THE ROLE OF RELIGION IN MOTIVATING SUSTAINABILITY: THE CASE OF THE OLD ORDER AMISH IN KISHACOQUILLAS VALLEY, PA

by

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The impacts of religion on environmental sustainability are inadequately studied at present. This thesis is a case study of an Amish settlement in central Pennsylvania, examining the importance of religion in the development of environmental attitudes and behaviors. Farmers from two Amish and two non-Amish groups were interviewed about their farming practices and environmental attitudes. The most conservative Amish sect was found to practice the most alternative type of agriculture. The two Amish groups showed the least environmental concern, as measured by the overall New Environmental Paradigm (NEP) scale. When dominion attitudes were removed from consideration, however, the Amish showed equal or greater amounts of environmental concern than the non-Amish. The NEP scale appears unable to predict the Amish culture's more sustainable behaviors. Instead, Amish religion can help explain their behaviors, which are more related to obedience to God and community stability than to general environmental concern.

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CHAPTER I

INTRODUCTION

The past few centuries have witnessed scientific truth superceding religious truth, especially at the university. While some scholars would say we have entered a world that calls both of these "truths" into question (i.e. postmodernism), religion has not simply faded into oblivion. It continues to be a vital force for many human communities, influencing their worldviews, cultural institutions and practices, and interactions with each other and with non-human creatures. Broadly defined, religion is that which provides people a sense of deep meaning, beyond mere rationality or one's atomized individual self.

From the radical environmentalist journal, Wild Earth, to a growing number of environmental studies scholars, members of the environmental community are becoming more aware of religion's implications for ecological behavior (Kinsley, 1995, p. xvi). Lynn White, Jr.'s famous paper criticizing "Judeo-Christianity" as the source of our modern ecological crisis remains a major presence in discussions of religion and ecology (White, 1967). Largely responding to White's accusations, many Christians and Jews have sought to counter those claims, seeking examples of positive ecological beliefs and behaviors within their traditions. Neither of these traditions is unitary. Christianity has been developing for 2,000 years and has many diverse belief systems under its umbrella.

Judaism has remained more stable, but it, too, consists of a number of groups with a variety of distinct beliefs.

The goal of this paper is to discuss one Christian tradition: the Old Order Amish. In particular, the paper will focus on a 200-year-old Amish settlement in Mifflin County, Pa. The Amish people are often considered to be quaint members of a pre-modern society that hasn't caught up with the "real world" yet. Their rural, agricultural lifestyle in some ways resembles pre-World War II rural life in the United States, but in other ways is very different. The Amish people value their community and lifestyle, limit the influence of modern technology, and live simply (even austerely). All of this is motivated by their foundational religious beliefs.

The Amish way of life has recently been called a "tradition of rural sustainability" (Lapping, 1997). This paper will examine this claim more closely, presenting data on both the ecological behaviors and beliefs of the Amish (using the New Environmental Paradigm scale), and discussing how the Amish religion both supports and hinders its own social and ecological sustainability.

The Need for Sustainability

Sustainability is one of the most popular and discussed concepts in the worldwide environmental movement today. From the arguments pitting sustainable growth (World Commission on Environment and Development, 1987) versus sustainable development (Daly, 1996) to the differing methods proposed to achieve sustainable development (increased human management or increased human respect for the land and its creatures),

it is apparent that a precise definition of sustainability eludes consensus (Gale and Cordray, 1994). In a general sense, sustainability implies continuation – of a biological community, of an ecosystem, of present agricultural or forestry practices (Doob, 1995). Even though the concept is somewhat fuzzy, the idea of sustainability has merit, particularly in light of the blatantly unsustainable trends that threaten the livability of Earth both for humans and other animals and plants. Global warming, ozone depletion, soil erosion, deforestation, fisheries collapse, and loss of biological and cultural diversity are some of the major warning signs.

Few agree completely on the source of these looming ecological crises, but two commonly cited evils are overpopulation and overconsumption by humans (Ehrlich and Ehrlich, 1990). Others blame technology, claiming that as humans increase their use of technology, they grow more insulated and isolated from the Earth; the resulting culture/nature split exacerbates the growing ecological crisis (Zerzan and Carnes, 1988). If humans are separated physically and mentally from the source of all life, then how will they know they are harming nature, much less how to restore it? Still others place the blame for the ecological crisis on the dominant Judeo-Christian worldview, which holds that God, in the Genesis creation story, gives humans dominion over all of nature (White, 1967).

Sustainability, then, can be defined in relationship to these problems. A sustainable culture would be one that lives in balance with the rest of nature, which does not disrupt the ecological interactions of the ecosystem.[1] A sustainable culture would be

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[1] Disruption in this case means more than mere alteration. All humans alter their surroundings, but

aware of its dependence on natural systems and treat its habitat with respect and appreciation. A sustainable culture would not use up the natural resources of an area and move on, but would live in such a way that the lifestyle could be perpetuated indefinitely. Not only would it "do no harm," but it would repair and restore its surroundings as much as possible. The sum of these ideas is encompassed in Aldo Leopold's land ethic, "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (Leopold, 1974, p. 262). A sustainable culture is a lasting culture.

As the advent of a new millenium approaches, it is readily apparent that the modern capitalistic, American culture and economy (which provides the model for the global economy) is not sustainable. The wealthy North (Europe, United States), consisting of about 20 percent of the global population, uses approximately 70 percent of the world's resources. Ecological footprints of the wealthy nations are estimated to range from three to five hectares/person (Wackernagel and Rees, 1995).[2] If the entire global population had a footprint of this magnitude, it would exceed the productive land capacity of the planet. It is also estimated that humans, one species among millions, now consume and co-opt approximately 40 percent of the net primary productivity (usable energy from the sun, transformed through photosynthesis) of terrestrial ecosystems (Vitousek et al.,

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modern humans are doing so on a rapid and broad scale, in ways that limit the ability of the original ecosystems to adapt. In a sense, we have created fields and forests "in our image" that are fundamentally different in terms of processes and functions than the original ecosystems. This is what I'm calling "disruption."

[2] Ecological footprints measure the land area needed to provide food and fuel for a population at their present standard of living, as well as the land area needed for waste storage/assimilation for the same population (Wackernagel and Rees, 1996).

1986). Continuing these per capita rates of consumption as the population increases would lead to a serious reduction in net primary productivity for non-human animals. Basically, the signs indicate that we are approaching the limits of the Earth (as best we can identify them). Whether we have actually exceeded the Earth's carrying capacity is unclear and extremely difficult to measure, but there are increasing concerns that the accretion of localized habitat destruction and transformation will eventually have a widespread impact. The challenge for our generation is to discover or develop cultures, economies, and specific communities that are sustainable.

Some scholars, such as C.A. Bowers, Paul Shepard, and Stanley Diamond, point to indigenous cultures of Africa, Asia, the Americas, and Australia as possible models for sustainable communities (Bowers, 1995; Orr, 1992). Their low-tech, highly spiritual interactions with their environments include complex rituals of respect for the Earth and its vast community of life (Suzuki and Knudtson, 1992). Granted, all indigenous cultures are not necessarily ecologically sustainable; this is a common "environmentalist myth" (Milton, 1996), perpetuated by popular and provocative novels such as Daniel Quinn's Ishmael. However, it is fairly clear that a number of indigenous cultures have lasted for thousands of years without unduly damaging the habitats on which they depend. For some hunter-gatherer tribes, their environmentally benign impact may be more a matter of small population sizes and simple technology than of any conscious action on their part. Other cultures, however, such as the Australian Aborigines and the Cree of Hudson Bay, have conscious rituals of reciprocity, in which they are required to care for the land that first cares for them (Kinsley, 1995).

Many of these indigenous cultures have been decimated by the twin plagues of colonialism and the technological society (i.e. neo-colonialism) (Shiva, 1993). Few people remain who know the ancient ways, and fewer still practice them. While the number of people in dominant cultures who respect indigenous cultural practices appears to be growing, much of the dominant, post-colonial North still sees these cultures as primitive, representing a stage of cultural development that we passed long ago. Thus they are believed to have nothing to teach us.

To a certain extent, this critique is accurate. In a world of nearly six billion people, population pressures make a return to hunter-gatherer lifestyles a practical impossibility. We may be able to incorporate certain aspects of indigenous cultures into our own, but to hope to do this rapidly on a large scale is rather unrealistic. We will be doing well to allow these cultures to persist.

In contrast to the neo-indigenous approach to sustainability, proponents of an opposing sentiment claim that population growth is good, and that increased technology and economic growth will lead to more efficient uses of natural resources. These "cornucopians," exemplified by the bane of environmentalists, economist Julian Simon, recognize the need for sustainable growth, but don't seem to see a need for diverse local cultures that form self-reliant sustainable communities. To them, the global economy is an efficient machine that, with minor adjustments here and there, will eventually lead to a technologically induced sustainability.

A milder form of this technological optimism shows up in the work of Paul Hawken, businessman and author of The Ecology of Commerce. Hawken (1993) argues

that businesses must accept the reality and significance of "natural capital," incorporate "externalities" into the prices of goods, and convert manufacturing wastes into forms that can be assimilated more easily by ecosystems. These goals would indeed be a major overhaul of our present system; however, Hawken does seem to think that if these structural and technological changes are made, we can continue our present affluent lifestyles. Hawken's solution does not require a return to indigenous, low-technology lifestyles, nor does it require a reduction of consumption or other types of individual limits.

Religion and the Sustainability Debate

Amidst the debate about the best path to sustainable development, an underdeveloped question is the role that religion plays (or fails to play) in motivating sustainability. Religious worldviews guide communities in their interactions with the earth, influencing how they perceive, relate to, and utilize the habitats in which they live. Modern science has led to incredible technological advances, but it has been unable to help humans discover deep meaning, increase in wisdom, or even simply act on the knowledge it provides us. Religion cannot be used as a simple policy prescription to transform unsustainable behavior into sustainable behavior, but understanding the roots of many cultures' interactions with their ecosystems may help us to find (or rediscover) more sustainable ways to live.

Religion is implicit in the discussion of indigenous cultures, since many Native cultures see nature as animate, perform rituals to effect protection and increase of plants

and animals, and celebrate nature's rhythms (Kinsley, 1995; Suzuki and Knudtson, 1992). Indeed, religion is crucial to the sustainability of indigenous cultures. "All traditional societies that have succeeded in managing resources well, over time, have done it in part through religious or ritual representation of resource management," states anthropologist E.N. Anderson (1996, p. 166). Sometimes these religious traits are missed or ignored because they don't look like our culture's version of organized religion, complete with holy books and an other-worldly focus. Instead, religion is deeply imbedded in a holistic worldview that connects Native ecological knowledge with the ethical codes and reverence that accompany it.

As neo-pagan and Goddess religions revive in Western society, and as members of the major religions begin to develop denominational and ecumenical organizations concerned about "Creation Care,"[3] it becomes increasingly evident that religion can play a role in supporting and motivating ecological concern. What is less clear is how much actual impact religion has on its members' behavior, and whether some religions are more effective in motivating sustainability than are others.

The present environmental debate is centered largely in the laboratory, the political arena, and the courtroom, with science, economic rationality, and legality being the primary considerations. Students learn how to identify and restore degraded ecosystems, how to write better Environmental Impact Statements (or challenge those that are written), and how to lobby Congress to enact better laws, but rarely do we in the

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[3] These include Earth Ministry, the Coalition on Environment and Jewish Life, the Evangelical Environmental Network, Christians Caring for Creation, the Christian Environmental Council, and the National Religious Partnership on the Environment, to name only a few.

academy pay attention to religion as a force for change. "Ignorance of religion prevents environmental studies from achieving its goals," says Lawrence Sullivan, editor of Harvard University's Center for the Study of World Religions Publications, "for though science and technology share many important features of human culture with religion, they leave unexplored essential wellsprings of human motivation and concern that shape the world as we know it" (Sullivan, 1997, p. xiii).

Religious communities have been at the forefront of many social movements in the United States, including abolition of slavery and civil rights. They are also likely to be a significant force in the environmental movement (Oelschlaeger, 1991). The academy ought to pay more attention to the emerging interaction between religion and environmentalism.

The Amish as a Possible Model of a Sustainable Culture

In this light, we turn to the Amish, a small Christian sect that has European roots but has remained separate from the dominant U.S. culture. The Amish community has been so effective in this endeavor that one scholar has compared them to "tribal" groups such as the Navajo, and found these two groups to have many similarities (Davis, 1996). Some scholars point to the Amish as a possible model of sustainability for the modern world (Lapping, 1997; Olshan, 1980), while others consider them to be resistant to and even afraid of the modern world (Jager, 1983).

The Amish are a rural, agricultural people who eschew modern technology. Numbering over 100,000 in the United States, the Amish reject many new forms of

technology for the sake of their communities, not out of fear or disinterest. Amish leaders strictly prohibit any outside influence or internal change, technological or otherwise, which is believed to threaten the cohesion of the community and the interdependent reliance each member has on the others.[4] The "Amish blueprint for expected behavior," an oral code of conduct called the *Ordnung*, guides community life; breaking the *Ordnung* (e.g. by using prohibited technology) results in serious sanctions (Kraybill, 1989, p. 95).

The Amish are not typical environmentalists in that they do not actively promote protection of the environment. In fact, they endeavor to avoid what they call the "world" (modern, mainstream society) and its influences as much as possible.

Yet, being farmers, the Amish are connected to the land and its health. They believe that "soil, created by God in the Garden of Eden, has spiritual significance, and humankind's first duty is to manage it as good stewards," says Elizabeth Place, an attorney who has worked with the Amish on land use and environmental issues (1993, p. 191). The Amish prefer to live in rural areas, both because of the isolated, agricultural lifestyle such rurality allows them, and because they tend to feel closer to God while in nature (Hostetler, 1993).

Critics of modern culture and agriculture such as Wendell Berry (1981, 1983, 1986) and Gene Logsdon (1988) laud the Amish as a model of health and sustainability in an otherwise-imbalanced country. Plain, a magazine produced by conservative Quakers

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[4] The Amish live in rural enclaves of neighboring homesteads, not communally (i.e. in shared housing arrangements as do their Anabaptist cousins, the Hutterites), but the cohesion of the church community is nevertheless of utmost importance.

from Ohio, promotes Amish-style simple living as a crucial counter-force to a modern overconsumptive, wasteful, and damaging lifestyle. For many people in a stressed-out, high-tech world, the Amish are a beacon of serenity and an indication that alternative modes of living are possible.

But as Amish communities become overrun by tourists seeking vicarious tranquility, one wonders if the Amish live up to their billing. Through no fault of their own (with rare exceptions), they are gradually becoming the darlings of pop culture, but do they deserve all the hype? Are the Amish anachronistic 19th century anomalies or harbingers of an alternative direction for American culture? Would the world really be a better place if more people were Amish, or lived like them?

Some challenges to the rosy picture of pristine Amish tranquility do exist. The Amish, while spiritually connected to the land, have also been a rather mobile people (Schwieder and Schwieder, 1975). "The Amish experience is the story of people on the move," says Duane Kauffman, a Mennonite historian (1991, p. 85). Scarcity of available land (due to large families), church splits (which are rather common), and the pervasive attitude of 19th century America to "go west" all contributed to a gradual westward migration of Amish communities (Kauffman, 1991).

Recently, both Amish population and, therefore, migration are on the rise. Since the average couple has seven children, the Amish population doubles nearly every 20 years (Hostetler, 1993). All these people must live somewhere, and existing settlements become crowded as more people try to farm the same amount of land. Between 1972 and 1992, 144 new settlements were founded, or 63 percent of the total existing Amish

settlements in 1992 (Luthy, 1994). The formation rate of new settlements averaged about seven per year over this period, whereas prior to 1972, the formation rate was closer to one or two new settlements per year. The majority of Amish people still live in the oldest settlements, however: 55 percent of all Amish church districts are located in settlements that began before 1900 (Garrett, 1996). The Amish may be people on the move, but they also stay put for a long time, if possible.

Not only are the Amish more mobile than we might expect, given their horse and buggy mode of transportation, but they sometimes have a peculiar way of showing their respect for the land. Land use conflicts in highly developed Lancaster County in southern Pennsylvania have involved Amish farmers contributing to pollution of groundwater and rivers that feed into Chesapeake Bay. Poor manure handling processes allow runoff to contaminate streams with considerable nutrient pollution. Rather than welcoming government regulations designed to ensure care for the environment, Amish farmers sometimes consider such regulations to be "worldly" interference with their way of life and resist them (Place, 1993).

While Amish communities offer modern Americans an alternative to what can be a seductive and destructive technological system, the Amish are not like Hindus who respect the spiritual lives of animals. Amish farmers are nearly always involved in animal husbandry. Butchering animals to eat does not coincide with the concept of ahimsa, or total non-violence to all creatures. The Amish strive to be stewards of God's world and, like many Christians, consider themselves to be "higher" than the animals and plants.

Thus the ecological impact of Amish communities is somewhat mixed. As mentioned above, most Amish would not consider themselves environmentalists, at least not in the modern sense, for example, of belonging to the Sierra Club. They work the land, however, and have an affinity for that land. In some regions, Amish people have been farming the same land for over 200 years. They have persisted in farming even as many American family farmers have gone bankrupt (Berry, 1981). For the United States, they do seem to be a promising model of rural sustainability (Lapping, 1997).

The questions remain. Do the Amish truly have a more ecologically and socially sustainable lifestyle than their American neighbors? If so, what factors lead Amish communities to be more sustainable? What role does the *Ordnung* (code of rules) play in influencing ecologically and socially sustainable behavior? How does Amish agriculture compare to alternative/sustainable agriculture? If Amish communities consume less resources (goods and services) than typical American communities and/or practice a more sustainable type of agriculture than non-Amish farmers, is that behavior a result of a conscious ecological worldview, a religious worldview, an artifact of limited technology, or something else? In other words, which cultural values best predict and influence Amish behavior?

Methodology

The Geographic and Social Setting: Kishacoquillas Valley, Mifflin County, Pa.

To address these questions, I chose to study the Amish settlement in

Kishacoquillas (Kish, for short) Valley in Mifflin County, Pa. The valley is quite isolated, bounded by mountain ranges on the northwest and southeast, with narrow gaps at either end. Although physically isolated, the valley is ecologically linked to the larger Susquehanna River Basin via Kishacoquillas Creek, a tributary of the Juniata River that eventually drains into the Chesapeake Bay. Figure 1 shows the location of Mifflin County and Kish Creek in relation to the rest of Pennsylvania.

Kish Valley features a unique religio-cultural landscape. An unusually high concentration of Amish and Mennonites (another Christian denomination with historical and religious ties to the Amish) live in Kish Valley. The Mifflin County Mennonite Historical Society reports that nearly every farm between the villages of Allensville and Belleville, seven miles apart, is being farmed by an Amish or Mennonite family.

Four distinct Amish-related groups, distinguishable by their different modes of transportation, live in Kish Valley. Three Old Order groups drive buggies: the Renno Church Amish drive black buggies, the Byler Church Amish drive yellow buggies, and the Nebraska Church Amish drive white buggies. The Amish Mennonites (also known as the Beachey Amish) may own and use automobiles, but these vehicles must be painted black. These outward choices reflect different religious beliefs among the four groups. Each group has a somewhat different *Ordnung* (code of rules), which guides the behavior of its members, especially in regards to acceptable technologies and dress codes.

Research Methods

My research entailed observation of and interviews with Amish, Mennonite, and

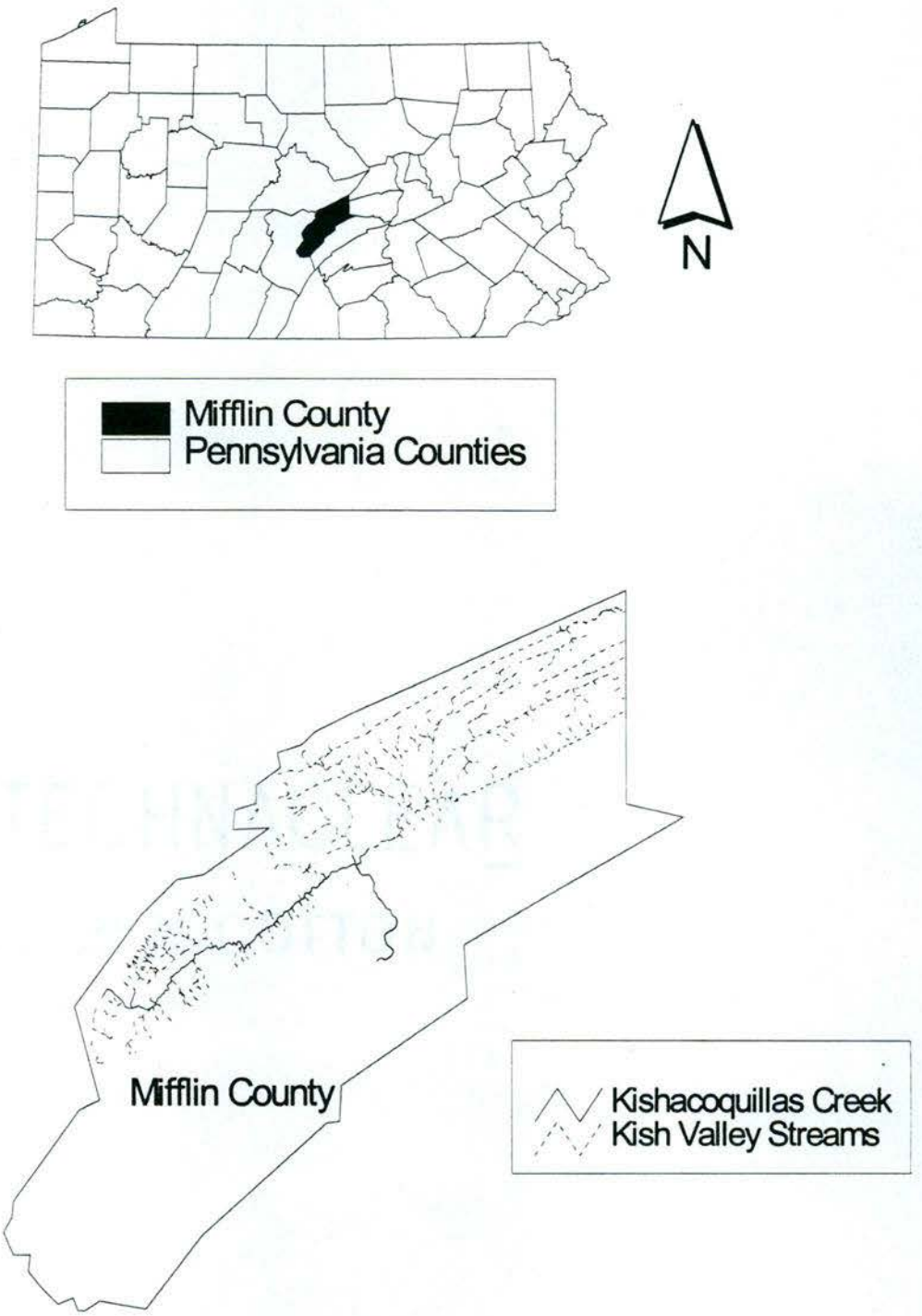

Figure 1. Kishacoquillas Creek, Mifflin County, Pennsylvania

non-Amish/Mennonite farmers in Kish Valley about their agricultural practices (representing environmental behaviors) and their general beliefs about human-nature relations (representing environmental attitudes). I surveyed 15 to 20 members of two different Amish groups, the Renno Church and the Nebraska Church, in order to examine what effects a different *Ordnung* has on environmental attitudes and behaviors. If the more typical Old Order Amish group (Renno Church), with its non-modern, low-technology lifestyle, proves to practice a more sustainable type of agriculture than their non-Amish neighbors, does the higher level of isolation and technological rejection that exists within the Nebraska Church (the most conservative Amish group in Kish Valley) lead to an even more sustainable type of agriculture?

I also surveyed an equivalent number of Mennonite farmers in order to study the environmental attitudes and behaviors of a group that shares a common history and similar theology with the Amish, but does not have a powerful social mechanism that prescribes and enforces individual behavior. Finally, I surveyed non-Amish/Mennonite farmers in the valley in order to provide a control group that shares the same geography and local history, but does not share the same religion. (For the remainder of the paper, non-Amish/Mennonite farmers will be referred to as the "English," the Amish term for English-speaking Americans, for the sake of brevity.)

For the agricultural practices section of the interview, I borrowed a questionnaire used in a study of modern Amish farming in New York (Blake et al., 1997). The study examined Amish and non-Amish agriculture in northern New York to see how the groups' farming practices compared to an ideal type of ecological agriculture. The major

topics covered in their survey are listed below. See Appendix A for the full questionnaire.

1. Amounts of land farmed, land leased, and plans for expansion
2. Crop types and acreage over the past three years
3. Animals on the farm over the past two years
4. Products marketed and locations of markets
5. Methods of pest control during the last growing season, including insecticide and herbicide use (types, amounts, and frequency of applications)
6. Fertilizer use and amounts over the past year
7. Crop rotation
8. Sources of agricultural information. (Blake et al., 1997, p. 149)

After administering the farming practices questionnaire, I asked the farmers to respond to an environmental attitude survey, consisting of 17 statements about the state of the environment and the relationship between humans and nature. Responses were assessed using a four point Likert scale (Strongly Disagree, Mildly Disagree, Mildly Agree, and Strongly Agree). The statements come from the New Environmental Paradigm and New Ecological Paradigm scales developed by Dunlap and Van Liere (1978) and Dunlap et al. (1992).

The original New Environmental Paradigm (NEP) scale is the "most frequently used measure of public environmental concern" over the past 20 years (Stern et al., 1995, p. 724). The New Environmental Paradigm is contrasted to society's Dominant Social Paradigm (DSP), which contends that growth and progress are good and inevitable, that private property rights are supreme, and that humans are more important than other creatures (Dunlap and Van Liere, 1978). The NEP scale is used to show whether and how much the public's sentiments about the environment are changing from the old DSP. The original NEP scale was updated in 1992, but this research has yet to be published

(Dunlap et al., 1992).

Since most of the studies examining the NEP have used the original scale, I decided to use the original scale as a whole, to allow for better comparison with other studies. Five additional statements from the New Ecological Paradigm scale were also included in the survey. See Appendix B for the text of the two scales.

After administering the NEP to the samples of Amish and non-Amish farmers, I compiled and analyzed the data using standard quantitative analysis methods, comparing the different study groups to one another and to other NEP studies.

I hypothesize that the Amish use agricultural practices that are considered to be more sustainable than those of non-Amish farmers. I also hypothesize that the Amish will not score highly on the NEP scale, possibly owing to their religious beliefs, limited public education, and isolation from mainstream society. However, considering the research that has been done on environmental attitudes, a relationship should exist between a group's environmental attitudes (score on the NEP) and its environmental behaviors (sustainability of agricultural practices). The results of both questionnaires are compared.

Significance of This Study

This study adds significantly to the discussion of religion and ecology, examining the interaction of religious beliefs with environmental attitudes and behaviors. Findings could also add to the overall discussion of how environmental attitudes lead to environmental behaviors. If the first two hypotheses stated above are supported by the

study, it could raise interesting questions as to whether the NEP is able to account for all the beliefs that may lead to positive environmental behaviors. Perhaps the Amish situation is unique; neither industrial (modern) nor ecological (post-modern), the Amish worldview may not fit either the DSP or the NEP. While it is beyond the scope of this study to fully explore this topic, most research that examines environmental behavior looks at recycling or other urban, contemporary forms of environmentalism. The Amish example likely would not fit well into these indicators of environmental behavior either.

Also, while the Amish have been studied rather extensively (especially by graduate students like me), most of this research has been cultural description, rather than analysis from an environmental perspective. The leading researchers of the Amish often make various statements regarding the religio-ecological perceptions of the Amish, including their closeness to nature and their belief that to reduce soil fertility is a heinous sin (Hostetler, 1993; Schwieder and Schwieder, 1975). However, it is not clear whether these comments are representative of the Amish community as a whole or only the opinions of a few Amish people. This study should help to systematically demonstrate the extent to which Amish people hold an ecological worldview.

Much of the support for the Amish as a model of rural sustainability is predicated on anecdotal and descriptive evidence, primarily the work of three people: Wendell Berry, Gene Logsdon, and David Kline, himself an Amish farmer (e.g., Lapping, 1997). Many of the researchers that have actually performed analytical studies of Amish agriculture have only observed a few farms (Jackson, 1988; Moore et al., in press; Stinner et al., 1989). In contrast, Blake and her colleagues at St. Lawrence University in New

York conducted a study of almost 60 farms, and their findings clearly demonstrate that Amish farmers use considerable amounts of chemical fertilizers and pesticides (Blake et al., 1997). The present study will help to show whether the Blake et al. findings are confined to that Amish settlement, or whether they indicate a larger trend among the Amish to convert to more modern agricultural techniques.

On the other hand, critiques of the Amish by neighbors are also extremely anecdotal. A study that attempts to more thoroughly assess the Amish and their environmental attitudes and behaviors could help to clear up the perceptual dissonance regarding these anecdotal viewpoints.

From a policy perspective, this research will help to explain whether religious belief in general plays a role in the development and maintenance of sustainable communities. Studies of Amish agriculture often end by saying how difficult it would be to transfer Amish practices to non-Amish communities (Grønvold, 1996). Amish life is too strict, too ascetic. No one will adopt these practices voluntarily. In contrast, a few optimistic people believe that the ecologically-positive aspects of the Amish lifestyle can be adopted by others without having to accept the theology and social organization behind it (Brende, 1996). Both of these views seem too simple, and I explore this question in more depth to determine what are the crucial aspects of Amish culture that maintain their distinctiveness and apparent sustainability.

I have personal reasons for wanting to study this region and these people as well. My mother grew up in Kish Valley, and her ancestors lived there for at least two generations, making this area a culturally important landscape for me. As a Mennonite, I

find myself challenged by the extreme piety the Amish express. On the one hand, I believe that one can be less visibly separated from the world but still maintain a religious distinctiveness that leads to different values and actions. On the other hand, however, the Amish serve as a reminder to me that one can survive without the modern luxuries I take for granted. They not only survive without luxuries, but their faithfulness might even depend on rejecting them. This study is important for me in terms of what the Amish are able to teach me about life in a modern world.

Limitations of This Study

The present study focuses on only one Amish settlement. Therefore, the results are not necessarily descriptive of other Amish communities, much less other religions. Similarities exist between the situation of the present study groups and that of other ethnic communities in the United States, including other Amish settlements, but generalizing beyond the present study area must be done with great care.

Also, the present study focuses primarily on male farmers. It will not accurately assess the views of Amish women or non-farming Amish men. This is a significant limitation, especially considering that women generally score higher on measures of environmental concern (Stern et al., 1993). The decision to confine my study to men is based on the likelihood that Amish women would be averse to talking to an "English" male alone. A more thorough study of the environmental attitudes of different sectors of the Amish community awaits another researcher. As long as this gender bias is clear from the outset, the study should still be an interesting comparison of male farmers from

different religious groups. Also, since the men are usually the primary decision-makers when it comes to farming practices (especially among the Amish), they have the most influence over the most significant ecological behaviors in the family. While household consumption is an important factor in Amish sustainability, farming involves the greater energy inputs and ecological impacts by far.

Organization of This Study

The following chapter describes previous research on the history, worldview, institutions, and farming practices of the Amish, exploring these components of Amish culture with the goal of discerning why an increasing number of people consider the Amish to exemplify sustainability. Chapter III describes the methodology used in the present study, including sampling techniques, a more detailed description of the four study groups and the reasons for their inclusion, the questionnaires used in the interviews as well as an explanation of their use, and a description of the interview process. Chapter IV presents the results of the present study, beginning with a discussion of the observations made while living among the Amish of Kish Valley, including general impressions of the Amish and the social and geographical context in which they live. Next, the survey data are presented and compared among the different study groups, as well as to the results of other studies using similar methods. Finally, responses to open-ended questions are presented. Chapter V concludes by summarizing and comparing the findings of both the agricultural practices and environmental attitude questionnaires, and discussing the relationship of Amish religion to sustainability.

CHAPTER II

LITERATURE REVIEW

The Old Order Amish may be a living example of a non-modern, sustainable culture. They have retained their distinctive agricultural lifestyle in the face of modernizing forces that have disenfranchised not only indigenous people, but also American family farmers. While their cultural persistence in the midst of an assimilative dominant culture is impressive in itself, the Amish have attracted attention from environmentally-concerned people who see in them the possibility of an ecologically sustainable community. The task of this chapter is to study the literature that leads people to think that the Amish may be an ecologically sustainable community. The Amish culture is described in terms of its history, worldview, institutions, and farming practices.

Brief History of the Old Order Amish

The Old Order Amish number approximately 140,000 and live primarily in the states of Pennsylvania, Ohio, and Indiana (Hostetler, 1993). They have their origins in Europe (Switzerland, Germany, and the Alsace region of France) and are a product of the Anabaptist wing of the 16th century Reformation. Anabaptists rejected the practice of infant baptism, which was the means by which the state assigned citizenship and levied taxes. This decision, along with their refusal to acknowledge the sovereignty of the state

in other crucial matters such as military service, led to persecution of the Anabaptists by the Catholic and Lutheran state churches. In the face of persecution, Anabaptists fled into the foothills and mountains of central Europe in order to avoid confrontation and martyrdom, but the church persisted and grew, nevertheless.

The Amish formed as a distinct group in 1693. Jacob Amman, a Mennonite leader, split from the Swiss Mennonites (one of the original Anabaptist groups) over disagreements about how to maintain the purity of the church. Amman felt that Christian believers should live moral, godly lives; those who did not live up to the community standards should be expelled from the church and shunned. The other Mennonite leaders were growing more lenient, allowing errant individuals to remain in fellowship with the congregation.

Historians have noted that the Amish (and the Anabaptists in general) developed their agricultural lifestyle after being forced off of their land and onto poorer hinterlands (Hostetler, 1993; Séguy, 1973). This led them to experiment, and they developed crop rotation, the use of natural fertilizers like clover and alfalfa (to increase soil fertility), and stable feeding of cattle before other central European agricultural communities (Kollmorgen, 1943).

Many Amish migrated to the United States in the early to mid-1700s, and again in the early 1800s, because of ongoing political persecution and marginalization, economic hardship, and regional conflicts. These migrations were crucial to the Amish, for if they had remained in Europe, researchers believe they would not have survived as a distinct subculture (Hostetler, 1993). No Amish congregations exist in Europe today; all

remnants have lost their Amish identity, assimilating into other Christian groups.

Modern Views of the Amish

The popular modern view of the Amish is one of a visually distinctive people. They are rural and agricultural, preferring farming as a way of life. They drive horses and buggies rather than cars. The men wear untrimmed beards (but no mustaches) and use suspenders rather than belts, while the women wear bonnets and plain, dark-colored dresses. They use horses rather than tractors to plow the fields. They speak Pennsylvania Dutch, a German dialect. Their appearance as "pre-modern" or "backward" remnants of a bygone era proves to be a great tourist draw, attracting many city-dwellers to visit these anachronistic oddities and, through them, to experience vicariously the rural idyll. In recent years, the Amish have even begun to be darlings of pop culture, with Amish characters featured in movies such as Witness, Kingpin, and For Richer or Poorer, and in "Weird Al" Yankovic's music video, Amish Paradise. The Amish aura spreads far and wide; Lane Community College, located in Eugene, Ore., over 2,000 miles from the major centers of Amish life, offers a class on "Amish Culture: The Complexities of Simplicity."

Meanwhile, the Amish have also gained attention from a more serious front: environmentalists. Concerned about the effects of modern U.S. society on the natural world, a number of writers, academics, and activists have looked more closely at the Amish to see if they could be used as a possible model of a more benign relationship with the more-than-human world. The Amish have been cited as living examples of E.F.

Schumacher's "frugal community" (Foster, 1981), their agriculture has been compared to alternative/organic/sustainable agriculture (Craumer, 1979; Grønvold, 1996; Stinner et al., 1989; Zook, 1994), and their careful examination of science and technology has been compared to Rachel Carson's critiques of the unquestioned use of chemicals (Daniel, 1993). In addition, Wendell Berry, a well-known author/farmer who writes prolifically about the importance of maintaining strong rural, agricultural communities, lauds the Amish and what he calls their "Christian agriculture, formed upon the understanding that it is sinful for people to misuse or destroy what they did not make. The Creation is a unique, irreplaceable gift, therefore to be used with humility, respect, and skill" (Berry, 1986, p. 213). In a similar vein, Mother Earth News featured the Amish in a special section on "Environmentalism and Spirituality" because "they demonstrate ... that spiritual motivation can, indeed, lead to positive ecological acts" (Stone, 1989, p. 60). And recently, a connection has been drawn between the Amish and the popular ecological concept of biodiversity (Moore et al., in press).

Ecologically-Relevant Cultural Components of the Amish

Amish Worldview

The Amish worldview is based on a literal interpretation of the Christian Bible. As an example of this literalism, only six percent of Amish surveyed in one study disagreed with the idea that the Earth was only 6,000 years old (Rechlin, 1986). This a-scientific worldview sees the physical world as God's good Creation, beautiful and

orderly (Hostetler, 1993).

Since there are many other groups who consider themselves Christian (and some that are also literalists) but who do not share the Amish people's strict and distinctive beliefs, some other factor must also be at work. Indeed, the Amish interpret the Bible through the lens of the Dordrecht Confession of Faith (Gallagher, 1981). Written in 1632, this document outlined the basic Anabaptist beliefs about God, Jesus, humanity, and the importance of humanity's obedience to God the Creator. The Confession also includes guidelines showing Christians how to avoid sin and thereby receive salvation. These guidelines include explicit lifestyle expectations, many of which derive from Jesus' "Sermon on the Mount" (Matthew 5-7) and from the letters of the Apostle Paul.

An important Amish cultural and spiritual attitude flows from New Testament descriptions of obedient living. *Gelassenheit*, or yielding to a higher authority, provides the underlying foundation of Amish society. According to Kraybill (1998), this attitude "reflects the most fundamental difference between Old Order culture and modern values" (p. 102). *Gelassenheit* allows the church community to cohere and to function smoothly by encouraging Amish individuals to put personal ambition and pride second to the needs of the community.

The Amish tend to give more weight to the New Testament of the Bible, but they still take the Genesis creation story very seriously, especially the command "to till and keep" God's Creation. In fact, they consider stewardship to be a moral responsibility, one with salvific implications; as one Amish man put it, "It helps you act ecologically if you know you're going to hell if you don't" (Stone, 1989, p. 60).

Being a Christian group, the Amish must face Lynn White, Jr.'s oft-cited critique that Genesis' command to humans to "have dominion" over Creation leads to Christianity being the root cause of the ecological crisis (White, 1967). In a study of a northern Indiana Amish community, only 16 percent of the Amish disagreed with the statement, "God gave us the world and all its creatures and plants to use and dominate" (Rechlin, 1976, p. 145). This attitude would seem to support White's view that Christians in general, and the Amish in particular, are anthropocentric. The Amish have no qualms about using domesticated animals for transportation, farming, or food since they believe that God told them to rule Creation. However, that rule is tempered and guided by the command "to till and keep," and by God's ownership of the land. Creation is ultimately God's, and humans don't have the right to damage God's world.

The Amish concern with stewardship and obedience to God may indicate a theocentric worldview, in marked contrast to the popular anthropocentric-ecocentric dichotomy discussed in environmental circles. A number of Christian theologians see true stewardship as essentially theocentric, where God is the Source of all life and humans are only part of the whole (Young, 1997). Theocentrism stands in opposition to the humanistic assertions of anthropocentrism.

While theologians and environmentalists will continue to debate the merits of theocentrism versus ecocentrism, it is apparent that theocentrism can lead to ecologically positive attitudes. For example, the study cited above also found the Amish strongly agreeing with the idea that "on earth, men as well as animals, the winds and rains, and <u>all things work together</u> according to a plan which God has made" (Rechlin, 1976, p. 145,

emphasis mine). This statement sounds quite ecological and theocentric. Indeed, at least some Amish people consider their "community" to include the land and all of its residents (Kline, 1990), which seems somewhat akin to Aldo Leopold's "land ethic" (Leopold, 1974).

Even when the Amish feel connected to the land, though, their religion still comes first. In discussing his home and the possible necessity of moving, one Amish man said, "All the roots are here. Leaving here would be like pulling up a plant by the roots. But I would do that, if that's what it takes, before we give up our faith" (Ericksen et al., 1980, p. 66).

Another scriptural influence that affects the Amish use of technology, and thus their ecological impact, is their concern with worldliness. Two passages from the Apostle Paul's New Testament letters lie at the foundation of this belief: "Be not conformed to this world, but be transformed by the renewing of your mind" (Romans 12:2), and "Be not unequally yoked together with unbelievers; for what fellowship hath righteousness with unrighteousness" (2 Corinthians 6:14). These passages emphasize the duality of the world (good and evil, obedience and disobedience) and the need for Christians to separate themselves from the unrighteous world, thereby distinguishing themselves as people of God. The Amish have interpreted these passages to mean that they should maintain distinct material and spiritual differences between themselves and the "world" (Hostetler, 1993). Nonresistance, or non-participation in the government (especially the military), is one result of this belief, which they share with some Mennonite groups. However, the Amish have taken the idea of separation further than

many Christians, to include a prohibition on many forms of modern technology. Their lives are full of visible and not-so-visible examples of how they are not of this world (at least not of the modern United States). The most obvious difference is their unwillingness to own cars. However, the arguably most significant break with modern society is their decision to remain "off the grid." The Amish do not use centralized electricity, nor do they have telephones in their homes. Both of these are examples of refusing to be "yoked together with unbelievers."

Jesus' admonition to love one's neighbors is also considered to be an ecologically significant ethical norm. Many modern actions involve far-reaching impacts, such as the use of pesticides that show up in rain and groundwater, and the use of electricity which supports (at least in the Appalachian region) strip-mining of coal, the destruction of farms, and the onset of acid rain. David Kline, an Amish writer, asks, "Can you love your neighbor and do this [use pesticides]?" (1990, p. xviii).

The rural presence of the Amish is not merely an accident; it has become a part of their worldview. The Amish believe it is easier to live a Christian life in rural areas, and that big cities tempt people to a life of immorality (Rechlin, 1976). Also, the Amish feel closer to God when they are working in the field or walking in the forest (Hostetler, 1993). Thus, while there may be no scriptural prohibition about living in a city, the Amish feel that it is essential to their Christian life that they retain their rural character.

In an era in which American children are more likely to know how to use computers than how to grow food and will likely spend more time playing Nintendo than experiencing nature, the Amish people's rural lifestyle offers an alternative to an out-of-

touch urban/suburban world. Assuming that part of the environmental problem with modern society is its alienation from the natural world, the Amish predisposition for a rural lifestyle could be a positive model for re-imbedding human society in the natural world.

Amish Institutions

Amish institutions, while not overtly ecological, play a vital role in perpetuating the Amish culture as a distinct subculture within modern U.S. society. Thus, if the Amish lifestyle of sustainable agriculture and conservative consumption is truly more ecologically sustainable than the majority society, the institutions which preserve this sustainable community ought to be considered of primary ecological significance. Long-lasting indigenous cultures like the Australian Aborigines and the North American Cree are often considered to be ecologically sustainable, but they haven't necessarily been able to thrive next to the dominant culture (Kinsley, 1995). A key question that arises, then, is how are the Amish able to successfully maintain their cultural particularity within an assimilative dominant culture? Their success is clear; the Amish have been doubling in population every 25 to 30 years since the turn of the century and geographically expanding, yet staying in farming and maintaining reasonable prosperity.

The Amish, who shun the intervention of government institutions, have two primary internal institutions: family and community (Berry, 1986). The extended family is the most important social unit in Amish life, and it takes a strong community to support strong families. The issue of modern technology and its place in Amish life is

inextricably tied to the Amish concern for their communities. Modern technology is not rejected simply because it is new or produced by the "world," nor because the Amish dislike high-tech gadgetry. The Amish apply what could be considered a version of the environmentally popular "precautionary principle" to all new technologies; they reject technologies that have the potential of hindering their efforts to do God's will (Gallagher, 1981). According to Hostetler (1993), "Community-building is central to the redemptive process; salvation is not an individualistic effort" (p. 75). Thus, technologies such as motor vehicles, televisions, and telephones that threaten to disrupt the viability and connectivity of the redemptive community are rejected.

To the Amish, the persistence and vitality of their communities has incredible spiritual significance. The Amish community is not simply a sociological group; to them it is, in the Apostle Paul's terms, "the body of Christ" (1 Corinthians 12:27).

Since community preservation is so important, the Amish have developed strong boundary-maintenance tools. Rules of behavior are necessary to maintain conformity to community standards and, thus, to maintain the unity of the group. The Amish recognize that an individual can introduce change into the community through personal decisions, change which could threaten the stability and persistence of their community. If one person purchases a car and remains in the group, for example, others will gradually follow that lead. In order to keep this from happening, the Amish have used an unwritten rulebook called the *Ordnung*. Each church district (approximately 30 families) has its own *Ordnung*, which guides the behavior of the community. The *Ordnung* is a significant ethical code; break it and face excommunication and *Meidung*, or shunning.

Once excommunicated, no one from the community, not even one's immediate family, is allowed to speak with the offending person (Hostetler, 1993).

Amish life is quite decentralized and self-sufficient, thanks to the lack of large, overwhelming institutions (Foster, 1981). This leads to development of different practices depending on the ecological niche in which they find themselves. In the Great Plains, for example, Hostetler (1980) found that the use of tractors became necessary for Amish agricultural survival on large, flat tracts of land. The fact that each church district has its own *Ordnung*, and that each *Ordnung* can be changed by consensus decision, allows for this kind of variability and adaptation to the environment. Sometimes the shapes of church districts on the landscape are even related to the local watershed geography (Moore et al., in press). The self-sufficiency and regional variation (depending on environmental conditions) inherent in the church district system seem rather similar to the environmental concept of bioregionalism.

Amish Practices

Amish practices that are ecologically positive owe their origin and their strength to both Amish worldviews and institutions, as well as to history and the ecological niche in which they find themselves. The direction of influence among the three main categories is not always clear; the category boundaries themselves are also quite fluid. In other words, the whole of Amish culture is not cleanly divisible into its parts. Even so, we can discuss the Amish practice of agriculture as one which defines who they are as a people, and one which best exemplifies their ecologically sustainable impact.

Agriculture

Amish agriculture is in some ways simply pre-World War II agriculture (Logsdon, 1988). However, it is not "backwards," at least not in the sense that it is unsuccessful. The fact that many Amish have persisted in small-scale, diversified agriculture in an age in which agribusiness claims farmers must "get big or get out" demonstrates the success of their practices. This success has attracted many people who are interested in finding sustainable alternatives to modern agriculture, Wendell Berry being the most prominent.

Berry likes Amish agriculture for a number of reasons. "They are far more productive than consumptive, they support families and communities, and they preserve and improve the land" (Berry, 1981, p. xiv). The Amish also endeavor to pass on the land to the next generation, using little fossil fuel and few pesticides and fertilizers. It should be noted, however, that many Amish do not practice strictly organic agriculture; according to at least two studies, their use of inputs is minimal, but they do not avoid them entirely (Blake et al., 1997; Craumer, 1977).

The diversified farm of the Amish starts with a diverse homestead. Instead of a cash crop monoculture, most Amish farms are a mixture of crops, pasture, and woodlots; animal husbandry is nearly always practiced and is often the primary source of income. Diversity of crops and livestock leads to a harmony, as the livestock waste feeds the crops, and the crops and pastureland feed the livestock.

On the Amish farm, ecological diversity includes humans. Sometimes environmentalists are accused of being misanthropic in their love for nature; their support

for removing humans from wilderness areas and their distaste for resource-based communities are two related examples. In response to these criticisms, one writer suggests that environmentalists ought to study the way the Amish work with, and include humans as part of, nature (Stone, 1989). Kline, the previously-mentioned Amish writer, echoes those who decry the removal of indigenous people from wilderness areas. He suggests that if Amish farmers were removed to make way for a "wildlife area" there would be less wildlife than before. To support his idea, he once counted, nesting around his farm buildings, 1,800 young of 13 species (Kline, 1990, p. xx). This is only a small portion of the birds that live in the surrounding fields, woods, and riparian areas. In the last 25 years, he has seen 175 bird species reside at or fly over his 120-acre farm in east-central Ohio (Kline, 1997, p. 8).

Other significant components of Amish farming include crop rotations and the use of horses rather than tractors. Crop rotations, traditionally a four-year cycle involving corn, oats, wheat, and hay, include legumes, which reduce the need for purchased fertilizers even further than the use of animal manure. Rotations tend to inhibit insect pests since they can't "camp out" on a monoculture from season to season. Rotations and cultivation also keep the weed species to a minimum, with little need for herbicides except in spot application. Traditional Amish practices once again look similar to a modern environmentally friendly practice: Integrated Pest Management.

The use of horses instead of tractors is ecologically beneficial for a number of reasons. Horse-drawn machinery weighs much less than tractor-drawn machinery, leading to a reduction in soil compaction (Jackson, 1988). Horse waste can be plowed

back into the field as a cheap source of nitrogen, and possibly produces fewer greenhouse gases than a tractor's waste (although this is mostly conjecture). Horse "fuel" consists of feed that can be grown on the farm, rather than fossil fuel, a non-renewable resource. Horses, being biological creatures rather than mechanical ones, procreate, allowing the farmers themselves to have more control over the supply. As one Amish man said, "When John Deeres start having baby John Deeres, then maybe I might get envious of tractor farmers" (Logsdon, 1988, p. 28). But beyond the issues of energy efficiency and cost-benefit analyses, Wendell Berry believes that horse farming works well precisely because horses are living creatures: "[Horses] fit harmoniously into a pattern of relationships that are necessarily biological, and that rhyme analogically from ecosystem to crop, from field to farmer" (Berry, 1983, p. 75).

Amish farms have even been shown, in quantitative studies, to be more energy efficient than typical modern farms. Two studies, undertaken during the "energy crisis" of the late 1970s, compared the efficiency and productivity of Amish farms to that of modern farms in different regions of the country (Pennsylvania, Illinois, and Wisconsin) to see whether the Amish offered a viable alternative to agribusiness in the face of potential future energy scarcity (Craumer, 1979; Johnson et al., 1977). The researchers assumed that the Amish would be more energy efficient, but that this increased efficiency would come at the cost of decreased productivity. Energy efficiency ratios were calculated by dividing the energy output (crops, animal products) by the energy input (feed, fuel, fertilizers and pesticides, machinery, repairs, etc.). Productivity was determined by dividing total output by the size of the farm. In Pennsylvania, typical

Amish farms were two to three times more efficient than modern farms, but just as productive per hectare as modern farms. (Farmers from the Nebraska Church, a more conservative Amish sect that uses even less technology and inputs than their fellow Amish, were the most efficient, but only about one-half as productive as the other Amish and modern farmers.) In Illinois, however, where land is flat and farms are large, the Amish were about equivalent in efficiency, but only half as productive as the modern farmers. In Wisconsin, the Amish were four to six times as efficient but only 65 to 80 percent as productive as their modern counterparts. From a cultural ecology perspective, Amish culture seems well-adapted to the diverse landscape of central Pennsylvania, yet cannot utilize the Illinois landscape as efficiently and productively as their neighbors, who use modern agricultural technology (Johnson et al., 1977). Thus, in certain locations, the Amish can be more efficient than modern farmers without sacrificing productivity; in the Farm Belt, however, modern agricultural technology is just as efficient as – and considerably more productive than – Amish methods.

To sum up the positive nature of Amish agriculture, Pete Daniel (1993) writes, "The limited and considered use of science and technology by the Amish suggests an alternative to the uncritical adoption of capital-intensive farming methods that cause human displacement and ecological damage" (p. 52).

Household

The Amish concern for a simple lifestyle also contributes to their low environmental impact. Jesus' example of owning very little and condemning greed

combines with the Amish reality of low technological capability to result in extremely low energy consumption by Amish households. In the Johnson et al. (1977) study, household energy use for the average Amish farm family was only one-tenth the amount used by the average American farm family. "If the Amish are conservationists," the researchers claim, "it is primarily in their consumption pattern. Their major contribution to energy conservation is in the limited demands they make on available resources to support their way of life" (Johnson et al.,1977, p. 378). One Amish woman, tracking her household spending for one month in 1987, spent only $400 for a family of seven, which included cooking and heating fuel, food, clothing, hardware, toiletries, transportation, and community insurance (Logsdon, 1988). Overconsumption is not generally a problem in the Amish community; they could write the primer on the eco-vogue topic, "voluntary simplicity."

Environmental Critiques of the Amish

While to some the Amish are the new environmental heroes, they do not escape criticism. The area for which they receive the most consistent criticism is their high fertility. Amish women each have an average of seven children, which leads to the doubling of Amish population every 25 years or so (Hostetler, 1993). Amish demography charts resemble those of developing countries (e.g., Hewner, 1998). However, large families appear to be intimately associated with the Amish community's agricultural way of life. Amish agriculture requires large amounts of labor. Children are significant assets in helping to run a farm. In fact, a recent study has found that Amish families whose

household heads work off-farm have fewer children (Wasao and Donnermeyer, 1996).

The Amish reproductive success demonstrates that they are a successful non-modern group. They are growing even though they are unsupported by the mainstream U.S. culture. While some environmentalists are disturbed by the Amish people's copious offspring, they could take heart in the fact that a group that challenges the mentality of modern America is actually thriving.

While the rapid population growth of the Amish may not have global implications, it does lead to problems at a local level. Amish communities expand rapidly, as present farm owners buy or subdivide new farms for their children. As they do, land prices skyrocket and the amount of available land decreases. Coupled with rapid suburban development in some Amish settlements, such as Lancaster County, Pa., this situation poses a dilemma for Amish culture. When an Amish family cannot set their children up on a farm, it usually leads to one of three results: one, out-migration or conversion to another church; two, a modification of lifestyle, such as non-agricultural jobs or more intensive farming on highly subdivided farms; or three, a reduction of fertility. "The Amish have had a culture that is intimately adapted to the environment," write Ericksen et al. (1980, p. 67). "It is from the increasing contradiction between the cultural tradition and the ecology that change can be expected to appear." In other words, population pressures in local areas can overtax or damage ecosystems, resulting in cultural change, which is a traditional environmentalist critique.

Another environmental critique of the Amish involves water pollution caused by Amish farming practices. Population pressures also exacerbate this problem. Smaller

farms and higher concentrations of animals lead to an overabundance of manure, which is often applied to the soil on the basis of disposal needs rather than on crop nutrient needs. Heavy application, combined with winter manure spreading on frozen ground, leads to pollution of local wells, waterways, and, in the case of Pennsylvania Amish, the Chesapeake Bay. The Amish have recently been facing more active enforcement of environmental restrictions related to manure management (Place, 1993).

While nutrient pollution is hardly confined to the Amish, the Amish may be more concerned about the problem than other farmers, at least in some cases. A study in Ohio has shown that the Amish are "significantly more likely than non-Amish to be aware of potential ground water pollution problems and to be more willing to act to prevent degradation of the resource" (Sommers and Napier, 1993, p. 138). Thus, even though the Amish are thought to be socially isolated and unconcerned about problems in the larger society, environmental problems included, perhaps this is an overgeneralization. However, it must be noted that the "Amish" sample (n=52) in this study consisted of a large number of Mennonites (n=25), who are more connected to the world and may be more aware of its issues and problems (Sommers and Napier, 1993, p. 131). Sommers and Napier's (1993) findings would suggest that if nutrient pollution does prove to be a problem in Amish communities, they will know that and correct it as soon as possible. More research needs to be performed to see if Amish in other areas share these attitudes and/or this level of awareness.

Regulatory concerns sometimes lead to clashes between the Amish and local governments. Soil conservation is an important ecological concern, considering that soil

erosion is a widespread problem for modern agriculture. One method used to estimate soil loss calculates that the Ohio Amish are losing 7-15 tons of topsoil/acre/year (Jackson, 1988, p. 483). Thus the Soil Conservation Service counsels the Amish to switch from traditional tilling methods to "no-till" agriculture. While no-till agriculture reduces soil loss and promises "green fields forever," the benefits of reduced erosion are balanced by the burdens of increased herbicide use and subsequent pollution (Kline, 1990). In a study comparing traditional Amish plowing to no-till agriculture, Jackson (1988) found that the Amish farm had significantly higher levels of organic matter in the soil, reduced soil compaction, and higher infiltration rates than the no-till farm. Jackson concludes that the method by which soil loss is estimated is probably inaccurate in the case of the Ohio Amish.

Land use planners can conflict with Amish communities, even when they are ostensibly trying to help. Agricultural zoning protects the Amish farming lifestyle by requiring low residential densities and restricting commercial uses of property in agricultural areas. However, these restrictions can also cause problems for the Amish, who are increasingly running small businesses out of their homes. As land grows scarce, cottage industries become more prominent in Amish communities, leading the Amish to appeal to local governments to amend their zoning laws to allow such small businesses (Place, 1993). Although they have not yet led to rampant business development in Amish country, such amendments weaken the restrictions meant to protect the rural character of the community.

In a similar vein, the amount of permits and plans and studies needed in order to

do any kind of land development can sometimes frustrate the Amish. Even when these regulatory processes are used to prevent rural development from damaging the rural environment, the Amish can often find themselves in opposition to the laws. There have been a number of cases where Amish people were cited and even jailed for failing to obtain the proper permits before adding on to a building or installing a privy. Often the local authorities even agree that no harm is being done to the environment by the prohibited Amish activity, yet the regulation (written for more dense developments and a higher level of per capita consumption) is enforced. Sometimes the regulations directly conflict with a traditional cultural practice, such as adding on a "grossdaddi" (grandfather) house for retired parents. In Lancaster County, Pa., families must jump through eight regulatory hoops (plans and permits) before they may begin building such an addition (Place, 1993).

The Amish as a Sustainable Culture

In order to consider whether the Amish live up to their billing as a sustainable culture, a clarification of sustainability is needed. Noted anthropologist John W. Bennett (1993) writes that sustainability requires two basic achievements, "the maintenance of productivity of a resource base" and "the stability of a particular socioeconomic regime that supported this [maintenance of productivity]" (p. 167). It is helpful, then, to discuss the sustainability of the Amish in terms of these concepts.

When it comes to maintaining the productivity of their resource base, the Amish are quite effective. Out of 228 identified Amish settlements, 18 were formed prior to

1900. While this number may seem small, these 18 settlements account for 572 of 1,020 church districts. The top 10 existing Amish settlements in terms of size were all formed before 1900 (Garrett, 1996). These statistics demonstrate the persistence of Amish farming over the centuries. If the Amish were not able to maintain the productivity of the soil, they would not have survived this long as an agricultural people.

As we have discussed, Amish agriculture is considered to be ecologically sound. In many anecdotal cases, the Amish have bought worn-out and supposedly non-farmable land from other farmers and proceeded to make a successful living (Berry, 1986). As one researcher has noted, "For the Amish, soil longevity has always been a priority" (Jackson, 1988, p. 485). Another said, "The Amish have demonstrated for several hundred years that what is needed to succeed is to care enough about the land and to treat it as one would treat one's offspring" (Zook, 1994, p. 28).

Thus the conservationist agricultural practices of the Amish are not at issue; however, we are faced with the reality that agricultural land used to be a "natural" community of non- or semi-domesticated creatures. In the eyes of preservationists, who would like to see the natural world as it used to be prior to European alteration of the landscape, the Amish conversion of land to agricultural use is, at best, a necessary evil, and, at worst, a blight on the landscape. In Kishacoquillas Valley, Pa., very little riparian vegetation remains along the creeks, and the only "natural" vegetation lies on the hillsides (Brooks, 1997). The issue of whether environmentalists should focus on sustainable management of resources and positive examples of human-nature interaction, or on the protection of "wild" nature, is still an open and highly contentious question, however, and

one which will not be resolved here.

Turning to the question of sustainability in regards to the stability of a "particular socioeconomic regime" that supports ongoing productivity of a resource, the Amish receive even higher marks. For it is the cultural persistence and long-term stability of the Amish in the midst of a "melting pot" dominant culture that is truly amazing. Writing about a northern Indiana Amish settlement, Pratt (1998) notes, "Relative to other groups, and evaluation has to be relative, they have achieved a sect integrity that few can match" (p. 294). While much of American agriculture grew ever larger and less concerned with the health of the land, Amish agriculture remained small, energy efficient, healthy, and based on lasting cultural values. Much of this long-term stability can be attributed to the Amish worldviews and institutions previously discussed. Another aspect of social stability involves the overriding concern that Amish families have for providing land and a livelihood for their children. One researcher showed that, in Iowa in the 1800s, the Amish actually sacrificed productivity and current income in order to invest heavily in the next generation and provide their children with enough land (Cosgel, 1993). This "Bequest Motive," as Cosgel (1993) called it, also increased the survival of the religion and the stability of the community. Like many indigenous cultures that consider how their actions will affect their descendants to the "seventh generation," the Amish consciously choose to support the long-term success of their culture.

Environmentalists are still learning the importance of cultural stability to a healthy and sustainable environment. Stoltzfus (1973) writes that the Amish can provide the concerned environmentalist with a possible answer to the particularly American problem

of materialism and overconsumption. To create a sustainable society, we will need both alternate engineering technologies and alternate social and personal satisfactions. The American technological society is much more adept at developing more effective engineering technologies, and, indeed, many environmentalists (represented by Vice President Al Gore) believe that all we need to do is improve our technologies and the Earth can be balanced anew. However, for those environmentalists who think that American consumption patterns are at least partly to blame for the ecological problems we are experiencing, the Amish offer a model that replaces the modern desire for high-tech "toys" with a renewed connection with one's family and community. This may be too simple to convince children to give up video games and parents to give up sports cars, but at least in the Amish culture, individuals derive much of their personal satisfaction from connections to the family.

The literature discussing the Amish appears to indicate that their culture does indeed contain elements of sustainability. However, direct empirical comparisons of the Amish with neighboring rural farmers are quite rare. Also, explanations for sustainable Amish behavior are often rather vague. Thus it remains somewhat unclear whether Amish "sustainability" is a result of cultural particularity or is rather an artifact of enduring rural values shared by other rural communities.

This study endeavors to test this matter further by comparing the farming practices of the Amish with neighboring farmers in a relatively intact rural community in central Pennsylvania. A survey of general ecological beliefs examines the underlying reasons for any observed differences in agricultural practices.

CHAPTER III

METHODOLOGY

A research project with the goal of fully measuring a community's sustainability would be an exceedingly complex and difficult project to undertake, considering that viable and broadly agreed-upon measures of sustainability do not presently exist. Also, any project endeavoring to engage in such a study would have to look at many different aspects of a community's existence over a long duration. Thus, I chose to look more closely at two aspects of Amish life that presumably affect the community's sustainability: general ecological beliefs and agricultural practices, arguably the Amish community's most visible and significant impact on the landscape. The ecological beliefs being measured are so-called "'primitive beliefs' … about the nature of the Earth and humanity's relationship with it" (Dunlap et al., 1992, p. 4). These general beliefs are thought to be "causally antecedent" to more specific beliefs and intentions that lead to particular actions relating to the environment (Stern et al., 1995, p. 726).

Site Selection

In order to assess whether the Old Order Amish practice more sustainable agriculture and/or have stronger ecological beliefs than their neighbors, a particular study area was chosen upon which to focus. Kishacoquillas Valley (Kish Valley, for short),

located in Mifflin County, Pa., is the home of an old and diverse Amish community.[1] Kish Valley was first settled by Amish migrants in 1791, making it one of the oldest Amish communities in the United States (Kauffman, 1991). Over the years, modernization, conversions, and differences in belief led to the formation of a number of new religious groups, both Mennonite and Amish. Presently, three distinct groups of Old Order Amish reside in the valley, alongside a number of other Anabaptist groups, both Amish and Mennonite.

The Kish Valley is part of the Ridge and Valley region of central Pennsylvania. It is a discrete watershed of the Kishacoquillas Creek, itself a tributary of the Juniata River, all of which is part of the larger Susquehanna River Basin. The valley lies between the parallel, northeast-running ridges of Jacks Mountain, on the northwest, and Stone Mountain, on the southeast. The Kish Valley runs approximately 30 miles in length, and its width varies from two to five miles between ridges. As such, the valley's geography provides clear physical boundaries by which to define the present study area.

Kish Valley's physical separation from the "outside world" suits its plain inhabitants. The ensuing social isolation allows the Amish of Kish Valley to live more private lives than, for instance, the Amish of Lancaster County, Pa., since Lancaster County is a highly suburbanized area and popular tourist destination. Thus the Amish of Kish Valley are perhaps not too representative of all Amish communities. However, in this era of rapid Amish growth and new settlement formation, one would be hard pressed to define any Amish community as the ultimate example of Amish life in the late 20th

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[1] Kishacoquillas Valley is also commonly referred to as "Big Valley."

century.

Sample Development

Sample Group Selection Process

In order to test whether religion impacts one's environmental beliefs and behaviors, I interviewed farmers in Kish Valley from each of four religious groups: Renno Church Amish, Nebraska Church Amish, Mennonite, and non-Amish/Mennonite (referred to here as the "English," the Amish term for all English-speaking Americans).

As mentioned above, the Kish Valley is home to a wide variety of Amish and Mennonite groups, including three Old Order Amish groups: the "Old Church," or Byler Church, the "Old School," or Nebraska Church, and the Renno Church. Each group is identified most clearly by the color of the top of their buggies: the Byler Church drives yellow top buggies, the Nebraska Church drives white top buggies, and the Renno Church drives the more common black top buggies. Other differences between these groups may be observed, notably the wearing of suspenders (Byler and Renno Church men wear only one suspender, Nebraska Church men wear none) but most are not readily apparent to the outsider.

Some differences are crucial to this study, however. The Nebraska Church is commonly thought to be one of the most conservative Amish groups in the country in terms of the church's attitude towards change, new technology, and involvement with the outside world. Indeed, in terms of agricultural technology, the Nebraska Church has

resisted many changes that other Old Order groups have made over the years. Nebraska farmers still milk by hand, cool milk with ice, use hay loaders or stationary hay balers, and refuse to own or use tractors in any form. Thus, on a spectrum of the acceptance of modern technology by Old Order Amish, the Nebraska Church represents the low-technology end, which is why they were selected as one of the study groups.

It should be noted, however, that the Nebraska Church itself is divided into four distinct subgroups. Differences between these subgroups range from the subtle (presence or absence of roof projections) to the great (cooling milk with ice versus diesel-powered bulk tanks). The two progressive subgroups that allow bulk tanks and pick-up hay balers broke off of the two major subgroups within the last 15 years. Although this variation would seem to warrant distinguishing among these subgroups in the sample development process, it was nearly impossible to identify which subgroup a family belonged to before actually visiting the farm. Therefore, all four subgroups were included in the pool from which I drew the sample. Since the majority of Nebraska farmers continue the traditional ways, however, this did not significantly affect the sample.

The selection of the Renno Church as the other Amish study group was predicated on their being the larger of the two less conservative Old Order groups in the valley, as well as the most typical, in comparison with Amish communities elsewhere. Unlike the Nebraska Church, Renno farmers accept more modern technologies such as diesel-powered milk coolers, pick-up hay balers, and the use of tractors around the barn.[2]

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[2] Tractors are only acceptable with steel or hard rubber wheels, however. Amish leaders think that inflatable tires would make tractors too comfortable, tempting farmers to use them more often than is absolutely necessary.

However, Renno farmers also milk by hand and refuse to use tractors in the field.

Craumer (1979), in his study of the energy efficiency of Amish farming in Kish Valley, looked at the Renno Church and the Nebraska Church separately, since they represented two poles of openness to modern farming. "The Rennos are more open to modern farming methods, and generally have adopted the most up to date methods which their *Ordnung* (church rules) permits," he writes (Craumer, 1979, p. 283). As for the Byler Church, he notes, "this group is not discernibly different agriculturally from the Rennos" (Craumer, 1977, p. 37). In fact, in his study, he combines the Renno and Byler Churches as one study group, claiming that together they form a "distinct agricultural system" (p. 40).

I had originally planned to sample only members of the Renno Church, rather than combining them with the Byler Church as Craumer did, in case any differences had arisen over the past 20 years. In fact, such differences have arisen. Between seven and 10 years ago, members of the Byler Church began to add bulk milk tanks to their dairy operations, switching from the traditional system of using milk cans for storage and transport. About three years ago, some Byler Church dairy farmers began to use milking machines, rather than milk by hand as do all of the other Kish Valley Old Order Amish. These two changes have allowed them to sell their milk as fluid Grade A, whereas other Kish Valley Amish still sell their milk as Grade B for processing (cheese, yogurt, cottage cheese, etc.). With the larger amount of income that Grade A brings, Byler Church farmers also began to increase their dairy herds, up from 15-25 to 30-40. While extremely progressive in terms of the Kish Valley, the Byler Church farmers who have accepted modern farming

techniques are simply catching up to technology used by the Lancaster County Old Order Amish since the 1950s (mechanical milking machines) and the 1970s (bulk milk tanks) (Kraybill, 1989, p. 186).

These major changes did not meet everyone's approval, however. One bishop in the Byler Church was concerned with and opposed to the rapid pace of change. His disapproval resulted in the formation of a new church district, with those families who supported the bishop leaving the other two districts. The new church district remains in close contact with the Renno Church, which also remains more traditional, having not yet accepted bulk milk tanks or milking machines. However, I did not include the newly-formed district of the Byler Church in the Renno sample.

If I would have been aware of this information before I began my research I may have decided to study the Byler Church farmers, since they represent a more liberal Amish position than the Renno Church. However, the reality of numbers would have remained an important issue: the Renno Church includes seven church districts, 54 farmers, and 1,051 members of the community (including children, who are technically not church members), while the Byler Church (not counting the dissenting district) includes only two church districts, 15 farmers, and 270 members (also including children). The total number of Byler Church farmers is smaller than the Renno Church sample, and the cumulative impact of the Byler Church farmers is clearly much smaller overall. However, even though I did not specifically study the Byler Church farmers, the qualitative data that were gathered indicate that their agricultural practices are even more modern than the Renno Church. I leave a more thorough assessment of the Byler Church

to the next researcher.

Mennonites in Kish Valley share a common origin with the Amish (as Anabaptist members of the radical Reformation in Europe) as well as a more recent common history (all Kish Valley Mennonite churches began as progressive developments of Amish church districts) (Kauffman, 1991). Yet the non-plain Mennonites no longer practice the strict separation from the world as the Amish do, nor do they maintain group conformity through strict ethical codes such as the Amish *Ordnung*. They both still claim connection to the same historical confessions of faith, the Schleitheim and Dordrecht Confessions (written in 1527 and 1632, respectively), as well as to the Martyrs' Mirror, a book of great symbolic importance describing the faithfulness of the Anabaptist ancestors in the face of persecution. Mennonites believe in the original tenets of Anabaptism (e.g. practicing nonresistance, avoiding the swearing of oaths, living simply, and serving others in the name of Jesus Christ) as do the Amish, but the gradual assimilation of non-plain Mennonites into the modern world over the past few decades has resulted in both a Nebraska Amish bishop and the Mifflin County Mapping Specialist expressing the sentiment, "There's not much difference between the Mennonites and the Lutherans, is there?" Thus, while Mennonites in Kish Valley consider themselves to be relatively close kin to the Amish (and in many cases, they truly are close kin), the outside world, and even the Amish, consider Mennonites to be more similar to Protestants than to the Amish.

Including non-plain Mennonites in this study as a separate group is meant to demonstrate the impact of one particular aspect of religion that may have an effect in motivating sustainability – namely, the ethical code embodied in the *Ordnung*. The

Ordnung, which modern Mennonites lack, guides Amish community members in their behavior. The rules in the *Ordnung* are meant to maintain and perpetuate the unity of the Amish community. In contrast, modern church communities, including Mennonites, are hesitant to challenge the rights of the individual or to set up any rigid rules to which church members must adhere. Without the clear code of rules and system of enforcement, Mennonite church members adopt more of the outside world's practices and behaviors, and look less like the Amish. Thus any observed differences between the Amish and Mennonite groups in this study may be explained, at least in part, by the presence or absence of the *Ordnung*, a significant cultural component of religious practice, rather than by differences in religious beliefs, per se. This will be discussed further in Chapter V.

The final group in the study are "English" farmers. This group will serve as the experimental control, since they are the group most representative of modern American society. Sharing a common geography, social setting, and occupation with the Amish and Mennonites, the English sample's main differences, as a group, are religious and ethnic. While most of the English who originally settled in Kish Valley are of Scotch-Irish descent (and the Amish and Mennonites are Swiss-German), not all of the present "English" group would necessarily be of the same ethnicity. Also, hundreds of years of living in the United States has transferred much of the ethnic identification of these descendants of European immigrants from their former homelands to a general American identity.

Developing the Random Sample

To randomly sample Kish Valley farmers from the four groups noted above, I first needed to develop the larger pools from which to choose. Using the boundaries of Kish Valley as a guide, I censused all agricultural land between Jacks and Stone mountains. The study area encompassed five townships in two counties, from Brady Township in Huntingdon County at the far southwest end of the valley down through Menno, Union, Brown, and Armagh Townships in Mifflin County. Using tax parcel information, I developed an initial list of all owners of agricultural parcels by township. Next, with the aid of Mennonite church directories, a local Old Order Amish directory, and informants familiar with local farmers, I began to determine whether each parcel was being actively farmed and, if so, the actual farm operator of each parcel and his or her church affiliation. Phone directories also proved helpful in determining which landowners had telephones and thus were unlikely to be Amish (since they disallow phones in the home), and in providing the addresses of those landowners. Landowners not in the phone book who also had a surname found in the local Amish community were initially presumed to be Amish. Finally, I double-checked the information against a mapped census of Amish farms that had been performed the previous summer by an intern in the Mifflin County Mapping Specialist's office, and finalized the lists of active farmers by religious group. I then transferred this information to parcel maps for a visual display of the distribution of Kish Valley farmers by religious group; the maps were also useful in helping me locate each potential subject.

For each of the four groups selected for study (Renno Church Amish, Nebraska Church Amish, Mennonite, and English), I developed an alphabetical list of all the farmers in the group and assigned each farmer a number. Using the spreadsheet program Paradox, I randomly selected 30 to 50 numbers for each group. From the first 20 numbers for each group, I developed a list of corresponding subjects to contact and interview. If any of the subjects either were not farming or were unwilling to participate in the study, the extra numbers were used to select replacements.

As Figure 2 shows, the distribution of the sample farms was well dispersed geographically. The Mennonite and Renno Church Amish farms lie predominantly in Menno and Union Townships, while most English farms are found in Brown and Armagh Townships. The Nebraska Church Amish farms in the sample are found solely in Brown and Armagh Townships. A few Renno Church Amish live in Brown Township and a few Nebraska Church Amish live in Union Township (none of whom were interviewed), but for the most part there is very little geographical overlap between these two groups.

Questionnaire Development

Agricultural Practices

For the measurement of ecological behavior, I wanted to study the general overall agricultural practices of Amish farmers rather than only focusing on one specific agricultural impact such as soil fertility or water pollution. To this end I used a questionnaire that was produced by a group of researchers at St. Lawrence University for

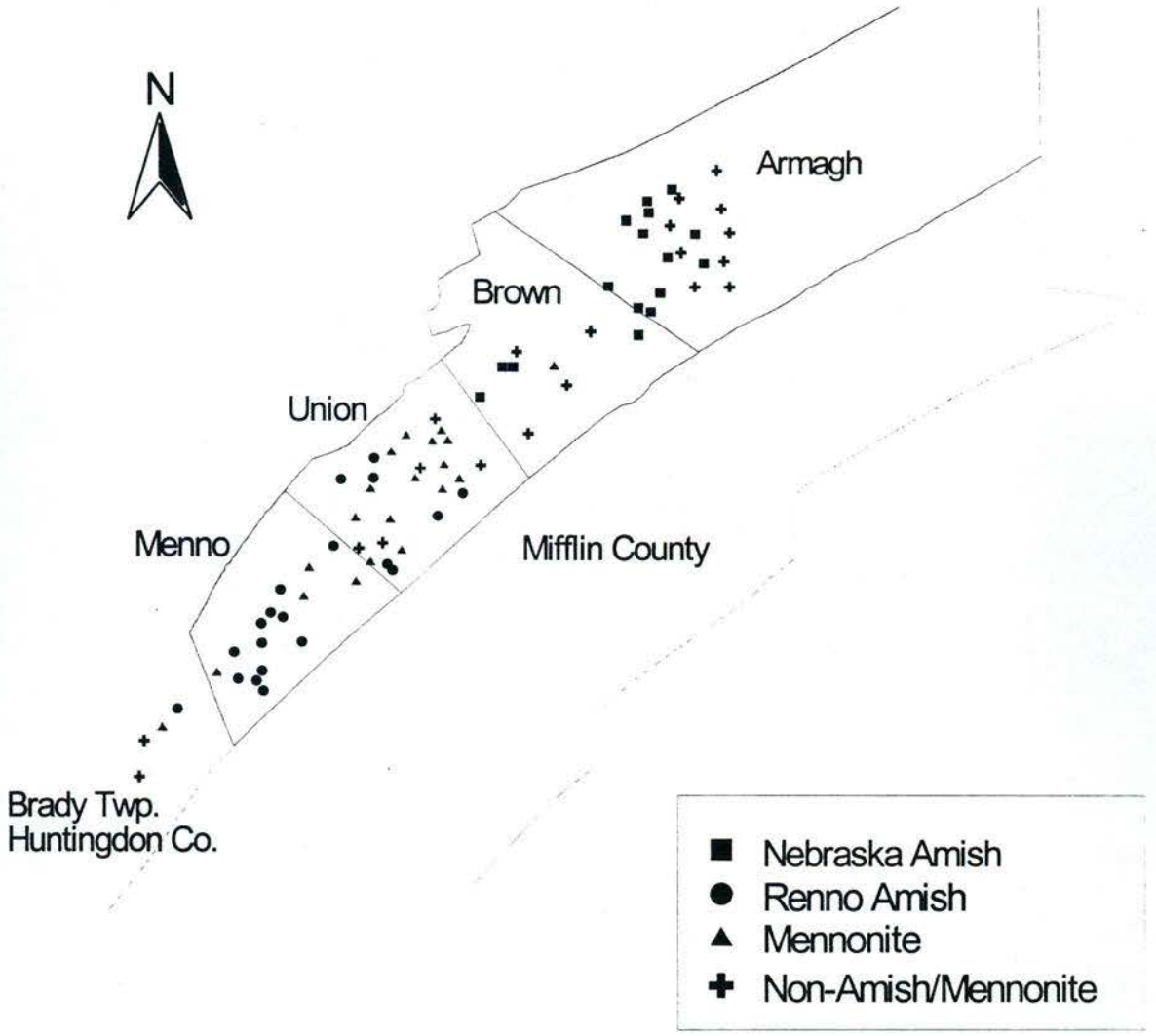

Figure 2. Distribution of Amish and Non-Amish Farms in Kishacoquillas Valley

a study of Amish farmers in New York (Blake et al., 1997). The researchers assessed farm size, diversity (crop types, animals on the farm), soil fertility (crop rotation and fertilizers), pest control (herbicides and insecticides), and connection to the larger world (sources of agricultural information and products marketed). The primary goal of their research was to see whether Amish farming exemplified "ecological agriculture" or whether it was becoming more like the modern agribusiness model. By using the same questionnaire, the two studies can be easily compared. A comparison of two Amish settlements, one very young (New York) and one quite old (Kish Valley), could add important knowledge to the overall study of modern Amish farming. The complete agricultural questionnaire is in Appendix A.

The items included in the questionnaire are meant to assess the sample groups' adherence to ecological agriculture, which "ultimately attempts to achieve a diverse, healthy, and productive ecosystem in which biological processes and cycles dominate" (Blake et al., 1997, p. 143). Beus and Dunlap (1990) prefer the term "alternative agriculture" to describe a variety of farming styles (including organic, sustainable, and ecological agriculture) that share both a common critique of "conventional agriculture" and an underlying philosophy of independence, decentralization, community, harmony with nature, diversity, and restraint (see Table 1 in Beus and Dunlap, 1990, pp. 598-599). In follow-up research studying female alternative farmers, Chiappe and Flora (1998) added the elements of quality family life and spirituality to those listed in the Beus and Dunlap paradigm. The "alternative agriculture" paradigm will be consulted initially in assessing the results of this questionnaire. Since this paradigm involves many items and

is somewhat difficult to operationalize, however, Gardner et al.'s (1995) "operational measures of agricultural sustainability" will serve as a guide as well (p. 58). These measures are based on three key principles: reduction of synthetic chemical inputs (fertilizers, pesticides, and energy), use of "positive practices" (crop diversity and rotations, and livestock diversity), and personal "commitment to the values and goals of increased sustainability" (rather than temporary adoption of sustainable practices for economic reasons, for example) (Gardner et al., 1995, p. 65). The first two principles are directly measured by the selected questionnaire, while the "commitment" item is measured more indirectly in the present study.

General Ecological Beliefs: New Environmental Paradigm Scale

In order to measure general ecological beliefs, I decided to use an existing survey rather than develop my own questionnaire. The New Environmental Paradigm (NEP) scale, developed by Dunlap and Van Liere (1978), is a 12-statement survey that asks respondents to agree or disagree with each statement using a four point Likert scale (Strongly Disagree, Mildly Disagree, Mildly Agree, Strongly Agree).[3] The scale assesses general ecological beliefs regarding the human-nature relationship, rather than awareness of specific contemporary environmental issues.

The NEP scale is reputedly "the most frequently used measure of public environmental concern" over the past 20 years (Stern et al., 1995, p. 724).

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[3] In addition, I recorded any comments that accompanied the requested responses. These comments often provided insights on the formation and justification of ecological beliefs.

Approximately 30 studies have used the NEP scale to compare the environmental attitudes of different groups: environmentalists and the general public in Washington state (Dunlap and Van Liere, 1978), farmers and urbanites in Iowa (Albrecht et al., 1982), citizens of different countries (Estonia, Latvia, and Sweden; United States and Japan; United States and Canada) (Gooch, 1995; Pierce et al., 1987; Steger et al., 1989), ethnic groups (African-Americans and Latinos) and Whites (Caron, 1989; Noe and Snow, 1990a), and the same population after adverse environmental experiences (drought, water shortages) (Arcury and Christianson, 1990). Additionally, the scale is often cross-tested with other measures of environmental behavior (e.g. recycling, writing letters on policy issues, willingness to pay more for environmentally friendly food) to see whether the NEP is able to predict positive ecological behavior. The scale has been tested thoroughly for reliability and dimensionality (Albrecht et al., 1982; Geller and Lasley, 1985; Noe and Snow, 1990b), and has been analyzed by respondent characteristics to see whether education, income, or gender, for example, influence one's NEP responses (Tarrant and Cordell, 1997).

Although it is 20 years old, the original NEP continues to be used in contemporary studies, with some updating at times, particularly in terms of inclusive language. However, the creators of the original NEP have reworked the scale into the New Ecological Paradigm scale, both to update the original and to improve on some of its noted weaknesses (Dunlap et al., 1992). The new scale consists of 15 statements, six of which are taken almost directly from the original scale. The new scale is improved over the original in a number of ways: its statements are more balanced in the direction of item

wording (whether agreeing or disagreeing with a statement measures a pro-environment attitude) and its content has been updated and broadened (Dunlap et al., 1992, p. 5). Despite these improvements, the new NEP has yet to be published, although the scale and the study which inaugurated its use were originally presented to the Annual Meeting of the Rural Sociological Society in 1992. Since the new NEP is therefore difficult to locate, nearly all NEP-related studies from 1992 to the present use statements from the original NEP scale. Thus, for the present data to be comparable to other studies using the NEP scale, I thought it best to use the whole of the original version, despite its age and its weaknesses. However, since the new NEP scale included some intriguing new items, I added five of its statements at the end of the original NEP survey (items #6, #8, #10, #14, and #15 from the new NEP). See Appendix B for both versions of the NEP scale.

Open-Ended Questions

While the NEP scale purports to measure general ecological beliefs, some researchers have pointed out its cultural foundations in U.S. academia and wondered whether it would validly measure general ecological beliefs in non- or non-typical U.S. cultures (Young, 1998). Specifically in terms of the Amish, I was concerned that the NEP scale's assumption of "worldly" knowledge and a certain level of education would leave it unable to fully assess the ecological beliefs of the Amish. Therefore, I included some open-ended questions that focused on stewardship of the land. Since it is asserted by some researchers that the Amish believe the maintenance of soil fertility has religious implications (e.g., Place, 1993; Schwieder and Schwieder, 1975), I wanted to test this

idea within this particular Amish community. After realizing that many Amish farmers, for whom English is a second language, did not know the term "stewardship," I began to ask whether they thought they had a responsibility to take care of the land. If they agreed, I asked them why they feel that responsibility, or where they think the responsibility comes from. Finally, I asked them how they carry out that responsibility, or what are some ways they try to take care of the land.

Also, many non-Amish people know that the Amish live and farm differently from the rest of American society. But do they know why? Broad sociological answers that supposedly speak for everyone are unsatisfying. I wanted to know why the Amish people themselves think they live and farm the way they do, so I asked them this as well.

Interview Process

The Amish, as a rule, do not keep telephones in their homes. Therefore, once I had developed a list of farmers to interview, I had to go house to house, trying to find the farmers at home and preferably not out in their fields baling hay. If the farmer was home, I introduced myself, stated my purpose, and requested an interview. At times the farmer would agree to be interviewed immediately. Other times the farmer would set up an appointment. Most common, however, was a rather vague response stating that he might be willing later on if he's not too busy. A considerable number of Amish farmers declined to participate in the study; this was not surprising considering the Amish community's general attitude of suspicion towards outsiders and its negative attitude towards higher education. Of 36 Renno Church farmers who were approached about an

interview, 20 agreed, for a response rate of 59 percent. These 20 farmers represent 37 percent of the 54 total Renno Church farmers in Kish Valley. The response rate for the Nebraska Church was a bit lower – 48 percent, or 16 interviews out of 33 contacted – which also was expected since this group is generally considered to be more resistant to involvement with the outside world. The 16 farmers interviewed represent 23 percent of the approximately 70 full-time Nebraska Church farmers in Kish Valley.

Members of both groups were often friendly and willing to talk informally about the farming life, but a number of farmers balked when the prospect of a more official-seeming interview was proposed. One Renno Church farmer, who was perfectly willing to share about his farming practices to an interested individual, declined when he realized that the information was being gathered for a project that might lead to publicity for his people. Another farmer, this one from the Nebraska Church, expressed annoyance at the idea of giving information to one more researcher without receiving any benefits for his time.

Members of the Nebraska Church, who were the most resistant overall to participation in the study, appeared to be less busy than were the other farmers. This coincides with the preliminary research that indicates their farming style is less intensive than those of the other groups. In fact, it was quite common that Nebraska Church farmers, when approached, would either refuse to participate outright or agree to be interviewed on the spot. This ability and/or willingness to take time upon the researcher's random visitation indicates at least a certain flexibility of schedule, if not a lesser degree of busyness. In contrast, members of the Renno Church often professed busyness as one

hindrance to setting up an interview. While busyness may have simply been a preferred excuse (and/or a passive way of refusing participation), my difficulty in finding Renno Church farmers at home and out of the field supported these verbal assertions.

Overall, while the response rate was lower than I would have liked (and lower than that noted in other studies of the Amish), the range of data received from those who participated does not appear to indicate that the sample was being biased in a particular direction (wealthier, larger farms, younger farmers, etc.). Some of the hesitancy to participate in the interviews may have come from an event that had recently brought widespread and unpleasant attention to Amish people all across the United States. In June, two young Amish men in Lancaster County (who were not yet church members) were arrested for dealing cocaine to other Amish youth. This event had occurred only a few weeks before my arrival in Pennsylvania; articles, editorials, and cartoons were still appearing in many newspapers in the region. The general sense of uneasiness this brought to the Amish may have helped make them even more reticent and suspicious of outsiders.

Another phenomenon regarding the Nebraska Church farmers that added to my difficulty in contacting potential subjects was the fact that many families living on small farms were not actively farming them. A growing trend among the Nebraska Church is for the men to work at small lumber mills and/or pallet shops that have sprung up all over Kish Valley. Since the Nebraska Church limits farming technology quite severely, farmers find it increasingly difficult to make a sufficient income. The men have realized that they can make much more money working full time at a small lumber mill, and this

is leading to a major occupational shift within the Nebraska Church. Of the 48 Nebraska Church farmsteads I visited, 14 of them were being farmed on the side by men who worked full-time off the farm. Few of these sold milk or other farm products. What this bodes for the future of the Nebraska Church is unclear, but many church members and outsiders alike are concerned that major changes loom very near.

The process of interviewing the Mennonite and English subjects, who own telephones, was considerably easier. I called a potential subject, explained my research, and set up an interview – held at the subject's home – for a later date. While some non-Amish farmers were so busy that finding them in the house was a challenge, the use of telephone technology definitely eased the process of interviewing these groups. Ease of contact, combined with the subjects' greater openness to outsiders, led to response rates of 91 percent (20 of 22 contacted) for both the Mennonites and English. These samples make up 47 percent of the 43 total Mennonite farmers in the valley, and 57 percent of the 35 total English farmers in the valley.

Administering the agricultural practices questionnaire led to some initial difficulties among all groups in terms of identifying specific fertilizers and pesticides used. A local soil service/fertilizer business performs much of the custom spraying for valley farmers, so the specifics of spray content and amount are not always known.

Finally, four items relevant to the interview process should be noted. First, the focus of the study on religion and sustainability was made clear to all subjects. Thus any mention of religion in relation to stewardship or agriculture practices may have been at least partially influenced by the subject's desire to effect a certain outcome in the results.

Second, researchers of the Amish will sometimes consult with local bishops before attempting to interview members of their districts. I decided not to do this, since I was not sure precisely which local bishops to contact, and since a rejection by an Amish leader would be a virtual death knell for any further research in that community. Going straight to individual Amish farmers seemed to be easier and have a reasonable chance of success, but perhaps the "official approval" of local bishops would have improved the final response rate. Third, I almost always mentioned my own heritage and connections to the local Mennonite community (grandparents, landlords) in an attempt to persuade potential subjects to trust me and agree to an interview. This tack was somewhat successful with the Renno Church Amish, and quite successful with the Mennonites. However, it did not appear to have an effect with the Nebraska Church Amish. Finally, my research (and photo) was featured in an article on the front page of the local weekly newspaper, the County Observer. This prepared some local farmers to anticipate being contacted for an interview. For the Amish, it appeared to have a slight net positive effect, with a number of them noting with interest that I was the "man with the picture in the paper."[4] However, for at least one Amish farmer, the article raised the possibility of further publicity, which led him to reject a scheduled interview.

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[4] The photo didn't necessarily endear me to the Amish, since they reject photos of people as "graven images," or idols. Yet it allowed them to visually associate their visitor with the article from the paper. Besides, the Amish don't expect non-Amish people to share their beliefs, nor do they hold non-Amish to the same standards to which they hold each other.

CHAPTER IV

RESULTS

Results are discussed in four sections. First, qualitative data regarding the geographic and social setting of the study area are presented. This is followed by the agricultural practices data (including farm size and diversity, pesticide use, and sources of information). Next, the results of the New Environmental Paradigm survey are presented and analyzed. The chapter concludes with responses to the open-ended questions on stewardship and lifestyle choices.

Social and Geographical Issues Related to Sustainability

Sustainability in the Kishacoquillas Creek watershed is not merely a theoretical discussion. Kish Creek is part of the Susquehanna River Basin, which drains over half of the state of Pennsylvania into the Chesapeake Bay (Alliance for the Chesapeake Bay, 1994). Over the past few decades, the ecological health of the bay has been deteriorating, damaged by nutrient pollution, sediment, and toxic substances. Because of the role of agriculture in enhancing some of these problems, the state of Pennsylvania has had to more strongly regulate farmers on matters of manure management and erosion. Thus farmers are quite aware of these specific environmental concerns, although many of those with whom I spoke felt farmers were being unfairly singled out for harming the bay.

The Kish Creek itself, however, appears to be a microcosm of the larger problems facing the bay. Kish Creek is considered to be "significantly pollution-stressed," contributing poor water quality to the Juniata River (Alliance for the Chesapeake Bay, n.d.). A recent water quality assessment of the Juniata River Subbasin concurred, finding that the physical habitat conditions of Kish Creek near Belleville are quite poor. Five miles of the creek do not support the designated use (trout-stocked fishery) because of siltation from agriculture (Edwards, 1996). The stream channel is severely degraded and riparian conditions are very poor. In addition, this segment of the creek has the highest recorded concentrations of dissolved nitrogen in the entire Juniata Subbasin (McGarrell, 1997).

A strongly promoted method to alleviate some of the siltation and nutrient pollution in the streams is stream bank fencing. This practice limits the amount of access that cows have to the stream, protecting the stream bank from erosion and reducing the amount of urine and manure that enter the water. Keeping the cows out of the stream is actually healthier for the animals, too, since wallowing in the slow-moving water can lead to mastitis or other possible infections. In my travels around Big Valley, I saw very few instances of this style of fencing. Rather, in the hot July days, I often saw cows congregating in streams, muddying the creek and relieving themselves whenever necessary. A few local farmers are beginning to fence off their streambanks, and the rest assume a new regulatory requirement will be coming in the near future. As one Amish farmer put it, "[Stream bank fencing] is going to happen. People are getting fussy about [contaminating the streams]."

Kishacoquillas Valley is not only located in a region of ecological concern, but an area of rapid growth. For all of its geographic isolation, Kish Valley happens to lie directly between Harrisburg, the state capital, and State College, the home of Penn State University, one of the largest universities in the country. The highway that runs through the valley, US 322, enables commuters to live farther away from these urban centers in rural communities. While Kish Valley has not yet become one of these so-called "bedroom communities," its intact rural character and charm appeal to new residents and tourists alike. Housing developments on former farmland are an increasingly common sight.

Growth was a common concern raised by the farmers I interviewed. It impacts them in several ways, both directly and indirectly. The most direct impact of this growth is the new US 322 bypass being built through Kish Valley. A Nebraska Church farmer I interviewed had his farm bisected by the highway, making the landlocked area useless for farming and blocking a dirt road that he and other Amish families used to travel to the nearby town. The local officials claimed the amount of traffic did not justify a bridge or underpass. As the farmer said, though, "We don't <u>want</u> much traffic, just access." In addition, he noted, 46 acres were bought for the highway right-of-way, but "they only pay half of what it's worth." At least three other farmers were directly affected by the construction project, including another Amish man whose farm was also split by the highway. His situation was featured in a local newspaper article because, in his case, a "cow underpass" was built, allowing his cows access to the other half of his farm (Cauffman, 1998, p. A-1+). The greatest irony of the new highway bypass is that even

though the Amish pay dearly for the highway (through the loss of farm acreage and value as well as through taxes that support its construction), the Amish themselves will not be allowed to use the road; buggies are not permitted on limited access highways. In this case, the Amish aren't even getting what they pay for.

Indirect effects of the growth in population and tourism are increased development, decreasing amounts of farmland in an already tight market, and increased land prices. One 100-acre farm near the highway is soon to be rezoned and sold for housing lots. Plans are being discussed for a water line along the nine-mile stretch of highway between the towns of Belleville and Reedsville, enabling easy roadside development in prime farmland. In a land market where farms are already expensive and difficult to obtain, the steady conversion of farmland to other uses only increases the prices and the pressure.

In a situation where in-migration combines with local population growth to create land shortages and high prices, the economic "bottom line" becomes more and more important to farmers. Productivity takes priority, along with the means to achieve a high level of productivity. This situation is quite common in Amish communities (Gallagher, 1980). The emphasis on productivity was seen among the Amish of Kish Valley as well, most clearly in the strong connections between Amish farmers (primarily Renno Church) and Union Mill Soil Service, the local division of Chemgro, an agricultural service and supply company based in Lancaster County, Pa.

While it was somewhat expected for Amish farmers to be practicing non-organic agriculture, I was surprised at the amount of influence that Union Mill had among farmers

in Kish Valley, especially Amish farmers. When working through the agricultural practices questionnaire, many farmers, Amish and non-Amish alike, pulled out their "program," a fertilizer and pesticide application plan drawn up with a Union Mill consultant prior to each growing season. Many farmers, in fact, did not know exactly what was going into their soil unless they checked their program. Union Mill does custom spraying, along with their consultant work, and many farmers take advantage of this service as well, distancing themselves even further from their own chemical use. My general impression is that Union Mill has an extremely significant role in influencing the agricultural practices used in Kish Valley, for both Amish and non-Amish farmers. Considering the number of Amish farmers who were following Union Mill's advice, this business may be more significant than either tradition or religious belief in determining Amish agricultural practices (especially chemical use).

The Nebraska Church Amish did not seem to be as connected to Union Mill; many of them are working with a local Amish Mennonite who does custom spraying and now promotes the Farm for Profit program, a middle-of-the-road sustainable agriculture program. While not entirely organic, the focus of Farm for Profit is on maintaining a high level of soil fertility and reducing the amount of chemicals needed by using a vegetable oil applicator.

To Union Mill's credit, the division carries both organic and chemical fertilizers; according to the division manager, Don Hartzler (1998), this is a matter of supplying the products that his customers want. Generally, however, the company's leadership supports the conventional wisdom of conventional agribusiness. Chemical pesticides and

fertilizers are viewed as necessary to maintain production. "Could we feed the global community in organics?" asks Hartzler rhetorically; "No." It is a risk-benefit issue, a tradeoff, which seems quite common in agriculture; no-till methods maintain soil structure and decrease the potential for soil erosion, for example, but they use copious amounts of chemical herbicides. Hartzler considers the new generation of chemical pesticides to be more specifically directed at the target species, thereby causing less disturbance to soil microorganisms. For this and other reasons, he thinks the benefits outweigh the risks. "We want our customers to be stewards of the ground, but also to get a crop," says Hartzler. Thus, conventional modern agricultural ideas and methods are being proposed and sold to Amish farmers by Union Mill, and the amount of influence is great.

The interactions between Amish and English in Kish Valley occur more often and in more places than solely at Union Mill, however. The Big Valley Livestock Auction brings together farmers of all types every Wednesday to buy and sell produce and livestock and to swap stories. Other venues exist to bring local residents in contact with one another, one of the most visible being the many Mennonite and English drivers who transport the Amish to stores and other Amish settlements. Many Amish work with non-Amish on roofing, painting, and construction crews. And when a Red Cross bloodmobile came to a local Mennonite church for a blood drive, a half-dozen Amish people gave blood during the hour while I was there. While the Amish appreciate the relative isolation from the "outside world" that Kish Valley affords them, they are not isolated from the local social setting, especially not from the local agricultural community.

Agricultural Practices

A few studies have demonstrated the differences between Amish farming and modern American agriculture (Blake et al., 1997; Johnson et al., 1977). In addition, the Renno Church Amish and Nebraska Church Amish have been shown to practice distinct styles of agriculture, the last scholarly research of these differences being performed in the 1970s (Craumer, 1979; see also Hostetler, 1951).

Amish farms are typically smaller than English farms, since the Amish rely on horsepower rather than tractors. Amish farms generally feature more crop diversity; farmers devote a greater percentage of land to pasture and practice crop rotation. These farms are usually more diverse in terms of livestock, because many of the animals are raised for the family's own consumption rather than as a product for sale. Thus the farms are more self-sufficient in terms of providing food for animals and people, and they mimic natural cycles by returning animal waste to the soil, feeding the crops. Traditional four-year crop rotations (corn-oats-wheat-hay), use of manure, and labor-intensive methods of weed control, i.e. cultivation, usually lessen the need for chemical inputs.

Farm Size

Figure 3 clearly demonstrates that Amish farms in the Kish Valley are indeed smaller than Mennonite and English farms. English farms are the largest on average, due in part to two farmers in the sample who farm more than 800 acres each. Another unsampled English farmer in the valley farms even more acres. Mennonite farms are also

sizable, though not as large as the English farms. Amish farms are the smallest, with no appreciable difference between Renno and Nebraska farm size.

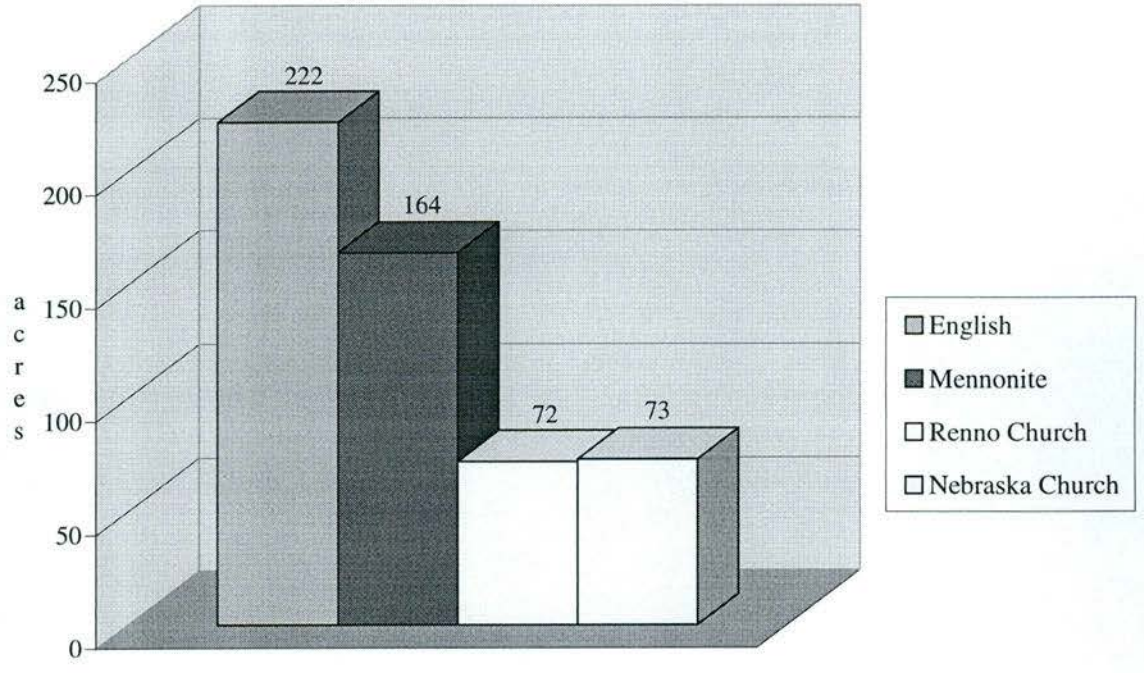

FIGURE 3. Mean Acres Farmed (Crops and Pasture) by Amish and Non-Amish Kish Valley Farmers in 1998

Not only do English and Mennonites farm more land than the Amish, but they are also more interested in expanding their existing farms. Forty-five percent of Mennonites and 35 percent of English would like to farm more land than they presently have, averaging a desired increase of 60 and 71 acres respectively. The Amish, by contrast, are generally not looking to increase their acreage. Nineteen percent of Nebraskas and 20 percent of Rennos would like to expand, averaging an increase of 15 and 13 acres respectively. Even though the non-Amish are relatively more interested in expanding, a

majority of each group is content with their present farm size. This might be due, in part at least, to the relative scarcity of available land – why desire something that is unavailable?

Crop Diversity, Rotations, and Tillage

Table 1 shows the types and amounts of crops grown by each group of farmers. Since the total acreage of Amish farms is smaller than non-Amish farms, it is no surprise that the average acreage of crops is smaller as well. However, the diversity of crop types grown on Amish farms is considerably greater than on non-Amish farms. Nebraska farmers grew the most types of crops per farm on average (4.9), significantly more than all other groups ($p<0.05$). Renno farmers grew an average of 4.0 crops each, significantly more than the non-Amish ($p<0.05$), while English farmers grew 3.0 and Mennonites grew the least (2.6).

Corn and alfalfa are the most common crops for all farmers except the Nebraska Church. Nebraska farmers still prefer mixed hay (clover and timothy) to alfalfa, but Renno farmers are more similar to the non-Amish, growing nearly pure stands of alfalfa. Many Amish farmers grow oats because of its value as horse feed. Other small grains (wheat, spelt, and barley) are also grown for animal feed and for sale, but the price is presently very low for wheat. Thus few farmers except those from the Nebraska Church still grow small grains. Five Renno farmers are growing a few acres of produce to diversify their farm products. While many Amish farmers sell extra produce from their gardens, growing produce specifically for the market appears to be a unique and growing

trend among this group.

TABLE 1. Amounts of Land in Crops and Pasture for Amish and Non-Amish Kish Valley Farms in 1998

Crop	Nebraska Church		Renno Church		Mennonite		English	
	Number of farms (%)	Mean number of acres (SD*)	Number of farms (%)	Mean number of acres (SD)	Number of farms (%)	Mean number of acres (SD)	Number of farms (%)	Mean number of acres (SD)
Corn	16 (100)	15.4 (8.1)	18 (90)	23.7 (6.9)	20 (100)	77.2 (27.0)	15 (75)	91.7 (75.3)
Alfalfa	12 (75)	9.0 (5.6)	18 (90)	20.6 (5.7)	18 (90)	56.6 (25.7)	14 (70)	76.2 (70.4)
Mixed Hay	14 (88)	12.2 (8.9)	6 (30)	7.5 (2.3)	5 (20)	28.0 (22.5)	5 (25)	63.4 (46.6)
Oats	16 (100)	10.8 (6.9)	14 (70)	6.9 (2.3)	1 (5)	10	6 (30)	28.4 (35.4)
Wheat	11 (69)	7.5 (8.3)	4 (20)	5.4 (3.2)	6 (30)	10.8 (5.7)	6 (30)	28.7 (35.3)
Spelt	9 (56)	4.6 (2.1)	4 (20)	4.5 (0.6)	0 (0)		1 (5)	3
Soybeans	0 (0)		0 (0)		2 (10)	12.0 (5.7)	6 (30)	40.7 (28.5)
Barley	0 (0)		3 (15)	4.3 (0.6)	0 (0)		0 (0)	
Sorghum	1 (6)	3	0 (0)		0 (0)		1 (5)	3
Fruit	0 (0)		2 (10)	9.5 (7.1)	0 (0)		2 (10)	66.5 (10.6)
Produce	0 (0)		5 (25)	4.9 (1.5)	0 (0)		0 (0)	
Pasture	16 (100)	21.8 (17.6)	19 (95)	18.4 (13.6)	20 (100)	24.6 (20.1)	19 (95)	46.8 (66.4)

* SD = Standard deviation

While the average amount of pasture per farm appears to indicate that non-Amish farmers have more pastureland than Amish farmers, the Amish still have a greater percentage of pasture than the non-Amish. Nebraska farms have the largest proportion of their land in pasture (30 percent). Renno farms have 26 percent in pasture, English have 21 percent, and Mennonites have the least at 15 percent. This supports the idea that non-Amish farming is more intensive, growing more crops, buying more feed, and relying less on pasture. However, in this case, the non-Amish still have a considerable amount of land in pasture. These numbers may be a bit misleading, however, because both the English and Mennonite samples include a few farmers practicing managed intensive grazing on large quantities of pastureland and these individuals may significantly

influence the group means.

Four-year crop rotations of corn, oats, wheat, and hay used to be a hallmark of Amish farming. Presently, however, only the Nebraska farmers in the study still maintain the traditional crop rotation, whereas many Renno farmers do not. Fourteen of 16 Nebraska farmers continue the traditional practice. Only 10 of 20 Renno farmers grow a small grain other than oats and none practice four-year, four-crop rotations. The most common rotation for Renno farmers was growing corn for two to three years, oats for one year, and then alfalfa for three to four years. Nine of 20 English farmers grow either a small grain or soybeans, and five (25 percent) grow solely corn and alfalfa. Twelve Mennonite farmers (60 percent) only grow corn and alfalfa, with the most common rotation being four to five years of corn and three to five years of alfalfa.

Tillage practices also demonstrate differences between farmers in Kish Valley. All of the Amish farmers interviewed use moldboard plows as their primary tool for tilling the soil.[1] Conventional moldboard plows turn the soil over and reduce weed growth, but they also disrupt soil structure and can lead to soil erosion. One each of the Nebraska and Renno farmers mentioned using no-till methods.

Non-Amish farmers, on the other hand, use minimum tillage methods (chisel plow, disk, harrow) predominantly. Eighty percent of Mennonite farmers used no-till methods this year, but only 15 percent used no-till on half or more of their cropland. No-till was less common overall for the English, with 73 percent using no-till on at least a few acres, but this group used the methods more intensively, as 33 percent practiced no-

[1] Only half of the Renno Church farmers were asked this question.

till on half or more of their cropland. Compared to no-till methods, moldboard plowing was used less commonly by both Mennonites and English (60 and 67 percent respectively), but Mennonites used conventional plows on a majority of their cropland more often than did the English (30 to 13 percent). In addition, Mennonites used conventional plows more intensively than they used no-till methods (30 to 15 percent).

Livestock Diversity and Treatment

Diversity on the Amish farm includes animals as well as crops. Table 2 shows the amounts and types of animals owned by each group of farmers. More types of animals are found on Amish farms (Nebraska – 4.8, Renno – 4.1) than on non-Amish farms (English – 2.7, Mennonite – 2.65).[2] In fact, the means of crop types and animal types are extremely similar across all groups. The significance of this similarity is unclear, but very intriguing.

Part of the observed difference in animal diversity is due to the omnipresence of horses on Amish farms. Horses provide essential transportation and fieldwork functions for the Amish, and thus are not typical livestock. Without horses, the difference between the number of animal types on Renno farms (3.1) and the number on non-Amish farms (2.45) is no longer statistically significant. The difference between the numbers of animal types on Nebraska farms and on non-Amish farms remains significant, however. The presence of horses, therefore, is the key difference in animal diversity between the Renno

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[2] For the animal diversity figure, the three categories of dairy cows, heifers/calves, and bulls were considered to be one overall "cow" type.

Church farms and non-Amish farms.

TABLE 2. Number of Animals on Amish Versus Non-Amish Kish Valley Farms in 1998

Animal	Nebraska Church		Renno Church		Mennonite		English	
	Number of farms (%)	Mean number of animals (SD*)	Number of farms (%)	Mean number of animals (SD)	Number of farms (%)	Mean number of animals (SD)	Number of farms (%)	Mean number of animals (SD)
Dairy cows	16 (100)	12.6 (6.4)	17 (85)	22.1 (4.3)	19 (95)	76.4 (28.0)	13 (65)	65.0 (30.2)
Heifers**	16 (100)	19.6 (24.2)	18 (90)	30.1 (21.2)	20 (100)	62.4 (25.0)	17 (85)	57.6 (44.6)
Bulls	16 (100)	1.7 (0.8)	18 (90)	1.6 (0.9)	14 (70)	1.6 (1.2)	11 (55)	5.5 (11.5)
Pigs	7 (44)	7.0 (6.3)	7 (35)	28.1 (58.6)	4 (20)	3.3 (2.6)	6 (30)	12.3 (14.6)
Goats	4 (25)	2.5 (1.3)	2 (10)	1.0 (0)	10 (50)	2.4 (1.8)	3 (15)	8.3 (10.2)
Sheep	6 (38)	6.0 (4.8)	4 (20)	2.8 (1.0)	1 (5)	1	4 (20)	16.3 (9.6)
Chickens	15 (94)	51.6 (54.4)	17 (85)	99.8 (217.1)	4 (20)	34.0 (19.1)	5 (25)	9015 (20116)
Horses	16 (100)	6.9 (2.3)	20 (100)	8.3 (3.2)	4 (20)	2.0 (1.4)	5 (25)	4.0 (1.9)
Ducks	6 (38)	36.7 (31.7)	7 (35)	26.1 (35.3)	1 (5)	12	2 (10)	18.5 (20.5)
Other	4 (25)	24.5 (27.4)	4 (20)	4.3 (1.5)	4 (20)	7.5 (9.0)	8 (40)	43.1 (51.8)

* SD = Standard deviation ** Includes both heifers and calves

English and Mennonite farmers own much larger herds of dairy cows and heifers (their primary production livestock) than do their Amish counterparts, but more Amish farmers than non-Amish own bulls (primarily for breeding). Herd size is in part related to farm size, but density figures show that other factors are at work as well. Mennonites have the highest cow density, at 0.87 cows/acre.[3] Rennos, surprisingly, have the second highest cow density, at 0.67 cows/acre. The English (who have the largest farms) and the Nebraska farmers feature the lowest cow densities, at 0.43 and 0.44 cows/acre, respectively. Thus, while larger farms feature larger herd sizes, Renno farmers actually have more cows per acre than the English do.

[3] "Cows" include dairy cows and heifers/calves. "Acres" include crops and pasture.

Nebraska Church farmers own a wider range of animals in order to provide more food sources for their own families. A high percentage of both Amish groups own chickens, which they use for eggs and meat, while few non-Amish own any sort of fowl. Wandering fowl (chickens, ducks, geese, turkeys), often with a scattering of young in tow, are a common sight at an Amish farmstead. Renno farmers own significantly larger dairy herds than do Nebraska farmers ($p<.001$), as well as more horses, although this difference is not statistically significant. The apparent difference in the size of Renno and Nebraska chicken flocks is also not statistically significant.

The use of BST (Bovine Somatotropin, or Bovine Growth Hormone) is a controversial issue in animal husbandry today. Many modern dairy farmers use the product because it causes the cow to increase milk production. Environmental and animal rights activists oppose the hormone because it is thought to harm the cow and increase the potential for disease contraction. However, even many farmers oppose the substance because of its high monetary price and because it "wears out" the cow, shortening the amount of years a cow can be milked. Of 13 English dairy farmers in the sample, none used BST, while five of 18 (28 percent) Mennonite farmers used BST. Although not specifically addressed in most interviews, it is unlikely that Amish farmers use BST, primarily because Amish farmers would not be able to feed their cows at such high levels of productivity.[4] Of the farmers included in the study, it is significant to note the minimal usage of this controversial product.

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[4] Intriguingly, anecdotal information indicates that Amish Mennonites may be Kish Valley's biggest users of the product, although this is highly speculative since no systematic study of Amish Mennonite farmers was undertaken.

Agricultural Inputs: Chemical Fertilizers and Pesticides

The use of agricultural inputs such as fertilizers and pesticides is perhaps the most significant issue in this study, considering that these substances are widely used in modern agriculture and are highly controversial in terms of public environmental and health concerns. Table 3 presents the most commonly used fertilizers by group. Precise amounts were often unavailable.

TABLE 3. Fertilizer Applications Reported on Amish and Non-Amish Kish Valley Farms in 1998

	Nebraska Church		Renno Church		Mennonite		English	
Fertilizer N/P/K (as percent of total)	Number of farms (%)	Mean lbs/acre	Number of farms (%)	Mean lbs/acre	Number of farms (%)	Mean lbs/acre	Number of farms (%)	Mean lbs/acre
10-20-20	9 (56)	250	14 (70)	250	7 (35)	165	6 (30)	270
5-20-20	7 (44)	190	9 (45)	213	0 (0)		5 (25)	220
N (urea)	0 (0)		8 (40)	76	9 (45)	95	12 (60)	75
Manure	4 (25)		2 (10)		15 (75)	8025 gal	12 (60)	7000 gal
Organic	3 (19)		3 (15)		0 (0)		2 (10)	
Other	13 (81)		15 (75)		16 (80)		14 (70)	

* N/P/K = Nitrogen/Phosphorous/Potassium

First, an explanation is needed regarding the apparently minimal use of manure by Amish farmers. The tabular results are due to the wording of the question and the conceptual relationship of fertilizer and manure in the Amish mind; they do not accurately represent the use of manure by the Amish. Farmers were asked to identify "what substances [they] use to fertilize [their] fields." Amish farmers did not often mention manure when they were asked this general question about fertilizers; upon

prompting, nearly all Amish indicated that they do indeed spread the manure that their animals produce. The fact that the Amish in Kish Valley did not immediately associate fertilizer with manure is quite intriguing, especially since this finding is very different from that of Blake et al. (1997), who found that Amish farmers were more likely to mention manure as a fertilizer (unprompted) than were non-Amish farmers.

In contrast, majorities of both the Mennonite and English groups mentioned manure as a fertilizer that they use. Often, this was the first substance mentioned, even before chemical fertilizers. Many of the sampled farmers own large manure pits or tanks, which allow them to spread manure only twice per year, before planting and after the harvest.

The corn starter, 10-20-20, is the most commonly used chemical fertilizer by the Amish farmers in this sample, with 5-20-20, a popular fertilizer for small grains, coming in a close second. English and Mennonite farmers used these specific fertilizers less often; instead, they generally used combination fertilizers with a higher ratio of potassium along with a purely nitrogen fertilizer. Also, nearly all English and Mennonite farmers used large quantities of liquid manure collected from their sizable dairy herds.

Overall, the fertilizer analysis is made difficult by the great variety of fertilizers used, demonstrated by the large numbers in the "other" category. Every group but the Nebraska Church used more than 20 different fertilizer varieties. Very few farmers of any group used commercial organic fertilizers, although only the Mennonite group used absolutely none. One interesting difference noted in the table is the lack of urea used by Nebraska Church farmers. Other than this and the use of corn starter and 5-20-20 by the

Amish, few group trends can be noted. The amount of fertilizer used was roughly similar across all groups. If anything, the Amish farmers may use larger amounts of purchased fertilizer than the non-Amish, although this is rather speculative.

The use of pesticides by Amish and non-Amish farmers presents clearer trends for comparison. Table 4 summarizes the methods used to control weeds in corn, including non-chemical methods.

TABLE 4. Weed Control Methods Associated with Corn Production on Amish and Non-Amish Kish Valley Farms in 1998

Control method	Nebraska Church		Renno Church		Mennonite		English	
	Number of farms (%) n=16	Mean pts/acre	Number of farms (%) n=18	Mean pts/acre	Number of farms (%) n=20	Mean pts/acre	Number of farms (%) n=15	Mean pts/acre
Cultivation	12 (75)		2 (11)		3 (15)		4 (27)	
Herbicide Use	15 (94)		18 (100)		20 (100)		14 (93)	
Atrazine	7 (44)	4	15 (83)	3	10 (50)	3	9 (60)	2.6
Cyanazine (Bladex)	2 (13)		5 (28)	2	2 (10)		2 (13)	3
Dicamba (Banvel)	1 (6)	0.25	0 (0)		4 (20)	0.75	1 (7)	0.6
Glyphosate (Round-up)	2 (13)	3	3 (17)	3.2	13 (65)	3	6 (40)	2.6
Metolachlor (Dual)	1 (6)	2	4 (22)	2	8 (40)	2.05	5 (33)	2
Pendimethalin (Prowl)	1 (6)	3	11 (61)	3.3	16 (80)	3.36	7 (47)	3.1
Simazine (Princep)	1 (6)		3 (17)	1	2 (10)		0 (0)	
2,4-D	9 (56)	1.13	3 (17)	1.17	2 (10)		2 (13)	1.25
Other	2 (13)		2 (11)		9 (45)	3.1	4 (27)	2.2

Clearly, nearly all farmers in each group use herbicides to control weeds in corn. Atrazine and 2,4-D are the most popular herbicides for the Nebraska Church farmers. Atrazine is even more popular for the Renno Church and English farmers, along with Prowl. Mennonites prefer Prowl, but many also use Atrazine and Dual. Round-up is commonly used by non-Amish farmers, not for killing weeds among corn plants (as are

the others listed), but for killing all vegetation prior to planting. No-till methods require Round-up or another chemical to burn off the existing weeds and crop before planting a new crop.

The amounts of herbicide applied are roughly similar across all groups, with the exception of Atrazine. For this herbicide, the Nebraska group appears to use more pints per acre on average than the other groups. These data cannot be considered irrefutable, however, since many subjects across all groups were not able to indicate how much herbicide they applied per acre. In any case, we would not expect application rates to differ significantly across groups, since most farmers would generally use the rates suggested by the manufacturer and/or Union Mill Soil Service.

Nebraska farmers were the heaviest users of non-chemical means of weed control, i.e. cultivation. A large majority of Nebraska Church farmers (75 percent) still use this traditional, labor intensive method. In contrast, only two Renno Church farmers maintain this practice. In fact, a greater proportion of non-Amish reported practicing cultivation than did Renno farmers.

For oats, 2,4-D was the herbicide of choice. Seventy-five percent of Nebraska Church oat-growers used herbicide, with 63 percent using 2,4-D. Of the Renno Church oat-growers, 79 percent used herbicide, with 64 percent using 2,4-D. Four of six English oat-growers (67 percent) used herbicide, with three using 2,4-D.

Alfalfa doesn't usually require herbicide once it is growing, but to start new seedings, 55 percent of Mennonites used herbicide, with 35 percent choosing to use 2,4-D B (Butoxone). In contrast, 39 percent of Renno Church farmers, 19 percent of English

farmers, and zero Nebraska Church farmers reported using herbicide on alfalfa, with Butoxone being the preferred product for the Renno and Mennonite groups as well.

Only one Nebraska farmer (6 percent) and three English farmers (15 percent) reported using no herbicide on any crop whatsoever. Two of the English farmers only do rotational grazing or hay, and thus grow no weed-threatened crops, and the other English farmer is converting to certified organic practices (the only one in the entire sample to do so).[5] In contrast, every Renno and Mennonite farmer in the sample applies chemical herbicides.

The most common insect problems for these farmers were rootworm in second-year (and beyond) corn and potato leafhoppers in alfalfa. Mennonites were the most intensive in their use of insecticides. One hundred percent of Mennonite farmers applied row insecticides while planting their corn, with Counter and Force being the most popular products. In contrast, only 67 percent of Renno corn-growers, 65 percent of English corn-growers, and 38 percent of Nebraska corn-growers used insecticide. For alfalfa, 94 percent of Mennonites, 94 percent of Rennos, 43 percent of English farmers, and 25 percent of Nebraska farmers sprayed insecticide. Lorsban was the preferred alfalfa insecticide for all groups, with many Mennonites and English also using Ambush and many Renno farmers using Dimethoate. All fruit and produce farmers in the sample used chemical insecticides (and herbicides) on these crops as well.

Neither Mennonite nor Renno Church farmers avoided insecticides; all the

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[5] Only one other certified organic farmer exists in Kish Valley, to my knowledge; he is a member of the Nebraska Church Amish and is in the process of joining a regional organic grower cooperative.

sampled members of these groups applied at least one insecticide. In contrast, 30 percent of English farmers and 56 percent of Nebraska farmers used no insecticide. Three of the six English farmers are not necessarily opposed to using chemicals; they simply haven't used any lately. One English farmer even wished he had used chemicals but couldn't afford them. The Nebraska Church farmers, however, appeared to purposely avoid chemicals if they could. At least six members of this group mentioned that they practice crop rotation so that chemicals are less necessary. "That's what I like about rotating, you get away from that [pesticides]," said one Nebraska Church farmer. Others made comments such as, "We don't like to use more than we have to; they're [herbicides] not too good for you," or "I never did spray alfalfa; I hate the idea of that stuff," or "I don't like to spend much on [insecticide] if I don't have to."

Farm Products Sold

The products that are sold off-farm vary according to type and amount. Figure 4 shows the vast differences in milk production from group to group. Interestingly, the Mennonites produce significantly more milk than do the English, both in terms of absolute and per capita production. Besides producing less milk, Renno and Nebraska Amish farmers are also restricted to selling their milk as Grade B for processing since they store it in 80-pound cans rather than bulk tanks. Similar numbers of Mennonite and English farmers sell field crops (40 and 45 percent respectively), while only one Amish farmer from each group sells any excess crops. Many Amish farmers, on the other hand, sell heifers (Renno – 75 percent, Nebraska – 69 percent), poultry (Renno – 45 percent,

Nebraska – 63 percent), and produce (Renno – 75 percent, Nebraska – 69 percent), with sweet corn, string beans, potatoes, and tomatoes being the most common items. Most of these items are sold either at the farm (produce and poultry), at the Big Valley Livestock Auction and other farmer's markets (heifers, poultry, and produce), or to local restaurants (ducks and chickens). None of the Nebraska Church farmers grow produce specifically for sale, whereas five Renno Church farmers (25 percent) devote cropland to high-value vegetables. Interestingly enough, ducks are a significant market item for Nebraska Church farmers; five of these farmers surveyed (31 percent) sell ducks, compared to only one duck seller among the Rennos.

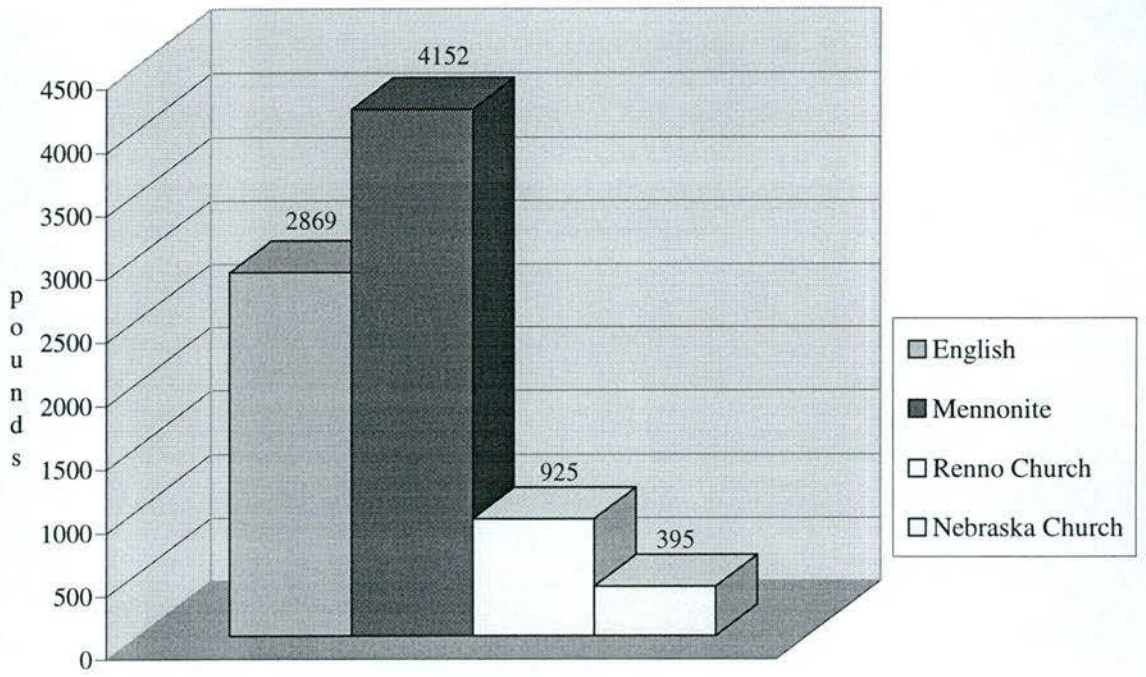

FIGURE 4. Mean Quantity of Milk Produced Daily on Amish and Non-Amish Kish Valley Farms in 1998

Sources of Agricultural Information

Not only do farmers of each group practice agriculture differently, they also learn about it differently. Figure 5 presents the primary sources of agricultural information for farmers in each group and illustrates the differences among the groups. Amish farmers consider their fathers and/or their own experience to be the most significant source of farming information.[6] English and Mennonite farmers put the most stock in farm magazines to keep them up to date on the latest machinery and farming techniques. No

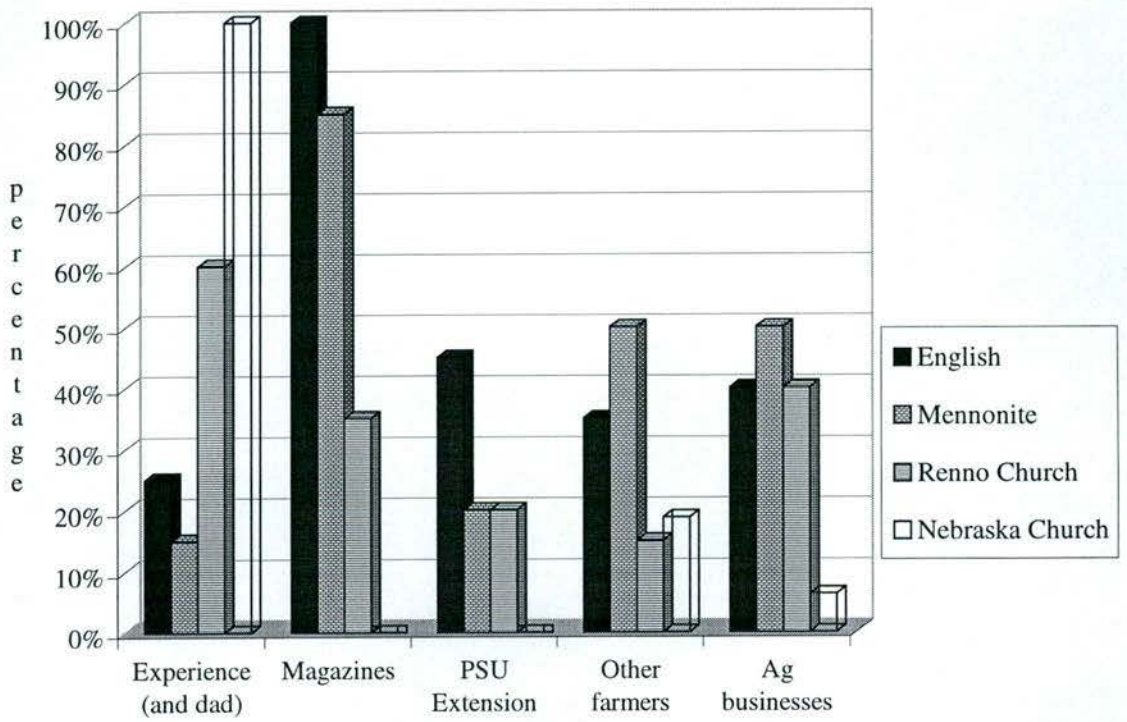

FIGURE 5. Primary Sources of Agricultural Information for Amish and Non-Amish Kish Valley Farmers

[6] The category of "Experience" also included responses such as learning from dad, being raised on a farm, and learning by doing.

Nebraska Church farmers mentioned either magazines or university extension agents as a primary source of information. A near majority of English farmers, more than any other group, consider the Penn State University Agricultural Extension offices to be a primary information source. Half of the Mennonites considered both agricultural businesses (e.g. Union Mill Soil Service, seed salesmen, feed consultants, etc.) and other farmers to be important sources of information, more than any other group. A considerable number of Renno Church farmers consult farm magazines (35 percent) or agricultural businesses (40 percent). More Renno Church farmers than any other group mentioned Union Mill Soil Service by name as a primary source of information, demonstrating the influential role that this company plays with these Amish farmers. Finally, three Mennonite farmers and one English farmer mentioned the Internet as a primary source of information, demonstrating the growing reach of modern technology even into extremely rural communities.

Environmental Attitudes

Overall Group Mean Scores on the NEP

How do the environmental attitudes of the study groups compare to one another? Table 5 presents the cumulative group mean scores on the original 12-statement New Environmental Paradigm (NEP) scale. Five statements from the New Ecological Paradigm scale are tested for group differences on an item by item case, but not included in overall mean scores.

Scoring works as follows. Each subject's response to each statement on the scale was given a score from one to four, a higher score indicating what is considered a more pro-environmental response. Undecided responses were not included in the scores for this part of the analysis. These statement scores were then summed and averaged to produce an overall mean score for each individual subject. For the group mean scores, then, a range from one to four is also possible, with a score of one indicating a strongly anti-environmental attitude and a score of four indicating a strongly pro-environmental attitude. The group mean is calculated by adding each individual's mean score and dividing by the group sample size.

TABLE 5. Comparison of Overall Group Means on the New Environmental Paradigm Scale

Sample Group	Mean Score (SD*)	Cronbach's Alpha (Reliability)
English (n=20)	2.88 (0.48)	.79
Mennonite (n=21)	2.69 (0.41)	.75
Renno Church (n=19)	2.66 (0.24)	.63
Nebraska Church (n=12)	2.64 (0.15)	-.77
Combined Amish (n=31)	2.65 (0.21)	.47
Iowa Study**		
Farmers (n=348)	2.9	.66
Urbanites (n=407)	3.2	.78
Washington Study***		
General Population (n=806)	3.0	.81
Environmental Organization Sample (n=407)	3.7	.76

* Standard Deviation ** Albrecht et al., 1982 *** Dunlap and Van Liere, 1978

Considering that a score of 2.5 is the midpoint of the scale, none of the groups

studied show strong pro-environmental tendencies. The English have the highest, or most pro-environment, score, followed in succession by the increasingly more conservative religious groups. The most conservative Amish group, the Nebraska Church, features the lowest group score, though not by much. The differences between the lowest three scores are not statistically significant. Using a between-group, two-tailed t-test, the difference between the English and Nebraska group means is significant at p=0.0536. The difference between the English and Renno group means is not as great, and therefore is only significant at p=0.0747. Since the sample size of the Nebraska Church Amish group is rather small, a combined Amish sample is also included and analyzed. The difference between the English group mean and the combined Amish mean is significant at p=0.0564.

Cronbach's alpha coefficient, a reliability measure that tests the internal consistency of a scale, is listed for each group (Clark-Carter, 1997). The English and Mennonite samples' alpha coefficients are adequate (>0.7), the Renno sample's coefficient is marginal, and the Nebraska sample's coefficient is extremely poor. Consequently, the combined Amish sample's alpha coefficient is also in the unacceptable range (<0.5). Thus, we should be cautious about drawing any major conclusions from NEP results that include the Nebraska or combined Amish samples.

The order of group mean scores, from the most socially conservative to the most socially mainstream group, is not particularly surprising. Prior studies have shown that one's level of education can influence one's pro-environmental attitudes, most likely because those with more schooling are more likely to have access to information about

the wider world and its range of ecological problems (Dunlap et al., 1992; Scott and Willits, 1994). This factor appears to be at work in this case as well. The Amish end their formal schooling after the eighth grade and are not exposed to much information about the outside world, which is exactly how the Amish want it. In this study, all of the Mennonites have graduated from high school, but only 15 percent have attended college; none graduated. The English were the most educated as a group, with 45 percent having attended or graduated from college.

The fact that this sample includes only farmers may help to explain why the overall scores are relatively low. In a prior study of Iowa farmers and urbanites, Albrecht et al. (1982) found that farmers scored significantly lower (2.9) on the NEP than did the urbanites (3.2). These findings were reportedly consistent with previous research that claimed farmers are less environmentally aware and concerned than are non-farmers (Albrecht et al., 1982, p. 41). The present study would seem to concur with the findings that farmers support the NEP at relatively low levels, although, of course, no urban-dwellers were sampled in this study with which to compare the farmers' scores.

Item Analysis

Figure 6 and Table 6 present (in graphical and tabular formats) the individual item means by group, which fluctuate widely. Items 13 through 17 in both Figure 6 and Table 6 correspond to items #6, #8, #10, #14, and #15 from the New Ecological Paradigm (Dunlap et al., 1992). See Appendix B for the full list of statements in both scales.

Two-tailed t-tests revealed significant differences among the groups on particular

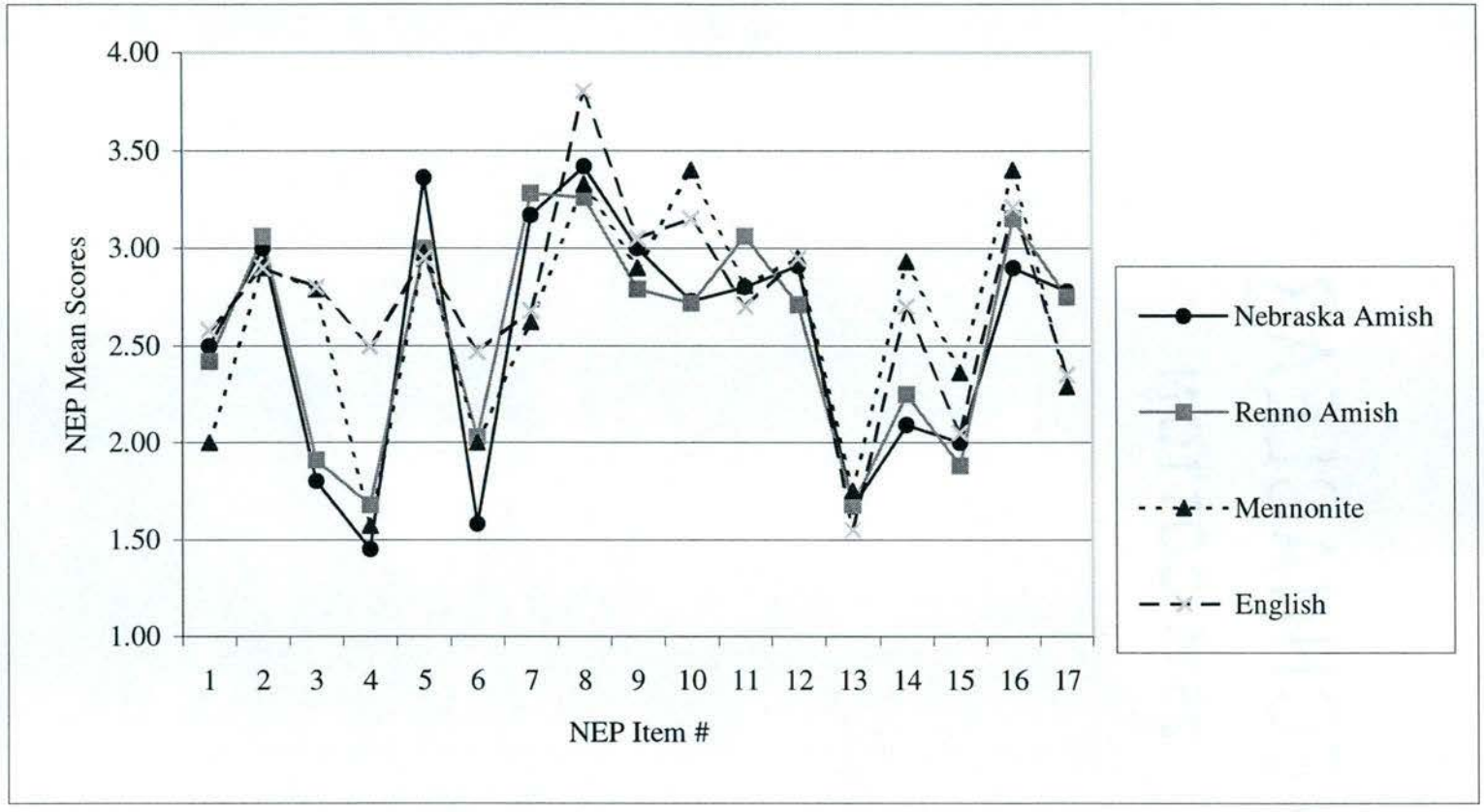

Figure 6. Group Mean Scores by Item for the New Environmental Paradigm Scale

TABLE 6. Comparison of Group Means for New Environmental Paradigm and New Ecological Paradigm Scale Items

Item #	Nebraska Church	Renno Church	Mennonite	English
	Mean Score	Mean Score	Mean Score	Mean Score
1	2.50	2.42	2.00	2.58
2	3.00	3.06	2.90	2.90
3	1.80	1.91	2.79	2.80
4	1.45	1.68	1.57	2.50
5	3.36	3.00	2.98	2.95
6	1.58	2.03	2.00	2.47
7	3.17	3.28	2.62	2.68
8	3.42	3.26	3.33	3.80
9	3.00	2.79	2.90	3.05
10	2.73	2.72	3.40	3.15
11	2.80	3.06	2.81	2.70
12	2.91	2.71	2.95	2.95
13	1.67	1.68	1.75	1.55
14	2.09	2.25	2.93	2.70
15	2.00	1.88	2.36	2.05
16	2.90	3.15	3.40	3.21
17	2.78	2.75	2.29	2.35

Groups (higher scores)	Nebraska	Renno	Mennonite	Engl.	Groups (lower scores)
English	3**,4***,6**,8*	3***,4**,8***	1*,4**,8*	---	
Mennonite	3**,10*,14*	3***,10***,14*	---		
Renno Church		---	7***	7*	
Nebraska Church	---		7*		

* p<0.05, ** p<0.01, *** p<0.001

Figure 7. New Environmental Paradigm and New Ecological Paradigm Scale Items with Statistically Significant Differences as Measured by T-Tests

items; these differences allow nuances in each group's environmental attitudes to be observed. The items featuring statistically significant differences are listed in Figure 7.

For any item in Figure 7, the group with the higher score is listed on the vertical axis, while the group with the lower score is listed on the horizontal axis. For example, in the box at the upper left corner, the English scored significantly higher than the Nebraska Church on items #3, #4, #6, and #8.

Differences between group means on individual items are generally relegated to degrees of agreement or disagreement, rather than agreement versus disagreement. Items #3, #14, and #17, are the exceptions to this trend. Item #3 states, "Humans have the right to modify the natural environment to suit their needs." Both non-Amish groups score significantly higher on this item than both Amish groups. A small majority of the non-Amish groups disagree with this statement (which is the pro-environmental response in this case), while both Amish samples consistently agree with the statement. As indicated by their comments during the interviews, a number of Amish seemed to be thinking of small, localized modifications, like cutting down trees, building houses, and, of course, farming. Their responses seemed to have in mind the government's tendency to disallow or make difficult some of their traditional activities through zoning laws, etc. A Nebraska Church farmer qualified his agreement, however, in a way with which many Amish would probably agree: "[Modification is acceptable] as long as they do it the natural way; if they don't do it the natural way, they could contaminate the air or water."

In contrast, the non-Amish seemed to be thinking more of the implications of rampant, unregulated development. Most non-Amish were supportive of modification

only if it was cautious and moderate. A Mennonite farmer related his response to his faith this way: "Some things you do to improve [the farm], but you can overdo it; God put things here for a reason."

A small majority of Mennonites and English disagree with item #14: "The balance of nature is strong enough to cope with the impacts of modern industrial nations." Their sense seems to be that locally, the balance is fine, but many in both non-Amish groups knew of examples in other parts of the world where the situation was not as positive.

The Amish, on the other hand, are in general agreement with this item. This result is somewhat surprising, since on other similar items, the Amish responded negatively to modern industrial growth. However, the results might be explained by the strong sense among the Amish that God's Creation is stronger than anything humans can do to it, in combination with the general lack of knowledge the Amish have about events in the outside world, including negative ecological impacts.

The difference between the Renno and Mennonite scores on item #17 is not statistically significant, but it is close ($p=0.0593$). On this item, the Amish are slightly in agreement with the statement's sensibility that "If things continue on their present course, we will soon experience a major ecological catastrophe." This agreement may be due to the Amish people's biblical sense of apocalypticism, and their association of ecological catastrophe with the end of the world. As one Renno farmer put it, "Once the Lord sees that the earth won't support us anymore, I believe he'll end it." The Amish believe that disobedience and evil behavior will receive punishment, and they certainly see a lot of both of these behaviors in the wider world.

The non-Amish are in slight disagreement with item #17, although there is considerable within-group variation for both groups. (See Appendix C, Table 9, which presents the table of frequency distributions of responses by item for each group. Sample sizes vary by item because of the removal of undecided responses.) Some think that since people are aware of the problems, the problems will be fixed, while others don't even believe in some of the purported problems, like global warming. Others in these groups strongly disagree, however, believing that ecological catastrophes are already occurring.

One of the strongest areas of group difference occurs on the humans-over-nature items, #4 and #6. These statements associate extremely closely with biblical interpretations of the Genesis creation story. It was not surprising, then, to note that 100 percent of Amish and 90 percent of Mennonite subjects agreed with #4, which reads, "Mankind was created to rule over the rest of nature." While all the subjects in the English sample affiliate with a Christian denomination, they were exactly split on this item, 50 percent agreeing and 50 percent disagreeing. The English more strongly rejected the idea of ruling, saying instead that we have to work the land with common sense. But although many Amish and Mennonites agreed with the statement, opining that this is what God or the Bible says, they also qualified the concept of "rule" quite strongly: "[We can rule] if we do it right, not if we spoil things," said one Renno farmer. "You don't want to rule over it just any old way," said another Renno farmer.

The agreement was only a little less strong on item #6, which reads, "Plants and animals exist primarily to be used by humans." As animal husbanders and biblical literalists, the Nebraska Church Amish are 100 percent in agreement with this statement

which, like #4, could be interpreted to relate to the Genesis admonition to have dominion. A few Renno and Mennonite farmers disagreed, though, recognizing the presence of animals and plants that are unused by people. The English were in the least agreement with this item, but once again, the within-group variation was dramatic. Some felt that animals and plants are here "for what we get out of them," while others in the sample felt that other creatures exist for beauty and the "good of the environment."

The Mennonites disagreed with item #10 significantly more than both Amish groups: "Humans need not adapt to the natural environment because they can remake it to suit their needs." This difference is primarily a matter of degree, with Mennonites strongly disagreeing and the Amish only mildly disagreeing, but it is still somewhat surprising considering the common notion that the Amish feel close to nature and care about Creation. The Amish, who have spent much of the modern era negotiating between modern culture and the needs of their cultural and physical landscape, could hardly be considered non-adaptive. Part of the low score may be due in part at least to some confusion over the construction of the sentence. Since the statement is a negative assertion, and a pro-environmental response is to disagree, one must keep the double negative straight in one's head to respond "properly." This may be one example where a stronger grasp of the English language would have improved the scores of the Amish. On another interesting note of interpretation, all four of the English subjects who agreed with this statement responded on the basis of what they feel <u>is</u> the case, not what they would like to see. Since humans <u>have</u> remade their environment in some ways, adaptation seems unnecessary, but at least two of these subjects disliked this reality and felt it was

detrimental in the long run. Thus, although these subjects held pro-environmental attitudes, as shown by their additional comments, their NEP responses gave the opposite impression.

Item #1 raises the specter of global overpopulation: "We are approaching the number of people the earth can support." This statement garnered slight agreement from the English, mixed responses from the Amish, and relatively strong opposition from the Mennonites. As farmers, subjects across all groups mentioned that food production must be sufficient to support everyone on the earth; otherwise, why would prices be so low and the government be encouraging farmers to set aside acres not to farm? Also, subjects from most groups acknowledged that there are many overcrowded places, like New York City and India, but that there are also many under-utilized areas. Many of the Amish expressed a lack of knowledge about "the Earth" (perhaps showing the influence of their goal of being separate from the world) and declined to either agree or disagree. One Renno Church farmer mentioned that technology is still keeping us ahead of any potential problems. Two Nebraska men commented that God is in control of this matter, not people. Another Nebraska man said that it depends on how humans live: "If they don't live right, [the Earth] might not support anyone!" The English have a stronger sense of the negative effects of population growth in terms of sprawl and overdevelopment. Some don't think that farm production is high enough if everything were distributed fairly around the world. Other English farmers echo the Nebraskas; they feel that God is in control and won't let humanity mess up the world. As a group, Mennonites expressed the most faith in technology and production capacity to cope with an increasing population.

Several said that the United States can definitely support more people than it does, but they were not as sure if this is true for other places.

Compared to the other groups, the English were also significantly more in agreement with item #8: "Humans must live in harmony with nature in order to survive." The difference was mostly a matter of degree, however, since both Amish groups expressed 100 percent agreement with this item as well. The overwhelming support for this item (80 percent strongly agreeing, higher than any group for any other item) among the English is somewhat intriguing, but perhaps is partly explained by an English farmer who strongly agreed, because "living with nature is not necessarily submissive to nature." Thus, while some environmentalists may see this statement as supporting complete non-interference in the natural world, animal husbanders can define harmony differently, wholeheartedly supporting the need for a good relationship with the other-than-human world.

The only item where the Amish scored significantly higher than the non-Amish was on item #7, which reads, "To maintain a healthy economy we will have to develop a 'steady-state' economy where industrial growth is controlled." Sometimes a "steady-state" economy was an unclear term, so an alternate wording was offered: "In the past 200 years, the U.S. economy and industry has been expanding and growing, building more new factories, stores, etc., and using more natural resources. In the future we will have to change, and limit or reduce the amount of growth" (adapted from Caron, 1989). Another alternative was defining the term as an economy that holds the amount of throughput, or "stuff," steady, rather than one that is continually growing in size. In any

case, many Amish clearly understood the concept of controlling industrial growth, and liked the idea. This response is understandable considering the Amish community's cultural predisposition to limits, or "cultural fences" (Kraybill, 1989, p. 236). As one Nebraska farmer put it, "If you don't control anything, it'll get out of control." The non-Amish, on the other hand, were more ambivalent. Some were quite concerned with the impacts of growth while others saw this statement as the "whole socialist idea" and felt that industrial growth was necessary and vital to the economy. These farmers were quite opposed to any more government control. Interestingly, in this case, the Amish do not appear to associate the need for limits with government intervention as the non-Amish do. Neither do they feel this statement directed at them, though. Thus it may be an example where the Amish are supportive of limiting the negative impacts of something that they feel is outside their cultural sphere.

The Renno Amish were also the high scorers on item #11: "There are limits to growth beyond which our industrial society cannot expand." This difference is not statistically significant ($p=0.093$); even so, the results on item #11 tend to support the results of item #7.

Dimensionality of the NEP

Some studies using the NEP have indicated that the scale may have more than one dimension; in other words, the scale may measure not one overall attitude, but a few distinct attitudes (Albrecht et al., 1982). Researchers identified three distinct dimensions using factor analysis on their NEP data from farmers and urbanites in Iowa: Balance of

Nature, Limits to Growth, and Man Over Nature. The Balance of Nature subscale includes NEP items #2, #5, #8, and #12. The Limits to Growth subscale includes NEP items #1, #7, #9, and #11. The Man Over Nature subscale includes NEP items #3, #4, #6, and #10. Table 7 shows the subscale scores by group.

TABLE 7. New Environmental Paradigm Subscale Scores by Group

Subscale	Sample Group	Mean Score
Balance of Nature	English	3.15
	Mennonite	3.04
	Renno Church	3.01
	Nebraska Church	3.17
	Iowa Farmers*	3.3
Limits to Growth		
	English	2.75
	Mennonite	2.58
	Renno Church	2.89
	Nebraska Church	2.87
	Iowa Farmers	2.8
Man Over Nature		
	English	2.73
	Mennonite	2.44
	Renno Church	2.09
	Nebraska Church	1.89
	Iowa Farmers	2.6

* Albrecht, 1982, p. 42

Two-tailed t-tests were performed to identify significant differences among sample groups. No significant differences exist in the Balance of Nature subscale scores. In the Limits to Growth subscale, the Renno Church score is significantly higher ($p<.01$) than the Mennonite score. Both non-Amish groups scored significantly higher ($p<.05$) than both Amish groups in the Man Over Nature subscale.

Comparing the Iowa farmers in Albrecht et al. (1982) with the English farmer

sample in this study, the two samples scored quite similarly across all subscales. Iowa farmers scored higher (3.3) than English farmers (3.15) on the Balance of Nature subscale, very close on the Limits to Growth subscale (2.8 – Iowa, 2.75 – English), and slightly lower on the Man Over Nature subscale (2.6 – Iowa, 2.73 – English). The subscale scores and the trends across subscales are similar enough to warrant confidence that the NEP is a fairly consistent measuring tool and that the subscales are measuring similar attitudes.

Analyzing scores by subscale helps clarify the environmental attitudes of the Amish. The low scores for the Amish on the Man Over Nature subscale indicate their support for dominion attitudes; this finding agrees with the item analysis and seems to be related to their biblical/religious beliefs. The Amish samples' evident support for human dominion is balanced, though, by their stronger support for limits to growth, which also appears to be religiously inspired. The Amish scores are improved even more by strong support for the importance of the balance of nature.

Table 8 presents the interrelationship of the subscales, listing the Pearson r correlations. If the subscales are measuring a common paradigm, they should be correlated (Albrecht et al, 1982). As it turns out, the subscales are correlated for the English sample across all subscales. The Balance of Nature and Limits to Growth subscales are correlated across all groups, showing a close relationship between the attitudes being measured. The relationship between the Man Over Nature and Balance of Nature subscales is less strong for the Mennonites, nonexistent for the Rennos, and strongly negative for the Nebraska Church. This indicates that these two scales are not

measuring positively related attitudes for the Amish groups and may, in the case of the Nebraska Church, be measuring opposing values. Likewise, the Man Over Nature and Limits to Growth subscales are weakly related for the Mennonite and Renno groups, and once again strongly negatively related for the Nebraska Church.

Table 8. Pearsonian Correlations between Responses on the Three New Environmental Paradigm Subscales

Subscale	Sample Group	Correlations	
		Balance of Nature	Limits to Growth
Limits to Growth			
	English	.66	
	Mennonite	.80	
	Renno Church	.74	
	Nebraska Church	.71	
Man Over Nature			
	English	.53	.71
	Mennonite	.26	.23
	Renno Church	.03	.22
	Nebraska Church	-.80	-.76

The lack of consistent relationships across subscales for all groups suggests that overall mean scores, which assume within-scale consistency, may be painting an incomplete picture at best. The results of the Limits to Growth subscale show this most clearly, since the Amish actually scored higher than did the non-Amish. With the subscale scores identified, the placement of the Amish at the bottom of overall group mean scores is clearly due to the low scores on the Man Over Nature subscale, which drew down their overall scores considerably.

Comparison to Other NEP Studies

The NEP results were compared to two other studies in order to see how this sample fits into the larger picture (Dunlap and Van Liere, 1978; Scott and Willits, 1994). In the original NEP scale study performed in Washington state (Dunlap and Van Liere, 1978), a larger proportion of the general population sample agreed with all statements but one (item #8), in comparison with the English farmer sample in this study. The difference in percentages of those who agreed with the other 11 items range from three to 17 percent greater for the Washington sample. See Appendix C, Table 10, for the actual results.

A statistical test was performed to check whether the English sample was significantly different from the larger population. Since the sample consists of rural farmers and is therefore assumed to score lower on the NEP, a one-tailed z-test was used. Surprisingly, the differences between the sample and the population were only significant on items #1 and #8 ($p<0.05$). Since the English sample was actually higher on item #8, a two-tailed test was performed, but the significance of the difference remained. Thus, on all but two items, the English sample in this study appears to fit within the general population sample from Washington.

Since the sample and population are from different states and studies, these results may be influenced by regional differences in geography, history, ecology, etc., not to mention differences over time. Therefore, results from the English farmer sample were also compared to a statewide Pennsylvania sample, which is a better sample-to-

population comparison (Scott and Willits, 1994). The data from the Pennsylvania sample were more abridged than those from the Washington sample; only cursory comparisons can be made. A five point Likert scale was used in the greater Pennsylvania study, with the results table combining the varieties of agreement and disagreement into one category each. Thus the data for this study were converted to a five point scale for comparison. (See Appendix C, Table 11, for the five point Likert scale table of frequency distributions for this study, and Table 12 for the comparison with the statewide Pennsylvania study.)

A larger proportion of the Pennsylvania sample agreed with items #2 through #7 and item #12 than did the English sample, with a range of eight to 19 percent more agreement. More members of the English sample than the Pennsylvania sample agreed with item #8, a similar result to the Washington state comparison. An equal number agreed with item #10. On the remainder of the items, the English sample agreed at higher percentages than the Pennsylvania sample, but the percentage of disagreement was higher as well. This result is due to the large number of undecided responses for the Pennsylvania sample, which on items #1, #9, and #11 was a greater percentage than the difference between the agreement of the English and Pennsylvania samples.

Basically, the results show that the English farmer sample showed consistently less agreement with the NEP statements than did the statewide Pennsylvania sample. This finding is consistent with the Iowa study of farmers and urbanites, since the Pennsylvania statewide sample would consist of a large proportion of urbanites, or at least non-farmers. An interesting note to add is that the Amish samples' high level of support for item #7, limiting industrial growth, is greater than the statewide population as

well as the local non-Amish sample.

Open-Ended Questions: Stewardship and Lifestyle Decisions

Besides the NEP, each farmer was asked a few open-ended questions regarding their sense of responsibility for taking care of the land and their self-professed reasons for living the way they do. The goal of these questions is to note any significant differences in the way Amish and non-Amish farmers perceive their reasons for taking care of the land or for their particular lifestyle. The literature discussing the Amish indicates that they believe in stewardship, that they feel responsible to God for taking care of Creation, and that they feel closer to God while in nature (Hostetler, 1993). If these attitudes are indeed more significant to the Amish than non-Amish Christians, we would expect to find higher levels of religious motivation and environmental concern in their responses.

In response to the question asking why they feel a responsibility to take care of the land, many Amish mentioned religion as a motivating factor. Many indicated, as expected, that the sense of responsibility to take care of the land comes from God and his requirement "to till and keep it" (Genesis 2:15). (A Nebraska Church bishop reworded this phrase in a rather modern, ecological fashion: "to till and conserve it" (emphasis mine).) Besides the positive motivation to remain faithful to God and his gift, a Renno Church farmer also indicated the negative implications of not taking care of the land: "We read in the Bible, God will destroy him who destroys the earth." Other motivations surfaced, such as concern for future generations and reciprocity, i.e. if you treat the land well, it will treat you well. But even the motivation to treat the land with care in order to

achieve farming success was related to the larger sense of faithfulness to God. As one Nebraska farmer put it, "[We take care of the land] so we can raise our own bread as God intended us to. If we don't take care of the land in some way, we might not be able to do that." In other words, taking care of the land perpetuates the farming lifestyle, which is a necessary part of following God.

If the Amish consider taking care of the land to be a God-given responsibility, what do they consider to be "taking care" of the land in actual practice? For the Amish in this study, taking care of the land is an active, involved endeavor, basically equivalent to farming itself. To the Amish, it is irresponsible not to farm arable land. As one Renno farmer said, "[I'd] rather see [a farm] being farmed than growing up in weeds. ... I feel that people on the farm should do their farming; sometimes you see barns falling down, fields growing up in woods." Maintaining the soil's ability to produce crops by building up the soil with inputs like manure, fertilizer, and lime and by reducing soil erosion was the most often mentioned way to take care of the land. Removing weeds was also considered to be caring for the land.

These results raise a few concerns. The importance of maintaining soil fertility has been noted in many other Amish studies as a positive sign of their ecological concern. However, the idea that farming is the best use of land and that high productivity is the main goal of farming does not seem particularly environmentally positive. It assumes that the needs of the land and the creatures who live on it are outweighed by human needs for food production. An example of this is the extreme lack of riparian zones along Kishacoquillas Creek. Forests and brush within Kish Valley are considered obstacles to

be removed. To the Amish, "the tree is the enemy," observed a local conservation agent. The Amish sensibility considers "weeds" to be an enemy to be eradicated rather than a colonizing species that thrives on human-created disturbances (like plowing). The Amish idea of stewardship is sustainable in intent, but because of its focus on high production rather than adaptation to ecological systems, it may not be sustainable in practice.

A few Amish farmers expressed a greater degree of environmental awareness than might be expected considering the previous discussion. A Renno Church farmer, thoroughly well versed in the importance of earthworms to soil health, discussed his concern that some chemical fertilizers or pesticides may kill earthworms. While the common sentiment seems to be that arable land ought to be productive farmland, a Nebraska farmer indicated that without humans, farmland will still be taken care of. "Nature takes care of it if you don't take care of it," he says. "Just like a mountain that's out there that nobody's taken care of, nature takes care of it."

Tradition was mentioned more often than religion by Amish farmers as a motivator of their way of life. The most common response to the question, "Why do you live and farm the way you do?" was simple and straightforward: "That's the way I was raised." Religion was mentioned less frequently as a motivation for their way of life. A Renno Church farmer was clear about the role of the church in his farming, however. "[We farm] according to our religion and the rulings of the churches; we daren't (sic) just farm any way – that's our ruling," he said. In general, a few more Nebraska Church farmers mentioned religion as a motivation for their way of life than did Renno Church farmers, but the difference was not clearly significant.

Other motivating factors cited for the Amish way of life include the farm's importance as the best place to raise a family, the farmer's sense of connection to the land or animals, or simple enjoyment of farm work. Religion was mentioned as often as each of these motivations for the Renno Church, and was mentioned slightly more often for the Nebraska Church. Only one Nebraska farmer mentioned pleasure as a motivating factor for his way of life.

While the Amish do claim to be motivated by religion and tradition, it is significant to note that, in response to the question asking why they feel a responsibility to take care of the land, Mennonites as a group mentioned religion at least as often as, if not more than, the Amish. The English also mentioned the motivation of stewardship in general, but specific references to religion were less common. The importance of one's upbringing in imbuing a sense of responsibility was more explicit, perhaps taking the place of religion for some English farmers. Reciprocity and concern for future generations appeared to be stronger sources of motivation for the English than for the other groups, although the Mennonites also indicated these were important factors.

When asked about their lifestyle motivations, however, religion did not appear to play a significant role for the non-Amish. Enjoyment of farm life and tradition were the first and second most commonly cited factors for Mennonites, while these factors were reversed as the top two motivators for the English. Only one Mennonite and no English connected their lifestyle decisions with religion. The Mennonites felt strongly about the value of the farm in raising a family, liked being their own bosses, and appreciated the connection to the land and animals. Economic factors also played a big part in

influencing their lifestyle and farming choices. The English also said they like being their own bosses and appreciate the connection to the land and animals about as frequently as the Mennonites. But fewer English than Mennonite farmers indicated that they were motivated by economic factors or the farm's positive influence on the family.

The non-Amish generally associate stewardship practices with modern soil conservation and manure handling practices, and were usually more articulate than the Amish in terms of modern ecological notions of taking care of the land. When asked how he takes care of the land, an English farmer spoke for many when he said, "[By] using modern practices – all sod, no erosion. Maintain a good nutrient balance; don't take out without putting back in. Keep brush and weeds controlled. Don't use an over-abundance of chemicals." No-till agriculture was commonly cited as an example of "taking care of the land." As discussed in Chapter II, this is a controversial and potentially troubling style of "care." Excessive chemical use was considered poor stewardship, but chemicals themselves were acceptable as long as they were only used "as needed." A general sensibility among Mennonites was that today's farmers were doing a better job than their predecessors did in terms of reducing soil erosion, primarily thanks to greater awareness of the problems and greater dispersion of information.

CHAPTER V

DISCUSSION

This chapter begins by summarizing and discussing the findings presented in Chapter IV. The results of the questionnaires on agricultural practices and environmental attitudes are then compared. The third section explains the importance of religion in supporting and motivating Amish agricultural sustainability. The fourth section examines what the Amish example adds to the broader discussion of religion and sustainability. The chapter concludes with sections on project limitations and suggestions for future study.

Summary of the Findings

Agricultural Practices

The hypothesis that Amish farming would be more like alternative/sustainable agriculture than would non-Amish farming was supported by the results. Differences between the groups abound. The Amish have smaller, more diverse farms than do the non-Amish, keeping them out of the specialization and monocultures characteristic of conventional agriculture. They consult different sources of information (primarily their own experience or their fathers') than do the non-Amish. They use horses rather than tractors for fieldwork, milk cows by hand, and store milk in milk cans rather than bulk

milk tanks; none of these practices are used by the non-Amish. These practices reduce their dependence on expensive technology and machinery that can drive other farmers into debt.

Similarities exist as well. Amish and non-Amish farmers alike use agricultural inputs, such as chemical fertilizers and pesticides. These off-farm, petroleum-based inputs are used by both the non-Amish and the Rennos in similar frequencies and amounts, although fewer Nebraska farmers use insecticides or straight nitrogen fertilizers. Unlike the findings of Blake et al. (1997) for New York Amish, in Kish Valley nearly all farmers market products, especially milk. The Amish are more self-sufficient in terms of raising gardens and livestock for their own food needs, but they still rely on selling farm products to make a living and are thereby tied to non-Amish society.

Looking more specifically at each group, Nebraska Church farmers continue to be the most conservative Amish group in Big Valley in their use of modern technology, including machines and chemicals. Nearly all Nebraska Church farmers use ice or spring water to cool their milk and do not use gas-powered pick-up hay balers in the field.[1] They feature the smallest farms (tied with the Rennos), the highest amount of crop and animal diversity, the smallest amount of milk production, the least usage of chemical pesticides, and the most informational isolation from modern agribusiness. Also, they still practice traditional crop rotations and use non-chemical methods of weed control.

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[1] The exceptions to this are two districts of the Nebraska Church that allow bulk milk tanks and pick-up balers, as mentioned in Chapter III.

Nebraska Church farming is the least modern of any group in the study, and in many aspects, the most similar to alternative/sustainable agriculture. In comparison with Beus and Dunlap's (1990) alternative agriculture paradigm, of the four sample groups, Nebraska farmers are the most independent from external sources of energy, inputs, and information and are the most diverse; they also strongly support most of the other elements of the paradigm (i.e. decentralization, community, restraint, quality family life, and spirituality). Nebraska farmers don't seem to support the "harmony with nature" element as strongly, however. Support for the maintenance of healthy soil is balanced by their support of dominion attitudes as measured by the New Environmental Paradigm scale (see below).

In comparison with Gardner et al.'s (1995) "operational measures of agricultural sustainability," Nebraska farmers as a group use the fewest synthetic chemical inputs and the most "positive practices" such as crop and livestock diversity, crop rotations, and non-chemical methods of weed control, i.e. cultivation (p. 58). No group studied expressed a high degree of commitment to the concept of sustainable agriculture, although Nebraska farmers seemed to express a few more reservations than the other groups regarding chemical use.

Renno Church farmers, in contrast, incorporate more conventional techniques into their farming and strive for higher farm productivity than do the Nebraska farmers. They use diesel-powered milk coolers as well as tractors out of the field, unlike the Nebraska Church. Renno farmers use pesticides as frequently as do English farmers (or more so)

and they apply both pesticides and chemical fertilizers at rates equivalent to non-Amish farmers.

Like the Nebraska farmers, the Rennos also support many elements of the alternative agriculture paradigm, yet as a group the Rennos use more synthetic chemical inputs and fewer "positive practices" than the Nebraska Church. In addition, their stronger association with the local agricultural business, Union Mill Soil Service, demonstrates a lesser degree of commitment to sustainable agriculture and a turn toward conventional agriculture.

English and Mennonite farmers are rather similar in most respects, indicating that perhaps Mennonites are as "English" as the English when it comes to agricultural practices. In some ways, Mennonite farmers appear to be even more embedded in conventional agriculture than are English farmers. Mennonite farms featured 13 percent less crop diversity than English farms. A larger proportion of Mennonite farmers used herbicides and insecticides for weed and insect control on alfalfa. Mennonite farmers produce nearly 50 percent more milk than the English farmers produce, even though Mennonite dairy herds are only 17 percent larger than English herds.

Overall, if one would place the four Kish Valley groups on a spectrum from least to most alternative/sustainable agriculture, Mennonites would be at the least alternative end, followed closely by the English; the Rennos would be next, on the more alternative side near the center, and the Nebraska Church farmers would mark the most alternative end.

Environmental Attitudes

Environmental attitudes were assessed for the four samples of farmers. The hypothesis that the Amish would score lower than the non-Amish on the New Environmental Paradigm (NEP) scale was supported. The group most representative of mainstream society, the English, scored the highest on the NEP scale. The Mennonites, who as a group have more public education than the Amish but less than the English, had the second highest score. The Amish had very similar scores to each other (only slightly lower than the Mennonites), although the Nebraska Church scored the lowest by a slim margin. None of the differences in scores were significant at $p<0.05$, but the differences between the English and the Nebraska Church and between the English and the combined Amish sample were only barely insignificant ($p<0.06$).

This slight difference in overall mean scores between the English and the Amish was due in large part to the attitudes on one section of the NEP: the Man Over Nature subscale. The Amish showed extremely strong support for the four statements of this subscale, which includes two statements that affirm the biblical concept of dominion. In contrast, the English were slightly in opposition to the idea of Man Over Nature. The NEP (following the tradition of Lynn White, Jr.) considers support for dominion to be an anti-environmental attitude.

The Amish tended to support the Limits to Growth subscale more strongly than the non-Amish (especially the Mennonites), however, giving evidence of a pro-environmental attitude in this case. The contradictory scores for the Amish on the two

subscales demonstrate that an overall score may obscure underlying differences in attitudes.

Comparison of Environmental Attitudes and Behaviors across Groups

An initial comparison of the environmental attitudes and behaviors (as measured by agricultural practices) of the four groups in this study presents us with an apparent conundrum. The Nebraska Church farmers practice the most alternative/sustainable agriculture of the four groups, yet they have the weakest pro-environmental attitudes, as measured by the NEP. In contrast, the English farmers generally practice conventional, rather than alternative/sustainable, agriculture, yet they have the strongest pro-environmental attitudes of the four study groups. How can this apparent anomaly be explained?

As noted above, the Amish do not have weaker pro-environmental attitudes on all NEP items. If the Man Over Nature subscale were removed from consideration, both Amish groups would have equal or better scores than the non-Amish groups. This action (removing the Man Over Nature subscale) may be legitimate, since researchers have not found a strong connection between these attitudes and environmental behavior.

According to findings from the statewide Pennsylvania NEP study by Scott and Willits (1994), attitudes expressed on the Man Over Nature subscale are much less relevant in explaining differences in environmental behavior than are the results of the other subscales. To explain this, they opine, "[It] seems plausible that believing that humans have dominion over nature could lead to stewardship rather than exploitation, if

'dominion' implies that people have a moral and ethical responsibility to preserve and protect the natural world" (Scott and Willits, 1994, p. 257). This sensibility fits with the caveat added by many Amish (and others) in this study that "rule" over nature must be carried out in a caretaking manner.

With the measures of dominion removed, the Amish no longer appear to have weaker pro-environmental attitudes than their non-Amish farming neighbors. However, they do not appear to have considerably stronger pro-environmental attitudes either. Either the NEP is unable to measure the pro-environmental attitudes of the Amish, or some factor other than environmental attitudes is at work in leading to the positive environmental behaviors of the Amish.

According to their NEP scores, the Amish do not demonstrate strong pro-environmental attitudes, nor do they show much evidence of an ecological worldview. The results, however, raise important questions about the NEP's ability to measure environmental attitudes across all cultures. The problem appears to lie in the construction of the survey and its choice of statements used to assess environmental attitudes. Statements that assume a certain style and content of education are unlikely to fully assess the environmental attitudes of a culture with an entirely different worldview. Not only will the survey be likely to incorrectly assess environmental attitudes (by misinterpreting culturally-bound responses to the statements), but it may completely miss attitudes that liberal, educated researchers fail to associate with environmental concern as it exists in their culture. For the Amish, statements that appeared to be biblical references

were quickly recognized and affirmed accordingly. They were not considered to be environmental attitude statements, but rather statements of religious belief.

Assuming that the Amish may have more pro-environmental attitudes than the non-Amish and that, for the reasons stated above, the NEP is unable to measure these special Amish attitudes, the open-ended questions on stewardship are consulted to examine this possibility.

Stewardship is definitely an important concept for the Amish; the earth is seen as a gift from God, and remaining in farming is the proper response to that gift. It is significant to note, however, that the importance of stewardship is expressed with relatively equal strength across all study groups. It is not only, or even best, articulated by the Amish.

In this case, at least, the NEP does not account for some pro-environmental attitudes of the Amish, although these attitudes do not appear to be unique to the Amish. Yet, as we have seen, agricultural practices differ substantially across the groups. Even though expressed environmental attitudes, as measured by the NEP and more culturally appropriate questions, are roughly comparable, behaviors are not. Another factor must be at work in causing these observed behavioral differences.

Sustainability and the Amish: The Importance of Religion

The key factor supporting Amish agricultural sustainability is religion. Farmers in all groups feel that religion plays a guiding role in their farming practices, although only the Amish acknowledge religion as a guiding force in their lifestyle decisions.

As discussed in Chapter II and supported by the findings of this study, ecologically speaking, the Amish appear to be more sustainable than their neighbors. Amish agriculture's greater sustainability exists in large part because of the technology they use. However, Amish sustainability is not merely an artifact of limited technology. The Amish can and do incorporate modern technology into their farming practices, demonstrating the choice involved in limiting technology.

The limits placed on technology by the Amish are not based on an indigenous or postmodern ecological worldview that sees the natural world as a web of interconnections and is concerned with perpetuating these processes. Neither are these limits based on knowledge about or awareness of specific contemporary environmental issues, since the limits were set up well before the environment become a major national policy issue.[2] Besides, the Amish in Kish Valley are presently not particularly responsive to environmental problems, as evidenced by the lack of streambank fencing on most Amish farms and their somewhat skeptical, defensive response to the trouble in the Chesapeake Bay.[3] The non-Amish sample had much more awareness and reported use of modern soil conservation practices than the Amish. If not based on an ecological worldview or awareness of specific environmental problems, on what, then, are these technological limits based?

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[2] Amish leaders in Lancaster County, Pa. prohibited the use of tractors in the field in 1923 (Kraybill, 1989, p. 172). David Kline (1998), noted Amish farmer/nature writer from Ohio, considers this a "divinely-inspired" decision since they couldn't have known at the time the incredible significance this decision would have over the long-term.

[3] A few Amish settlements in Ohio, Wisconsin, Missouri, and elsewhere in Pennsylvania do incorporate limitations on chemical use in their *Ordnungs*, thereby exhibiting a greater level of environmental concern than that shown by the Amish of Kish Valley.

The limits in Amish culture are based on their religious worldview. Religion is of utmost importance in the life of an Amish community. And, conversely, the church community is vital to the redemptive process. Without a strong community, individuals would have a much harder time resisting the "world's" vices. Moreover, salvation is a corporate matter for the Amish; a person receives salvation as a part of a community, not individually (Hostetler, 1993, p. 75).

Other Christians hold strong religious beliefs, yet the Amish put their beliefs into practice in a way that other denominations do not and cannot (and perhaps don't want to) emulate. Three elements of Amish culture play vital roles in determining how religion is practiced.

Gelassenheit, or self-denial, leads to personal, internal acceptance of the *Ordnung*, the unwritten rules of Amish society. The *Ordnung* operationalizes Amish beliefs, requiring Amish community members to practice what the bishops preach. Unlike many churches, the Amish ensure that religious beliefs are followed in practice, on pain of social/psychological sanctions in the form of the *Bann* (excommunication) and *Meidung* (shunning). Without these three crucial elements of Amish life, it seems likely that the Amish would be much farther down the path of social acculturation and modern agribusiness practices, much like their Mennonite neighbors.

Aside from these sociocultural factors, however, one significant difference in religious beliefs may also help explain why Mennonites and Amish differ in practice. Mennonites in Kish Valley who have been influenced by mainstream American evangelicals find themselves at odds with the Amish over the issue of "assurance of

salvation." Many of these Mennonites believe the Bible teaches that those who accept Jesus Christ as their personal savior will be saved by grace. This doesn't mean that Christians can do anything and still be saved, but it does lessen the need for rigid purity. The Amish, in contrast, believe that humans cannot know whether they are saved or not in this life; that is up to God. Thus, they must constantly live pure, virtuous and obedient lives in community with others who are doing the same, or risk eternal punishment. This lack of "assurance" may help to explain the Amish emphasis on maintaining group purity relative to the Mennonites. However, it doesn't explain why Catholics, who also believe salvation is related to one's actions, do not live like the Amish.

Figure 8 presents a proposed model to help explain the role of religion in motivating sustainability for the Amish. God, the Creator of the world, and Jesus, the incarnation of God in human form, are the foundation of Amish religion. The Bible is given its authority by God, but it also reciprocally supports God's authority by telling the story of God's actions in history, including Jesus' life, death, and resurrection. The Bible outlines the vital importance of the church community as the primary locus of action in this life, as well as the guidelines for following Jesus and living obedient lives. Key biblical ideas for the Amish include separation from the world, which strengthens the community by lending religious support for maintaining clear boundaries, and stewardship. As interpreted by the Amish, these ideas lead to a rural, farming way of life, which in turn supports the community by allowing the family to work together and by reducing urban influences. The rural, farming lifestyle also supports environmental sustainability; the connection is considered indirect since not all rural, farming lifestyles

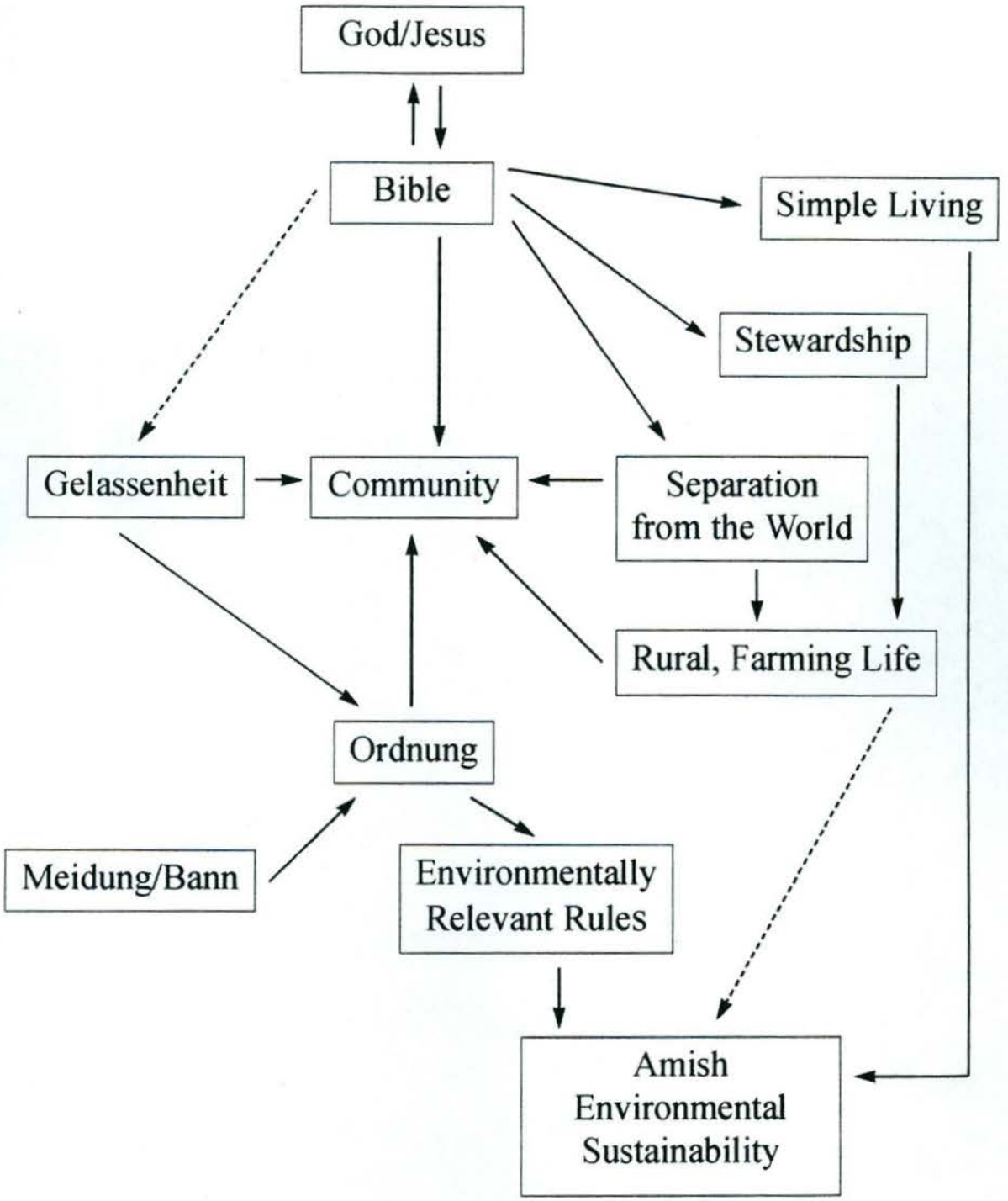

FIGURE 8. A Proposed Model of the Interactions between Elements of Amish Religion that Lead to Environmental Sustainability.

are agriculturally sustainable. *Gelassenheit*, which is indirectly influenced by biblical understandings of the proper Christian mentality, and the *Ordnung* both strengthen the community, as discussed above. The *Bann/Meidung* enforces the *Ordnung*.

At least some of the environmentally relevant aspects of Amish life are not directly related to Amish religion, but are artifacts of the importance of community in Amish religion. The rules of the *Ordnung* that have ecological significance, such as the bans on public electricity and ownership of cars and the restricted use of tractors, exist because of their protective effects on the community, not because of the environmental impacts of public electricity, cars, or tractors. Even tractors, which are known by the Amish to cause soil compaction, are not restricted for this reason, but because their use might lead to automobile use and/or larger farms, either of which would create problems for the community.

Some environmentally relevant aspects of Amish life, such as simple living, stewardship, and separation from the world, are more directly related to religious beliefs. However, even these environmentally positive features of Amish society are not based primarily on environmental concern, but are direct, biblical commandments. Carrying these commandments out is a matter of obedience and faithfulness; the Amish are not consciously attempting to achieve the positive result of environmental sustainability.

Religion, Sustainability, and the Amish Example

What does the Amish example contribute to the discussion of religion's role in motivating (or hindering) sustainability? First, it challenges the idea that all pro-

environmental behavior can be predicted by present environmental attitude scales such as the New Environmental Paradigm. This study's findings concur with Kanagy and Willits (1993), who assert that "environmental concern and action can also arise out of ideas other than those contained in the NEP, and that at least some of these ideas are linked with religiosity (church attendance)" (p. 682).

A number of social scientific studies on the connection between religion and environmental attitudes have found negative correlations between biblical literalism and environmental concern (Eckberg and Blocker, 1989; Greeley, 1993; Guth et al., 1995). Some of these results may be somewhat spurious, however, since the researchers often did not properly control for other factors that may be influencing environmental concern, such as formal education (Woodrum and Hoban, 1994, p. 194). The negative associations of religion and environmental concern are also challenged by the findings that religious participation is positively associated with environmental behavior (Eckberg and Blocker, 1996; Kanagy and Willits, 1993; Wolkomir et al., 1997).

Dietz et al. (1998) found an interesting connection to environmental attitudes when comparing different views of the sacredness of nature (theocentrism, ecocentrism, and anthropocentrism). "Individuals who believed nature is sacred because it is created by God were more likely to be willing to sacrifice" than either those who consider nature sacred in itself or those who consider nature important, but not spiritual or sacred (Dietz et al., 1998, p. 465). The indicator "willing to sacrifice" included questions about how much people would be willing to pay in taxes, higher prices, or cuts in their standard of living "in order to protect the environment" (p. 466). These findings appear to relate to

this study, since the Amish share the theocentric view of nature that it is sacred because it is created by God, and they are also exemplars of reduced standards of living. Those in the Dietz et al. study who supported this perspective were also similar to the Amish in that they would have generally scored lower on environmental attitude scales.

The Amish example challenges the mainstream environmentalist notion that the best or only path to sustainability lies down the liberal individualist road. The Amish demonstrate that a culture can arrive at sustainability using religion as a vehicle. In their cultural and religious particularity, the Amish represent a large portion of the world that doesn't share the modern, secular, individualistic ethos of the United States and Europe. The success of the Amish indicates that U.S. environmentalists should not necessarily encourage other cultures to follow the same modern, "postmaterialist"[4] path to environmental concern that the United States has followed. Instead, cultures should be encouraged to examine and renew their own worldviews, especially the ecologically positive aspects.

Limitations of This Study

Although the NEP scores appear to follow an expected trend from least to most education and connection to the "world," we must be cautious in putting too much weight on the results. Presenting a formal academic survey to Amish farmers often proved challenging, if not extremely troubling. Nearly all Amish speak English, but their

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[4] Postmaterialism posits that members of affluent, advanced industrial societies whose basic survival needs are well met tend to be more interested in "quality of life" issues. Environmentalism is considered to be a "postmaterialist" value (Inglehart, 1990).

primary language is Pennsylvania Dutch, a German dialect. Thus, I was often asked what a particular word in a statement meant. This situation posed quite a dilemma for me in terms of potentially influencing their responses, since it was difficult to simply define a word without interpreting the question somewhat. It also, of course, demonstrated the difficulty of achieving accurate results for the Amish, if they could not fully understand the words, much less the concepts, contained in the survey. At times, Amish subjects asked me what I thought regarding a statement about which I was asking them. I declined to answer, saying that I did not want to bias their response, but the sense among some Amish subjects that there was a "correct" answer or a particular response that I wanted them to give, was somewhat troubling.

Besides the dilemma of potentially influencing Amish responses, I was also often left with the responsibility of interpreting the responses they did make. Unused to the formal survey process, many Amish did not respond in the prescribed fashion (i.e. Mildly or Strongly Agree), instead opting for nodded assent or phrases such as "I would think so," "pretty much," or "I guess that's about the way, isn't it?" In these cases, I sometimes repeated my request for one of the desired responses, but at other times I tried to interpret whether the response appeared to be mild or strong in relation to the subject's other responses. This is not a preferred method, but at times the cultural gaps seemed too broad to bridge and instead of pushing incessantly for a "proper" response, I opted for a lower-key approach. This interpretive approach may have reduced the amount of extreme responses, since in most cases my interpretations were of mild agreement or

disagreement. However, it is unlikely that I assumed a completely opposite response, e.g. recording Mildly Disagree when the subject actually agreed with the statement.

The option of "Undecided" was not included in the list of possible options, assuming that the Amish, typically reticent people, might overwhelmingly prefer that option if given it. However, they still refused to either agree or disagree often enough to cause some difficulty in analyzing the results. The non-Amish samples were also not given the option of an "undecided" response and, in keeping with their greater cultural understanding of this type of survey, only rarely refused to use the given responses. Thus, we are left with the non-Amish responding to a four point Likert scale, while the Amish in effect responded to a five point Likert scale. Either way the results are analyzed, there will be difficulties in comparing the results.

In actuality, the most-favored response by the Amish groups was Mildly Agree. In keeping with their reserved, humble nature, the Amish would be expected to respond in the least prideful or controversial manner. While many Amish people hold strong opinions, they will not often share these opinions with outsiders, especially academic outsiders who are new to the area. Thus, either strongly agreeing or disagreeing is less likely. As one Renno Church man put it, "I disagree. I won't say strongly because I'm human and I may be wrong." Also, when some subjects were unsure of what exactly a statement was saying, they often chose Mildly Agree since they didn't know enough to disagree with it. "Sometimes I don't quite understand the statements, so I just pick one," admitted another Renno Church farmer.

An understanding of the Pennsylvania Dutch language may have helped in the administration of this survey, but even so, some of the concepts may be too culturally bound to translate effectively. While the difficulties discussed above do not undermine the study's results, they do indicate the need for a good deal of caution in interpreting the results. The problems experienced in this research call into question the assumption that such social surveys are valid across all cultures.

Suggestions for Future Studies

An important matter presently affecting social and economic sustainability in Kish Valley involves the Nebraska Church Amish. This group is in the midst of a major occupational shift from farming to lumber mills and pallet shops. See Chapter III for more information. Many people in Big Valley, both in and out of the Nebraska Church community, expressed concern to me about the potential impacts of this shift. Will the Nebraska Church be able to maintain its traditional way of life in the wake of increased affluence from less work? As they might say, only God knows the answer. A study focusing on the tradeoffs between environmental and economic sustainability in Nebraska Church agriculture might be fruitful.

Also, some researchers indicate that environmental attitudes can best predict environmental behaviors when they share a similar level of specificity (Beus and Dunlap, 1994). Thus a study that directly compares agricultural practices with agricultural paradigms (using the "alternative-conventional agricultural paradigm scale"), rather than

with general ecological beliefs, might uncover more nuances in the pro-environmental attitudes of the Amish.

Finally, the case of the Amish Mennonites is worth studying, to examine the specific aspects of Old Order Amish beliefs and behaviors that lead to their agricultural sustainability. Amish Mennonites in Kish Valley, although not directly studied, seemed to operate the largest and most conventional farms of any group in the valley, more so than the non-plain Mennonites included in the present study. Yet Amish Mennonites are perhaps the most similar group to the Old Order Amish in many beliefs and behaviors, such as plain dress.

Conclusion

The Amish in Kish Valley practiced agricultural sustainability at a greater level than non-Amish farmers. Yet the Amish farmers did not appear to have more pro-environmental attitudes than the non-Amish farmers, according to the New Environmental Paradigm scale and open-ended questions about stewardship. Amish religion, with its accompanying system of prescriptive behavior, was found to be the primary motivating factor leading to Amish agricultural sustainability.

The Amish example presents a complex but powerful socio-religious system for maintaining group cohesion and encouraging behaviors that are in line with expressed beliefs. This system cannot be transferred easily to people with modern sensibilities. It may be the wrong goal, in any case. According to Olshan (1994), the most important Amish trait for the rest of society is the ability to set their own limits. For this process of

setting limits to be successful, it requires a living, cohesive community where members are committed to the larger whole. Setting limits as individuals is unlikely to be successful in the long-term.

The Amish example features individuals who find satisfaction in the "success" of the group, and are embedded within a larger purpose. The importance of a religious underpinning for the Amish church community may help to explain why some intentional communities with less transcendent aspirations did not last. The Amish are attempting to humbly and faithfully live in obedience to God; they are not striving to find meaning, or save the world, or reconnect with the land as are idealistic back-to-the-landers. Infecting modern society with *Gelassenheit* is a wild and unlikely hope, but perhaps a balance can be struck between the Amish way of emphasizing the primacy of the community and the American way of emphasizing the primacy of individualism.

Sustainability will require not only technical knowledge about how to live gently on the landscape, but also the means to carry out this knowledge. For people to behave in ways that support sustainability, they need to be inspired, coerced, or cajoled. The Amish example does some of this rather well, but is lacking modern ecological concern. Thus, a worldview that supports a sense of ecological interconnections, combined with practical incentives and, if necessary, sanctions, may be the best hope we have.

APPENDIX A

AGRICULTURAL PRACTICES QUESTIONNAIRE

Code #_____

1. How many years have you been on the existing farm? _____

2. How many acres are you currently farming? _____
   How many acres of farmland do you own? _____ Lease? _____

3. How many acres, if any, would you like to add to your current farming activities? ____

4. What crops did you plant and how many acres of each in:

1998 Crop/Acres	1997 Crop/Acres	1996 Crop/Acres
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. How many acres (not included above) did you have in pasture in:

1998 _____ 1997 _____ 1996 _____

6. How many of the following animals did you have in:

	1998	1997
Dairy (milking)	_____	_____
Heifers, Calves	_____	_____
Bulls	_____	_____
Pigs	_____	_____
Goats	_____	_____
Sheep	_____	_____
Chickens	_____	_____
Turkeys	_____	_____
Horses	_____	_____
Other _____	_____	_____

7. What is your normal crop rotation?

8. What are your means of controlling weeds on the crops you grow?

Crops	Means 1	Freq.	Amount (if known)	Means 2	Freq.	Amount (if known)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

9. What are your means of controlling insects on the crops you grow?

Crops	Means 1	Freq.	Amount (if known)	Means 2	Freq.	Amount (if known)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

10. Where do you buy the seeds for the crops that you grow?

_____
_____

11. What substances do you use to fertilize your fields, at what time of year, and how much?

Fertilizer	Time of Year	Amount, if known
_____	_____	_____
_____	_____	_____

12. What farm products do you market, how much, and where? (Year-round, spring, summer, fall)

	Product	Amount, if known	Where
Dairy:	_____	_____	_____
	_____	_____	_____
Poultry:	_____	_____	_____
Fruit:	_____	_____	_____
Veg.:	_____	_____	_____
	_____	_____	_____
Honey:	_____	_____	_____
Map. Syr.:	_____	_____	_____

13. How do you refrigerate, or preserve, milk and other farm products?

Products	Methods
_____	_____

14. What are your primary sources of information about farming activities (e.g. extension services, magazines, etc.)?

Interview conducted by: _____
Date: _____

APPENDIX B

NEW ENVIRONMENTAL PARADIGM AND NEW ECOLOGICAL PARADIGM SCALE QUESTIONNAIRES

New Environmental Paradigm Questionnaire

Please answer each question with one of the following responses. Code # _____
Strongly Disagree (SD) Mildly Disagree (MD) Mildly Agree (MA) Strongly Agree (SA)

1. We are approaching the limit of the number of people the earth can support.
SD...MD...MA...SA

2. The balance of nature is very delicate and easily upset.
SD...MD...MA...SA

3. Humans have the right to modify the natural environment to suit their needs.
SD...MD...MA...SA

4. Mankind was created to rule over the rest of nature.
SD...MD...MA...SA

5. When humans interfere with nature it often produces disastrous consequences.
SD...MD...MA...SA

6. Plants and animals exist primarily to be used by humans.
SD...MD...MA...SA

7. To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled. SD...MD...MA...SA

8. Humans must live in harmony with nature in order to survive.
SD...MD...MA...SA

9. The earth is like a spaceship with only limited room and resources.
SD...MD...MA...SA

10. Humans need not adapt to the natural environment because they can remake it to suit their needs. SD...MD...MA...SA

11. There are limits to growth beyond which our industrialized society cannot expand.
SD...MD...MA...SA

12. Mankind is severely abusing the environment.
SD...MD...MA...SA

New Ecological Paradigm Questionnaire

Do you agree or disagree that:

1. We are approaching the limit of the number of people the earth can support.

2. Humans have the right to modify the natural environment to suit their needs.

3. When humans interfere with nature it often produces disastrous consequences.

4. Human ingenuity will insure that we do NOT make the earth unlivable.

5. Humans are severely abusing the environment.

* 6. The earth has plenty of natural resources if we just learn how to develop them.

7. Plants and animals have as much right as humans to exist.

* 8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.

9. Despite our special abilities humans are still subject to the laws of nature.

* 10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.

11. The earth is like a spaceship with very limited room and resources.

12. Humans were meant to rule over the rest of nature.

13. The balance of nature is very delicate and easily upset.

* 14. Humans will eventually learn enough about how nature works to be able to control it.

* 15. If things continue on their present course, we will soon experience a major ecological catastrophe.

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* Items that were included at the end of the NEP questionnaire for the present study.

APPENDIX C

NEW ENVIRONMENTAL PARADIGM FREQUENCY DISTRIBUTION TABLES

TABLE 9. Frequency Distributions and Means of New Environmental Paradigm Scale Items by Group

Item #	Group	SA*		MA		MD		SD		Mean
		n	%	n	%	n	%	n	%	
1	Nebraska	0	0%	3	50%	3	50%	0	0%	2.50
	Renno	0	0%	6	46%	6	46%	1	8%	2.42
	Mennonite	0	0%	6	29%	9	43%	6	29%	2.00
	English	3	16%	9	47%	3	16%	4	21%	2.58
2	Nebraska	1	10%	8	80%	1	10%	0	0%	3.00
	Renno	3	19%	11	69%	2	13%	0	0%	3.06
	Mennonite	6	30%	7	35%	6	30%	1	5%	2.90
	English	6	30%	7	35%	6	30%	1	5%	2.90
3	Nebraska	4	40%	5	50%	0	0%	1	10%	1.80
	Renno	3	18%	13	76%	1	6%	0	0%	1.91
	Mennonite	1	5%	8	38%	6	29%	6	29%	2.79
	English	0	0%	9	45%	6	30%	5	25%	2.80
4	Nebraska	6	55%	5	45%	0	0%	0	0%	1.45
	Renno	6	32%	13	68%	0	0%	0	0%	1.68
	Mennonite	12	57%	7	33%	1	5%	1	5%	1.57
	English	4	20%	6	30%	6	30%	4	20%	2.50
5	Nebraska	4	36%	7	64%	0	0%	0	0%	3.36
	Renno	2	11%	14	78%	2	11%	0	0%	3.00
	Mennonite	6	30%	8	40%	6	30%	0	0%	2.98
	English	5	26%	9	47%	4	21%	1	5%	2.95
6	Nebraska	5	42%	7	67%	0	0%	0	0%	1.58
	Renno	4	21%	12	63%	2	11%	1	5%	2.03
	Mennonite	7	33%	8	38%	5	24%	1	5%	2.00
	English	5	26%	5	26%	4	21%	5	26%	2.47
7	Nebraska	4	33%	7	58%	0	0%	1	8%	3.17
	Renno	5	28%	13	72%	0	0%	0	0%	3.28
	Mennonite	1	5%	12	57%	7	33%	1	5%	2.62
	English	4	21%	6	32%	8	42%	1	5%	2.68

TABLE 9. (Continued)

Item #	Group	SA*		MA		MD		SD		Mean
		n	%	n	%	n	%	n	%	
8	Nebraska	5	42%	7	58%	0	0%	0	0%	3.42
	Renno	5	26%	14	74%	0	0%	0	0%	3.26
	Mennonite	9	43%	10	48%	2	10%	0	0%	3.33
	English	16	80%	4	20%	0	0%	0	0%	3.80
9	Nebraska	1	13%	6	75%	1	13%	0	0%	3.00
	Renno	1	6%	13	76%	1	6%	2	12%	2.79
	Mennonite	8	38%	5	24%	7	33%	1	5%	2.90
	English	7	35%	9	45%	2	10%	2	10%	3.05
10	Nebraska	0	0%	5	45%	4	36%	2	18%	2.73
	Renno	0	0%	5	28%	13	72%	0	0%	2.72
	Mennonite	0	0%	2	10%	8	38%	11	52%	3.40
	English	1	5%	3	15%	8	40%	8	40%	3.15
11	Nebraska	0	0%	8	80%	2	20%	0	0%	2.80
	Renno	2	12%	14	82%	1	6%	0	0%	3.06
	Mennonite	2	10%	13	62%	6	29%	0	0%	2.81
	English	2	10%	12	60%	4	20%	2	10%	2.70
12	Nebraska	3	27%	6	55%	0	0%	2	18%	2.91
	Renno	1	6%	10	59%	6	35%	0	0%	2.71
	Mennonite	6	29%	8	38%	7	33%	0	0%	2.95
	English	4	21%	10	53%	5	26%	0	0%	2.95

* SA = Strongly Agree; MA = Mildly Agree; MD = Mildly Disagree; SD = Strongly Disagree

Table 10. Frequency Distributions and Means of New Environmental Paradigm Scale Items for English Sample (n=20) and Washington State Sample (n=806) (Table 1 *in* Dunlap and Van Liere, 1978, p. 13)

Item #	Group	SA	MA	MD	SD	Mean
1	English	16%	47%	16%	21%	2.58
	Washington	34.6%	38.4%	19.5%	7.5%	3.00
2	English	30%	35%	30%	5%	2.90
	Washington	40.7%	39.4%	16.7%	3.2%	3.18
3	English	0%	45%	30%	25%	2.80
	Washington	6.9%	31.2%	41.0%	20.9%	2.76
4	English	20%	30%	30%	20%	2.50
	Washington	18.5%	28.0%	25.7%	27.9%	2.63
5	English	26%	47%	21%	5%	2.95
	Washington	29.8%	46.4%	20.6%	3.2%	3.03
6	English	26%	26%	21%	26%	2.47
	Washington	11.0%	27.6%	31.2%	30.2%	2.81
7	English	21%	32%	42%	5%	2.68
	Washington	20.6%	49.3%	24.2%	5.9%	2.85
8	English	80%	20%	0%	0%	3.80
	Washington	56.6%	39.0%	4.2%	0.3%	3.52
9	English	35%	45%	10%	10%	3.05
	Washington	42.2%	40.9%	12.2%	4.7%	3.21
10	English	5%	15%	40%	40%	3.15
	Washington	3.0%	12.4%	41.4%	43.3%	3.25
11	English	10%	60%	20%	10%	2.70
	Washington	24.1%	51.2%	19.8%	4.9%	2.94
12	English	21%	53%	26%	0%	2.95
	Washington	35.5%	43.5%	17.9%	3.1%	3.11

Table 11. Frequency Distributions and Means of New Environmental Paradigm and New Ecological Paradigm Scale Items by Group, Scored on a 5-Point Likert Scale

Item #	Group	SA		MA		U*		MD		SD		Mean
		n	%	n	%	n	%	n	%	n	%	
1	Nebraska	0	0%	3	25%	6	50%	3	25%	0	0%	3
	Renno	0	0%	6	32%	6	32%	6	32%	1	5%	2.92
	Mennonite	0	0%	6	29%	0	0%	9	43%	6	29%	2.29
	English	3	15%	9	45%	1	5%	3	15%	4	20%	3.20
2	Nebraska	1	8%	8	67%	2	17%	1	8%	0	0%	3.75
	Renno	3	16%	11	58%	3	16%	2	11%	0	0%	3.79
	Mennonite	6	29%	7	33%	1	5%	6	29%	1	5%	3.52
	English	6	30%	7	35%	0	0%	6	30%	1	5%	3.55
3	Nebraska	4	33%	5	42%	2	17%	0	0%	1	8%	2.08
	Renno	3	16%	13	68%	2	11%	1	5%	0	0%	2.08
	Mennonite	1	5%	8	38%	0	0%	6	29%	6	29%	3.36
	English	0	0%	9	45%	0	0%	6	30%	5	25%	3.35
4	Nebraska	6	50%	5	42%	1	8%	0	0%	0	0%	1.58
	Renno	6	32%	13	68%	0	0%	0	0%	0	0%	1.68
	Mennonite	12	57%	7	33%	0	0%	1	5%	1	5%	1.67
	English	4	20%	6	30%	0	0%	6	30%	4	20%	3.00
5	Nebraska	4	33%	7	58%	1	8%	0	0%	0	0%	4.25
	Renno	2	11%	14	74%	1	5%	2	11%	0	0%	3.84
	Mennonite	6	29%	8	38%	1	5%	6	29%	0	0%	3.64
	English	5	25%	9	45%	1	5%	4	20%	1	5%	3.65
6	Nebraska	5	42%	7	58%	0	0%	0	0%	0	0%	1.58
	Renno	4	21%	12	63%	0	0%	2	11%	1	5%	2.18
	Mennonite	7	33%	8	38%	0	0%	5	24%	1	5%	2.29
	English	5	25%	5	25%	1	5%	4	20%	5	25%	2.95
7	Nebraska	4	33%	7	58%	0	0%	0	0%	1	8%	4.08
	Renno	5	26%	13	68%	1	5%	0	0%	0	0%	4.21
	Mennonite	1	5%	12	57%	0	0%	7	33%	1	5%	3.24
	English	4	20%	6	30%	1	5%	8	40%	1	5%	3.20
8	Nebraska	5	42%	7	58%	0	0%	0	0%	0	0%	4.42
	Renno	5	26%	14	74%	0	0%	0	0%	0	0%	4.26
	Mennonite	9	43%	10	48%	0	0%	2	10%	0	0%	4.24
	English	16	80%	4	20%	0	0%	0	0%	0	0%	4.80
9	Nebraska	1	8%	6	50%	4	33%	1	8%	0	0%	3.58
	Renno	1	5%	13	68%	2	11%	1	5%	2	11%	3.55
	Mennonite	8	38%	5	24%	0	0%	7	33%	1	5%	3.52
	English	7	35%	9	45%	0	0%	2	10%	2	10%	3.85

Table 11. (Continued)

Item #	Group	SA		MA		U*		MD		SD		Mean
		n	%	n	%	n	%	n	%	n	%	
10	Nebraska	0	0%	5	42%	1	8%	4	33%	2	17%	3.25
	Renno	0	0%	5	26%	1	5%	13	68%	0	0%	3.42
	Mennonite	0	0%	2	10%	0	0%	8	38%	11	52%	4.31
	English	1	5%	3	15%	0	0%	8	40%	8	40%	3.95
11	Nebraska	0	0%	8	67%	2	17%	2	17%	0	0%	3.5
	Renno	2	11%	14	74%	2	11%	1	5%	0	0%	3.89
	Mennonite	2	10%	13	62%	0	0%	6	29%	0	0%	3.52
	English	2	10%	12	60%	0	0%	4	20%	2	10%	3.40
12	Nebraska	3	25%	6	50%	1	8%	0	0%	2	17%	3.67
	Renno	1	5%	10	53%	2	11%	6	32%	0	0%	3.32
	Mennonite	6	29%	8	38%	0	0%	7	33%	0	0%	3.62
	English	4	20%	10	50%	1	5%	5	25%	0	0%	3.65
13	Nebraska	4	33%	8	67%	0	0%	0	0%	0	0%	1.67
	Renno	6	35%	11	65%	0	0%	0	0%	0	0%	1.68
	Mennonite	8	38%	9	43%	1	5%	3	14%	0	0%	1.95
	English	11	55%	8	40%	0	0%	0	0%	1	5%	1.60
14	Nebraska	1	8%	9	75%	1	8%	0	0%	1	8%	2.25
	Renno	1	6%	9	53%	3	18%	3	18%	1	6%	2.62
	Mennonite	0	0%	9	43%	1	5%	3	14%	8	38%	3.45
	English	2	10%	7	35%	0	0%	6	30%	5	25%	3.25
15	Nebraska	2	17%	5	42%	3	25%	2	17%	0	0%	2.42
	Renno	4	22%	6	33%	6	33%	2	11%	0	0%	2.36
	Mennonite	4	19%	9	43%	0	0%	5	24%	3	14%	2.74
	English	5	25%	8	40%	1	5%	6	30%	0	0%	2.40
16	Nebraska	0	0%	5	42%	2	17%	1	8%	4	33%	3.33
	Renno	0	0%	4	24%	0	0%	6	35%	7	41%	3.91
	Mennonite	0	0%	1	5%	0	0%	10	48%	10	48%	4.36
	English	1	5%	3	15%	1	5%	6	30%	9	45%	3.95
17	Nebraska	1	8%	6	50%	3	25%	1	8%	1	8%	3.42
	Renno	1	6%	9	50%	4	22%	3	17%	1	6%	3.36
	Mennonite	0	0%	9	43%	0	0%	9	43%	3	14%	2.71
	English	3	15%	6	30%	0	0%	6	30%	5	25%	2.80

* U = Undecided

Table 12. Frequency Distributions of New Environmental Paradigm Scale Items for English Sample (n=20) and Pennsylvania Statewide Sample (n=3,541) (Table 1 *in* Scott and Willits, 1994, p. 246)

Item #	Group	% Response		
		Agree	Undecided	Disagree
1	English	60	5	35
	Pennsylvania	45.4	24.6	30.0
2	English	65	0	35
	Pennsylvania	77.1	11.0	11.9
3	English	45	0	55
	Pennsylvania	15.8	13.7	70.5
4	English	50	0	50
	Pennsylvania	27.3	12.1	60.6
5	English	70	5	25
	Pennsylvania	82.6	8.9	8.5
6	English	50	5	45
	Pennsylvania	31.7	11.0	57.4
7	English	50	5	45
	Pennsylvania	57.8	23.6	18.6
8	English	100	0	0
	Pennsylvania	93.9	3.6	2.5
9	English	80	0	20
	Pennsylvania	72.0	12.2	15.9
10	English	20	0	80
	Pennsylvania	9.3	10.2	80.5
11	English	70	0	30
	Pennsylvania	56.6	24.4	19.0
12	English	70	5	25
	Pennsylvania	89.3	5.2	5.5

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