other non-farming Islanders. I was aware of the power of potato farming on the Island and I wanted to avoid uncomfortable situations or confrontations. Furthermore, I did not want to put anyone in a difficult situation. I connected with farmers who had once worked under contracts but who were now practicing organic forms of agriculture. Again, this proved to be fortuitous as I wanted to learn about the reasons people decided to shift from agrochemical intensive farming practices to organic practices. With these farmers, we could openly discuss the social movements on the island to ban the use of pesticides and we also discussed the hardships farmers face in the 21st century.

My biases softened through the course of this research. I admit that I had strong convictions and these did guide me, but I was also aware of wanting to uncover the processes that lead farmers to apply large quantities of pesticides. I wanted a layered and holistic analysis and through this very process, I learned about the intricacies and complexities of the issue from multiple sides: industry, activists, farmers. I became aware of my tendencies to be more critical of one than the other and I negotiated these feelings by discussing the issues openly with my flatmate. Although her personal experiences similarly informed her biases, because of her formal education and career in public health policy, she had strong tendencies to be analytical and pragmatic. I was reminded through her that my objective was to learn about the issues and analyze why and what processes contribute to the overuse of pesticides.

It was important for me to be honest and open with the people I was corresponding with. I live under the operative of demonstrating my "humaness", that I am a human being with a history that guides my praxis and ethics. I felt so much respect for the people who openly responded to my emails and my telephone calls, and who have devoted their time to research and action that can lead to a safer environment for all of us. Building a rapport and establishing trust seemed rather natural for me. I had worked in community organizing prior to undertaking graduate studies, and through this experience, I had a sense of where people were coming from when I chatted with them. In addition, I have also learned through work and life experiences that when I open myself-up, when I share my experiences, when I expose my vulnerabilities, people tend to feel safe enough to share their experiences and vulnerabilities too. Of equal importance was establishing a safe environment for the individuals with whom I discussed sensitive issues. I did this by

expressing where I was coming from on a very personal level and then by validating the work that was being done in the field of community organizing. I also wanted people to know that I was performing research that would be written up in the form of a graduate thesis in partial fulfillment of a masters degree. I always discussed this aspect with people and suggested that depending upon their desires, I could include or not include their communiqués.

The community organizers I developed relationships with were responsive, caring, and generous, they did not request to remain anonymous. In fact, the relationships were reciprocal, we exchanged ideas, desires, information, insights, comments of reports, articles, documentaries, books, workshops, we expressed anger and frustration too. And in this sense, I sometimes felt too involved in their processes and worried that our discussions could lead to local and public actions on their part. One experience in particular made me realise just how reciprocal our sharing was. I had asked a question and stimulated a telephone conversation late one evening during which I mentioned something off the record, but I had failed to qualify the information as being said off the record. Before I knew it, there was a snowball in motion. At first I panicked and wondered how on earth I was going to get myself out of this. I worried about the impacts of what I had disclosed. My passing comment was shared with an employee in a government ministry and this individual was preparing to act on the information. I had to be honest and admit that I had made a mistake in sharing the information and that I had to explain that I had believed that the conversation was in confidence and that they could not act based on the information I had shared, that they would have to locate another source. This caused some tension and a little disappointment for the individual who

needed this information. I learned that the personal is the political and that particular to this cause, there is a need to expedite change so information had to pass quickly into the right hands.

With more cautious footing, I continued sharing with each of them what I had learned in the research, I felt that in this light, they would gain insight into my understanding of the complexities of the issue, and they could offer me complementary or alternative perspectives. I felt that if they understood that I had gotten through and into the layers of the evolving issues, we could discuss the impact of kin-ties and capital on social actions. It became apparent over time that the four individuals I most corresponded with were happy to be quoted, that an important component of their work as community organizers and activists was to be "out-there", in the public; they depended on having their issues and their organizations known.

The irony of conducting research that depends on telecommunications is that there was not a formal separation between them and myself. Email and telephone calls occurred at all hours of the day. When telephoning people, I made every effort to ask people via email when it would be an opportune time for a discussion. I think that people generally felt that it was because I was a student that I needed to set up times because this idea of giving people advance notice, was not extended to myself. On numerous occasions, after long days, when I was not at my best, the telephone rang. It would sometimes be someone new, who had been given my telephone number by either Sharon or Helen. This was a challenge. I really wanted to be an active listener, engage with the person, develop discussions and gain further insights into organizing for pesticides. I wanted to be fresh and be able to ask and answer questions. I was also aware that many

of these telephone calls were long distance calls. I did not want to insult the person who was spending their hard earned money to chat with me. On the flip side, it was hard to be a financially strapped student and have lengthy long-distance telephone calls. I resorted to using calling cards, and it was often the "one minute left" signal that alerted us to the need to wrap up conversations, exchange emails and communicate again through internet.

As part of my process, I often let people know ahead of time via email that I would be ringing them, and together we would establish times for discussions. Reflecting upon this process, I was sensitive to people's personal space and I did not want to be an intrusive individual, encroaching on their time. I did soon realise that in the world of social activism, time was precious and a non-issue, really. When situations arise, when political and economic developments transpire that impact the agenda of the collective action, then people act. My experience with long-distance activism, or witnessing at a distance (Ribeiro 1998), was that distance in kilometers did not necessarily impact the dialogical exchanges that happened at all hours of the day, night. I often felt completely immersed in the topic matter. It became obvious to me that I was constantly negotiating emails and telephone calls, at home and at school. There did not seem to be a space between my private and public sphere. One evening, as I was preparing dinner, the telephone rang. I answered it and spent the following hour and a half, discussing key aspects of effective social organizing in democratic nations, such as Canada. Helen Jones had connected Marsha a veritable fountain of expertise in working the democratic process as a means of effecting real legislative change. I had been expecting a phone call, as I had received an email earlier in the week from Helen,

> There is someone in the Montreal area you would really enjoy talking to on the phone! Marsha Akman is a friend of mine who works on the pesticide issue politically at both the federal and provincial level. She's a powerhouse, fun, plain speaking, and really

> knowledgeable about the political system ...and... she is committed to getting pesticides out of our communities (she's also a member of the Quebec Liberal Women's Commission - they're preparing for the convention at the end of November). Do yourself a treat and call her as soon as you can (I mentioned your name to her) (email correspondence from Helen Jones, October 2002).

This connection was particularly fruitful as Marsha lived in Montreal and this meant that we could meet, providing that she had time to spare. Marsha's particular expertise was sought by numerous activists, Helen being one of them. It was important to catch up with her as I had been told through other activists that her schedule was so compact that I may not be able to meet with her. Once on the telephone we established our lines of connection, our "kin-ties" – who I knew, who she knew, and we compared where we were both coming from -what my concerns and politics were, where she was directing her energies, why we were working on particular topics, with particular agendas, and what my long term objectives were...

Although I did not often ask this question at the beginning of a conversation, I did ask people later on once I had established a rapport with them, whether or not they felt that long term activism was in their future. Questioning me, however, about the duration of my involvement came up quite frequently but not in a suspicious way, more so with a hope of optimism for a long term commitment to activism. People expressed excitement – telling me outright at how pleased they were that I was interested in the community process, and the current debates-their excitement also came across in their tone of voice and rapidity of speech. To many, I was a motivated "young person", a student. My age, status as a graduate student, and perhaps even my gender placed me in a category that seemed to invoke a need in people to help me, to guide me, to encourage me. I often heard expressions of, "Oh I have a daughter in university too".

At the same time, my life experiences beyond academia, my multiple subjectivities had similar positive impacts and enhanced my research experience. It seemed that my personal experiences somehow validated my work in their eyes. Furthermore, because I had worked in community organizing, some of the issues and the people working in action oriented fields were familiar to me. This connection seemed to break down barriers and we freely discussed issues such as burnout, feelings of being overwhelmed, under-supported, misunderstood, dealing with low income, the ghettoization of social organizing work, engendered fields.... Indeed these initial conversations established trust and familiarity between us. As time lapsed and familiarity and trust deepened, the formalities of email letter writing decreased, often quick notes would open with, "just a thought about..." or a question posed right away. It was sometimes frenetic, the exchanges of questions and answers or thoughts. I was working on a dial-up connection at home and often I answered one email and the next would be waiting. Time passed so quickly, just staying afloat and abreast of the communiqués required me to be very organized. I had files, print-outs, and lists of who to contact and with what information or with what questions. I also kept a work log of what I did and what I needed to do the following day.

As a means of connecting with a wider network of people involved in environmental and health related activism, I signed up for several list servers; I attended lectures and discussions facilitated by students in Montreal and professional activists; and I read through on-line public discussions at web-sites that catered primarily to activists (http://AlertNet.org, www.comm-dev.org).

Building a political landscape:

Through my discussions with Helen and Sharon, I learned of an information web service that was operated by Mike Christie. At the time of my research, Mike Christie was the Co-chair of the City of Ottawa Health Dangers of the Urban Use of Pesticides Advisory Committee. I signed up at the end of September to receive email updates and news alerts from Mike Christie. This often involved receiving up to two large files per day, everyday. The files contained up-to-the minute information and media reports or briefs about anything and everything related to the manufacturing, distribution, and registration of pesticides; the adverse effects of pesticides on humans, animals, and the environment; and about community initiatives calling for restrictions on pesticide use. The information was drawn largely from mainstream media sources that were predominantly from North America, although there were a few exceptions where information about environmental contamination and citizen actions from various areas across the globe were included. Although I greatly benefited from being a part of this list service, I did find the volume of information at times to be overwhelming. I had to maintain a very regimented process of checking my email because the large file sizes would sometimes fill-up and freeze my email account. I made note of the time of day when some of the emails were sent, ten pm, midnight…, and I went online late at night to download my messages as I often worried that a file sent late in the evening would fill my account and thereby block other people from sending me emails. Because email was my primary means of contact and connecting with people, I was systematic to the point of obsession about clearing my email account and downloading the files to my hard drive or to diskettes. Between the end of September 2002 and the middle of December 2002, I received a total of 52 email files that sometimes contained up to twelve media reports, or

entire parliamentary transcripts. I was very interested in the type of activism that Mike was engaged in, I decided to not only passively receive information from Mike Christie, so I connected with him via email and engaged in dialogue about the toxic substances regulatory framework in Canada and the processes involved when Parliamentary Bills receive Royal Assent. I connected with Mike Christie at a time when the committee he co-chaired was pursuing a motion to have pesticides banned in the city of Ottawa. This motion was denied and Mike Christie terminated the service in January, 2003. This meant too, the end of my correspondence with him.

PANNA is an organization that I remain linked to. When I first undertook this research, I was very interested in PAN as a resource and a link to people who are organizing around issues related to pesticide use – social and environmental justice, human health and ecological impacts of pesticide use, economic inequity. I therefore registered with PANNA to become a subscriber to PANUPS – Pesticide Action Network Updates Service-, a weekly email news service that provides "action alerts", resource pointers and guides, and general reports on pesticide. PANUPS distributes articles and information that are often overlooked by mainstream medias.

I accessed the latest literature on issues related to food security, economic inequity, environmental racism. Unique to PANUPS, was the polyvocality of contributors. Authors and activists working in economically developing nations, and economies in transition contribute a significant amount of the work that is featured on the PANNA web-site and within the PANUPS listings. Registering with PANUPS kept me abreast of the collective actions, it was a resource for free downloadable documents, and it also provided an overabundance of contacts and resource people from around the

world, all working on pesticide related issues. Throughout the course of three and a half months of research, I received messages from PANUPS on average once every week. From the end of September until the middle of December, I received a total of 34 messages with links and resources. I however, accessed the web-site daily. Because of the richness of information and insights that comes from PANNA, I continue to receive PANUPS and will do so indefinitely.

Another list server I registered with was the Pesticide Management Regulatory Agency (PMRA) web-site , www.hc-sc.gc.ca/pmra-arla/english/index-e.html. From this site I accessed current and archival information about the management and regulation of toxic substances in Canada. There is a PMRA publications mailing list, "What's New/Quoi de Neuf", to which I subscribed and I received weekly or twice weekly emails with status updates about chemicals registered for use in Canada, about changes in regulatory processes, and sometimes about more general concerns such as the spraying of pesticides to combat West Nile virus. This web-site also enabled me to access information pertaining to pesticide spray buffer zones, risk indicators, national sales database, consumer information, the processes involved when a biotech firms seeks to register a new pesticide for use in Canada, fact sheets addressing among other things, pesticides and food, residual levels, Integrated Pest Management (IPM), legislations such as the Pest Control Product Act, Bill C-8, and the pest management advisory council.

My web-based research was divided into subject matter: Environmental health; toxic substances and the regulatory processes for the uses thereof in Canada; agriculture and agroindustrialisation on PEI, particularly potato farming; economic indicators and objectives for Atlantic Canada; sustainable development in Canada; acute illness in farm

families and among people living in close proximity to agricultural areas; physiological impacts of toxic substances on neonates, infants and young children; social and environmental movements in Atlantic Canada.

On a daily basis, my research consisted of managing the mounting emails in my account, reading these over and performing inquiries. I spent on average eight hours a day reading emails, performing literature and web based research, reading related materials and discussing my research on potatoes with people. The frequency and rapidity of exchanges waxed and waned and this really did depend on the person I was corresponding with. It tended to happen that we would email a few times in the week and then have a lengthy discussion on the weekend. At times this was problematic, people tended to telephone during the evenings, and so if I were anticipating several calls, I had to schedule people in. Over all, however, this was a really effective way of grounding our weeks worth of email correspondences in human voice and stories about other parts of our lives.

When contacting government bureaus, such as Health Canada, or the PEI Department of Agriculture and Environment I tended to send out requests for information with a brief preamble describing who I am and what I am researching. Responses to my initial email were generally quite brief but they would post packages to me within the week of our initial correspondence. Once received, I would email a thank you, read through the contents and then send along an email with questions, comments, etc. Sometimes, if telephone numbers were included, I would contact the person via telephone for further discussion about the information package. This was the method I

used when I inquired about fish kills on PEI and when I sought epidemiological and health status reports for residents of PEI.

In recognition of the time difference between Montreal, Nova Scotia and PEI, I spent the morning corresponding with people and organizations in Atlantic Canada and the afternoons corresponding with people in central and western Canada. This worked relatively well and enabled me to simultaneously read materials acquired through online resources, or spend time in the library. I did find this method of working isolating and so I worked predominantly in a student computer lab where over the course of the four months, I developed some wonderful friendships.

Another way that I dealt with my feelings of distance from people was by attending lectures and by meeting with local organizations. Attending events enabled me to learn about the localised movement and about the type of people involved in activism around issues of environmental health. On October 24, 2002, I attended a lecture at Concordia University, featuring, Steve Tvedten, aka, The Pest Guy, a renown pest management professional who discussed, "The Politics of Pesticides and the Real Grassroots". Although I learned a great deal about his politics, what was most fruitful were the people I met who were in attendance. There were only nine individuals at the roundtable. I found this quite shocking, such an important issue garnered little attention from students, even from the student organizations that advertised the lecture. I surmised that the small number was a result of the time period: it was close to mid-term exams and term paper due dates. Still, between 4-6 pm, on a Thursday afternoon, I was expecting to see more students. As a facilitator, The Pest Guy did not inquire as to our interest for being there. He did however, inquire as to our use of chemical substances to eradicate

pests and then he shared his history as a once ruthless user of chemical substances to exterminate pests. The purpose of The Pest Guy's lecture was to alert the general public to the abundant ways of eradicating pests without the application of pesticides. This was my first foray into public discussions about pesticides and I was happy to listen and reflect on the information and insights shared although I did feel that it leaned heavily on his mantras and not necessarily on the politics and grassroots components of pesticide use as suggested by the title of the lecture.

At the beginning of November I read about Olga Prin's book launch at the Montreal Book Show, November 15. Olga Prin's book, Victims d'un Heritage Contamine (2002), is an exploration of the impact of toxins on the health of her family, particularly on the health of her son . Similar to Nicole Bruinsma, Olga Prin became increasingly concerned by her son's reoccurring bouts of poor health, she embarked on a research project to determine the connections between her son's ill-health and toxic contaminants in environment surrounding their home. I knew that Olga Prin was involved in the Quebec Coalition for Alternatives to Pesticides, and I decided that if I attended the launch, I might have the opportunity to meet her and also, to meet with other people in the Montreal area working around the issue. I felt that this was a good way for me possibly to make some connections and create a support network for myself in the city. This worked well for me, although sometimes shy, I managed to approach Olga, congratulate her on the book and chat about her organization. This opened up a type of informal group discussion with other attendees about the work we were engaged in and I exchanged emails for future connections.

When I first began thinking about the possible connections between environmental contaminants and illness, I perused the reference materials at the BC Cancer Agency where I came upon a reference, Living Downstream: A Scientist's Personal Investigation of Cancer and the Environment, by Sandra Steingraber 1997/1998. This autobiography is filled with scientific information about toxins and their effects on people and the environment. One chapter in particular, *Space*, discusses how certain occupations and physical areas increase an individual's exposure to cancer-causing substances. The example provided and explored is farming and farm fields, this chapter was highly influential on my research. As I read through the book, I jotted down quotes, information, references, and startling facts. I went online to the Silent Spring Institute, www.silentspring.org, and located a world of reference materials and of scientific studies that discussed the links between environmental contaminants and human illness. I was also able to access links to organizations working around advocacy. I connected with many women in America studying and working around issues related to environmental health.

One day, reading through the Montreal Mirror, I came upon a notice of a public lecture to be delivered by Dr. Steingraber at McGill in December 3, 2002. Dr. Steingraber's lecture, "Protecting The First Environment: The Ecology of Pregnancy and Childbirth" examined the physiological processes of conception and neonatal development and the impact of pesticides on the neonate and the young child. This was an important lecture for me as I was able to gain a stronger understanding of the physiological effects of toxins upon pregnant women and upon the developing fetus. Dr. Steingraber argued that pregnancy, far from being a private and intimate issue, is a public

health issue, and that environmental devastation is poor prenatal health care. Citing examples of the link between poor air quality and low birth weight, high PCB levels and premature births, infected breast milk and higher risks of infant asthma, obesity, lymphoma, Dr. Steingraber emphasized the need for increased awareness and increased activism. At the end of the lecture, along with many other people, I approached Dr. Steingraber and asked her a few questions related to recent studies of breast cancer clusters in areas of New England in addition to the Halifax movement. During this time I met a professor from McGill who was conducting research on breast cancer clusters in the city of Montreal. The three of us discussed recent movements to ban the use of cosmetic pesticides, we also exchanged emails.

In January, although I had completed my time-framed research period, I re-connected with both the professor from McGill and Sandra, not with any precise question in mind, but more to discuss the research process and how I was feeling now that I had completed my research time frame. I found the lack of daily updates from Mike Christie and the now very sporadic emails from Helen, Dave, and Sharon, challenging. I struggled with not examining the new information that was accessible to me. In this sense, I found that leaving the field conflicted with my desire to be informed about current changes in legislation, regulatory processes, scientific studies, actions and success stories about more restrictions, etc.

I craved connections and so to resolve this, I met with colleagues who encouraged me in my new role as full time thesis writer. It was important to me at the time to continue to discuss what I had learned and what I was learning and share it with people. From the beginning, I had been quite clear about timelines with the other people I was

involved with. Around Christmas I sent each a happy holidays email and then in the New Year I sent them warm wishes for 2003. Included in that email was a brief update on what I would be doing in the coming months. My separation from my friends and from the research topic was challenging. The time had passed for me to wrap up my research, and in this sense, I left the field of inquiry, but my yearnings to continue to learn and to look beyond this research as a time framed project remained and remain strong.

CHAPTER THREE: PEI - A CASE STUDY

In summer the land is gentle and alluring, accented by a green the gods must have conferred over for centuries before creating. On its own the verdant colour of Prince Edward Island is lustrous enough, but what lends special depth and uniqueness is the contrasting red of the Island soil...One becomes so enveloped by the dusky rouge...colour defines the Island. The farm fields in late fall and early spring are long ribbons of red-brown burrows. On and on they march, like crumbly worms, until they smack into the sky and are gobbled up (Cruise and Griffiths 1999:2-3).

I work in Earth Action, an environmental activist group. We work on a number of issues, but I have been involved in agricultural issues, and specifically pesticides, for the past seven years. The issue is very complicated and of course involves the usual government and corporate players. But the social situation, particular to Prince Edward Island, and possibly [to] other small places, plays a very important role in perpetuating the poisoning of the island (email from Sharon Labchuk, September 2002)

On the northeastern Atlantic coast of Canada, nestled in the Gulf of the St. Lawrence, between Quebec, Nova Scotia, New Brunswick, and Newfoundland, lies the province of Prince Edward Island. At 5,548 km squared, and measuring 280 km from one end to the other, it is the smallest province in Canada and has a population of 138, 514 people (Statscan 2001). Characterized by a gentle rolling landscape with a hilly region in the middle where elevations peak at 135 meters above sea level, the remaining 75 percent of the land surface is less than 45 meters above sea level. The province is divided into three counties, running east to west is Prince, Queens, and Kings; only 43 percent of Islanders live in the urban areas of Charlottetown, Cornwall, Stratford and Summerside, the rest live in rural communities (Statscan 2002).

The Islands' climate tends to be volatile. It is distinguished by high winds, an abundance of precipitation, and freeze-thaw cycles during the winter months of January and February when subtropical air currents produce rapid temperature changes of up to 25 degrees causing soil surface layers to thaw while the subsoil remains frozen.

Of equal importance to what is happening above the ground, is what is occurring on and beneath the Islands' red soil and some Islanders would argue that the soil structure is a crucial component, if not the pivotal component, in supporting the Islands' economy (email correspondence with Aiton 2002; Cruise and Griffiths 1999; email correspondence with Labchuk 2002). PEI soils are largely comprised of silt and sand, they have low fertility and organic matter; natural regeneration is difficult and the poor structure of the subsoil which inhibits permeability only further deteriorates its quality (PEI Department of Fisheries and Environment, PEI Department of Agriculture and Forestry). Furthermore, soils that contain a very high percentage of fine sand and silt-sized particles erodes more easily than soils with either a high clay or coarse sand content. The intensity of the rain received, coupled with the poor soil structure and compact subsoil that reduces water infiltration, results in large quantities of the topsoil layer being displaced and deposited downstream, or in off-farm environments. These conditions present interesting challenges to farmers who need to sustain high yields and prevent soil erosion which has been identified as the Islands' most significant environmental problem (ibid).

Islanders have consistently exploited the islands' natural environment to net financial gains. In fact, the Island has gained national and international notoriety for its successful potato and tourism industries (email correspondence with Aiton 2002; email correspondence with Labchuk 2002; email correspondence with Schneider 2002). In 2001, the province earned CA$175 million from the international export of raw and processed potatoes (Statscan 2002, PEI economic indicators for 2001). Also in 2001, during the peak tourist season, the Island hosted upwards of 200,000 visitors (defined as pleasure and business guests) per day which brought in CA$30 million in sales taxes

alone (ibid). But once the cool breeze signaling the end of summer begins to blow across the Island, tourists leave and all that's left is what it was and what it always has been: farmland (Cruise and Griffiths 1999:45).

PEI has as its motto, *parva sub ingent*, the small under the protection of the great. Far from being the quaint quiet place as made popular in Lucy Maude Montgomery's Anne of Green Gables series, there are an increasing number of clashes and fractions amongst and between corporations, provincial and federal government ministries, farmers, and non-farmers. At the core of the debate is the question of the feasibility of maintaining the Island's potato agro-economy and many people both within and off the Island are wondering who amongst the great are interested in and willing to protect the environmental and human health of the small?

On an Island that is so intimate, colliding ideologies are tenuously balanced between farmers and environmentalists who stand on a precipice that seems to be increasingly constructed by forces outside of the province. On the one side, local and distant activists call for radical changes to farming practices on the Island that would shift from the current chemical intensive monocropping of potato farms to more sustainable and organic mixed farms. While there are a number of crops that are grown on farms on the Island both for local consumption and for export, the majority of farms produce potatoes – Russet Burbank potatoes in particular. Additionally, the majority of farmers have contracts to produce specific crops for multinational food corporations. The individuals and organizations who advocate organic farming practices suggest that adopting more ecologically sensitive methods of farming, although cost-intensive to farmers and the province in the short-term, in the long-run, the less aggressive

mechanized and chemical farming trends do yield substantial net profits that are beneficial to the Island's ecosystem. On the other hand, the agrochemical dependent, nutrient-leeching and polluting potato farming although providing immediate benefits and sufficient yields for farmers and the province, continues to cause and exacerbate environmental and human health problems. The former is encouraged by activists on and off the Island who are concerned about the mounting evidence suggesting that toxic chemicals used on agricultural commodities adversely affect humans, animals and ecology. The latter is encouraged silently but forcefully by corporations, the Island potato board, provincial and federal governments, and contract farmers.

In sum, the local health and environmental needs of Islanders are secondary to the financial objectives established by outside players, who are far removed emotionally, physically, and financially from the ramifications of toxins in the environment. The question then lies in what actions can be taken to alter the course that was started centuries ago when the first colonists landed on PEI and began a long and rich history of farming?

What follows is a brief historical overview of the populating and land use practices of PEI that led to the development of the Island's agroeconomy. Emphasis will be placed on the colonial history of the French, the British, the Scottish, and the Irish.

Archaeological evidence suggests that human habitation of the Maritimes began approximately 10,000 years ago with the receding of the latest ice age. Successive cultures have been identified with that period, in particular, the Mi'kmaq First Nations people emerged about 2000 years ago and their population on PEI peaked in the 1500's, at 300 (www.gov.pe.ca/photos/original/population_bkg.pdf). While members of the

Mi'mkaq nation utilised all areas of the Island year-round, processing and procuring foodstuffs from the littoral and the inland regions, settlers tended towards sedentarism, establishing farms and fishing villages.

Evidence suggests that although Viking seafarers landed on PEI around 1,000 A.D., European contact was sporadic even after Jacques Cartier claimed the Island for the King of France in 1534 when at this time, PEI was known as Ile de Saint Jean and was part of several land grants. The Island remained untouched by further colonists for many years (although it continued to be occupied by the Mi'kmaq First Nation) until 1713, when Acadia was ceded to Britain. After this point in time, the population of colonists on PEI began to increase. Many of the first Europeans who did settle on the Island were French anglers who resided along the north-shore town of St. Pierre, this eventually became the largest settlement. Slowly, groups of Acadian farmers began to settle the areas around St. Pierre and developed extensive communities and trade relationships with individuals who were involved in fishing. By 1752, the Islands' population reached 2,663 people and between 1752 and 1758, the population doubled as many French people sought refuge therein from the turbulent political situation on the mainland. The demographic make up of the Island, however, was greatly impacted with the fall of Louisbourg in 1758. British troops stormed the Island to cleanse it of the French inhabitants. Those who could, hid, while others fled, eventually returning once the war-fare and raiding ceased. The British deported as many of the Ile St. Jean Acadian residents as they could and sent them back to France. The Acadian population that eventually returned or that remained on the Island form the basis of PEI's present Acadian population. With the Traite de Paris in 1763, the Island was confirmed as a

British possession, this resulted in a large influx of emigrants from Scotland, Ireland, and Britain. By 1850, all of the available farmland had been allocated to Island residents, therefore, the Island's frontier was closed. In sum, by the late 1800's, PEI was covered in a dense network of small mixed-farms, and by the early decades of the 20th century, almost 90 percent of PEI's land-base had been converted to mixed-farms that were family owned and operated (www.gov.pe.ca/photos/original/population_bkg.pdf).

The important contributions of the potato farming industry to the Island's economy cannot be underemphasized. The total cash receipts from agriculture for the first six months of 2001 were CA$182.4 million, CA$175 million of this was from potatoes (Statscan: Agriculture and Agri-Food Canada 2002). Annually, in excess of one billion kilograms of potatoes are produced. Some are processed in local plants, and some are exported as raw potatoes (email correspondence with Aiton 2002). Processed potatoes, valued at CA$145.6 million (Statscan:2002 Agriculture and Agri-Food Canada), are the Island's dominant international export while raw potatoes are valued at CA$29.4 million (Statscan 2002: Agriculture and Agri-Food Canada). The continued demands placed on farmers to produce substantial yields have resulted in farmers adopting questionable and environmentally damaging farming practices: intensive monocropping, not adhering to the proper 1:3 crop rotation (a regulated crop such as potatoes, followed by a grain crop, and a forage crop, with potatoes being planted once every three years), planting rows of potatoes on slopes which exceed 9 percent grades (thereby exacerbating soil erosion), and the frequent application of pesticides. Intensive farming on the Island is dangerous to the local ecosystem simply given the high sand content and low fertility of the Island soil. Moreover, potatoes are very greedy crops and

leech nutrients, thereby further depleting the soil of its already very low organic matter. The routinization of land sterility has not always been the case on PEI.

During the 1970's and the 1980's, potato farmers were registered seed growers and grew potatoes to seed standards as established by the Canadian Food Inspection Agency (CFIA) (email correspondence with Aiton, 2002). At this time, seed was grown so that it could be planted the following year as crop (ibid). Unlike most vegetables, potatoes are not grown from true seeds, they are clones and are propagated in the same way that gardening plants such as geraniums are. Only true seed is used in plant breeding and variety propagation (ibid). There are nine classes of seed potatoes: Nuclear, Pre Elite, Elite I, Elite II, Elite III, Elite IV, Foundation, Certified and Tablestock. Nuclear is the best seed and is used for plant breeding and Tablestock is the poorest and is used for human consumption. Pertaining to economic value, Nuclear seed sells at $.30 per pound, Elite II seed sells at $.12 per pound, and Foundation seed sells at $.08 per pound (email correspondence with Aiton 2002; Statscan 2002: Agriculture and Agri-Food Canada). The lower the seed class, the lower the price commanded. Although the seed industry can be very lucrative it is also a high risk venture and losses for all investors can be great.

Up until the early 1980's everyone involved in potato farming on the Island grew seed. For example, in 1981, 61,000 acres were devoted to growing seed potatoes (ibid). Although the export market was highly lucrative, it was not until the changes within the PEI potato industry began in the early 1980's when the processing industry was developed on the Island. Processing potatoes are specifically grown for human consumption and are sold to a processor who makes french-fries. Only the lowest class of seed is used to grow product for the processing trade. The most coveted of this class is

the Russet Burbank because its regular elongated shape yields a maximum number of french-fries with minimum waste. Further adding to its attractiveness is the low sugar content in the potato, which means that when deep fried, the potato does not turn brown, rather, it retains its golden hue, ideal for McDonalds french fries or McCain fries (Cruise and Griffiths 1999; www.mccain.ca). As the processing industry further developed, many seed growers converted from seed production and specialized in growing processed potatoes, Russet-Burbanks in particular.

Tablestock and processing potatoes have a long maturation period: 130-140 days which means that they are less labour intensive and do not require as much management as compared to other potatoes. However, given that the Russet Burbank is the lowest classification of seed and therefore did not command a high price per pound, farmers were required to increase the size of their operations to, for example, 1,000 acres per farm. Additionally, in 1991, McCain Foods of Canada opened a CA$36 million processing plant in Borden-Carleton, PEI, this further propelled the industry on the Island into high speed production.

McCain Foods of Canada began in Florenceville, New Brunswick in 1957 and employed 30 people. Today, McCain Foods has more than 18,000 employees and approximately 55 production facilities on six continents, 30 of them are potato processing facilities. The countries include Canada, United Kingdom, United States, Netherlands, Belgium, France, Poland, Australia, New Zealand, Argentina, Mexico and South Africa. McCain also exports to more than 100 countries, and maintains its own representatives in locations around the world (www.mccain.ca). The company which is still family owned and operated, has expanded horizontally into fruit, vegetables, frozen foods, juices,

deserts, pizza; and vertically, they have holdings in transportation, cold storage, fertilizers, machinery, beef feed lots, meat processing plants, large scale farms, wholesaling, and retailing. They are the largest producers of frozen french-fries in the world and they are one of three of the largest frozen food processors (www.mccain.ca). McCain has a manufacturing capacity of more than 1,000 000 pounds of potatoes per hour (www.mccain.ca). McCain Foods of Canada is a multinational corporation that proudly illustrates their designs for being a monopoly through the company motto, One World, One Potato. The logo featured on the company web-site is further indication of what global aspirations the McCain corporation has (www.mccain.ca):

The potatoes in this logo are Russet Burbanks, the type of potatoes that are grown on PEI for processing and for export. With the arrival of McCain Foods into PEI in 1991, farmers began transforming, en-mass, what available land they had into potato fields. The Island's landscape changed radically. Subsequent ramifications on ecosystems were devastating. Farms that were once surrounded by hedgerows and trees both of which helped to reduce erosion and provided habitat for wildlife that would consume bugs, were grazed to make room for the row upon rows of potatoes (email correspondence with Aiton 2002; email correspondence with Labchuk 2002; email correspondence with Mutch 2002; email correspondence with Schneider 2002). Paralleling the growth and development of the processing industry was the tablestock industry. Specialized plants opened on the Island to grade potatoes into 5, 10, 20, 25, pound sacks for consumers and

specialty packs for restaurants, hotels, and institutions (email correspondence with Aiton 2002). Between 1981 and 2001, the acreage devoted to potato crops increased from 64,000 to a peak in 1999 of 113,000 to a steady 107,000 in 2001 (Statscan). In 1981, 4 million cwts of processing potatoes were harvested, by 2001, 13, 300,000 cwts of processing potatoes were harvested (email correspondence with Aiton 2002; Statscan).

Unlike other types of agribusiness, potato farming does not have a quota system or a marketing board that sets prices or controls production. When farmers plant seed they never know how much they will be able to sell from the harvest, nor do they have an idea of how much they can charge per pound of potatoes. If farmers produce either tablestock or processing potatoes they have the option of negotiating a contract with a large processing plant. The benefit of this system is that it guarantees the farmer a certain amount of money at the end of the season. Having a contract helps offset the risks of losing crops due to blights and/or from bad weather. The gamble of farming is that you might loose your investment. With a contract there is a sense of security.

Currently, Canada holds 12 percent of the international potato market (Agriculture Division Statistics Bulletin, July 2002) and PEI plays a very important role in this country's ability to either hold or increase its share of the international food export market. The Agri-food industry in Canada is an important source of wealth for the country, representing 8 percent of the GDP and 15 percent of Canadian employment (ibid). Agricultural productivity almost doubled between 1961 and 1984. Canada is a relatively small player in the international food market and therefore is much more vulnerable to the international environment than are larger and less dependent nations or blocks such as the US or the EU. The value of Canadian agri-food exports increased from

CA$13 billion in 1993 to CA$22 billion in 1997. The objective of CA$20 billion in exports by the year 2000 that was established by the Agri-food industry in 1993, was achieved by 1996. The Canadian Agri-food Marketing Council established as its new objective to increase Canada's share of the world agri-food trade from 3 percent to 4 percent, this translates financially into an increase from CA$22 billion to CA$40 billion by 2005 (Agriculture Division Statistics Bulletin, July 2002). While this is a substantial financial objective, what troubles many farmers is that the increase in inputs and the increase in financial objectives established by ministries does not translate into increases in revenues for the farmers who are out tilling the fields. Comparative provincial figures for potato acreage of the top four potato producers from 2000-2002 inclusive are indicative of the importance of the PEI potato industry in Canada's overall strategy:

Table 1: Acreage Allotted to Potato Production among Top Four Producers in Canada

Top four producers:	**Acres allotted for potatoes: 2000**	**Acres allotted for potatoes: 2001**	**Acres allotted for potatoes: 2002**	**Total Square Kilometers:**
PEI	109,000	108,000	109,000	5,548
Manitoba	78,000	77,500	85,000	649, 947
NB	55,000	57,000	57,000	73, 440
Alberta	52,900	55,000	60,000	661, 190
Canada total	408,400	411,600	425,900	9,984,670

Sources: www.statscan.ca; Statscan 2002: Agriculture and Agri-Food Canada; www.//open-site.org/Regional/North_America/Canada; Aiton 2002.

While it is evident that acreage allotted to the production of potatoes increased steadily over the three years for all four provinces noted in the chart, what is striking is

the relative size of PEI in comparison to the other provinces. This raises important questions about land use patterns: how much land is devoted and protected from non-agricultural pursuits? This chart also brings to light the role of PEI potato production in the Federal international export market agenda.

In order to keep pace with the increasing requests for processing potatoes, many farmers working under contract have adopted mechanized farming practices that have required new methods of irrigation and increased uses of agrochemicals. Long maturing potatoes are planted in early spring and harvested late in the fall, usually after the first frost. Consequently, farmers generally do not have time to lay down a crop cover of hay or rye grass once they have completed the harvest. A top cover is absolutely critical in stabilizing the soil and returning the vital nutrients that have been leeched by the potatoes. Often left exposed to wind and rain, the soil is apt to erode. This is highly problematic given that late maturing varieties of potatoes account for 65 percent of the PEI potato crop (email correspondence with Aiton 2002). The result has been an increase in soil erosion and an increasing loss of fertile land. On-farm and off-farm environments have been damaged by the use of pesticides or as the PMRA refers to them, crop protectants (PMRA 2000). The impact to target and non-target organisms and environments has incited significant protest both on and off the Island.

Since the mid-1980's, the rapid increase in the production of high intensity potato crops has resulted in an increase both in kilogram quantity and in frequency of pesticide applications. Under the current system of production, while other pest management practices have decreased, chemical pesticide use has steadily increased. Indeed, between 1982 and 2000, pesticide sales on PEI increased by nearly 600 percent (CTV: W-5). For

illustration, consider that in 1993, there were 87,000 acres of potato farmland and 60, 200 kilograms of active pesticide ingredients was applied to crops. In 1996, there were 108,000 acres of potato farmland and 1,053,000 kilograms of active pesticide ingredients was applied to crops. In 1999, 113,000 acres were planted with potatoes and 1,152,000 kilograms of active pesticide ingredients was applied to crops (email correspondence with Aiton 2002). In the high stakes and unpredictable business of potato farming, crops are doused with pesticides systematically and abundantly. For example, in 2002, potato crops were sprayed 26 times in the growing season, this amounts to crops being sprayed once every 5 days or less (email correspondence with Aiton 2002; email correspondence with Labchuk 2002). Application frequency and dosage is determined by the perceived and or actual level of disease threat. Through daily reports on the front page of the daily newspaper, island residents are kept abreast about the condition of the Islands crops and the fluctuating price of potatoes on the world market. Agricultural extension officers and members of the island's Agricultural board provide daily write ups featured in the newspaper about the shape, size, colour and condition of the flowering spuds; they also report any disease and they recommend what and when to spray.

In 1999 a potato wart was located in one isolated corner of one field in one area of PEI. The US placed a moratorium on the import of PEI raw potatoes and the Islands' economy and the farmers growing crops for export suffered the consequences. Disease pressure can manifest through microbes, aphids, or even climatic conditions such as frost, rainstorms, droughts, or flooding (email correspondence with Aiton 2002; email correspondence with Mutch 2002; email correspondence with Schneider 2002). To

prevent financial loss, PEI farmers can spend up to and in excess of CA$100,000 annually on "crop protectants" (email correspondence with Aiton 2002).

Although stringent rules govern when and how pesticides are applied, pesticides are volatile and are easily transportable. This means that not only do they impact target organisms, but they affect non-target organisms too. Equally, the severity of the impact depends upon the dosage and the duration of exposure to the chemicals. Islanders became increasingly aware of the adverse health effects of the chemicals used on PEI in 1994 when large numbers of fish were found floating dead in streams and rivers. To date, there have been 26 reported fish kill incidents and 17 rivers have been declared dead – meaning: no life exists therein (Mutch 1999). Fish kills continue to occur at alarming rates. As recently as July 2002, within a five kilometer area along the Wilmot River, 4,500 dead fish were collected for tissue analysis. The laboratory findings have yet to be made public (personal communication with Mutch 2002). A critical report on the status of fish kills from 1994-1999, published in 1999 by Mutch et al argued that the data from fish necropsies and the standing water samples from where the dead fish were retrieved indicated that the fish contained high toxic loads. Specifically, twelve pesticides along with their metabolites that are commonly used on potato crops, were identified: chlorothalonil, alpha-and beta- endosulfan, dimethoate, azinphos-methyl, cypermethrin, disulfoton, metalaxyl, atrazine, carbofuran, metribuzin, and dithiocarbamates. Of these, azinphos-methyl, chlorothalonil and endosulfan were present in concentrations that exceeded maximum levels determined by Freshwater Aquatic Life Guidelines (FWALG) (Mutch 1999, 2000, 2001). Of further note, atrazine is a known endocrine disrupter and

its use is currently under review by the US Environmental Protection Act (PANNA 2002; PANUPS 2002).

Both surface water monitoring and fish kill investigations have played a significant role in bringing about an understanding of pesticide risks to the PEI environment, to wildlife, and to humans. While there is an abundance of epidemiological evidence (cf. Colborn et al 1993; Briggs 1992; Guillette et al 1998; Thomas 1995; Steinberger 1998; Rodier 1995; Carson 1962; Wade 1999; Metcalfe 2002; Merrington et al 2002; Soto et al 1994; Wolff 1995; Repetto and Baliga 1996) that suggests a link exists between chronic and acute illness in families involved in intensive agrochemical farming, to date, no such studies have been undertaken on PEI residents. In an email to me, Sharon Labchuk explains that although studies are desired, they are not necessary because the scientific evidence has already proven that pesticides cause acute and chronic illness:

> There is absolutely no information available. Our chief medical officer tells me that the population of PEI is too small to be statistically relevant, so he will not conduct any studies. We barely even have this kind of information on wildlife. Until a couple of years ago there had been NO studies on the effects of pesticides on wildlife. Now there is one small study underway at UPEI to look at the effects of endocrine disrupting pesticides on freshwater fish... While it would be nice to have studies particular to PEI, this has never hindered us. Look at it this way: If tobacco is found to cause cancer in smokers living in Alberta, we do not need further studies on smokers in PEI to determine whether smoking causes cancer here. Over 70% of the agricultural pesticides used on PEI are classed by California as 'Chemicals known to the State of California to cause cancer'. About 70% of the agricultural pesticides in use here are endocrine disrupters. Many are known neurotoxins. These percent numbers refer to the weight of active ingredient used. I have no end of information on the health effects of the pesticides used on PEI (email from Sharon, October 12, 2002).

There are two important points made by Sharon that warrant consideration. Globally, sufficient evidence proves that pesticides cause chronic and actute illness, another study to position the Island in relation to other farming communities to evaluate risk, is therefore not necessary. The risks are already known and published (cf. Colborn et

al 1993; Briggs 1992; Guillette et al 1998; Thomas 1995; Steinberger 1998). What is interesting to consider is how the medical examiner's office conceptualizes the people of PEI: as being too small a population to warrant a study. This has important implications about how official institutions construct people and perhaps place more value on some communities than on others. Regardless of what the official line is, Island residents are concerned about the human health effects of pesticides. Their concern however is not only with pesticide use and the effects thereof, but it also involves social relations and concern for being anonymous. Sharon Labchuk shared this with me in an email and explains,

> There are health problems on PEI and I am the one who gets the calls all summer long from people with complaints. Alot of people call anonymously, some give their names but ask that I do not reveal them. They do not bother to go to government for many reasons. Briefly, they will get no help from government but more importantly, they will be punished in some way if they speak out. We can go onto more detail on this later if you like, but this fear is really at the heart of the whole problem on PEI. We saw people in Winnipeg dragging dumpsters into the street this summer to block spray trucks (for mosquitoes). They did this to try to prevent the spraying. On PEI, a typical potato field can be sprayed 20 times in a season depending on the weather. These fields adjoin home lawns, schools yards, day-cares, hotels, restaurants, seniors homes, etc. (email from Sharon September 27, 2002).

The point that people feel they need to telephone anonymously is disturbing. What motivates this need to guard their concerns? It seems that the only "acceptable" evidence that pesticides are in the PEI environment and that they are causing deleterious effects is supplied by the fish kill reports published by PEI Department of Fisheries, Aquaculture and Environment. Notwithstanding, statistical evidence from Health Canada (Census2001) illustrates the health problems challenging rural and urban populations on the Island. Asthma rates among Island children are the highest in North America (Census2001). Between 1996 and 1997, PEI had twice the Canadian rate of hospitalizations for asthma in children and youth (aged 1 to 19 years) (PEI Department of

Health and Social Services 1999), high particulate matter has been linked to asthma and other respiratory diseases. One farmer wondered why the rates were so high, and posited, "Why do you think that is? We don't have smoke stacks and diesel engines, we don't have heavy industry around here. I only see smoke from the [pesticide] spray"(Anon. source; October 2002).

Morbidity rates for breast, colorectal, and prostate cancers are higher on PEI than anywhere else in Canada (Van Til 1997), and morbidity rates for skin melanoma, non-Hodgkins lymphoma and kidney cancer are steadily increasing (Second Report on the Health of Canadians: PEI 1999). The number of Islanders admitted into psychiatric wards for clinical depression has consistently been higher than the national average (ibid). Sharon Labchuk referred to studies that have linked depression in farm-families with pesticide exposure. Sharon argues that the mental stress of industry enforced monocrop farming in combination with the physical impairments resulting from exposures to pesticides is physically and emotionally damaging. The incessant strain of production quotas and the high costs of inputs impacts farmers who, across North America are experiencing bouts of depression that often require hospitalization. Mental acuity and physical development amongst Island children points to a widening gap between them and other children across Canada (Anon. source, September 2002; Sharon Labchuk, November 2002).

Regardless of the lack of "official" PEI pesticide specific data , Islanders have drawn correlative conclusions between the impact of toxins on wildlife as evidenced in the increasing number of fish kills, the ground and well water contamination (email correspondence with Mutch 2002; email correspondence with Schneider 2002) and the

impacts that the toxins can have on their own health (email correspondence with Labchuk 2002; email correspondence with Jones 2002; email correspondence with Schneider 2002).

During the summer and fall of 2002, media reports on the fish kills in aquatic systems on the Island were the subject of discussion on the CBC web-site and in local PEI newspapers. The headline from the CBC, July 20, 2002 read: "Pesticides may be killing PEI Fish" (www.cbc.ca/stories/2002/11/08/pei_fish02118). Similarly the November 9, 2002 article in the Journal Pioneer (www.journalpioneer.com/article.cfm?showid=2295) featured the headline, "Fish kill test results released". Both articles reported that 4,500 fish had died in Island rivers in nine incidents and that laboratory reports indicate that the insecticide azinphos-methyl was detected in the fish collected during the initial investigation July 10, 2002. The report stated that azinphos-methyl is a popularly used insecticide that helps protect potato crops. The nine fish kills that happened during 2002 all occurred after heavy rains.

There is still some tentativeness about discussing and linking the fish kills with the agrochemicals that are used on crops. Although the fish tissue samples have pointed to the presence of pesticides, it seems that no one other than Sharon Labchuk, is willing to say that pesticides are the cause of the fish kills. Fish kill investigations are challenging. The unpredictable nature of fish kills limits the amount of control that can be exercised over sampling locations, timing, and procedures (Mutch et al 2000). With many fish kills there is a delay between the time when a rainfall event initiates pesticide wash-off into streams and when the resulting impacts of the fish are noticed (Mutch et al 2000:95). The delay ranges from two hours to one week and is a noted flaw in the

method of conducting investigations. The short length of PEI streams and the speed with which surface water flushes through these systems means that the pesticides can be flushed from the sampling area by the time the investigation is initiated (Mutch et al (2000:95). During droughts, pesticides tend to remain in the application area. However, once it starts to rain, if the precipitation levels are voluminous, the pesticides wash off the crops and along with the eroded soil, they flood the streams. Mutch et al (2000:97) articulates this point,

> *it is difficult to interpret the results from the sediment sampling in terms of impacts on fish health because there are no toxicity guidelines or values for concentrations of pesticides bound to sediment. During runoff events when the streams carry high loads of suspended sediment, sediment passes through the gills of the fish, but the actual exposure to the pesticide is unknown.*

Notwithstanding, suggest Mutch et al (2000:98), "pesticides bound to these sediments could be the agents of mortality".

Generally, Island residents are the individuals who notice the dead fish and they in turn contact the Department of Fisheries, Aquaculture and Environment (DFAE) who initiate an inquiry into the causes of the fish kill. The intention is to locate the point source of stream contamination and then to move forward with punitive charges. The charges to farmers however are minimal. If an agricultural extension officer notices that a farmer has sprayed too close to buffer zones or has ignored the pesticide application guidelines, the farmer can be charged a CA$100 fine.

Fish kill reports that are produced by the DFAE are often made public. Because of the increase in frequency of fish kills and the increased circulation of the reports, pesticides are within the social consciousness of Island residents. Consequently, over the

past ten years there has been an increase in work by activists, both on and off the Island, to radically alter how pesticides are used on potato crops.

The current push by citizens in communities across Canada to ban the use of pesticides for cosmetic purposes (chemicals applied to private or public land that enhance the aesthetics of the land) in urban centers, would, in a place such as PEI, quite simply be, cosmetic. Although legislation has been passed in two urban communities, Summerside and Charlottetown, which empowers these municipalities to establish regulations regarding the use of cosmetic pesticides by citizens, 91 percent of all pesticides sold in Canada are for agricultural purposes. This is an important consideration given that 61 percent of Islanders live in rural communities that are surrounded by active farms.

In 1991, in order to address the acute and persistent problem of pesticide spraying, a group of concerned citizens organized themselves and formed ECO-PEI, the Environmental Coalition of Prince Edward Island. Gary Schneider, one of the founding members explains how ECO-PEI came to fruition, and what they work on:

> [W]e started in 1991 after a series of meetings to fill a void - there were no environmental groups at all here. We work mostly on the issues of agriculture, public transportation, climate change, environmental education and forestry. We try to learn a lot about environmental issues, pass that information along to the public, and run campaigns when resources allow and when necessary. Lately, we have been working more in building coalitions with other groups on a variety of agriculture, health, transportation and wildlife issues. I don't think there is an ecopei definition of activism - everyone works in the way they feel most comfortable, everything from helping with the bookkeeping to participating in a rally, to organizing meetings. I guess we're trying to make this a better and more just world and find effective ways of doing that.. I am primarily interested in forestry and agriculture, as well as environmental education (Email correspondence, September 2002).

At the time, because no other environmental group existed on the Island, the organization provided a forum wherein people could voice their concerns and trouble-shoot around the rapid changes occurring to the Island environment.

In the beginning, members of ECO-PEI were interested in learning more about environmental issues challenging the Island and chose as one of their mandates to share with the citizens of PEI what they had learned. When resources allowed, ECO-PEI ran campaigns. One such campaign was lead by Sharon Labchuk whose interest lay in educating Islanders about recycling and composting. She began fighting the dumps and the Charlottetown incinerator. For a number of years this consumed her time with ECO-PEI. However, during the summer of 1995, ECO-PEI began fielding numerous telephone calls from Islanders who expressed mounting concerns about how the persistent spraying of potato fields with chemicals could impact their health. Citizens wanted to put forth a petition to stop the spraying. Responding to these requests, the pesticide committee of ECO-PEI began a direct action campaign against The Potato Industry. The objective was to publicize and politicize how agrochemicals adversely affect target and non-target organisms. The strategy taken by ECO-PEI was to pit the two economic engines – the agriculture industry and the tourism industry- against each other. They hoped to do so by alerting tourists visiting PEI to the potential dangers of pesticides that were sprayed on Island potato crops. The strategy was to encourage tourists to choose an alternate destination other than PEI. The idea was to reduce the number of visitors to PEI and then have the tourism industry blame the potato industry for the loss of revenue to the Island. In August 1996, members of the pesticide committee headed to Tormentine, New Brunswick and handed-out pamphlets to tourists waiting to board the PEI bound ferry. With captions such as "Come get sprayed on our Island", "Toxic Playground: What the PEI government won't tell you in the tourist brochures", and "How to protect your family from pesticide poisoning while visiting PEI", and by effectively using the media, the

overall objective of drawing attention to the issue was highly successful. Perhaps too successful, industry members both within the potato and tourism sectors were angered, as were the provincial and federal governments, and certain organizing members within ECO-PEI.

A charity organization risks loosing its charitable status if the Auditor General can prove that the organization devotes more than ten percent of its resources to political issues. What this translates to is that tax receipts can be offered to donors as long as an organization is not too political in its actions or agenda (Falconer 2001). At the time, because ECO-PEI was the only environmental group on the Island, the organization comprised of various individuals each with their vision of what environmental activism constituted. Consequently, the diversity of people, ideas, and methodologies for activism, impacted the organization, and was illustrated in the strong and mixed response to the pamphlet distribution (Falconer 2001; email correspondence with Labchuk 2002). After the leaflet "incident", the ECO-PEI Board introduced policies that ultimately hindered the type of direct action the pesticide committee wanted to pursue. When the Board introduced a monitoring policy, committee members were forced to pass every strategy and press release through the Board for approval prior to enacting any action. In reaction to the new policies, many of the more radical members who made up the ECO-PEI pesticide committee, members who were advocating an entire paradigm shift away from industrial export led agriculture to organic and locally directed agriculture, left the organization in 1998 and formed Earth Action.

Earth Action is a collective community organization that is comprised of four principle individuals: Sharon Labchuk, Irene Novaczek, a scientist and a member of Save

our Seas, Aaron Koleszar an anti-globalization activist, and Brad Duplisea, an activist who lives in Ottawa and who devotes his time to the campaign to eradicate genetically modified foods. The meetings and decisions are made by email or by telephone; the structure is flat, there is no one leader; it is fully democratic and participatory.

Sharon Labchuk describes Earth Action as an environmental organization devoted to bringing to fruition philosophies grounded in deep ecology. Moving beyond mere rhetoric, Earth Action seeks to involve citizens in lobbying the government to abolish the current dependence on the agroeconomy and implement a system of sustainable and localized organic farming. Through numerous direct action campaigns, Earth Action, has brought even more attention to the harmful effects of agrochemicals but they have not yet been successful in increasing their on-Island membership. Regarding the work and philosophy of Earth Action and the pesticide campaign, Sharon offers this,

> We are a working group of activists organized around the deep ecology philosophy. We do not accept government or corporate funding. Our money is derived from donations from individuals. We work on a number of issues but I have been involved in agricultural issues, and specifically pesticides, for the past 7 years.... We are the only organization on PEI working to transform our industrial monoculture model to one that is 100% organic and focused on supplying local markets, first and foremost....We are very much a political group looking for social and environmental change on a deeper level than mainstream groups. We do not lobby for increased regulation for example, except as a short-term emergency measure while long-term solutions are being implemented. Regulation that seeks to mitigate some of the nastier side effects of industrial agriculture are simply not acceptable. People who live next door to potato fields will not be happy with, say, a 50% reduction in pesticide use (which is not possible, at any rate). Getting sprayed 10 times a season rather than the usual 20 is simply not an option for those of us who live anywhere near a potato field...(email correspondence September 2002).

Many Island residents are exposed to and are adversely affected by the contamination of the environment by chemical spraying on food crops simply because schools, childcare centers, hospitals, homes, adult care centers and farms are all within very close proximity. However, because the Island is an island where everyone is connected and there exists much interdependence, radical actions are often socially

inhibitive for people who would perhaps other wise voice their opinion (Falconer 2001; email correspondence with Jones 2002; email correspondence with Labchuk 2002). Strong kin-ties limit a person's ability to be fully involved in a campaign that questions the largest income generator for the Island residents. Many people have their livelihoods at risk when they attempt to speak out. Sharon explains,

> The issue is very complicated and of course involves the usual government and corporate players. But the social situation, particular to PEI and possibly other small places, plays a very important role in perpetuating the poisoning of the Island...when people speak out in a small place like PEI here's what happens: a man might be a welder of farm machinery, if he speaks out he will be boycotted; the woman may be shunned at the next Women's Institute or church meeting; your brother's wife's sister's cousin may lose her job at the processing plant if you protest; you definitely will not get the seasonal provincial flagging job with Highways (and therefore will not get the requisite number of weeks for unemployment insurance)... There is very little public protest (email correspondence October 2002).

Sharon Labchuk is a single parent of two children who, aside from a few years when she lived in another province, has resided on PEI her entire life. Motivated by fears of how the pesticide smog and drift was impacting her children's health, she began researching the environmental and human health effects of pesticides. She started asking questions and reading everything she could get her hands on about the chemicals. Paralleling her increasing knowledge, was her increasing fear. Sharon felt that other people would want to know the information she had acquired and so she began publicizing the information to farmers and the government but eventually gave up trying to work within the system and opted to begin educating the general public about the human and environmental risks from chemicals. This shift in tactics from farmers and provincial government ministries to citizens was the tactic pursued when she was with ECO-PEI. When the conflict within ECO-PEI erupted, the solution for her was to go at it alone and with support from similar minded individuals. Now, along with organizing

direct actions and campaigning through the print medias on the Island, Sharon also publishes articles within environmental publications outside of PEI. According to Susan Hawkins, Coordinator of Prince Edward Island Eco-Net (http://www.isn.net/~network), Sharon is a veritable encyclopedia of information on the pesticide issue; noting that Sharon,

> is part of a very active environmental group called Earth Action. Our office fields calls for her from all over North America. Sharon is exceptional (email correspondence September 2002).

Through the media campaigns and the direct actions organized by Earth Action, there has been an increasing amount of publicity surrounding the health effects of pesticide spraying on the Island. This has resulted in pressure on the potato Industry and this has caused a back-lash against Sharon. Initially, Sharon was seen as an individual working to safeguard human and environmental health, but as time passed and as the politics and economics of the pesticide industry and the potato industry were revealed, she has been constructed by members of the agricultural community as a threat to the livelihoods of many Island residents who are involved in agriculture.

Today, ECO-PEI maintains the ideology that cooperation is better than confrontation. It is part of a sustainable-land coalition that includes eighteen groups, three of which are the International Farmers Union, the Atlantic Salmon Federation and the Island Nature Trust. On behalf of ECO-PEI, Gary Schneider runs the MacPhail Woods Ecological Forestry Project. The mandate at the centre is one of education and this is achieved through demonstrations of forest restoration, erosion control and windbreaks, and through a native-plant nursery. In addition, the MacPhail Woods Forestry Project offers nature workshops. As more and more land is cleared to accommodate potato rows,

habitat and ecosystems disappear. The intention of the forestry project is to reconfirm the importance of forested areas for a healthy ecosystem, particularly one that is in close proximity to potato farms. In this way, Schneider is reminding people about the importance of trees and wooded areas while also cautiously condemning the potato industry. Funding for the MacPhail Woods Ecological Forestry Project is provided by government and corporate donors. Annual corporate memberships cost $100.00. Gary feels that education and collaboration is the best way to increase environmental awareness. He does not condone ranting protests or aggressive confrontations suggesting that this causes people to close their eyes and their ears and then to look the other way. For Gary, this method only leads to even more closed-door conversations and in the end, things never change. Similar to Sharon, Gary contributes letters to the Editor in the Charlottetown Guardian, the Provincial paper, and also writes articles that are accessible on the ECO-PEI web site. However, ECO-PEI does not conduct campaigns outside of the Province, preferring rather to work within the province and build alliances and participation among the residents.

While there are a number of environmental organizations on PEI, most of them work around issues of conservation, for example of coastal zones, forestry, wetlands or parks, ECO-PEI and Earth Action, although pursuing radically different methodologies, remain the only two organizations that continue to challenge the agrochemical industry with the objective of prohibiting further environmental contamination on the Island.

CHAPTER FOUR: REGULATING PESTICIDES, MANAGING THE ENVIRONMENT

The purpose of this chapter is to provide a brief background about pesticides and review how they are regulated and managed in Canada. Pesticides are Persistent Organic Pollutants – POPs – these are characterised as being able to travel long distances, as bioaccumulating in the adipose tissues of organisms, and as persisting in the environment. As biocides, their intended use is to prevent, destroy, repel, or mitigate any pest which can be "weeds", anthropods, or pathogens. Falling under the general rubric of "pesticides" are: insecticides, herbicides, fungicides, bacteriacides, molluscicides, nematocides, personal insect repellents, rodenticides, and algaecides. Although there is evidence to suggest that pesticides were used in Roman and Greek times, the synthetic compounds that are in use today were developed and produced en-masse during the 1940's (NRC 1996). Pesticides were created for the purpose of protecting agricultural crops by minimizing crop damage from blights and or pests while maximizing yields and returns on a farmer's investments.

The highly toxic and aggressive synthetic organochlorine and organophosphate insecticides, and the herbicide 2,4-D, along with several lethal fumigants that were introduced after World War II, set a precedence for the development and use of toxic chemicals as a means of controlling unwanted pests. The rapid pace of the major developments in synthetic chemistry revolutionized the pesticide industry (NRC 1996:23). New products were constantly introduced onto the market because pest management was viewed as a critical component to the production of a plentiful food supply for the increasing populations, particularly in America. Initially, farmers adopted the new technologies because they tended to be very effective at reducing pest

populations, they were flexible – one product could be applied to a diversity of plants, and they were relatively inexpensive when compared to the costs incurred from crop damage (NRC 1996: 23). Over time however, it became apparent that many pests developed resistances not only to the applied product but to entire classes of pesticides. The treadmill of continually increasing pesticide dose and frequency, in addition to the increased financial investment allotted to the research and development of new chemicals for pest control, began and persists today.

The precise mechanisms that occur to the target or non-target organisms once the pesticide has been applied varies and is dependent upon the type of pesticide used (organochlorine, organophosphate, carbamate, phenoxy, pyrethroid), the frequency in application, and the dose. Most of the pesticides used today for agricultural purposes are synthetic organic chemicals that work by interfering with important metabolic processes occurring in the plant or organism (Merrington et al 2002; NRC 1996). The broad application of chemicals by aerial spray can reach both non-target and target organisms that occupy areas within and external to the intended treatment zone. Generally, once a pesticide has been applied, the target or non-target organism will experience either an acute or a chronic effect. Acute effects - convulsions, blindness, asphyxiation, neurological impairment, and mortality -occur immediately after heavy exposure to a lethal or near lethal dose of a pesticide. Chronic effects are more challenging to detect and diagnose because of the latency period before which signs and symptoms of toxic poisoning present. The chronic effects of exposure to pesticides – reduced sperm counts, reproductive health issues, feminization, physical deformity, for example, –appear slowly and sporadically over a long period of time. Chronic effects usually result when an

organism has been exposed to repeated sublethal doses (Merrington et al 2002; NRC 1996; Briggs 1992; www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html), they are also transgenerational.

Lethal or sub-lethal dosage is derived at by taking the median lethal dose of a given substance at which fifty percent of the test organisms (typically adult male rats or mice, sometimes canines) die. The value is expressed as LD_{50} and refers to the milligram of a substance per kilogram of body weight of the subject (Merrington et al 2002: 160-161). The lower the LD_{50} value, the more toxic is the substance. Once an LD_{50} is established, this can be extrapolated and transferred to give a general indication of the toxicity of a substance to humans and livestock (Merrington et al 2002).

Pesticides are comprised of chemical compounds called active ingredients and adjuvants, or "inerts". Referring to adjuvants as "inerts" is interesting given that some inerts are more toxic than the active ingredients (cf Marquardt, Cox and Knight 1998, for an enlightening discussion). Adjuvants are emulsifiers, solvents, or dilutents that are added to the chemical to improve the efficacy of the chemical. Merrington et al (2002:184) site six ways that adjuvants improve the environmental and agronomic behaviour of pesticides:

1. they protect against poor weather, especially cold conditions;
2. they reduce the loss of pesticide due to rain washing the pesticide off its target;
3. they reduce the drift by increasing the spray droplet size;
4. they increase the retention of the pesticide on the plant;
5. they assist the plant in the uptake of the pesticide;
6. they increase the chemical activity of the pesticide.

Pesticides can be applied by spray, as solution, emulsion, or particles, they can be spread (granules or dust), or they can be dispersed as a fumigant (Merrington et al 2002). Pesticides are usually diluted with water and distributed as a fine spray with a tractor

mounted or trailer sprayer. The spray is usually directed downwards and is applied to the crop. The exception is in orchards where the spray is directed upwards under high pressure to reach fruit at the top of trees. Aerial crop spraying is also a method of application.

The particular chemical and biological compounds that comprise the active ingredient and the adjuvants in addition to the pesticide's persistence will determine how the pesticide breaks down once in the environment. Merrington et al (2002) define persistence as a measure of the time necessary for the pesticide to degrade in the environment. While some pesticides persist for a long period of time and are not deleterious to human or environmental health, others breakdown rapidly and create intermediate metabolites that can be more harmful than the original pesticide. This has been the case with DDT and its metabolites DDE and DDD. Research suggests that DDE is an androgen receptor and has the potential to cause male sterility (Wade 1999, Merrington et al 2002). Additionally, DDE persists far longer than DDT - the biological half life of DDT is approximately 8 years. Meaning, it takes eight years for an animal to metabolize *half* of the amount of DDT it assimilates. If ingestion continues at a steady rate, DDT builds-up within an animal over time (www.chem.ox.ac.uk/mom/ddt/ddt.html, Fisher 1999:A20).

There are many classes of chemical pesticides used in Canada today, however, I review the five principle classes: organochlorines, organophosphates, carbamates, phenoxy herbicides, and synthetic pyrethroids, and summarize them in a chart.

Organochlorines:
Common organochlorines: Aldrin, Chlordane, DDT, Dieldrin, Lindane, Mirex, Toxaphene.

Organochlorines have three characteristics, they are persistent – they resist phytolytic (breaking down by exposure to light), biological, or chemical degradation, hence they are long living in the environment, they are volatile –meaning they can travel long distances, and they are lipophilic – fat loving. Consequently, concentrations of contaminants can reach elevated levels in the fatty tissues of predators who are high on the food chain.

One of the most persistent and widely used organochlorines is dichlorodiphenyltrichloroethane, DDT, a chlorinated organic insecticide. Discovered in 1873, and beginning in 1939 when its effectiveness as an insecticide was discovered, DDT, is the most widely used pesticide to date (www.chem.ox.ac.uk/mom/ddt/ddt.html). DDT was used extensively during the Second World War to protect soldiers and citizens from malaria, typhus, and other vector borne diseases, and it was used as a nerve agent (Fisher 1999:A20). Following the end of WWII, DDT was used as a pesticide on a variety of agricultural crops, on cotton plants and in forested areas. At the time, while unaware of the deleterious effects of DDT, the pesticide seemed ideal: it was inexpensive to manufacture and it demonstrated a low toxicity having a LD_{50} of between 300-500mg/kg, therefore DDT was the preferred means of protecting human health, agriculture and siliviculture (www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html). However, through Rachel Carson's publication of Silent Spring (1962) the deleterious effects of DDT became widely known: it persists in the environment and it remains stored in adipose (fat) tissue.

DDT and its metabolites DDE, DDD, have been detected in virtually all organochlorine monitoring programs, it is ubiquitous throughout the global environment (www.epa.gov/ opptintr/pbt/ddt.htm; Fisher 1999:A20; Turusov et al 2002). Exposure routes for humans are through the consumption of contaminated foods such as fish, or imported foods which are directly exposed to DDT; through eating crops that are grown in DDT contaminated soils. Infants are exposed to DDT though the consumption of their mother's breast milk.

The International Agency for Research on Cancer (IARC) classifies DDT as a *possible* human carcinogen because there is inadequate evidence of carcinogeneity in humans. Notwithstanding, laboratory and wildlife studies indicate that DDT, DDE, and DDD cause acute and chronic toxic effects in animals (Turusov et al 2002), they are teratogenic, mutagenic and carcinogenic and they impact the nervous and reproductive systems. Laboratory studies point unequivocally to the stimulation of increased tumor production resulting in liver damage, and liver, lung, and breast cancers and lymphomas in rats, mice, and hamsters (Turusov et al 2002, www.epa.gov/opptintr/pbt/ddt.htm). Additionally, there is sufficient evidence drawn from animal experiments indicating that DDT, DDE and DDD are highly toxic to aquatic species, and that they affect fish behaviour. In birds, the presence of DDT, DDE, and DDD has resulted in eggshell thinning and embryo deaths. DDT has also been linked with feminization and altered sex ratios of western gull populations off the coast of California (Turusov 2002, Steingraber 1997, Fisher 1999; www.epa.gov/ opptintr/pbt/ddt.htm).

In Canada, the double crested cormorant, a predator that feeds on fish, is used as the national indicator of persistent organochlorine levels because the bird occupies a

broad region of southern Canada where there are high concentrations of human activities and industrial processes (www.parl.gc.ca/InfoComDoc/36 /2/ENVI/Studies/Reports /envio01/12-ch5-e.html).

As a POP, DDT is volatile and is demonstrative of the grasshopper effect. Lallas (2001:2) clarifies the grasshopper effect as follows:

> *Although exact patterns of transport vary by substance, POPs generally turn into vapor at higher temperatures and condense at lower temperatures. In the form of vapor, POPs are capable of being transported over long distances by air currents. When they condense, they may fall to the ground into water, and be transported by water currents. These transport characteristics lead to global circulation through the so called grasshopper effect, where substances rise and fall in the atmosphere based on temperature. These characteristics also tend to produce higher accumulations in colder climates, where POPs are more likely to condense, putting such places downwind of the source of POPs contamination at risk for high concentrations of POPs.*

The transport characteristics of POPs, in addition to their tendency to bioaccumulate in fatty tissues, has resulted in some sobering consequences, particularly for northern communities. The Canadian Arctic is one of the most contaminated environments on the planet, receiving pollution from the tropics and industrial wastes from Central and East Asia. As an integral part of their diet and culture, many Inuit consume foods such as animal fat that is potentially contaminated with POPs.

Since the 1970's, DDT has been banned in 34 countries and severely restricted in 34 other countries. However, Turusov et al (2002: 127) argue that the available epidemiological and experimental data indicate that the presence and persistence of DDT and its metabolites worldwide are still problems of great relevance to public health. As to whether or not DDT should be completely banned remains an active debate because it is applied in eleven countries in Africa, seven in Asia, and five in Latin America (ibid) as a

method of controlling mosquitoes that spread malaria, and lice that carry typhus. The World Health Organization suggests that to-date, 25 million lives have been saved as a result of the prophylactic use of DDT (www.chem.ox.ac.uk/mom/ddt/ddt.html). The UNEP explored the possibilities of a total ban on the use of DDT however, when a temporary ban on DDT use was initiated in South Africa there was a sudden increase in malaria and mortalities from malaria (Turusov et al 2002:127). While it is apparent from the data that the human health and environmental risks from DDT use are high, a ban would be to the detriment of economically impoverished nations who can afford the use of DDT to safeguard against malaria but who cannot finance the use of more expensive pesticides to ensure public health from malaria (Turusov et al 2002).

Organophosphates and Carbamates:
Common organophosphates: Chlorpyrifos, Diazinon, Glyphosate, and Malathion.
Common carbamates: Carbofuron, Aldicarb, Methomyl, and Carbaryl.

Organophosphates and carbamates are very powerful chemical groups that were created at the same time as organochlorines but which are now used in the place of organochlorines. As nerve poisons, they cause direct mortalities in wildlife because they inhibit the enzyme acetylcholinesterase, the enzyme that is responsible for hydrolyzing the neurotransmitter acetylcholine, from firing (Briggs 1992, Metcalfe 2002, Merrington et al 2002, Raven and Johnson 1989, www.parl.gc.ca/InfoComDoc/ 36/2/ENVI/ Studies/ Reports/envio01/12-ch5-e.html).

Insects, like other animals, have a nervous system that transmits nerve impulses throughout the body. The system is made up of a series of neurons that interconnect via synapses to form a complex network of nerves. Nerve impulses are conducted through this network by both electrical and chemical processes. The electrical processes travel

along neurons, while the chemical processes travel across the synapse. The chemical process of a synapse involves the neurotransmitter acetylcholine and the removal of its residue, acetylcholinesterase. Acetylcholinesterase is one of the fastest acting enzymes, it cleaves one acetylcholine molecular every 40 microseconds (Raven and Johnson 1989:896). The expeditious removal of neurotransmitters by acetylcholinesterase enables for the transmission of nearly 1000 impulses per second to be transmitted across the neuromuscular junction. Of significance, acetylcholinesterase hydrolyses acetylcholine as soon as it has transmitted an impulse across the synapse, this prevents over-stimulation and over-activity. Many organophosphate pesticides inhibit the activity of acetylcholinesterase which leads to the over-activity and over-stimulation of nerve impulses, convulsion, and mortality.

Metcalfe (2002), Briggs (1992), and Merrington et al (2002) suggest that although organophosphates and carbamates are preferred because of their low level of persistence in the environment, while they remain chemically active they are highly toxic to mammals and are known to impact human health, affecting the central nervous system causing dizziness and convulsions (cf. Reeves et al 2002, Sancha et al 1998). A consequence of their low persistence is that multiple applications are required and because of the broad spectrum nature of the chemical, a larger area is sprayed and more organisms are impacted. Studies have indicated that exposure to these pesticides results in chronic health effects such as lowered sperm counts, reduced fertility and lower hemoglobin (Briggs 1992, www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html). In Canada, of approximately 30 approved pesticides that can poison wild birds, most are organophosphates or carbamates.

Phenoxy compounds:
Common phenoxy herbicides: 2,4- D; 2, 4, 5-T (Agent Orange), Dichlorprop, Mecoprop.

Phenoxy compounds are widely used to remove broadleaf plants. The most commonly used, 2,4-dichlorophenol (2,4-D) is a chlorinated compound and is present in many commercial products. It is used in agriculture, forestry, pasture and range-land, on gardens, and in private homes. The toxic effects of many phenoxy compounds on plants are well documented; however there remains a dearth of data about the effects on mammals and humans, although necropsy reports suggest that phenoxy compounds are highly toxic to aquatic organisms (Briggs 1992, www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html).

Synthetic Pyrethroids:
Common pyrethroids: Deltamethrin, Cypermethrin, Fenpropanthrin

There are two forms of pyrethroids: natural and synthetic. Natural pyrethrum is extracted from flowers of the *chrysanthemum cinerariaefolium*. Although this extract is still applied as a more organic method of pest control (Merrington et al 2002: 163), the synthetic form which was introduced in the 1970's to combat the inconsistent supply of chrysanthemum flowers and the high economic cost of excreting the substance, is more popular. Pesticides comprised of synthetic pyrethroids are highly stable and very active upon application. They have a high insecticidal action which means that only a small amount of the formula needs to be applied to the desired area: approximately 100 gm per hectare (www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html).

Synthetic pyrethroids are characterized as having a "knock-down effect" (Merrington et al 2002:163), they rapidly attack the central nervous system of the

organism by inhibiting the conduction of certain minerals across the nerve cell membrane in parasites and then they block the transmission of nerve impulses (www.parl.gc.ca/Info ComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html). Studies indicate that synthetic pyrethroids are of low mammalian toxicity and low environmental persistence because of the speed at which they are hydrolyzed by water and degraded by light (Merrington et al 2002; www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports /envio01/12-ch5-e.html). Nonetheless, suggests Metcalfe (2002) non-target invertebrate species are often wiped out by the use of this class of insecticide.

The above discussion is summarized in the following table:

Table 2: Five Classes of Chemical Pesticides Used in Canada

Class of Chemical Pesticides	First Used	Examples	Types	Current status	Effects
Organochlorines Ocs	1942	Aldrin, Chlordan, Dieldrin, Endrin, Lindane, Methoxychlor, Toxaphene, Hexachlorophenol (HCB), Mirex, Penatchlorophenol (PCP), DDT.	Insecticide, Acaricide, HCB and PCP are fungicides.	Lindane, Methoxychlor and Pentachlorophenol are registered for use in Canada. The other products are still used in economically developing nations.	They persist, bioaccumulate and depress the nervous system, the immune system and the endocrine system.
Organophosphates Ops	Early 1940's	Schraden, Chlorpyrifos, Parathion, Diazinon, Malathion, Glyphosate.	Insecticide, Acaricide.	Schraden was discontinued for use in Canada in 1964. This resulted in a move to "less toxic" groups such as Malathion and Parathion.	A nerve poison with a relatively short half-life once in the environment. While chemically active, they are highly toxic. Broad-spectrum: kills non-target and target organisms. Toxic to humans; birds, and fish.
Carbamates	1930; large-scale use in mid 1950's.	Carbofuron, Aldicarb, Carbaryl, Methomyl, Propoxur.	Fungicide, insecticide, acaricide.	Aldicarb was discontinued in 1964. The others are registered for use in Canada.	Low level of persistence, thus requires multiple applications which increases the risk of toxic effects. Kills non-target and target organisms. Toxic to fish and birds.

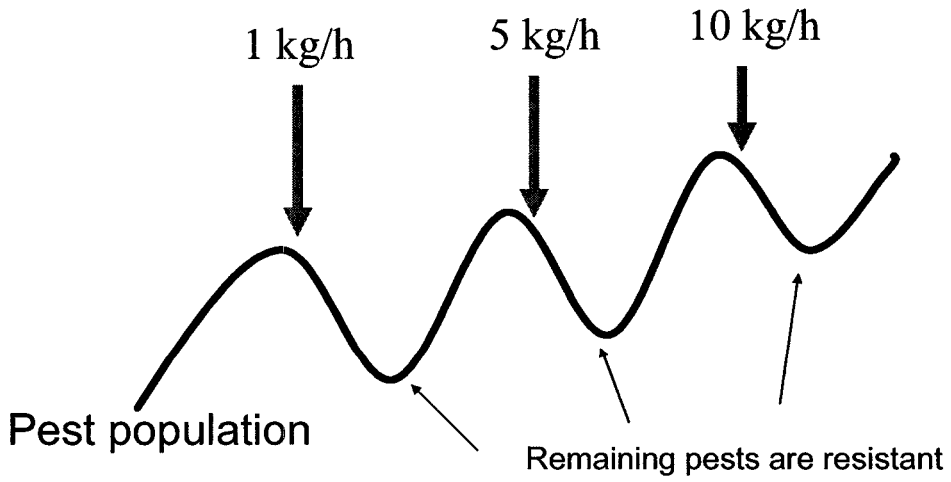
Table 2 (continued): Five Classes of Chemical Pesticides Used in Canada

Class of Chemical Pesticides	First Used	Examples	Types	Current status	Effects
Phenoxy	1946	2,4-D, 2,4,5-T, Dichloroprop, Mecoprop.	Herbicide.	2, 4- D is widely used in Canada. 2,4,5 –T banned in Canada.	Effects of phenoxy herbicides while known for plants; remain unknown for mammals. 2,4-D causes cancer in laboratory animals.
Pyrethroids	1980	Fenpropanthrin, Deltamethrin, Cypermethrin.	Insecticide.	While Fenpropanthrin is not registered for use in Canada; the other two pesticides are.	Target-specific: more selective than OPs and Carbamates; not actuely toxic to brids or mammals but toxic to aquatic species.

Drawn from multiple sources:
"Basic Guide to Pesticides: Their Characteristics and Hazards". Rachel Carson Council, http://members.aol.com/rccouncil/ourpage/samples.htm; "Potential Effects of Pesticides on Health". www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envi01/12-ch-5-e.html; Fisher 1999; Metcalfe 2002, presentation notes for Roots of our Future conference, November 2002; CEPA Toxic substances list; Tryphonas and Feeley 2001.

Pesticides are readily used by most commercial crop growers because of their capacity to effectively suppress or kill pests. While it seems initially that pesticides are effective, the longer they are applied to a particular crop and area, the less effective they become. In effect, pesticides are a short term solution to pest infestations. Some pests, when regularly and widely exposed to a particular pesticide, develop a resistance to the pesticides, while others simply remain unaffected by the pesticides entirely (NRC 1996, van Emden 1996, Merrington et al 2002:167, Metcalfe 2002). What happens is that over time, insects prompt physiological changes – they develop less permeable cuticles, they retain toxins in fatty tissues more effectively, or they develop more efficient methods of metabolizing the toxins (van Emden 1996, Merrington et al 2002). In these ways, exposed insects become resistant to the pesticide. When a pest resistance is recognized, growers typically respond by increasing their rate of application, and by eventually switching to another mix of chemical compounds. This is illustrated in the following diagram:

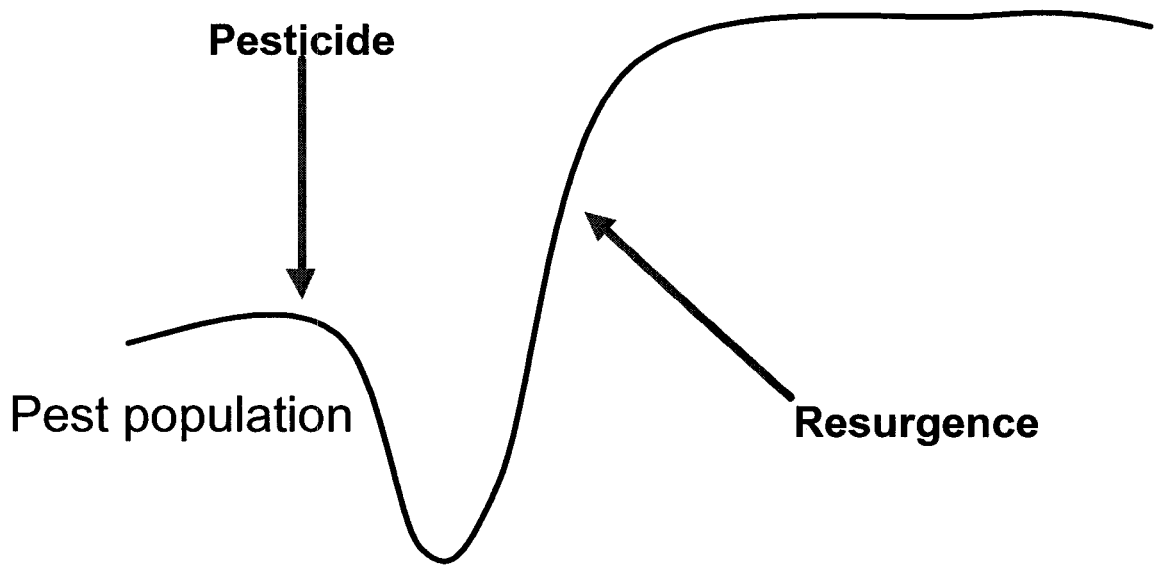
Figure 1: Insect Resistance Results in Increased Quantities of Pesticide Use



Source: Metcalfe, Chris. "Roots of Our Future Conference", November 7-10, 2002, Trent University.

Another problem of using broad-spectrum pesticides is that in killing non-target organisms, the existing pest problems can be exacerbated or new pest problems can be created (NRC 1996, Merrington et al. 2002, Metcalfe 2002). This is because in addition to eradicating the problem pest, through the application of a broad spectrum pesticide, natural pest predators are also killed. In the absence of natural predators, populations of pests can increase exponentially, thereby causing an even greater infestation of the area. This is illustrated in the diagram below:

Figure 2: Pest Resurgence After Pesticide Application



Source: Metcalfe, Chris. "Roots of Our Future Conference", November 7-10, 2002, Trent University.

Pesticides are a major source of environmental pollution and the precise effects vary and depend on the method, form, and timing of the pesticide application (Merrington et al 2002:166). While there was a large environmental movement in the 1960's to ban the use of DDT, since then however, agricultural development has

intensified and so too have the quantities and types of agrochemicals and environmental pollution resulting from agrochemical use.

In Canada, agricultural area pollution is the greatest and most problematic source of pollution in the aquatic environment (www.parl.gc.ca/InfoComDoc/36/2/ ENVI/Studies/Reports/envio01/12-ch5-e.html). Atrazine, a known endocrine disrupting substance (EDS) (www.the advocate.com), is the most widely used herbicide in Canada and the U.S. It has consistently been found in surface and groundwater in rural communities across Canada. On Prince Edward Island, this pesticide was identified in the necropsy reports of fish kill data from 1999, 2000, 2001 (Jamie Munch personal communication November 2002).

Significant scientific data (Colborn et al 1993, Briggs 1992, Guillette et al 1998, Thomas 1995, Steinberger 1998, Rodier 1995, Carson 1962, Wade 1999, Metcalfe 2002, Merrington et al 2002, Soto et al 1994, Wolff 1995, Repetto and Baliga 1996) has pointed to the deleterious human and environmental health effects of pesticides. Biocides have been identified as affecting reproduction, growth, neurological development, behavioral development, and the functioning of the immune and endocrine systems. Wildlife data in addition to laboratory studies supporting these claims is derived from necropsy reports, from sampling and studying particular birds or aquatic organisms that are known to have health effects from environmental chemicals. Through wildlife toxicity data, people have come to learn that neonates, toddlers, and adolescents exhibit the greatest sensitivity to pesticides.

Many of the chemicals that have been released into the environment since WWII are known endocrine-disrupting substances. These disturb the development of the

endocrine system and of the organs that respond to endocrine signals. During the most vulnerable period of physiological development –embryonic, neonatal and infancy- the exposure to endocrine disrupting substances can be devastating and irreversible (Colborn et al 1993:378). The targets for EDS are: the reproductive organs and systems, the brain, the skeleton, the thyroid, the liver, the kidney and the immune system (ibid.). Colborn et al (1993:378),Wade (1999), Soto et al (1994), and Turusov et al (2002) cite numerous wildlife studies that have linked the deleterious health effects of endocrine disrupting substances with the following: abnormal thyroid function in birds and fish; decreased fertility in birds, fish, shellfish, and mammals; decreased hatching success in fish, birds, and turtles; demasculization and feminization of male fish, birds, and mammals; feminization and masculization of female fish, gastropods, and birds; and alteration of immune functions in birds and mammals.

In addition to behaving as estrogen mimics, many endocrine disrupting substances are persistent organic pollutants that resist degradation and that accumulate within adipose tissues. For women this means that persistent organic pollutants are stored in the fat pads in which breast tissue is embedded (Wolff 1995). Wolff (1995) and Soto et al (1994:381) explore epidemiological studies that demonstrate a positive correlation between breast cancer and blood serum levels of DDE. Soto et al (1994) caution that this finding suggests, but does not prove, that organochlorines and their metabolites may be an important etiological factor on breast cancer. Nonetheless, Soto et al (1994) attribute the increased risk of breast cancer to the estrogenicity of DDE. Further studies sited in Soto et al (1994), suggest that estrogen mimicking chemicals can be responsible for the increase incidences in cryptorchidism (failure of testicles to descend), testicular and

prostate cancer (Soto et al 1994: 381; www.nlm.nih.gov/medlineplus/ency /article/000973.htm).

Animal studies further indicate that pesticides alter the immune system's normal structure, they disturb immune responses and they reduce resistance to antigens and infectious agents (Colborn et al 1993, NRC 1996, Merrington et al.2002, Metcalfe 2002, Repetto and Baliga 1996:1).

The immune system in the body is a multi-layered defense mechanism that works in concert to recognize and eliminate bacteria, fungi, virus, and parasites. The immune system has both a screening system and a defensive system, it uses immediate responses in conjunction with several layers of long-lasting immune protection. The immune system is in constant operation, checking throughout the bloodstream for foreign cells and molecules – antigens. When an infection is detected, the immune system responds to the antigens with the production of proteins called antibodies. The invading microbes are then attacked and destroyed. The immune system is not localized to one place in the body, nor is it controlled exclusively by one organ, ie. the brain. It is rather composed of a host of individual cells, the "army of defenders" (Raven and Johnson 1989:1033), that rush to the infected site to combat the invading bacteria and viruses. These cells are the white blood cells originating from the bone marrow, they circulate throughout the blood and in the lymph. While white blood cells are not bound together, they do act in concert by exchanging information, and acting in an integrated system. White blood cells are found in the blood, lymph, in the lymph nodes, spleen, liver, thymus and bone marrow. They are larger in size than red blood cells and differ in that they have a nucleus. There

are three kinds of white blood cells: *phagocytes*, *T cells* and *B cells*. The T cells and B cells are referred to as lymphocytes.

The following table summarises the immune defense screening and defensive systems.

Table 3: Summary of immune system cell type and function

Cell Type	Function
Helper T Cells	Leads the immune responses. The helper T cell detects the infection (antigen) and sounds an alarm, initiating T cell and B cell responses.
Inducer T Cells	Not involved in the initial response to infection, these cells mediate the maturation of T cells that are involved in the response.
Cytotoxic T Cells	These are recruited by the helper T cells, these detect and kill bacteria and infected body cells.
Suppressor T Cells	These cells reduce the activity of the B cells and the T cells, scaling back the defense after the infection has been checked.
B Cells	Precursors of plasma cells. These cells are specialized to recognize particular foreign antigens.
Plasma Cells	These are biochemical factories producing antibodies that are directed to destroy a particular foreign antigen.
Mast Cells	Initiate the inflammatory response which aids in the arrival of white blood cells to the infected area.
Monocytes	Precursors of macrophages.
Macrophages	These cells are the body's first line of defense, they proudly serve the antigen cells to the B cells; later in the defense, they engulf the antibody-covered cells.
Natural Killer (NK) Cells	These cells detect and kill a broad range of foreign cells by punching a hole in the foreign cell. NK cells attack only antibody-coated cells.

Source: Raven and Johnson. 1989: 1044.

Pesticides are known immunosuppresants and weaken the immune system in its attempts to ward off, combat, or recover from infections, parasites, viruses, or disease (Repetto and Baliga 1996). This is supported by experimental findings of mammals that are exposed to pesticides in the wild or in captivity and by epidemiological studies of people residing in high risk areas (farming communities or heavy industrial areas), of people who have careers that expose them to contaminants (farmers, chemists, industrial factory workers), and of people who consume contaminated foods (produce that is grown with pesticides or in pesticide contaminated soil). Certain organophosphate and carbamate pesticides as well as Dieldrin and Aldrin, two pesticides that have had a high history of use, impact the non-specific immune response – macrophages, and natural killer cells, by delaying the activation of macrophages. Evidence suggests (c.f Repetto and Baliga 1996) that by weakening the immune system, pesticides leave the individual more vulnerable to chronic or acute illness. What this means is that when a chronically or acutely ill individual draws upon their energy reserves, thereby metabolising stored fat, the lipophilic chemicals that have accumulated in the fat tissues are released into the body where they circulate freely and further compromise the individual's immune system. Through this cyclical process, the individual is rendered even more vulnerable to opportunistic infections.

Although the impact of pesticides to human health and the environment is well documented, the challenge remains in proving a direct link, and this is where complications develop in the scientific arguments. While there is sufficient data from laboratory tests or wildlife studies pointing to the presence of toxins in the organism, determining beyond a doubt that one toxin in particular and in isolation from all other

factors caused the death or acute illness, is challenging. Multiple toxins accumulate in the body and have varying levels of impacts. Measuring and studying the effects of each in isolation is possible but understanding what happens when multiple toxins are present - the aggregate effect, is complicated and can lead to scientific uncertainty when attempting to pinpoint the single cause of chronic or acute illness or death. Therefore, although environmental contaminants are present in the individual or organism, and there is evidence that these anthropogenic chemicals cause endocrine disruption and cancer, and that they contribute to the disappearance of species, proving the absolute cause is challenging. There may be multiple and varied causes and outcomes that might affect some people or animals more than others, there may be long latency periods that also vary depending on the individual or animal. Another consideration is the timing of exposure: did it occur during a crucial and highly vulnerable period in the individual's life, ie. during infancy? Or, was the individual consistently exposed to a low dosage over a long period of time? Given these often undeterminable factors, the problem of pinpointing a direct cause remains a challenge to scientists. Regardless, sufficient evidence connects adverse environmental and human health effects to pesticides and because of this, regulations and procedures for the use and storage of pesticides exist. The following section will present a brief overview of the environmental and health legislation currently in place in Canada.

The CEPA 1999:

The Canadian Environmental Protection Act 1999 replaced the CEPA that had been in existence since 1988. The CEPA 1999 is an Act regarding pollution prevention

and the protection of the environment and human health in order to contribute to sustainable development. The declaration states:

> *the protection of the environment is essential to the well-being of Canadians and the primary purpose of this Act is to contribute to sustainable development through pollution prevention.*

Further articulated in the preamble of the CEPA 1999, the Government of Canada:

1) recognizes that the risk of toxic substances in the environment is a matter of national concern;
2) endeavours to adopt a polluter pays principle whereby the cost of the use, production, and release of toxic substances, pollutants, and wastes will be borne by the user, producer; and
3) endeavours to control and manage the risk of adverse effects as a result of the use and release of toxic substances, pollutants, wastes, and it will strive for the virtual elimination of persistent and bioaccumulative toxic substances.

Also within the preamble the federal government establishes its objectives to virtually eliminate the most persistent and bioaccumulative toxic substances and to control and manage pollutants and wastes if their release into the environment cannot be prevented (CEPA 1999). CEPA-toxic substances considered to pose the greatest threat are those that accumulate in living tissue, remain in the environment for a long time without breaking down, and are a result of human activity – bioaccumulate, persist, and anthropogenic. Existing substances that meet these criteria are the Dirty Dozen, a group of persistent organic pollutants (POPS). Of the 12 chemicals on the Dirty Dozen list, 9 are pesticides. The Dirty Dozen comprises: Aldrin, Chlordane, DDT, Dieldrin, Dioxins and Furans, Endrin, Heptachlor, HCB –hexachlorobenzene, Mirex, PCBs – polychlorinated biphenyls, and Toxaphene. These chemical compounds have been identified by the United Nations Environment Programme (UNEP) as powerful threats to

human and wildlife health on a global basis and are slated for virtual elimination (Fisher 1999).

The CEPA 1999 provisions address pollution prevention and establish new methods for investigating and assessing substances, and create obligations with respect to the substances that the Minister of the Environment and the Minister of Health have determined to be toxic or potentially toxic within the meaning of the Act.

As a member of the Organization for Economic Cooperation and Development (OECD), the International Programme on Chemical Safety (IPCS) of the World Health Organization (WHO), the Free Trade of the Americas Agreement (FTAA), and as a signatory to the Stockholm Convention 1972, Canada is required to undertake a thorough substance assessment process. When the CEPA passed through parliament in June 1988, it included a Priority Substance List (PSL) which comprised of a list of 44 toxic substances that were slated for investigation and scientific toxicity testing to determine whether environmental exposure to the substances posed a risk to human and environmental health (CEPA 1988). Of the 44 substances listed, 25 were found to be toxic. Regulations now exist for 4 of these substances; 2 others are to be regulated, and 19 are subject to a strategic review to determine what options exist for the provisions of reducing environmental exposure to these substances. The Existing Substances Division which operates within the Environmental Contaminants Bureau of the Safe Environments Programme of Health Canada is responsible for the assessment of the substances that are currently in-use in Canada that could pose potential risks to human health. The health risk assessment entails identifying the critical adverse effects –acute or chronic - associated

with exposure to the chemical compounds, analyzing the dose-response[6] relationship, and determining the extent to which the population or certain subsets of the population (developing embryo, neonates, infants, adolescents, pregnant women, and the elderly-essentially all Other as related to the dominant male) are exposed. Environment Canada is responsible for assessing the risks posed by existing substances to the environment and to non-human organisms. Once the assessments of toxic substances have been completed, Health Canada and Environment Canada develop options for controlling exposure to these substances.

Under Section 5 paragraph 64 regarding the control of toxic substances, except where the expression "inherently toxic" appears, a substance is *toxic* if it has or may have an immediate or long-term effect on the environment or its biological diversity; if it constitutes or may constitute a danger in Canada to human life or health; or if it constitutes or may constitute a danger to the environment on which life depends. A *toxic substance* is defined in the CEPA 1999, under Section 3 paragraph 1A as any distinguishable kind of organic or inorganic matter, whether animate or inanimate, and includes:

a. any matter that is capable of being dispersed in the environment, or of being transformed in the environment into matter that is capable of being so dispersed or capable of causing such transformations to the environment;
b. any element or free radical;
c. any combination of elements of a particular molecular identity that occurs in nature or as a result of a chemical reaction;
d. complex combinations of different molecules that originate in nature or are the result of chemical reactions but that could not practicably be formed by simply combining individual constituents and includes, any mixture that is a combination of substances and does not itself produce a substance that is different from the substances that were combined;

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[6] Dose-response refers to the biological changes that occur in the range of human exposures to a chemical substance.

e. any manufactured item that is formed into a specific physical shape or design during manufacturing and has for its final use, a function or functions dependent in whole or in part on its shape, or design; and
f. any animate matter that is contained in effluents, emissions, or wastes that will result from any work undertaken or activity.

One of the CEPA 1999 mandates was to establish a framework by which Health Canada and Environment Canada could assess the potential risks posed by the existing substances that are released into the environment or used in consumer goods or are by-products from manufacturing processes. Health Canada and Environment Canada endeavor to categorize the 23,000 substances that are currently on the Canadian market by September 13, 2006. The categorization of the substances is based upon whether the substance presents the potential to human exposure, is inherently toxic to human or non-human organisms, bioaccumulates and is persistent (CEPA 1999). If the substance meets any of the above criteria, it is then subject to a screening assessment, which could lead to one of three possible outcomes:

1). the substance is found to be CEPA-toxic (CEPA 1999). The consequences are that Health Canada and Environment Canada take steps to manage its potential health and environmental risks; or
2). the substance is added to the Priority Substance List and additional information regarding environmental and human health risks is sought. Health Canada has five years to complete an in-depth assessment of potential health risks to determine whether or not the substance is CEPA-toxic. Environment Canada has a similar time period to determine the environmental fate[7] of the substance; or
3). it is not CEPA-toxic, the substance is set aside, no further action is required.

The assessment process is intricate and requires continuous and plentiful access resources such as finances, technically trained scientists that are knowledgeable abut risk assessments and the environmental fate of toxins in the environment, and up to date screening equipment. Notwithstanding, the Federal government declares in Section 2

paragraph 1.A that it will act in accordance with the Constitution and the laws of Canada to exercise powers in a manner that protects the environment and human health and that in order to do so, it will apply the Precautionary Principle, defined as thus,

> *where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation, and promotes and reinforces enforceable pollution prevention approaches* (CEPA 1999).

Addressing toxic substances, through the administration of the CEPA 1999, the Federal government endeavors to:

- protect the environment, biological diversity, and human health from the risk of any adverse health effects of the use and release of toxic substances, pollutants, and wastes (CEPA 1999 2.1j);
- protect the environment, including biological diversity, and human health by ensuring safe and effective use of biotechnology (ibid: 2.1.j1); and
- act expeditiously and diligently to assess whether existing substances or those new to Canada are toxic or capable of becoming toxic and assess the risk that substances pose to the environment and to human health (CEPA 1999 2.1).

As the evidence accumulates linking adverse human health and environmental effects to the release and circulation of toxic substances, the Minister of Health is required under Section 44.4 CEPA 1999,

> *to conduct research and studies relating to hormone disrupting substances, methods related to their detection, methods to determine their actual and likely short-term and long-term effects on the environment and on human health, and prevention, control, and abatement measures to deal with substances to protect the environment and human health.*

Once the data collection and analysis has been completed, in collaboration with Health Canada, the Minister of Health and the Minister of the Environment, the research is disseminated among the public (ibid: Section 3. 45). In doing so a CEPA 1999

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[7] What happens to a toxic substance once it enters the environment, people, or animals.

objective of ensuring transparency in the collection of information and data and in the regulatory and legislative processes, is achieved.

The Federal government also makes a strong declaration to adopt, include, and support sustainable development, which is defined in the CEPA 1999 Section 3.1, as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The mandate of sustainable development is to be achieved by conserving and enhancing environmental quality and by encouraging and promoting economic development that conserves and enhances environmental quality (ibid).

The Pest Management Regulatory Agency – PMRA:

The Pest Management Regulatory Agency (PMRA) of Health Canada was established in 1995 in response to the recommendations put forward by the Pesticide Registration Review Team, a multi-stakeholder group responsible for studying and making recommendations to improve the federal pest regulatory system. The PMRA administers the Pest Control Product Act (PCPA) on behalf of the Minister of Health, and manages the regulation of pesticides at the Federal level in Canada (Franklin, Clair, Executive Director PMRA, Thursday, November 7, 2002, addressing the Standing Senate Committee on Social Affairs, Science and Technology). Prior to the establishment of the PMRA, the "5N's" -Health Canada, Environment Canada, Natural Resources Canada, Fisheries and Oceans, and Agriculture and Agri-food Canada- shared in the responsibility of pest management practices. The last three listed departments now play a supporting role, but are no longer directly involved. The PMRA is accountable for protecting human

health and the environment from the risks of pest[8] control products/pesticides[9] through sound, progressive science, and by promoting innovative approaches to Integrated Pest Management.

The PMRA is divided into five divisions:

1). Submission Management and Information Division:

this division manages and tracks submissions by agrochemical and pharmaceutical companies of pest control products for use in Canada. Annually, application fees to register a product earns the PMRA approximately CA$8 million (Wendy Sexsmith, Executive Director, PMRA W-5, CTV interview, October 11, 2002). The PMRA operating budget is partially supported by these registration fees (Wendy Sexsmith, Executive Director, PMRA, W-5 interview, CTV October 11, 2002). Further to note, scientific screening is a lengthy process, of 550 pest control products on the market today, only 17 have been re-viewed. This is highly problematic given that many of the pesticides in use were created in the 1940's and 1950's when testing for human health and environmental affects was limited, if not completely absent.

2). Product Sustainability and Coordination Division:

undertakes efficacy, sustainability, and value assessments.

3). Health Evaluation Division:

provides expertise on human health hazards, risk assessment, and risk mitigation; conducts toxicological evaluations and exposure assessments.

4). Environmental Assessment Division:

provides risk assessments and risk mitigation, conducts assessments on environmental fate and effects of pest control products.

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[8] Pest as defined in Section 2 of the Act, is any injurious, noxious, or troublesome insect, fungus, bacterial organism, virus, weed, rodent, or other plant or animal pest, and includes any injurious, noxious, or troublesome organic function of a plant or animal.

[9] a pest control product, more commonly known as pesticide, is defined as a product, an organism or a substance including a product, an organism or a substance derived through biotechnology, that consists of its active ingredient, adjuvants and contaminants, and that is manufactured, represented, distributed or used

5). Alternative Strategies and Regulatory Affairs Division:

directs the development, review, and assessment of policies, regulations, programs, and legislative amendments including those pertaining to Sustainable Pest Management – integrated pest management.

The PMRA is guided by four advisory groups, each comprised of stakeholders with vested financial interests in the decisions the PMRA makes regarding the registration of pesticides and that influence the PMRA's decision-making and legislations:

1). Economic Management Advisory Committee -EMAC:

This division provides the PMRA with advice on how to improve efficiency and cost-effectiveness. Important to note, this comprises representatives from many of the manufacturers and users of pesticides in addition to those who are impacted economically by the PMRA decisions to re-register or decline registration of a pesticide product. For example, the advisory board is comprised of members from within the Lawn Care Industry, the Agrochemical Industry, the Pharmaceutical Industry, farmers who have lucrative contracts with food processors, and cattle rangers who export beef.

2). Pest Management Advisory Committee -PMAC:

This committee provides a forum where ideas, information, and advice is exchanged. Participants are representatives from pesticide manufacturers, pesticide users, environmental and health groups, as well as individuals with appropriate expertise.

3). PMRA Policy Council -PMRAPC:

This council comprises the PMRA Executive Director, and the Assistant Deputy Ministers from the 5NRs: Environment, Fisheries and Oceans, Agri-food and Agriculture Canada, Health Canada, Industry and Natural Resources.

4). Federal, Provincial and Territorial Committee on Pest Management and Pesticides:

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as a means for directly or indirectly controlling, destroying, attracting or repelling a pest or for mitigating or preventing its injurious, noxious or troublesome effects (Bill C-8, 2.1).

This is a forum for the exchange of ideas, information, advice, and to achieve harmony between and amongst programs and policies.

When assessing and evaluating a toxic substance that is being considered for registered use in Canada, the protocol undertaken by the PMRA does not include PMRA testing of the chemical. Rather, the PMRA carries out a scientific review of the test data – a literature review -that is submitted by the manufacturer who is requesting the product registration. It is thus the responsibility of the manufacturer seeking approval to conduct the tests. It should be noted that testing for endocrine disruption, potential immunotoxicity, and developmental neurotoxicity, is not required for all pesticides products that are being considered for registration and use in Canada.

Similar to the CEPA 1999, one of the objectives of the PMRA is to create and support a transparent and participatory regulatory process. This is achieved by calling for public participation in major regulatory decisions and empowering stakeholders to participate in the actual regulatory process, the PMAC and EMAC are examples of this process in action. The PMRA must balance between being transparent and encouraging wider public participation - which can be a lengthy process-, demonstrating discretion regarding trade secrets, and acting swiftly to enable the competitive participation by people involved in agriculture, forestry, other resource sectors and manufacturing to access the most technologically advanced and effective methods of pest control.

In addition to processing registration applications for agrochemical substances, the PMRA re-evaluates the currently registered products, and establishes maximum

residue limits[10] under the Food and Drug Act. In 2001, the PMRA committed to re-evaluate 405 of the 550 active-ingredients registered for pesticide use in Canada, by 2006. Of the 49 registration re-evaluations begun prior to March 2002, 17 have been completed or their registration has been discontinued (Wendy Sexsmith, Executive Director, PMRA W-5, CTV interview, October 11, 2002).

Toxic Substances Management Policy:

In 1995, the federal government initiated the Toxic Substances Management Policy to guide the management of toxic substances. This policy applies to all substances that are subject to Federal regulations. Under the TSMP, all toxins are categorized into groupings, they are either Track-1 or Track-2 substances. Track-1 substances are the Dirty Dozen. Although most of the substances found on the Track-1 list have been used in Canada, none are currently allowed, they do nonetheless enter the country via imported foods or flowers, and because of the grasshopper effect, they deposit in the Canadian Arctic. Furthermore, three Track-1 chemicals are or may be found in several commonly used Track 2 substances. For example, pentachlorophenol a commonly used wood preservative (often used on telephone poles) creates – unavoidably- through the manufacturing process, Furans, Dioxins, and HCB. Also, HCB can contaminate two very widely used pesticides, Atrazine and Chlorothalonil. Dioxin contamination can occur in

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[10] If a pesticide is intended for use on, or affecting food commodities, the Maximum Residue Limit (MRL) of the pesticide on food products is determined as part of the PMRA, PCPA registration process. MRLs are established by the Food Residue Exposure Assessment section within the Health Evaluation Division of the PMRA, under the authority of the FDA. To set a MRL the registrant proposes a value that is derived from field trial data that reflects the highest level – the maximum residue - that could potentially be on food at the point of sale. The MRL is then used to generate Potential Daily Intake (PDI) estimates of pesticide residues, based on food and drinking water consumption patterns. The MRL is accepted on condition that the PDI will not exceed the pesticides acceptable daily intake (ADI). The ADI is the quantity a pesticide can be consumed daily over a lifetime without adverse effects in humans (NOAEL – no observed adverse

three very commonly used pesticides in Canada: 2,4,-D, Mecocrop, and MCPA. Further to note, the pesticide Dicofol which is registered as an ingredient in thirteen pesticide products across Canada is contaminated with DDT, a product used in the manufacturing process of Dicofol. The pesticides Endosulfan and Chlopyralid can be contaminated with HCB and PCB (Marquardt et al 1998). In essence, there are regulatory processes for the active ingredients but the adjuvants and metabolites are not sufficiently accounted for in the review processes.

The TSMP and the PMRA are part of a more global movement to eliminate persistent organic pollutant contaminated pesticides. To do so effectively, under the 1999 PMRA's strategy, new products containing Track-1 active-ingredients[11] or adjuvants[12], will be and or have been denied (re)-registration. However, this does not apply to pesticides already in use in Canada containing or producing as a by-product any Track-1 contaminant. One contentious area remains to be negotiated: manufacturers do not need to list on the ingredient label the adjuvants used in the pesticide, in-fact, non-disclosure laws protect the manufacturers. This is highly problematic given that some adjuvants are more toxic than the active ingredient (Sancha et al 1998).

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effects level – the highest dosage of a pesticide at which no adverse effects were observed in animal toxicity studies.

[11] As per Bill C-8, Section 2.1, active-ingredient means a component of a pest control product to which intended effects of the product are attributed and includes a synergist but does not include a solvent, diluent, emulsifier, or other component that is not primarily responsible for those effects. Also known as the "parent" substance.

[12] As per Bill C-8, Section 2.1, adjuvant or formulant refers to any component of a pest control product that is added intentionally to the product – solvent, dilutent, emulsifier or other component- that is not an active ingredient. (Highly problematic language, all chemical substances are active. Formulants are sometimes referred to as adjuvants or inerts, and they are anything but. In Toxic Secrets, the review of formulants published by the California Pesticide Agency, the CPA discovered that many of the so called inert substances were CEPA toxic and listed as Class 1 – carcinogens by the International Agency for Cancer Research.

Track-2 substances are chemicals that do not meet all the CEPA-toxic criteria, but nonetheless, are of concern because of their potential to harm human health or the environment. TSMP and the PMRA aim to control and minimize the release of Track-2 substances through all stages of their life cycles. To note, however, as mentioned earlier, many Track-2 chemical substances contain Track-1 substances through the manufacturing process.

Bill C-8: The Pest Control Products Act -PCPA:

The PCPA received Royal Assent December, 2003. The PCPA is the first major overhaul of rules governing pesticide regulation since 1969 (Bill C-8: 1st session, 37th Parliament 49-50-51 Elizabeth 112001-2002; www.parl.gc.ca). The Minister of Health formally administers its regulations; however, the day to day operations are carried out by the PMRA. The PCPA's mandate is to regulate products used for the control of pests in order to protect and secure human and environmental health (Bill C-8: 1st session, 37th Parliament 49-50-51 Elizabeth 112001-2002; www.parl.gc.ca).

The PCPA aims to:

1) Strengthen health and environmental protection by:
- requiring that infants, and children be considered as a subgroup;
- considering pesticide exposure from multiple sources of food and water supplies; and
- supporting pesticide risk reduction;

2) Make the registration system more transparent by:
- establishing a public registry to allow the public access to the detailed evaluation reports of registered products;
- allowing the public to view test data on which the pesticide evaluations are made; and
- allowing the PMRA to share scientific studies with provincial, territorial, and international regulators which will enhance the process for the international joint reviews thereby providing Canadian growers equal access to newer, safer pesticides, while empowering growers to remain competitive in the marketplace;

3) Strengthen the post-registration control of pesticides by:

- requiring that pesticide companies report adverse effects. The Minister has the authority to remove pests from the market if the data is not supplied;
- requiring that pesticides undergo re-evaluation 15 years after they are registered; and
- providing increased powers of inspection and also higher maximum penalties of up to CA$1 million when pesticides are not marketed or used in accordance with the law (www.hc.sc.gc.ca/pmra-arla/english/legis/pcpa-e.html).

This enactment provides a pest control product registration regime that gives the Minister of Health the necessary powers to ensure that pest control products are registered only if the risks[13] and value[14] are determined by the Minister to be acceptable. Pest control products are determined to be acceptable if there is reasonable certainty that no harm to human health, future generations, or the environment will result from exposure to or use of the product, taking into account its conditions or proposed conditions of registration (Bill C-8 Section 2.2). This therefore falls under the Federal government's provisions for sustainable development. However, "reasonable certainty" is not defined in the Act. Risk management of registered pesticides is achieved primarily through setting conditions of use that are then clearly stipulated on the product label. These product labels are in-effect legislative documents and the use of the product in a

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[13] Risk is defined twice, once pertaining to the environment and once pertaining to health. Under section 2.1., the *environment* is defined as the components of the earth and includes: air, land, water; all layers of the atmosphere; all organic and inorganic matter and living organisms; and the interacting natural systems that include components referred to in the above. (Health is NOT defined.) *Environmental risk* in Section 2.1, is defined as the possibility of harm to the environment, including its biological diversity, resulting from exposure to or use of the pest control product, taking into account its conditions or proposed conditions of registration. *Health risks*, under Section 2.1 is defined as the possibility of harm to human health resulting from exposure to or use of the pest control product, taking into account its conditions or proposed conditions of registration.

[14] Value, under Section 2.1 is defined as the products actual or potential to contribute to pest management, taking into account its conditions or proposed conditions of registration, and includes the products: efficacy, effect on host organisms in connection with which it is intended to be used, and the health, safety, and environmental benefits and social and economic impacts.

manner that is inconsistent with the directions on the label is prohibited and punishable by law (www.hc-sc.gc.ca/pmra-arla/english/index-e.html).

Through the PCPA, the Minister of Health encourages the development and implementation of innovative sustainable pest management strategies and this coincides with the sustainable development mandate expressed in the CEPA 1999. To achieve this, the PCPA facilitates access to those pest control products that pose lower risks to human health and the environment. What is significant about the PCPA is the explicit attention to vulnerable populations such as neonates, infants, adolescents, pregnant women, and the elderly. Until more recently, infants and children were the most understudied group and had consistently been neglected when ADI, MRL, and PDI for toxic substances were established. The estimates of toxic effects are generally established by weight ratios for adult male rats and mice. These laboratory tests do not account for important particularities such as: gender, age and corresponding behavioural patterns. Children are not miniature adults, they have very unique metabolic and physiologic pathways that are distinct from those in fully matured adults. The discrepancies in toxicity between children and adults are a result of age-related differences in absorption, metabolism, detoxification and excretion of anthropogenic compounds. Neonates are the most vulnerable and also the least equipped to metabolize and excrete toxins (Lubin and Lewis 1995:S6 99-100). Children have a higher respiratory rate and rapid lung development which lends itself to complications if strained by airborne toxins; they have a longer life expectancy which means that there is a greater time period over which acute or chronic illnesses can develop (Lubin and Lewis 1995: S6 99-100). It is critical that guidelines are created that are sensitive to the particularities of the developing child. Consider the following points:

- Bearer (1995:8) documents that during embryonic development, chemical substances such as carbon monoxide, ethanol, polycyclic aromatic hydrocarbons (PAHs), and lead are capable of trans-placental passage. The first environment is thus a polluted environment (Steingraber; "Protecting the First Environment: the Ecology of Pregnancy and Childbirth", Part of the Betty Memorial Lecture series at McGill University, December 3, 2002);
- the developing brain of the neonate is distinguished by the absence of a blood-brain barrier (Rodier 1995 S6:73-76; Bearer 1995:9; Steingraber; "Protecting the First Environment: the Ecology of Pregnancy and Childbirth", Part of the Betty Memorial Lecture series at McGill University, December 3, 2002). The development of the blood brain barrier is a gradual process, beginning in-utero it is completed at six months of age. Some toxic agents that never enter the adult brain because of the intact presence of the blood-brain barrier, freely enter the developing brain;
- the endocrine and excretory systems continue to mature into adolescence (Bearer 1995:9);
- a preambulatory infant cannot remove himself/herself from a noxious environment. Furthermore, infants have greater dermal contact with carpets, floor boards, pets, or furniture that may have been treated with fumigants or insecticides (Bearer 1995:8; Chance and Harmsen 1998; Hertzman 1998; Reynolds, Von Behren, Gunier, Goldberg, Hertz 2002; Rice; 1998). Concentrations of pesticides near the floor are higher and persist longer and are less affected by window ventilation than those which are found at adult height (Chaudhuri 1998);
- children pass through a developmental stage of intense oral exploration, ingestion of residual substances is acute at this stage(Bearer 1995:8; Chance and Harmsen 1998; Hertzman 1998; Reynolds, Von Behren, Gunier, Goldberg, Hertz 2002; Rice; 1998);
- children consume more calories of food per unit of body weight than do adults. At the same time however, children tend to be fussy and therefore, consume much more of a certain type of food (Thomas 1995: S6 46-48), usually these are foods that are abundantly sprayed with pesticides: apples, apple juice and apple sauce made from apples that are routinely sprayed, bananas, sweet potatoes.

In 1995, the Canadian Institute of Child Health posed the question, "Do children require special protection from environmental contaminants?" Until 1995, there had never been a national effort in Canada to comprehensively study the impacts of environmental contaminants on children's health. This is remarkable in light of the scientific evidence derived from laboratory and wildlife studies indicating that environmental contaminants cause adverse health effects. In 1997, the National Symposium was held in Ottawa with delegates who gathered to discuss children's environmental health. This led to a focused effort to understand the health consequences

of environmental toxins on the developing child. The discussions and studies contributed to the PCPA mandate to consider the particular and unique needs of developing children in toxicological tests. While the PCPA is a significant improvement over the existing thirty-year old legislation, there remains room for improvement. Most notably, the PCPA does not include the precautionary principle that is included and honored in the CEPA1999.

Table 4: Distribution of principal responsibilities of pest management in Canada.

Federal – PMRA of Health Canada	Provincial/Territorial	Municipal
Pest Control Products Act (PCP Act) and Regulations Pesticide registration and re-evaluation Human health and safety Value (including efficacy) assessment Alternative strategies Compliance and enforcement	Transportation, sale, use, storage, and disposal Training, certification, and licensing of applicators and vendors Spills and accidents Permits and use restrictions Compliance and enforcement	Bylaws for municipal (and, in some cases, private and residential) lands only

Health Canada, October 2001
*PMRA ARLA Fact Sheet: The Regulation of Pesticides in Canada (*www.pmra-arla.gc.ca*)*

CHAPTER FIVE: COMPETING DISCOURSES

Discourses, particularly those advanced by experts, produce powerful truths, ways of creating and intervening in the everyday lives of people (Escobar 1995:20); they are instances where "possible worlds are constantly reinvented in the contest for real, present worlds" (Haraway 1989:5). Discursive analysis reveals the processes that create and maintain power inequities so that privileged individuals and institutions frame how society functions. Additionally, discourse analysis reveals the processes which provide a public space for the communication of some ideas and provides an empowered position for some people to frame society while others are silenced (cf. Gal 1991). Wolf argues that "ideas and idea-systems are often monopolized by power groups and rendered self-enclosed and self-referential" (1999:7). Although power is dynamic and relational, thus effecting and being affected by competing ideas and power groups, being self-referential means that other ideas are neither considered nor presented in and through the discourse. In this light, discourses give voice and empower some privileged people and institutions while silencing others. Equally, power, specifically, structural power, in combination with ideas presented in and through discursive processes, creates culture (Wolf 1999). Therefore, discourse shapes the social world within which people live, and in this sense, because culture is socially constructed, it must be considered as material.

My desire throughout this research has been to come to some understanding of why and how pesticides, despite the significant evidence pointing to their deleterious effects to environmental and human health (cf. Colborn et al 1993; Briggs 1992; Guillette et al 1998; Thomas 1995; Steinberger 1998; Rodier 1995; Carson 1962; Wade 1999; Metcalfe 2002; Merrington et al 2002; Soto et al 1994; Wolff 1995; Repetto and Baliga

1996) – that they affect reproduction, growth, neurological development, behavioral development, and the functioning of the immune and endocrine systems- are encouraged.

Through discourse analysis I reveal pesticides discursively become "crop protectants" and through an analysis of structural power that explores how social labour and modes of production are organized around key relationships, I reveal why farmers and people involved in agriculture related processes feel compelled to follow the dominant discourse and demonstrate actions that are deemed socially appropriate. These behaviours involve both agricultural farming practices and silencing. I therefore ask the following questions: Whose version of culture on PEI is being constructed and disseminated? What are the consequences – social, environmental, economic and political - of this discourse? And importantly, whose stories are silenced, what is it about those stories that requires silencing? Equally I ask, what is the role that differential access to power has in creating a very particular type of society that ultimately serves to empower and maintain the privilege of a few? Gal (1991:197) notes the importance in determining the operatives of power because "power is more than an authoritative voice in decision making; its strongest form may well be the ability to define reality, to impose visions on the world". Prince Edward Island is one of the most intensely farmed areas of Canada, with potatoes grown inside the city limits of both Charlottetown and Summerside. Whose vision is it to convert urban land into potato fields?

Taking the world as a whole unit, as a totality of interconnected processes, is essential in order to come to understand how the interconnections of corporations, federal and provincial ministries, the PMRA, farmers, activists and citizens all exert forces and pressures on each other that shape the processes of community development. As

discussed in Chapter two, societies emerge as changing alignments of social groups, segments and classes, without fixed boundaries or stable internal constitutions (Wolf 1982:387). In effect, in considering the numerous multidirectional relationships that are at play between the local and the global, it becomes possible to understand why and how people come to make decisions about the way they interface with their world. In this case, I hope to understand, through discourse analysis and historical materialist analysis, how Prince Edward Islanders make sense of their everyday lives, how they negotiate the ways they practice farming that requires the extensive use of pesticides, and how people who want to see change work within the existing socio-economic and political webs to voice their vision.

The history we come to know is a particular history, a history of power (Wolf 1990) that effectively silences alternative stories. My ambition has been to write a history of the present, to come to some understanding of the complexity of multiple histories that are taking place simultaneously (Schneider 1995:38). It is within the complex, incomplete, and dynamic processes that frame social interactions and modes of production that I locate the analysis of the events which occurred on PEI between September and December 2002. My attempt is to reveal some of the multiple histories that were being written.

The version of PEI as described in Destination PEI travel brochures and as promoted by the Island potato industry is not the same PEI that many Island residents and members of Earth Action, or ECO-PEI know. In marketing texts and photographs, through the use of vibrant colors and romantic language, PEI is created as the ideal getaway. Another angle used to promote the Island is the idea or the discourse that the

paths on PEI are paved with gold, the hue of lightly fried Russet Burbank potatoes, the "world class" potato grown in that rich, fertile red sand and soil, the potato of preference that fulfills the culinary tastes and needs of urban consumers, worldwide. PEI is presented as a province of treasured landscape and productivity. However, similar to Said's (1979) argument that during the Enlightenment, European discourse created the Orient thus Orientalising Asia, PEI is constructed and understood in the vision of the potato elite. Only a marginal amount of attention is paid to how the social, economic, and environmental changes on the Island have impacted local people and these concerns center around how to sustain the vision of PEI as a potato producing province, as being about potatoes and thus, of having a potato culture.

The story of Prince Edward Island is not a new one, nor is it an atypical one. Sadly, it is one that falls well within the classic framework of an economic development plan that is fraught with problems and that challenges rather than enriches the life and culture of many citizens who live on the Island. The creation and application of the current development plan, which is based on the production and export of large quantities of potatoes, has failed to meet the needs of the local residents and yet has successfully empowered and enriched multinational and transnational corporations, government agencies such as the Pesticide Management Regulatory Agency, a very small group of privileged farmers on the Island, and additionally, has served to meet and in actuality, surpass, the export economic goals established by the Canadian Agri-food industry.

Consider the following: under the current system of agroeconomic development, the rate of un-employment has steadily increased; while there has been an increase in the size of corporate farms that have integrated horizontally and vertically into the agri-foods

market, the number of small family owned and operated farms has diminished. Equally, because of the increased presence of MNCs in farming practices in addition to an increased dependence on mechanical methods of farming, there has been a separation of farmers from the basics of farming: seed creation, experimentation, and innovation has shifted from the hands of farmers into the hands of large biotechnology firms. This process ultimately denies local knowledges and practices. The result has been the systemic and widespread de-skilling of labour. The increased costs of inputs such as pesticides and new machinery has impacted the social dynamics of family run farms. Women used to make important contributions to the farm operations, but because of the high costs of inputs this has required many women to take off-farm employment, often in low-paying, low-skilled jobs. The result is that the family business that was once guided by contributions made by women and men, is becoming a male dominated space, very much reflecting the new created culture of farming that privileges male forms of knowledge. Women's practices and knowledges about farming are not considered in this new discourse, thus women are silenced. Similar to many smaller rural economically developing communities, there is an ideology of out-migration amongst youth who aspire to leave PEI and the vortex of agricultural work in pursuit of careers that position them in different classes than those of their parents. The youth envision less labour-intensive, less socially marginalising, and more financially lucrative careers. This is in direct opposition to what many farm owners desire to see: that the family farm which has been tilled for two or more generations will remain within their family, and that the upcoming generation will take over the business of farming the land. There is little hope of seeing this intergenerational transition occur, not only because youth are not interested in the

work, but rather, because there is widespread environmental devastation and the sustainability of the Island's agroeconomy, according to many farmers, is questionable. There have been 26 reported fish kills in streams and rivers throughout the Island. The water, soil, and air is contaminated. In essence, there is mounting concern over the impacts of agroindustrial methods of potato production given that more and more marginal land is grazed and transformed into potato fields and the land that is available is being exploited to the point where soil erosion is rampant. In an effort to address the mounting environmental impacts from agribusiness supported farming practices, the Agricultural Crop Rotation Act was drafted in 1997. This Act stipulates that crop rotations of 1:3 must be followed. Additionally in 1997, to address the issue of soil erosion on the Island, the Agricultural Board passed a motion which restricted farmers from planting crops on slopes with grades greater than 9 percent. However, the pressure to produce potatoes to meet the contract requirements often means that agricultural practices ignore legislation: in 2001, 4,000 acres of potato acreage was planted on land that had a slope greater than 9 percent, and 40 percent of the potatoes produced were being tilled in fields that did not abide by the three year crop rotation (Aiton 2002; www.gov.pe.ca/af/agweb/crop_rotation/acr_brochure.pdf)...

What complicates the equation for people on the Island who do want to see change are the strong kin-ties that through filiation, marriage, consanguinity, and affinity (Wolf 1982:91), link people into networks of modes of production – kin-tie modes of production or capitalist modes of production (Wolf 1982), that render it difficult for a person to demonstrate autonomy of thought and or of actions. These same kin-ties are embedded in a system of discursive hierarchy, with the most powerful individual(s)

exerting persuasive powers that frame which farming actions and practices are appropriate and which are inappropriate.

Through discursive processes, structural power, and modes of production, the economy and polity of the Island is being crafted. It seems that the potato culture is constructed by structural power that organizes social labour around the production of potatoes. The strong kin and capitalist modes of production embed people in what appear to be radical practices of pesticide use, and these practices cannot be publicly contested. The cumulative result is the creation of a society, a potato culture, that reflects the visions of the dominant economic interests on and off the Island. This version of PEI is not one which seems to be defined by local people in local communities, nor is this version of PEI culture one that accounts for the creativity, interpretation, and transformations by local community members. This is a corporate vision, a culture that is created and defined by corporations and institutions in their quest for capital accumulation, and for power.

For many residents of Prince Edward Island, this is a complex and impassioned story, the opportunities for change do appear to be quite limited or, more to the point, quite limiting. Participating in the Island's agroeconomy enables farmers and non-farmers alike to earn an income. For farmers this means that they are able to keep afloat for another year with the hope that next year will be more fruitful, that their products will earn a higher price and that the costs of inputs will remain constant or better yet, decrease. Many farmers expressed their desires to honor their ancestors who had also tilled the very land that they touch daily. It seems that this connection to their historical past, to their biography, has kept a number of farmers involved in farming, and that this

helps them get through the hardships. For non-farmers, people can earn an income by working in the potato industry, for example, by being employed in processing plants, by working as a member of the potato board, or by being employed in a subsidiary company of one of the processing corporations. But while some jobs are created by the presence of food corporations and processing plants and the lucky few farmers who can afford the increasing costs of agricultural inputs continue to farm in efforts to meet the demands of the export quotas, there are many people who are concerned about the effects that the industrial potato production is having upon both the social fabric, the health and quality of the environment for the residents of the Island.

It appears that a particular development discourse has crafted the Island landscape and culture. As discussed in Chapter two, Escobar (1995) and Sachs (1992) advance that development discourse has been used to create a homogenized group of people, who are impoverished, illiterate, and backward; in essence the discourse has constructed people as being in need of help. Additionally, this development discourse as presented by Escobar (1995) and Sachs (1992) has created a global division of societies, polarizing and empowering nations of the "First World" over and above nations of the "Third World". Discourse communicates dominant and acceptable ideas which are enveloped in language that, as explained by Bourdieu (in Wolf 1999:55), is "not only an instrument of communication or even of knowledge, but also an instrument of power". Taken in this light, the speaker whether that be an individual, a group, or an institution seeks not only to be understood but also to be believed, obeyed, respected, distinguished (55). The accredited experts that create and manage the development strategy, conceive of this modernization programme in their offices which are far removed from where the plan is

going to implemented. Equally, these experts are themselves located within a very determinate political economy. Because of this, the vision for economic development held by the development planners fail to consider the local environments, knowledges, customs and desires – visions and dreams- of local communities. The push to develop PEI's agroeconomy and propel PEI potatoes even further onto the international market has not been the ambition of Island residents. The development of a regional economy in relation to the objectives established by the "core", the federal government, mimics the discourse and development plans created by development experts who, through the application of their plans, aspire to bring the regional economy into pace with the core. Many residents groaned when I inquired why so much of the land is being cleared for potato fields, and why pesticides are used so liberally? Consistently, people suggested that PEI is the potato culture, it's what the Island is about and farming is what people have always done. Many people however, also mentioned the intimate involvement of two potato processing corporations: McCain Foods of Canada and Irving. One farmer expressed,

> *...the big guys, those corporations have got you, coming and going. You buy their seed, you buy their machines and then you need some oil...they put out a new product that isn't that much better than the last, it just costs more, but it doesn't make a real difference. In the end, you shut up and do what they say... I have land that I could sell, but it's not worth much to anyone other than the big guys and I don't want to see my land – my family's land -go into their hands so I keep farming, hoping that things will change but the only thing that changes is that my friends are losing their land...All I've ever done is been a farmer, I am in the business of farming. I clear the land, I put the seed in the ground and I do what I need to get the crop I can. Farming is a gamble but it is freedom too. I have my land and I'll keep working it...farming is about freedom.* (Personal communication with a potato farmer, October, 2002).

People involved in the business of farming are entangled in complexities and contradictions. On the one hand, for some farmers, owning land is liberating and creates a

sense of security and place within the Island. On the other hand, the only way to continue to finance a farm is to have a contract with a potato processing corporation. The rules that govern these modes of production are laced with social pressures, family and personal history, and money. To act in accordance with the rules of the contract means that the farmer can keep their land, their house, their chosen life-style, but they cannot always choose the methods of farming that they would prefer to institute.

Everyday life is structured around potato production. Information monitoring the Island's potato production is disseminated daily on PEI. The newspaper has potato reports that keep the residents updated on the status of the Island's "prized crop", on the price per pound, on the threat of blight, on the world market...Over the radio, agricultural extension officers inform Islanders about the need to spray which pesticide and when. Meteorological reports discuss the rain, sun, humidity, wind, snow, ice, in relation to the potato crop. During harvest season, children are dismissed from school for up to two weeks so that they can help out on the farm. Through these constructed and imposed systems, the potato culture is deliberately placed in the minds of PEI residents.

As Stoler (1997, 2001), Gal (1991), Wolf (1999), Foucault (1965/1973, 1984), and many others have argued, discourses have the power to shape social reality. As highlighted in Chapter two, Sachs (1992) expresses that the meanings behind terms such as "environment", "health", "resources", "needs", "poverty", are culturally, economically, historically and politically specific. Terms such as capitalism, activist, and even "crop protectants"- the euphemism for pesticides that is used by the PMRA- are constructed to reflect the dominant views of the people who are doing the naming, the

history making. Further emphasizing this point, Escobar suggests that regarding the natural environment,

> *nature is always constructed by our meaning-giving and discursive processes, so that what we perceive as natural is also cultural and social; said differently, nature is simultaneously real, collective, and discursive – fact, power, and discourse- all need to be naturalized socialised, and deconstructed accordingly* (Escobar 1999:2).

For those who advance the discourse of the potato culture, the environment on PEI is to be used as a vehicle for capital accumulation. Terms such as 'environment', 'pesticides', 'risk', 'disease', for example, are socially constructed. Just what they mean, what ideas and values they encapsulate, depends very much upon who is framing the social reality and in what context. The environment on PEI is constructed within a capitalist perspective, that is, by an individual or institution who stands to benefit financially. Sachs (1992:35) suggests that this capitalist perspective constructs nature as malleable, as being reducible to a set of administrative and managerial strategies that are geared to use resources efficiently while minimizing losses. On PEI the institutions and individuals who stand to benefit from the islands' agroeconomy have created, marketed, and thus, disseminated a discourse suggesting that the environment on PEI is one which is ideally suited for agriculturally based economic forms of development. However, as noted in Chapter three, the soil structure in certain areas on the Island is not amenable to aggressive forms of agriculture. Furthermore, monocultural forms of agriculture are extremely corrosive to the already eroded landscape. However, through this now dominant discourse, the environment has been constructed to be a useable, bountiful, and exploitable resource. What is ironic is that because of the aggressive industrial monocropping of potatoes the nutrients in the soil have been significantly reduced, in

order to enhance growing conditions and produce significant yields even in challenging circumstances, pesticides have become a routine part of the farming process.

One of the biggest environmental problems on the Island is soil erosion due to over use of land. The flash floods that occur frequently on the Island result in large quantities of pesticide-laden soil sediment being deposited in streams and rivers, and have been detrimental to aquatic ecosystems. The problem with pesticide spraying on PEI is that there are no boundaries between rural and urban communities. In an email to me, Sharon Labchuk explained the concerns about proximity and pesticide spray on PEI,

> it may be different when they [pesticides] are being sprayed far from people, in the middle of nowhere, but in P.E.I., they are being sprayed five feet from a sandbox where children play, 10 feet away from the open kitchen window of a private home.

Furthermore, Sharon emphasized the amount of spray used by farmers on PEI,

> sales records show more pesticide is used per person in P.E.I. than any place else in Canada or the United States. Local farmers spray a whopping 18 pounds of pesticide per person each year. This is compared to an average of just three pounds per person across Canada, or six pounds per person in California.

Pesticide discussions on PEI are charged discussions. For farmers, having a contract with a processing corporation ensures financial gain at the end of the growing season. Although this may only just cover the costs of inputs, in the unpredictable business of potato farming, a guarantee is welcomed. The application of pesticides – when to apply, how much to apply and how to apply them is also stipulated in the contract, but it is further encouraged by the agricultural extension officer, the farm conditions and weather reports that are read over the radio, and the neighbour who is silently but sternly watching for any behaviours that could be reported to the processing corporation. The financial cost of using pesticides is enormous. Some farmers spend upwards of CA$100,000 annually on pesticides (email correspondence with Aiton 2002).

Given that pesticides are a costly input, some farmers may choose not to spray when the directive to spray is administered. This is risky, the neighbour who is in competition for a contract with a processing corporation may report this farmer for not upholding the conditions of the contract. The compounding stresses and pressures resulting from the melange of corporate voyeurism and invasion, of neighbourly competitiveness, and of service to the Island economy, all aligned to sustainably exploit the land, entangles farmers in a series of social and economic relationships that are filled with tension and that silence alternatives or opposition. When people begin talking about a ban or a reduction in pesticide use, about mounting a campaign against pesticide use, a great deal of delicacy is required. In an email, Gary Schneider shared this with me,

> as to the potato culture here, it is much like any industry, except that there is no one big bad guy, which makes change even more difficult. if it was just *one* big corporate-owned farm that was polluting water, it would be easy to make them targets. your neighbour whose kids go to school with your kids is a much harder target (Email correspondence, November 2002).

The adverse effects of pesticides have been documented and made public through multiple mediums such as television, various mainstream and alternative newspapers, the internet, books, and journal publications (cf. Colborn et al 1993; Briggs 1992; Thomas 1995; Steinberger 1998; Rodier 1995; Carson 1962; Merrington et al 2002; Soto et al 1994; Wolff 1995; Repetto and Baliga 1996). Individuals and organizations on PEI and beyond PEI working to ban pesticide use are equally informed about the dangers of pesticides and the presence of pesticides in the environment on PEI. Helen Jones for example is working on the Halifax ban. In a letter she sent to her MP in Halifax, Helen draws attention to the contaminated environment on PEI. Helen writes,

> *Planning to swim in PEI near any of its river outlets or drink the water? I wouldn't. The following pesticides were found in PEI rivers in 1999 and/or 2000:*

> *Atrazine, Chlorothalonil, Metribuzin, Endosulfan I and II, Cis-permethrin, Cypermethrin, Trans-permethrin, Fenvalerate, Deltamethrin, Alkylphenols, Pirimicarb, Carbofuran, Phorate, Dimethoate, Fonofos, Diazinon, Disulfoton, Metalaxyl, Linuron, Malathion, Chlorpyrifos, Phosmet, Methoxychlor, and Azinphosmethyl.*
>
> *What pesticides, co-formulants, and toxic breakdown products are present in other Maritime rivers? Shouldn't we be asking? Shouldn't this be publicized regularly without asking?* (provided to me in an email correspondence, November 2002).

The agricultural news that is shared over the airwaves, in the newspapers, and through the television is very selective, it is about production methods, it is about how to uphold and perpetuate the production of potatoes, the culture of potatoes. The agricultural information that Helen, Sharon and others circulate is not mentioned in the dominant discourse. The information for example that Sharon shared with me in an email about air pollution from pesticide spray is not mentioned in the dominant discourse. Sharon writes,

> ...Environment Canada did some air quality testing for 2 years here. Every single sample taken was contaminated with cancer-causing potato pesticides. Every sample in the control area - the end of a wharf in a community that has very little potato production - was contaminated with these same pesticides (Email correspondence, September 2002).

The discourses presented and circulated by Earth Action, ECO-PEI and other individuals or organizations concerned with the effects of pesticides compete with the dominant discourse as established, reinforced, and disseminated by members of the potato industry who stand to benefit from the potato culture. Importantly, it seems that through the discourse and social labour relations, pesticides are constructed and spoken about in language and concepts that highlight the need and benefit of their use.

Referring to pesticides as "crop protectants" removes any opportunities for people to contest pesticides for being toxic, dangerous, damaging, and lethal. The idea

communicated to farmers is one of support and solidarity. It is one of understanding that farming is a gamble. It is a balance of working with the environment and controlling the environment. In constructing pesticides as crop protectants, the PMRA sends the message that these products are necessary inputs that will, if used rigidly, ease the emotional and financial worries of farmers. Crop protectants can bring peace of mind to farmers. Furthermore, the scientific particularities about the toxic nature of pesticides are cast in a technical and exclusive language. Farmers on PEI are not viewed as being competant as they have not acquired the accredited degree and label of "expert", nor do they work within an accredited institution. Linguistic competency is a tool used to establish and reinforce class divisions (Lindstrom 1990 in Wolf 1999:55). On PEI, this is evidenced in the divisions between the farmers and the Agricultural experts who are employed either with the Agricultural Board, with Agri-Food Canada, or with the PMRA. As demonstrated by Gal (1991), Wolf (1982), Foucault (1965/1973) and, as explained by Lindstrom (1990 in Wolf 1999:55), power is involved in deciding who can talk, through which discursive procedures, and about what topics. Indeed, as suggested by Hall (1997), discursive competence and social power can define the topic for discussion, how it can be spoken about, reasoned about. Additionally, this discursive power, particularly when someone has the label of expert, controls the questions and thus, in this light, maintains social inequalities (Lindstrom 1990 in Wolf 1999:55). Consequently, a necessary step in getting farmers on PEI to use pesticides is to reinforce the social inequities that accompany class divisions that honor and empower the expert as having knowledge/truth while the experiential knowledge of the farmer is marginalised and dismissed. Furthermore, and importantly, when competing discourses about pesticides enter the

public arena, such as has been the case on PEI, the experts reinforce their expertise by skillful use of rhetoric and by reinforcing their privileged knowledge/truth, hence power, by delivering messages from official institutions, such as the PMRA, the Agricultural Board, and so forth. Individuals like Sharon Labchuk, Helen Jones, and Mike Christie, for example, are not credited publicly by formal institutions as being knowledgeable about issues related to pesticide use. However, my understanding and experience has revealed that members of the general public both on the Island and off the island who are concerned about pesticides do turn to them, their peers in their community. When I initiated this research, Veronica Sherwood of the Prince Edward Island Environmental Network suggested that I contact Sharon Labchuk, "a veritable encyclopedia of information on this issue on the Island" because the PEI office fields calls for her from all over North America. Furthermore, Sharon shared with me how the Earth Action office fields telephone calls all summer about the pesticide spray. When I was inquiring about pesticide use on PEI, no one ever suggested that I contact the Agricultural Board or the PMRA. This immediately established in my mind that two very competing discourses are operating on and off the Island.

Constructing Sharon as a knowledgeable source, an expert on the pesticide issue is not how members involved in the Island's agroeconomy construct her. In an interview on CTV's W-5, Sharon suggested that the residents on the Island who are involved in the agricultural economy refer to her as a terrorist, as someone who is trying to send the Island into financial ruin. Because of Sharon's work with Earth Action to ban the use of pesticides, Sharon has been cast in discursive processes that serve to discredit and diminish her knowledge and her loyalties to the Island. It seems that the potato culture

requires the residents to share a homogenized frame of mind that is: working to meet the set development target.

The PMRA administers the Pest Control Product Act (PCPA) on behalf of the Minister of Health, and manages the regulation of pesticides at the Federal level in Canada. It is an official governing agency that is staffed with experts who reinforce the "truth" that pesticides are positive inputs that effectively protect crops for farmers. Foucault (1965/1973), Wolf (1999), and Gal (1991) argue that discourse lacks power unless it is institutionally authorized and delivered by a person who is accredited and empowered through the backing of an institution. Wolf (1999:55) tells us that language and linguistic competence in perfecting the social codes of communication which convey authority and legitimacy implies the power to be able to impose reception of these ideas on people. The expert, in this case, the PMRA, disseminates knowledge and truth to other accredited institutions such as the Agricultural board, the agricultural extension officers, members of the mainstream media, etc. who then circulate this information which is cast as truth. Through this economy of discourse the power behind the ideas is emphasized.

The concept of pesticides as advanced by the PMRA, the Agricultural Board of PEI, and biotechnology companies vying for registration and use of their latest and greatest product sets the discursive agenda for how the topic of pesticides can be approached. Analyzing how the PMRA gets a large amount of its funding, reveals that the PMRA is not necessarily a neutral organization. This is what Foucault (in Rabinow 1984:6) brings to our attention by arguing that the real political agenda of civil society is to evaluate critically how institutions operate because in doing so, the corruption that is masked by their authorial and privileged position in society, will be revealed. There are

several points of concern that I have with how the PMRA operates. The PMRA is accountable for protecting human health and the environment from the risks of pest control products/pesticides through sound, progressive science, and by promoting innovative approaches to Integrated Pest Management. The organization is divided into five divisions (refer to Chapter four for a full discussion), I draw attention to the first division, the Submission Management and Information Division which manages and tracks submissions by agrochemical and pharmaceutical companies of pest control products for use in Canada. The PMRA earns a substantial revenue from application fees by biotechnology firms who are hoping to have their product cleared for use in Canada. According to Wendy Sexsmith, Executive Director of the PMRA, annually, application fees to register a product earns the PMRA approximately CA$8 million (Wendy Sexsmith, W-5, CTV interview, October 11, 2002). In actuality, the operating budget for the PMRA is partially supported by these registration fees (ibid). The PMRA is also responsible for re-evaluating existing pesticides that are in use in Canada. In 2001, the PMRA committed to re-evaluate 405 of the 550 active-ingredients registered for pesticide use in Canada, by 2006. Scientific screening is a lengthy process, as of October 2002, only 17 have been re-viewed (Wendy Sexsmith, Executive Director, PMRA W-5, CTV interview, October 11, 2002). This is highly problematic given that many of the pesticides in use were created in the 1940's and 1950's when testing for human health and environmental affects was limited, if not completely absent. It seems that the challenge for the PMRA is that they must keep products on the Canadian market that help farmers maintain or increase their crop yields as these crops contribute directly to the Federal mandate to capture five percent of the international agricultural market by 2004.

In this light, the PMRA has an intimate relationship with biotechnology firms that are pushing to place their crop protectants on the Canadian market, and with Agri-Foods Canada as they try to meet financial objectives. The PMRA is, thus, anything but neutral. In this light, the PMRA does work to promote the adoption and use of pesticides by casting them as crop protectants which in effect appeals to the vulnerabilities of farmers and farming. In the case of pesticide use, the ecological and human health effects, the local knowledges on PEI that differ from the dominant discourse are subsumed under the professional and paternalistic discourse put forth and supported by the PMRA and others –institutions, corporations, and individuals who are involved in agribusiness.

There are other discourses, counter-discourses but these are not always allowed space and privilege by the dominant discourse. Consequently, the alternative stories are not often heard, and this seems to be because we are not meant to hear them or to consider them. The history of the present that is being crafted about PEI is done so to create a social, economic and political climate that speaks about success and wealth, about dreams and possibilities, about "world class potatoes". Extending Bhabha's caution about placing colonial power in the hands of the colonizer (in Escobar 1995:11), regarding PEI, it is a mistake to think that power is entirely possessed by the dominant group. It is important to consider the variety of forms with which people resist interventions and how they struggle to create alternative ways of doing and being (Escobar 1995). Foucault (1972) argues that changing the order of discourse is a political question that entails the collective practice of social actors and the restructuring of existing political economies of truth. In essence, social movements unmake the means of discourses, they pull apart the continuity of the dominant discourse, they expose the

constructed nature of discourse creation and, social movements contest the inequities that the discourse creates and supports. Through the social movements on PEI, several new ways of imagining the ecology and economy, the polity and social climate are being advanced. The methods of resistance and counter-discourse creation that are pursued by ECO-PEI and Earth Action are very different. What follows is a discussion of how these two environmental organizations operate within and counter to the dominant discourse.

For ECO PEI, the decision to work within the existing system and discourse in addition to accepting financial support from institutions and private citizens limits the political agenda of the group. For Earth Action, the strong social ties proved prohibitive and dangerous for the campaigners with the result that Earth Action has engaged in building and nurturing relationships with activists working outside of the province of Prince Edward Island.

ECO-PEI's approach to environmental education and activism is broad based and geared to popularizing agroindustrial potato production practices that are more ecologically sensitive than the ones currently utilized. The campaign focus for ECO-PEI has been the "Island's environment", an approach that attempts to compartmentalize and disentangle the "environment" from the localized political economy and social relations. However, I think that the process of working within the system signals an understanding of the complexities and delicate nature of the social relations and labour relations amongst residents on the Island. It appears that ECO-PEI is politically correct and more of a generalist organization that abstains from making politically charged and socially alienating statements such as "scientific evidence links pesticides to cancer", opting for the more temperate statement demonstrable of an organization that has the environment

as its core focus, such as "there are fish kills, ...soil erosion is a problem on our Island". Although editorials submitted by ECO-PEI members do appear in the local papers and on their website, it seems that for ECO-PEI discussing the obvious impacts ie, fish kill reports in the media, is less politically charged than out-rightly making statements about the human health effects of pesticides. The rationale is to evoke change through education and not through confrontations.

Working in numbers to develop and nurture coalitions means that for ECO-PEI, the responsibility of laying blame and pointing fingers is shared. No one organization is singled out and vilified or comes under political scrutiny. Furthermore, coalition building enables ECO-PEI to link into environmentally friendly businesses that have the environment as a foremost concern. Building ties with corporations and provincial ministries enables ECO-PEI to develop education campaigns and programmes that involve the community and invite the community to reflect upon what the environment and what ecosystem health means. This is evidenced in the MacPhail Woods Ecological Forestry Project that teaches residents and visitors sustainable ecological practices. The fact that the organization sells corporate memberships does guide their practices and their discourse which is reflected in their cautious tone and their demonstrable politics. As Gary expressed, according to members of ECO-PEI it is far better to involve and educate Island residents, to invite people to reflect on their practices, than it is to politicize an issue to the point where people on the Island turn away. Working within the agenda set by the dominant interests such as the Agricultural Board, corporate farmers, and with processing firms, enables ECO-PEI to participate in the decision making processes, to at

least advance an ecologically sustainable and eco-friendly perspective in the agroeconomic practices that are instituted on the Island.

This approach is evident in a speech delivered by Nancy Clement, co-chair of ECO-PEI, at a rally Friday, August 16, 2002 at the Legislature in Charlottetown. Nancy mentions the fish kills in the recent months and appeals to people in the community to voice their concerns about the impacts that pesticides are having on the sustainability of industries. Nancy works within the dominant discourse that places importance on the economic success of the Island; ECO-PEI shows its public loyalty to the overall development scheme:

> *Many of us have been concerned for some time about the degree of chemical pesticides being used in the agricultural industry, and about the repercussions for the people and the wildlife of PEI. The fish kills that have occurred this summer and in recent years have heightened this concern and have brought the issue to the forefront for a large number of Islanders. It is evident that we cannot continue to put this quantity of chemicals into our environment without serious, long term damage. Not only are we concerned about our own health, children's health, and the overall health of the ecosystems surrounding us, but we are also concerned about the future of important industries on the Island including tourism, the shell fishery and other fisheries, and the long term outlook for the agriculture industry itself.*

The approach used by members of Earth Action, on the other hand, is one which counters the dominant discourse and the behaviours which are deemed to be publicly and socially acceptable. Sharon suggests that the social situation on the Island – the strong interconnections- has made it difficult for them to create a stir, to generate support for a pesticide ban. Consequently, for Earth Action, the pressures to conform and to turn the other cheek, led to the adoption of a mandate that politicizes and publicizes the poisoning of the Island outside of the Island's geographical boundaries. In removing the equation of the social relations that can silence, the objective has been to gain support and

momentum for the abolition of agroeconomic development on the Island and the adoption of organic farming practices that specifically serve the local Island market.

In light of the prohibitive social relations on the Island, to continue to politicize and protest the issues of pesticide, Earth Action has created a community of activists and supporters beyond the confines of the Island. The internet has played a key role, the relationships that have been developed and nurtured extend into Central and Western Canada and America. Internet use is an effective tool through which information can be disseminated and communities of support can be built (Ribeiro 1998). For Earth Action, the internet is a perfect exponential medium through which relationships with a greater number of people – far exceeding the support that is possible on PEI -who are concerned about the deleterious effects of pesticides in our environment can be built and sustained. The result is that more information is learned, shared and disseminated to and amongst activists outside of PEI. The hope is that the activists at a distance will spread the word in turn. I am an example of this process in action. Through a series of networks that began with an internet search and a question directed at several environmental resource organizations, the information, the energy, and the serendipity began and gained in momentum. I was consistently presented with information and contacts and insights about the causes and effects of pesticide use. Through the continued conversations with Helen Jones and Marsha, through the work of Mike Christie and Gary Schneider, the word was spread, the information disseminated, the stories shared.

What this proves significantly is that the internet can be and is an effective tool for community organizing and activism at a distance. The afore mentioned community organizers demonstrate this concept in action, as have Ribeiro (1998), Garcia (1992),

Amit (2000), Knowles (2000), Norman (2000), and Caputo (2000). Collectively, these studies demonstrate that communities are built regardless of face to face interactions, communities can be developed and nurtured through and by the strengths of sharing stories and vulnerabilities, passions and objectives, strategies and experiences. The means of sharing – telephone conversations, exchanges via electronic mail, letter writing and photographs- does not seem to be as important as what is shared and expressed between and amongst people.

Dominant discourses create social realities that make it very difficult for alternative stories, histories of the present to be heard. For Earth Action, having their discourse marginalised within and by the elite of the PEI agricultural community did not limit the organization's activism. What it did was force a group of passionate individuals to stretch the definitions of their terms and the boundaries of their visions to empower their actions. The community that they participate in is not determined by nor limited to geography or ethnicity. Rather it is based on a shared vision about the way that people can challenge and alter the dominant discourse to create a community and a world that is more reflective of values that honor equity and uphold human rights to abolish environmental racism, and economic and social marginalisation.

CHAPTER SIX: REFLECTIONS FOR MOVING FORWARD

This anthropological project has been a labour of love for me. It has been a learning experience and an emotional experience. My desires to understand pesticide use stems from my most immediate and most challenging and intimate experience of watching my mom die from cancer. I have not been able to separate personal experience, from anthropological inquiry. I doubt I ever will be able to do so. The personal is the political and it has been important for me to move beyond critical reflection, thought, and inquiry to action.

Through my methodology I was able to participate in a community movement. Witnessing from a distance the tremendous effort, passion, and imagination of people working to ban the use of pesticides inspired and humbled me. I did not only engage as a voyeur in the social movements being advanced by Helen, Sharon, Mike, Gary, and Marsha. I listened, queried, learned, and shared. Initial formalities gave way to friendships that tested my emotional commitment and critical analysis, my political beliefs and my energy for action. This community of activists engaged all facets of my being. Questions that are central to how I understand the world -questions about power differentials, about how "truth", "fact" and "knowledge" are constructed, about how dominant discourses and ideas can construct, label and marginalise certain people and their visions while empowering the dreams of others-, framed my examination of pesticide use on Prince Edward Island.

The scientific data attests that pesticides are immunosuppresants, are carcinogenic, teratogenic, and mutagenic; they are biocides that effectively kill target and non-target organisms. It seemed incredulous to me that even though we have significant

proof of the ecological and human health impacts that pesticides cause, and even though, as discussed in chapter four, legislation and regulations exist that are charged with protecting human health and the health of the environment, the power of a pro-pesticide discourse has created and framed pesticides as crop protectants and in doing so, has legitimized their use. On PEI, through disseminating the ideas, beliefs, practices, and values of a powerful group of individuals and institutions, in addition to the kin ties that control social labour, a social reality –"potato culture"- has been created. The euphemism "crop protectant" is deployed and circulated by the institution that controls the registration and management of pesticides in Canada. Through this term, the manner by which an individual can conceptualize and approach the topic of pesticides ("crop protectants"), has been created and sanctioned. The positive aspects and benefits of pesticides are highlighted. Their use by farmers demonstrates responsibility and concern for securing their crop, their investment. It demonstrates concern for protecting the crops of other farmers on the Island from blights; additionally, using pesticides demonstrates loyalty to the way the economy has been structured on PEI.

Contesting the dominant culture are discourses that bring to light that pesticides are killing aquatic environments on the Island; that children on PEI have the highest rate of asthma in North America; that morbidity rates for breast, colorectal and prostate cancers are higher on PEI than anywhere else in Canada and morbidity rates for melanoma, non-Hodgkins lymphoma and kidney cancers are steadily increasing; that the results from a two year air quality study of an area at the end of a wharf in a community that has very little potato production indicated high concentrations of pesticides. Discourses which bring attention to the problems -the social, economic, and ecological,

that exist within the current agroindustrial development program are dismissed. These counter discourses reveal that the potato culture has been created and continues to be created to benefit a small number of people at the cost of the majority.

Through applying the framework of discourse analysis I have sought to understand how and why certain people on PEI who present a counter discourse are silenced? Who serves to benefit from the dissemination of a certain narrow definition of pesticides as crop protectants and not as biocides? How is the topic of pesticides constructed, approached, and/or dismissed? Equally, I have applied a historical materialist framework. I have connected structural power to the organization of labour to reveal how people exert force on nature and on people. Through an exploration of a few of Wolf's critical works, (1966, 1982, 1999), I have been able to understand how social labour is organized in accordance to key relationships that are rooted in power inequities. Joining discourse analysis to a materialist perspective has enabled me to perform an analysis to determine who is creating the dominant discourse on PEI and to understand what these individuals and or groups stand to gain by organizing social reality and labour relations to underscore their position of privilege. I have also worked to write a history of the present by creating a space where alternative stories can be shared, heard, acknowledged and acted upon. It is important however to remember that all stories are partial, all are in constant process and motion. In this light, the stories presented in this thesis are only a minutiae of the ones being lived.

I entitled this chapter, *Reflections for moving forward* because the type of anthropological research that I aspire to practice is one which has as its intention to open the lines of inquiry and then share, and encourage other people to take the inquiry and

analysis further, deeper, or in a new direction. Dominant discourses construct a very particular type of reality. The social world on PEI is ordered through social labour relations and modes of production that reflect the dominant ideas of people in positions of privilege. We need to ask how topics are constructed and how topics are dismissed. How are health risks from chemicals addressed or dismissed? People are at the core of these risks. I believe that there is a place for activist oriented anthropological research as not only can it reveal which discourses are underscoring domination and subjugation, but perhaps more importantly, it can reveal the resistances that are occurring. It can bring into view how, "in the peripheries of the peripheries, people are articulating fragile new orders of difference and possibility" (Starn 1992:91). Of central importance for me is practicing anthropology at home, in Canada. There are so many injustices occurring in Canada that warrant critical inquiry. The history being written in communities across Canada is not the entire story. As anthropologists we reveal those "hidden histories" (Schneider and Rapp 1995) and in doing so we will uncover a richer, more complex nation. Furthermore, including peripheralized discourses effectively repositions the marginalised in a central position thereby de-centering dominant discourses and bringing to light our need as a nation to address issues of inequality.

There are many points of inquiry within this thesis that I was not able to research or discuss, and this frustrates me. Regarding the topic of health, I found that many women have made important contributions to the discussions about pesticides in our environment. Mothers who have struggled emotionally or physically with the pain of cancer, of seeing their children or their partners, their sisters, or their friends struggle with cancer. Through asking powerful questions framed from personal experience and

intimate knowledge, women like Nicole Bruinsma, Sandra Steingraber, Elizabeth Guillette, Olga Prin, Helen Jones, Sharon Labchuk, and so many others, have advanced a new discourse that challenges the dominant discourse that is disseminated and that legitimizes behaviours that allow for the use of chemicals in our homes, on our parks, and on our foods. These discourses that operate within a very determinate elite polity are devastating. It would be interesting to move through and to bring to light the incredible yet silenced role women have played in revealing alternative truths in medical and scientific discourse, such as demonstrated by Nicole, Sandra, Olga, Sharon and Helen.

I think that another interesting line of inquiry would be to determine what is happening around environmental youth movements on PEI. How do the youth of PEI feel about the current political, social, economic and environmental situation on the island? Are the youth of PEI involved in organizations that are working to change the dominant discourse? With so many youth not wanting to participate in farming, and given that the Island's economy is based on agriculture, I wonder what alternatives are available for youth? Perhaps this question needs to be re-framed: I wonder what is constructed as permissible or possible for youth? How are they being liberated, or how are they liberating themselves so that they can imagine a future for themselves, a life that makes senses to them that meets their own needs and desires?

Through the internet, the possibilities of activism at a distance, witnessing at a distance, changes who can say what, when, and how. Using the internet provides people with the possibility of voicing their stories. This is empowering and liberating. By using the internet as a tool for social activism, people have found new ways to demonstrate agency and autonomy in thought and action. Conceptualizing the internet as a tool for

social activism brings to light that the internet can be a forum for collaboration in creating and disseminating counter-hegemonic ideas, and ideologies where visions for and of an oppositional culture that is inline with principles of social justice can be communicated and gain momentum.

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PEI: General Information. www.gov.pe.ca/photos/original/population_bkg.pdf

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APPENDIX A – ONLINE RESOURCES

Agriculture and Agri-Food Canada
www.//open-site.org/Regional/North_America/Canada

Alert Net's environmental health section
http://AlertNet.org

Alternatives Journal
www.alternativesjournal.ca

Atlantic Canada Green Lane
www.ns.ec.gc.ca

"Basic Guide to Pesticides: Their Characteristics and Hazards"
http://members.aol.com/rccouncil/ourpage/samples.htm

Beyond Pesticides
www.beyondpesticides.org

Canadian Environmental Law Association, CELA
www.cela.ca

Canadian Environmental Network
www.cen-rce.org

Canadian Environment Protection Agency: Sites for Endocrine Disrupting Substances:
Priority Substances Effects Project
www.nwri.ca/aeprb/psefp.html
Priority Substances Exposure Project
www.nwri.ca/aeprb/psexp.html
Ecosystem Health Assessment Project
www.nwri.ca/aeprb/ehap.html
Enviro-Canada Fact Sheet on EDS
www.ec.gc.ca/eds.fact

Canadian Food Inspection Agency
www.inspection.gc.ca

Canadian Health Network
http://Canadian-Health-Network.ca

CBC, July 20, 2002: "Pesticides may be killing PEI Fish"
www.cbc.ca/stories/2002/11/08/pei_fish02118

Center for Food Safety

www.centerforfoodsafety.org

Chelsea pesticide legislation information
www.municipalite.chelsea.qc.ca

Earth Action PEI
www.earthaction.ca

EcoAction 2000
www.ns.ec.gc.ca/ecoaction/home.html

Ecology Action Center
www.ecologyaction.ca

Environment Canada's National Strategy for addressing EDS
www.2.ec.gc.ca/eds/strat_e.html

Environmental Coalition of Prince Edward Island
www.ecopei.ca

Environmental News Network
www.enn.com

Fact Sheet on the Regulation of Pesticides in Canada
www.hc-sc.gc.ca/pmra-arla

Genuine Progress Index for Atlantic Canada
www.gpiatlantic.org

International Forum on Globalisation
www.ifg.org

International Society for Ecology and Culture
www.isec.org.uk

International Union Against Cancer
www.uicc.org

Inter Pares
www.interpares.ca

Inter Pares, Photo Essay
www.interpares.ca/en/photo_essay/2/index.php

Journal Pioneer, "Fish kill test results released"
www.journalpioneer.com/article.cfm?showid=2295

Land Institute
www.landinstitute.org

Main PEI information network
http://www.isn.net/~network/main.html

McCain Foods
www.mccain.ca

National Cancer Institute of Canada
www.ncic.cancer.ca

National Institute of Environmental Health Sciences
www.niehs.nih.gov

Natural Resources Defense Council "Pesticides threaten Farm Children's Health"
www.nrdc.org/health/kids/nfarm.asp#

North Shore News
www.nsnews.com

Northwest Coalition for Alternatives to Pesticides
www.pesticide.org

Nova Scotia Environmental Network
www.web.ca/~nsen

OECD: Best Practices in the Regulation of Pesticides in 12 OECD Countries
www.olis.oecd.org/olis/2001doc.nsf

PANNA – Pesticide Action Network North America
www.panna.org

PEI - general historical information
www.gov.pe.ca/photos/original/population_bkg.pdf

PEI Government Fisheries, Aquaculture, and Environment
www.gov.pe.ca/government/index/php3

PEI Government listing for Agriculture and Environment
www.gov.pe.gc.ca/af/index.php3

PEI Statistics. November 2002. The PEI Economy: Progress Report, 2002.
www.gov.pe.ca/photos/origina/progress_2002.pdf

PEI: General Information
www.gov.pe.ca/photos/original/population_bkg.pdf

Pesticide Action Network Database
www.pesticideinfo.org

Pesticide Management Regulatory Agency (PMRA)
www.hc-sc.gc.ca/pmra-arla/english/index-e.html

Pesticides- chemical compounds and toxicological information:
www.chem.ox.ac.uk/mom/ddt/ddt.html
www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envio01/12-ch5-e.html
www.theadvocate.com
www.nlm.nih.gov/medlineplus/ency/article/000973.htm
www.epa.gov/opptintr/pbt/ddt.htm

Pesticides properties database
www.arsusda.gov/ppdb.html

PMRA and stakeholders
www.hc-sc.gc.ca/pmra-arla/english/pdf/fpt/fpt_stakeholders-e.pdf

PMRA Information on administering the PCPA
www.hc-sc.gc.ca/pmra-arla/english/legis/pcpa-e.html

"Potential Effects of Pesticides on Health".
www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies/Reports/envi01/12-ch-5-e.html

Prince Edward Island Environmental Network
www.isn.net/~network

RATE: Real Alternatives to Toxins in the Environment
http://www.chebucto.ns.ca/Environment/RATE/

Report of the Population Strategy Panel
www.gov.pe.ca/photos/original/population_rpt.pdf

Report on Environment and Sustainable Development
www.parl.gc.ca/InfoComDoc/36/2/ENVI/Studies?Reports?envi01/05-pre-e.html

Sierra Club campaign to reduce pesticides
www.sierraclub.ca/national/pest/index.html

Statistical information on PEI; "Island Economy". 2001
www.statscan.ca/pei

Statistics Canada
www.statscan.ca

Summary PCPA –from Bill C-58, to Bill C-8
www.hc-sc.gc.ca/pmra-arla/english/legis/pcpa-e.html

The Health of Canada's Communities
www.statscan.ca/english/freepub/82-003-SIE/82-003-SIE2002001.pdf

The Silent Spring Institute
www.silentspring.org

Topographical information about PEI
www.gov.pe.ca/af/agweb/library/documents/soilconserv.link2e.php3

"Toxic Secrets" -information about inert ingredients in pesticides
www.pesticide.org/inertreport.org

GLOSSARY

Aldrin – a pesticide used to control soil insects, termites, corn rootworms, grasshoppers. It is used predominantly to protect corn and potato crops and to protect wooden structures from termites. In plants and animals, aldrin is readily metabolised to dieldrin another chemical on the Dirty Dozen list. It is persistent and hydrophobic, it bioconcentrates in animal tissues mostly as dieldrin. Banned in several countries, severely restricted in Canada and the USA.

Bioaccumulation – refers to the process of uptake from both water and dietary sources. How much an organism accumulates depends on the ability of the body to detoxify and clear products.

Bioconcentration – refers to the uptake of a chemical directly from water in an aquatic organism.

Canadian Environmental Protection Act 1999 (CEPA) – the declaration states that the protection of the environment is essential to the well-being of Canadians. The primary purpose of this Act is to contribute to sustainable development through pollution prevention.

Carcinogenic - causing or tending to cause cancer.

Chlordane – broad based spectrum insecticide used on agricultural crops such as small grains, potatoes, maize, sugarcane, beets, fruits, nuts, vegetables, cotton, juice. Binds to aquatic sediment, bioconcentrates in lipids of organisms, alters the immune system.

Chronic condition – a condition is considered chronic if it is a type of condition that ordinarily persists for a duration of three months or more.

Clinical Studies – consists of detailed reports on individuals who have been physically examined and subjugated to a battery of laboratory tests after having been exposed to a suspected health risk.

DDT – dichlorodiphenyltrichloroethane is an organochlorine, it was used extensively during WWII to protect people from malaria, typhus and other diseases, it remains in use today to protect people from vector borne diseases. It is currently used as a pesticide to protect cotton crops but is not reported to be used on agricultural crops. DDT is banned in 34 countries and remains severely restricted in 34 other countries.

Dieldrin – a pesticide that has traditionally been used in agriculture to control soil insects, it is also used by public health programmes to control several insect vectors. Primary uses today are to control termites, wood borers and textile pests. The persistence of the chemical in conjunction with its high lipid solubility allows dieldrin to biomagnify and bioconcentrate in organisms. A 1992 study revealed that dieldrin is the second most common pesticide detected in US pasteurized milk.

Dioxins and Furans – a total of 210 dioxins and furans exist. Dioxins are released into the atmosphere by the incineration by-product in the production of pesticides, and other chlorinated substances. Furans are the major contaminant of PBCs. Both of these pesticides have been detected in emission from the incineration waste of hospitals, municipal waste, hazardous waste, car emissions, the burning of coal, peat and wood. They are lipophilic, insoluble in water, and have high persistence in the environment. Food of animal origin is the primary source of exposure to dioxin and furans. Pollution controls in many countries has decreased the production and release of dioxins and furans.

Dirty Dozen – "Most Wanted" chemicals. These belong to a class known as persistent organic pollutants (POPS) and are characterized as being able to travel long distances, as bioaccumulating in the adipose tissues of organisms, and as persisting in the environment. Of the 12 chemicals on the Dirty Dozen list, 9 are pesticides. These chemical compounds have been identified by the United Nations Environment Programme (UNEP) as powerful threats to human and wildlife health on a global basis and are slated for virtual elimination (Fisher 1999).

Dose response - refers to the biological changes that occur in the range of human exposures to a chemical substance.

Endocrine disruptors - anthropogenic chemical substances that alter the function(s) of the endocrine system and consequently cause adverse health effects in an organism, its progeny, or (sub)populations.

Endrin – a foliar insecticide used on field crops such as cotton and grains. It is also used as a rodenticide to control mice and voles. It is not lipophilic and it is rapidly metabolised by animals. Can contaminate surface water from soil run off that has pesticides on it. Remains in the soil for up to 12 years, it is very persistent.

Environmental fate – what happens to a toxic substance once it enters the environment, people, or animals.

Epidemiology – the statistical and biological analysis of the determinants, distribution, and frequency of diseases. Epidemiologists can use descriptive, case study, retrospective cohort, and prospective cohort in their analysis.

HCB – a fungicide introduced in 1945 to treat wheat, rye and cereal crops. It is a by-product of industrial chemicals, including carbon tetrachloride and "perch" – perchloroethylene. It is banned and or severely restricted in several countries.

Heptachlor – insecticide used against soil insects and termites, cotton insects, grasshoppers, crop pests, and malarial mosquitoes. It is insoluble in water, it is highly volatile, it binds to aquatic sediments and bioconcentrates in the fat of organisms. It has a half life in soil of nearly 2 years.

Immunosuppressants – impacts, effects, and lowers the body's normal immune system, thereby reducing the efficacy of the immune system to protect the organism from opportunistic infection.

Integrated Pest Management (IPM) – rooted in the concept that pests can be controlled naturally through biological mechanisms and that a certain amount of pest damage is acceptable. Acknowledges the important role that predators and parasites play in keeping pest populations in check. IPM was designed to utilize management tactics that prevent pest problems from occurring and to only use chemicals as a last resort.

Lethal, or sub-lethal dosage - derived at by taking the median lethal dose of a given substance at which fifty percent of the test organisms (typically adult male rats or mice, sometimes canines) die. The value is expressed as LD_{50} and refers to the milligram of a substance per kilogram of body weight of the subject. The lower the LD_{50} value, the more toxic is the substance. Once an LD_{50} is established, this can be extrapolated and transferred to give a general indication of the toxicity of a substance to humans and livestock.

Lipophilic – fat loving.

Maximum Residue Level (MRL) – if a pesticide is intended to be used on food, the MRL is determined as part of the PMRA, PCPA registration process. MRLs are established by the Food Residue Exposure Assessment section within the Health Evaluation Division of the PMRA, under the authority of the Food and Drug Administration (FDA). To set a MRL, the registrant proposes a value that is derived from field trial data that reflects the highest level – the maximum residue - that could potentially be on food at the point of sale. The MRL is then used to generate Potential Daily Intake (PDI) estimates of pesticide residues, based on food and drinking water consumption patterns. The MRL is accepted on condition that the PDI will not exceed the pesticides Acceptable Daily Intake (ADI). The ADI is the amount of a pesticide that "can" be consumed daily over a lifetime without causing adverse effects in humans (NOAEL – No Observed Adverse Effects Level – the highest dosage of a pesticide at which no adverse effects were observed in animal toxicity studies).

Mirex – one of the most stable and persistent pesticides. It has a half life of 10 years. It is used as a fire retardant and is also used to control fire-ants. Insoluble in water, binds strongly to aquatic sediment, it bioconcentrates and bioaccumulates. It has been banned in many countries, but persists in the St. Laurent River. Primary source of exposure is through food, especially meat, fish, and game.

Morbidity – refers to incidence, prevalence, hospitalizations and physicians visits.

Mutagens – a substance or agent that can induce genetic mutation.

Organophosphates – a group of related pesticides that affect the functioning of the nervous system.

PCBs – a mixture of chlorinated hydrocarbons that are used extensively for industrial purposes: in tranformers, in paint additives, in carbonless paper copy, in plastics…209 exist. The main source of exposure in humans is through food, especially fish.

Persistent Organic Pollutants (POPs) – a class of chemicals that have four common properties: persistence, bioaccumulation, global transport, and toxicity.

Pesticides - are POPs, they are biocides and are by their very nature designed to kill. They are created with the intention of preventing, destroying, repelling, or mitigating any

pest which can be "weeds", anthropods, or pathogens. Falling under the general rubric of "pesticides" are: insecticides, herbicides, fungicides, bacteriacides, molluscicides, nematocides, personal insect repellents, rodenticides, and algaecides.

Persistence – is a measure of the time necessary for the pesticide to degrade in the environment.

Pest Control Product Act (PCPA) – is mandated to regulate products used for the control of pests in order to protect and secure human and environmental health.

Pest Management Regulatory Agency (PMRA) – manages the regulation of pesticides at the Federal level in Canada and administers the Pest Control Product Act (PCPA) on behalf of the Minister of Health.

Phytolytic – affected by light.

Precautionary Principle – reversing the onus that was previously assigned to the general public, placing responsibility on the proponents of chemical users or technologies to prove, beyond a reasonable doubt, that what they are proposing is safe. If there is doubt, the precautionary principle mandates that it not be introduced.

Propargite- insecticide used primarily in orchards and vineyards to control mites. Classified as a class B, "probable human carcinogen", based on excess tumors observed in laboratory rats fed a diet with propargite traces.

Teratogen – an agent that produces a malformation or raises the population incidence of malformation, interfering with normal embryonic development.

Toxaphene - herbicide and insecticide. Introduced in the 1940's, this was banned in the USA in 1986 and has since been it has banned in 37 countries. However, given that it is persistent, detectable levels exist in the environment today and deaths related to excessive exposure to it are recorded. Primary exposure is through food.