

Preparing for a Sustainable Future

**Future Sustainable Farmers:
The Skills and Knowledge They Require and the
Role of Land-Grant Institutions in Preparing Them**

**A Report of the
Minnesota Food Association**

September 1996

Foreword

This report is a project of the Minnesota Food Association, a thirteen year-old non-profit membership organization whose mission is to form an urban and rural coalition of informed, connected, and activated citizens to build a more sustainable food system. The Future Farmer project was the brainchild of Ken Taylor, the founding director of the Minnesota Food Association. This project took several years to initiate and grew out of Ken's concern that future farmers in sustainable agriculture would need a different kind of resource to acquire the skills and knowledge necessary to be on the land. He would be pleased, I think, with the outcome.

The bulk of the work of this project was conducted by members of our Future Farmers Advisory Committee. Their dedication to the completion of this work is reflected in the depth of the data gathered as well as the thoughtful guidance of its implementation.

Members of the committee include Shar Bjerke, Dave Butcher, Paul Englund, Susan Freeman, Mere Piare Khalsa, Linda Littrell, Jim Mason, Clea Rome, Barbara Weisman, and Kim Zeuli. A special thanks goes to committee co-chairs Linda Littrell and Barbara Weisman, who have provided the citizen leadership necessary for the implementation of a successful volunteer-based project. We are grateful for their skill and participation. Thanks also to committee member Clea Rome for her research and preparation of the report's literature review.

We owe another debt of gratitude to Dick Levins who acted as special advisor and angel to our project. His thought provoking musings always served to enhance the quality and scope of our work.

Patricia Love served as our project consultant, analyzing the mounds of data accumulated and organizing it into a coherent, very readable report and coordinating the work of the Council members. She very much provided the glue that made this project happen.

The Future Farmer project has been funded by a contract with the North Central Sustainable Agriculture Research and Education (SARE) program and by a grant from the Jay and Rose Phillips Family Foundation. The work would not have happened without their financial support and understanding of the critical nature of the information in building the future of sustainable agriculture within the land-grant environment.

Additional thanks goes to Anne de Meurisse and Leslie Reindl who did the initial organizing work and kept the project going in difficult times.

Although the Minnesota Institute for Sustainable Agriculture (MISA) has been an unrecognized partner in this project, they will be critical in the final phases of dissemination of the information. Without MISA's collaboration within the land-grant institution, it would have been much more difficult to assure that the research would actually be useful to those rebuilding and reshaping curricula and other institutional resources.

And last, but certainly not least, a big thanks to all those people who contributed their time and thoughts through the survey and interview process. They provide the real world grounding to this project and give their experiences and perspectives as a gift to those who will follow in the future.

-Jan O'Donnell, Executive Director
Minnesota Food Association

Preface

If current trends continue, the future of both farming and rural communities may not be very bright. As the number of farms declines, the average size of those remaining grows larger. Meanwhile, the average age of a farmer in Minnesota is 57, only a decade away from retirement in many cases. What will happen once these farmers decide not to farm? Who will tend the land and support the community?

Citing long hours and low compensation, many farmers have not encouraged their children to farm. In other families, the children needed no encouragement; they knew they did not want to farm and left for opportunities elsewhere. When these farmers retire, they either sell or lease their land to operators who may farm thousands of acres, but do not live in the area. Predictably, the impact on communities can be devastating.

Fortunately, this is not the only option. Other farmers and their children would like to keep the family farm, but do not want to, or cannot, expand and acquire expensive equipment and risk. They are willing to change the way in which they farm to provide for themselves and future generations a financially secure operation that offers a high quality of life. To make this change, however, they require new skills and knowledge.

Meanwhile, in cities, suburbs, and rural areas, many people who have never lived on farms are learning about agriculture and considering farming as an occupation. Many others only dream about the notion since they do not know how to initiate a career that often seems as if its practitioners were born into it. These people, who may also represent an important source of tomorrow's farmers, are often interested in farming in a way that protects the environment and bolsters the community, while providing sufficient profit and a high quality of life.

Since the future farmer is apparently not the same as yesterday's or today's farmer, how and what he or she is taught must change as well. Educational programs must be strengthened that teach both urban and rural children about sustainable farming and help give them the support and confidence they need to follow what may seem to their family and peers as an unusual path. Land-grant universities must reorient their research, teaching, and outreach to meet more effectively the needs of future sustainable farmers and attract and provide

appropriate programs for students with non-traditional farming profiles. More classes and workshops, offered at times and places current farmers interested in acquiring and maintaining new skills can attend, must also be arranged.

This project, which incorporates the views of sustainable farmers, academic experts, educators, sustainable agriculture professionals, and future farmers, seeks to provide land-grant and other educational institutions with useful information on the educational and training needs of future sustainable farmers as well as insights into their backgrounds, traits, and social concerns. The Minnesota Food Association hopes that these institutions will integrate this information into the planning and development of their curricula as well as their research and outreach efforts.

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Executive Summary

The Minnesota Food Association's Future Sustainable Farmer Project attempts to describe the background and skills successful 21st Century sustainable farmers will require and offer insights into their traits, attitudes, and social priorities.

Purpose of the Project

The purpose of the project is to help address the educational and community barriers with which future sustainable farmers are faced. Quite often, sustainable farmers find that publicly-funded institutions do not provide the information, education, and training they need. Meanwhile, they may be faced with a lack of support from community members and other farmers who look with suspicion on their practices. Although farmers often face other serious impediments to farming, such as financial and land-access barriers, they are not the focus of this project.

The future of a reliable and safe food source, healthy communities, clean water, and productive land may rest to a large extent in the hands of tomorrow's farmers and today's educators. In an effort to help educational institutions meet this challenge, the Future Sustainable Farmer report identifies attitudes, knowledge, skills, and social issues that will be important to 21st Century sustainable farmers and explains how sustainable farmers acquire and maintain the skills they need to farm sustainably.

The results of this report and the dialogues form the basis of a job description that highlights the background, skills, knowledge, education, and experience a future farmer will require. The skills and knowledge identified in the study will also be compared with various land-grant curricula to determine how well the university courses match the needs of future sustainable farmers. In addition, the Minnesota Food Association has begun to work with land-grant institutions to increase and enhance the universities' sustainable agriculture offerings.

Summary of the Findings

The profile of the sustainable farmer of the future will not mirror that of farmers of previous generations. The farmer of the future may or may not have grown up on a farm. In fact, the future farmer may have lived his or her entire life in the city. The future farmer may easily be a man or woman, born in the United States or elsewhere. One certainty is that the traditional image of a farmer is likely to change.

Profile of the Future Sustainable Farmer

The sustainable farmer of the future will do more than just grow food, raise animals, and make a profit to support the family; he or she will serve as educator, protector of the land, and community builder. The future sustainable farmer will require patience and the ability to think and plan long-term. Although the future sustainable farmer will derive much satisfaction through this broader type of farming, significant manual and intellectual work as well as special management skills will be required. Finally, the future farmer will view quality of life and living within his or her natural and financial means as top priorities.

Skills and Knowledge Required

Along with the appropriate attitudes, future sustainable farmers will require specific knowledge and skills. Among these are business skills, such as marketing and management, that meet the specific needs of both changing markets and farming. The training that has worked for conventional farmers may not always apply here. Future sustainable farmers will also require a variety of communication skills. They will need to be able to communicate with distributors, stores, other producers, and consumers. Related to this is ability to build coalitions among these groups and within their communities. A final area of knowledge and skills is the collection of practices that make certain types of farming sustainable. These techniques change, so it will not be enough to learn them once and then reapply them every year. The sustainable farmer of the future will need to be committed to continued learning.

Role of Educational Institutions

To help future sustainable farmers acquire and maintain the skills they will need to farm sustainably, educational institutions will have to rethink not only what they teach, but how they teach it and who they view as their customers. Land-grant universities are in the position to lead the way with programs geared at preparing students from a variety of backgrounds to become farmers and helping current farmers maintain and improve their skills. The Extension Service, schools, and youth organizations in both urban and rural areas can expand their efforts to educate children and teenagers about sustainable agriculture and careers in farming. Efforts should also be made to encourage greater exchanges between researchers and farmers so that the work universities produce is sure to match the needs of their intended audiences, which will include in greater numbers sustainable farmers.

1

Introduction

In an effort to develop both a clear understanding of the knowledge and skills needed by future sustainable farmers and a picture of their backgrounds, traits, and attitudes, the Minnesota Food Association reviewed literature on sustainable agriculture and conducted a survey and interviews. Participants in the study included sustainable farmers, sustainable agriculture professionals, educators in agriculture and related fields, and future farmers.

This report, which is based on the results of the literature review, survey, and interviews, includes findings concerning: 1) the background and attitudes of future farmers, 2) the skills and knowledge future sustainable farmers will require, 3) social issues of concern to future sustainable farmers, 4) how farmers currently acquire and maintain their skills, and 5) the role of educational institutions, particularly land-grant universities, in preparing sustainable farmers of the future.

The Minnesota Food Association's hope is that land-grant universities and other institutions that provide agriculture-related education and training will integrate the information included in this report into their curricula.

2

Methods

Information used in the study was collected through a literature review, survey, interviews, and dialogues. MFA employed all of these techniques in an effort to draw a more complete picture of the needs of future farmers and how land-grant and other educational institutions might help farmers acquire and maintain the knowledge and skills they need to farm sustainably.

The first phase of the study consisted of a review of academic literature on sustainable agriculture. Specifically, MFA wanted to identify the skills, knowledge, values, and attributes researchers have found to be important to sustainable farmers. The review offered a framework for understanding the results generated in the surveys and interviews.

As part of the second phase of the study, MFA mailed surveys to 427 people identified through its membership list and referrals. Seventy-three people returned completed surveys. MFA grouped the survey respondents into four categories: 1) sustainable farmer, 2) sustainable agriculture professional, 3) educator, and 4) employed in other field. Slightly more than half of the respondents identified themselves as farmers. An additional 18 percent are in sustainable agriculture professions, and 10 percent are educators. Almost 21 percent of respondents are employed in other fields. Forty-six percent of the sustainable agriculture professionals, 29 percent of the educators, and 67 percent of the respondents in other fields would like to become sustainable farmers.

As part of the survey, respondents were asked to rate how important specific skills and knowledge will be to sustainable farmers in the 21st Century. They were also asked rate the importance of specific social issues to sustainable agriculture and explain what they view as the difference between sustainable and conventional agriculture. Farmers were asked how they acquired the skills they need to farm

sustainably and where they find the information required to maintain these skills.

Table 1. Study Participants

Occupation	Number Surveyed	Number Interviewed
Sustainable Farmer	38	15
Employed in field other than sustainable agriculture	15	5
Sustainable agriculture professional	13	4
Educator	7	3
Total	73	27

The third phase of the study consisted of a series of interviews with farmers, sustainable agriculture professionals, educators in related fields, and people who would like to become farmers. The interviews covered many of the same questions included in the survey, but generated longer and more in-depth responses.

MFA volunteers also conducted dialogues with sustainable farmers, professionals in sustainable agriculture, educators, and students. The dialogues were used to both refine a job description that highlights the key skills, attitudes, and knowledge future sustainable farmers will require and explore ways in which land-grant institutions might be more responsive to the needs of sustainable farmers.

3

Literature Review

The first phase of the project consisted of a review of academic literature on sustainable agriculture. The purpose of the review was to identify the skills, knowledge, values, and attributes academic researchers have found to be important to sustainable farmers. The review served as a foundation for the rest of the study and offered a framework for understanding the results generated in the surveys and interviews.

According to much of the literature reviewed, sustainable agriculture embodies three key elements that also serve to define it. Specifically, to be sustainable, agriculture must be environmentally sound, economically viable, and socially responsible.

Environmentally-Sound Farming Practices

Farmers mention environmental and health concerns most often when asked by researchers about the reasons they adopted sustainable methods.¹ With its dependency on fossil fuels and high inputs of chemical pesticides and fertilizers, conventional agriculture, these farmers fear, is creating serious ecological hazards. In response to this concern, the sustainable agriculture movement has spurred research on new ways to manage agricultural systems with an environmental conscience.

By modeling farms as closely as possible to natural ecosystems, the resources on the farm can be maintained and recycled rather than lost.² Farm-generated outputs become resources that are incorporated back into the farming system. In order to work within this whole-ecosystem context of agriculture, a sustainable farmer must have detailed knowledge of ecology, or “the relationships between crops, weeds, diseases, insects and soil fertility”.³ Plant knowledge and an understanding of soil dynamics are also important to minimizing inputs and tightening nutrient cycling in a crop system. With a decreased reliance on chemical applications, careful timing of farming practices becomes very important for pest and weed control.⁴

Economic Viability

In addition to knowledge of environmentally-sound practices, a commitment to economic viability is also key to creating a sustainable agricultural system. As John Ikerd, professor at the University of Missouri, points out, "Enterprises that lack economic viability will lose control over use of ecological resources to their economically viable competitors...farming systems must be made economically viable as well as ecologically sound if they are to be sustainable."⁵

Although many established farmers believe that low input use results in low profits, much evidence exists that counters this assumption.⁶ For example, a study of fertilizer use showed Iowa farmers, on average, applied nearly 40 pounds less nitrogen per acre of corn than did Illinois farmers, yet there was no difference in average yields. About the results, John Ikerd wrote, "Iowa farmers saved an estimated \$80-89 million during 1989-90 by practicing better fertilizer management."⁷ Additional examples are included in the report, *The Profitability of Four Sustainable Farms in Minnesota*.⁸

Hard Work and Continued Learning

Another key requirement of sustainable farming is the willingness to work long hours. A 1994 Northwest Area Foundation study of sustainable farmers found that, "Sustainable farmers (operator and spouse combined) spend over one-fourth more time on farm work than do conventional farmers."⁹

Along with hard work, continued learning was found to be key to economic success in sustainable farming. To obtain the knowledge and skills they need, many farmers rely on on-farm research and experimentation. Two important external sources of information are other farmers and sustainable farming organizations. The importance of the farming organizations was highlighted in research that found that farmers who are involved in sustainable organizations generally fare better economically than those who are not members.¹⁰ An external source of information and education that is ignored in many cases is land-grant and other public institutions. In its study, the Northwest Area Foundation found that only one in four sustainable farmers found local extension agents, area/state extension specialists, university scientists, and soil conservationists to be of use to them.¹¹

Social Concerns and Community

A final component of sustainable farming is social responsibility and the importance of community. The systems approach that characterizes sustainable farming applies to the role of farming in society as well. As Patricia Allen has found, "Viewing agricultural systems as true ecosystems can serve as a model for bringing the whole-systems perspective to bear on social and economic issues as well".¹²

Like conventional farmers, sustainable farmers take pride in their roles in communities as providers of food and caretakers of the land.¹³ In addition, many recognize the integral relationship between farmers and the urban communities they support—the producers of food in society and the consumers. However, to many consumers, farming has no relationship with what they see in a grocery store and many farmers feel as though there is a lack of appreciation for the importance of agriculture.¹⁴

Building a socially responsible agriculture that in Wendell Berry's words, "does not deplete soil or people" requires building strong communities. Sustainable farmers are positioned to take on considerable responsibility for that task and have begun to do so. Research has found that sustainable farmers are more likely than conventional farmers to purchase local products from other farmers or businesses in their area.¹⁵ This investment in local capital builds community involvement and increased stewardship due to localized concerns. As Cornelia Butler Flora has found, "A move toward more sustainable practices and reinvestment of some capital in the local community could result in more diversified local enterprises, more options due to greater individual and collective income opportunities, and healthy local business."¹⁶ In addition to their more community-friendly farming practices, sustainable farmers need communication and community-building skills to assume their role in strengthening communities.

Decision-making, Critical Thinking, and Problem Solving Skills

In the literature, sustainable agriculture has been described as "a philosophy of farming"¹⁷, "a goal and movement"¹⁸, "a question rather than an answer"¹⁹, and "a highly adaptive set of principles flexibly applied to each situation."²⁰ These definitions point to the fact that sustainable farming is a complex process that requires considerable decision-making, critical thinking, and problem solving skills. One

report added that a sustainable farmer must also be creative and flexible with exceptional managerial skills.²¹

In summary, sustainable farmers must be able to make decisions based on a whole-systems framework and an understanding of how one's actions affect biological balances, resource quality, and local communities – both socially and economically.

4

Profile of Study Participants

As part of the study, MFA received 73 completed surveys and interviewed 27 people. Survey and interview participants included sustainable farmers, educators, sustainable agriculture professionals, and individuals who would like to become sustainable farmers. Profiles of the survey and interview participants follow.

Profiles of Those Surveyed

Fifty-five percent of the farmers surveyed reported that over half of their household income was derived from sustainable agriculture. One-third of the farmers reported that more than 75 percent of their household income came from sustainable agriculture. Of those farmers who answered a question about the level of education attained, 71 percent had at least a college degree, and one-third had completed some graduate work.

The sustainable agriculture professionals who participated in the survey work for cooperatives, non-profit organizations, and government. Some also work as consultants to farmers. Seventy percent of the respondents in this category receive at least 75 percent of their household income from sustainable agriculture.

The survey respondents in fields other than sustainable agriculture currently work in areas such as advocacy, conservation, and policy analysis. Seventy-three percent of the respondents have at least a bachelor's degree, and over half have completed at least some graduate work.

Fifty-seven percent of the educators who responded to the survey have doctorate degrees and work in fields such as agricultural economics, agricultural education, and plant pathology. The other educators work or have worked until retirement as teachers.

Forty-six percent of the sustainable agriculture professionals and 29 percent of the educators would like to become farmers. Of the respondents employed in other fields, 67 percent want to become sustainable farmers.

Table 2. Survey Respondents

Occupation	Number
Sustainable Farmer	38
Employed in field other than sustainable agriculture (10 respondents would like to become farmers)	15
Sustainable agriculture professional (6 respondents would like to become farmers)	13
Educator (2 respondents would like to become farmers)	7
Total	73

*Profiles of
Those
Interviewed*

Of those interviewed, 56 percent are sustainable farmers and another 19 percent would like to become sustainable farmers. Most of the farmers' operations are diversified and include a mix of animals and crops or vegetables. The interests of those who plan to become sustainable farmers vary. One respondent wants to become an urban farmer, while another wants to raise llamas and other fiber producing animals. A couple of future farmers want diverse crop and livestock operations, and one wants just vegetables.

Table 3. Interview Participants

Occupation	Number
Farmers	15
In other fields but want to become farmers	5
Professionals in Sustainable Agriculture	4
Educators	3
Total	27

5

Backgrounds and Attitudes of Future Farmers

Insight into the attitudes and backgrounds of current and potential farmers can be derived from the surveys and interviews. Most of the current farmers surveyed and interviewed grew up on farms or have relatives with farms on which they worked. Although these farms were generally described as conventional, some farmers noted that their parents or other relatives instilled in them a sense of land and water stewardship and a bias against heavy chemical use. As one farming couple noted, "Our parents had never gone the chemical route." Another farmer said that his move from "chemical dependency" was triggered, in part, by the memory that his father produced without the use of chemicals some of the highest corn yields in his county. One farmer's experience demonstrates how the definition of sustainable farming evolved within his family. He said that although his father had a strong conservation ethic, he did not have an "ecological vision". His father shared his priority to "leave the land better than you found it," but assumed that meant he should use more fertilizer and herbicides.

Urban and Rural Backgrounds

Although many of the current farmers grew up on farms, several of those identified in the study as future farmers do not share this background. Of those interviewed who said they would like to become sustainable farmers, half were reared on farms and half grew up in the city. One respondent has no intention of moving from the city and would like to pursue urban farming. Only 11 percent of the survey respondents who want to become farmers grew up on a farm or worked on a farm as a youth, and most currently live in urban areas. One respondent operated a farm for a few years. Several listed only gardening and coursework as their agricultural experience. Others cited experience with community-supported agriculture organizations, books, and contact with growers.

***Differences
between
Conventional and
Sustainable
Farming***

How survey and interview participants define sustainable agriculture and distinguish it from conventional agriculture also sheds light on some of the attitudes and traits of sustainable farmers. Most of the definitions provided in response to related survey and interview questions were multi-faceted and implied that sustainable farming is a “process”. One farmer’s definition summed up the sentiment of many respondents, “...a farm right for the community and environment that can be profitable.” Another farmer said that a sustainable farm “offers a biological model rather than an industrial one and emphasizes values other than production – values like stewardship, mindfulness, and community.”

***Sustainable
Farming Is an
Exercise in
Balancing Many
Values***

In general, the participants define sustainable farming as a long-term endeavor that requires long-term vision and planning. Sustainable farming is also an exercise in balancing many values: profitability, health, nutrition, environment, family needs, worker needs, community, and the humane treatment of animals. Accordingly, many respondents emphasized that sustainable farming, unlike conventional farming, requires a holistic approach.

Another commonly cited distinction is the reliance on various inputs. Sustainable farming often requires more manual and intellectual work as well as high levels of management to deal with often diverse operations. Conventional farming relies more on mechanical labor and a different type of management to address the often single function nature of these farms. Many respondents also said that they believe quality of life and living within one’s natural and financial means are greater priorities of sustainable farmers than conventional farmers.

Some of the definitions the participants provided also offer specific attitudes, traits, and skills that should be included in the job description of a sustainable farmer. These ‘requirements’, which supplement the more concrete technical farming and business skills described in a later section, include: manual labor, the ability to balance many activities and priorities at once, intelligence, curiosity, patience, perseverance, the ability to think long-term, and, of course, hard work.

6

Skills and Knowledge the Future Sustainable Farmer Will Require

The most important skills and knowledge a future sustainable farmer will need can be divided into three major categories: business, communication, and farming.

Marketing Is Key

Marketing is by far the most important business skill cited in both the surveys and interviews. Over 97 percent of farmers surveyed rated marketing as a very important skill. Marketing also received the most support from all of the respondents combined. The interviews produced similar results and helped clarify the types of marketing skills and knowledge farmers require, including: understanding the market for various products, options for marketing, developing marketing strategies, and distinguishing between marketing and selling. On this last point, one respondent wrote that most people make the mistake and “sell more than market.” In an interview, a sustainable agriculture professional commented that marketing skills, particularly “packaging and presenting your farm” are very important.

In the surveys and interviews, participants emphasized the need for farmers to take more control of marketing, which requires that farmers be in touch with what consumers want, that they can identify, understand, and find ways to reach niche markets, that they work to change society’s attitudes about food quality and the consumer’s role in the food system, and that they develop cooperatives and networks that offer marketing assistance in addition to other types of support.

In addition, several of the survey respondents who would like to become farmers cited a lack of marketing skills and experience as a barrier to their entering farming.

Management Skills

Accounting and business management skills were rated highly overall in the survey. However, the importance various groups place on these skills varies. One-hundred percent of educators rated accounting and business management as very important skills, compared with 76

percent of farmers. In the interviews, the importance of accounting and management skills was mentioned by only one respondent, a potential future farmer.

In other sections of the surveys and interviews, however, specific types of management skills were defined and emphasized. For example, several people responded that the future sustainable farmer will require the ability to manage a complex operation and multiple projects and concerns simultaneously. In addition, almost 70 percent of all survey respondents rated holistic resource management as a very important skill for future farmers.

Finally, several survey and interview participants cited the need for strategic planning. Specifically, future sustainable farmers will need to know how to develop and implement a strategic management plan.

Communication Skills Are Very Important

Communication skills were also rated very highly in the surveys and interviews. For the purpose of this report, networking and public and human relations skills are included in this category. Although the survey did not include communications skills in the list of skills to be rated, several respondents added it in response to a question about other important skills. Roughly 40 percent of sustainable agriculture professionals and farmers entered communications as an important skill, compared with only 14 percent of educators and those in fields other than sustainable agriculture.

The specific types of communication skills needed include “both one-on-one and electronic” communication skills, “interpersonal skills,” “people skills to deal with retail customers and other business customers,” “writing and public speaking,” “networking,” “community building,” and “coalition building”.

Sustainable Farming Skills

The third major category of skills and knowledge includes those related to farming. These include crop rotation, use of green manure, cover cropping, post harvest handling, soil testing, animal husbandry, companion planting, permaculture, seed saving, and orchard management. Of these, crop rotation and the use of green manure were rated very important by the highest percentage of respondents, 90 percent and 82 percent, respectively. Cover cropping was rated very important by at least two-thirds of respondents. Table 4 includes the skills and areas of knowledge listed in the survey and the percentage of respondents that rated each one as very important to the sustainable farmer of the future.

Priorities varied slightly among the groups of respondents. Seventy-one percent of professionals in fields other than sustainable agriculture believe that seed saving will be important to future farmers, whereas only 18 percent of farmers anticipate that this skill or knowledge will be very important. Post harvest handling was rated as a very important skill by 86 percent of those in fields other than sustainable agriculture.

Additional Skills and Knowledge

Some additional farming skills and knowledge that were mentioned in the survey and interviews include the following:

- integrating animals into the operation for balance and manure,
- conserving water and protecting water purity,
- land management techniques,
- weed control,
- composting and mulching, and
- growing special crops.

Several other skills and types of knowledge that do not fit into the previous three categories were also mentioned in the survey and interviews. One of these is computers and their use in farming operations. Overall, only 40 percent of survey respondents viewed the use of computers as an important skill for future farmers. Of the four groups, 54 percent of sustainable agriculture professionals and 29 percent of educators viewed computer use as important. Only a small number of those interviewed mentioned computer use as important to future farmers.

Other skills that participants either added to the survey or mentioned in the interviews include: machinery repair, observation and investigation, and locating useful information.

Table 4. Skills and Knowledge Sustainable Farmers Will Require**

Skills and Knowledge	Combined	Farmers	Educators	SAP*	Others*
marketing	94%	97%	86%	85%	100%
crop rotation	90%	92%	86%	92%	86%
accounting/business management	83%	76%	100%	92%	86%
use of green manure	82%	82%	86%	69%	93%
cover cropping	71%	68%	57%	69%	86%
holistic resource management	69%	68%	57%	77%	71%
post harvest handling	64%	71%	43%	31%	86%
soil testing	61%	45%	57%	77%	93%
animal husbandry	54%	61%	43%	31%	64%
mechanics	51%	45%	43%	62%	64%
permaculture	40%	37%	29%	54%	43%
companion planting	36%	24%	43%	31%	71%
seed saving	35%	18%	29%	46%	71%
food processing	32%	26%	43%	23%	50%
orchard management	31%	24%	14%	31%	64%
cooking	26%	21%	14%	31%	43%
carpentry	26%	29%	14%	15%	36%

Table shows the percentage of respondents who rated each skill as very important to future sustainable farmers. **SAP* refers to sustainable agriculture professionals. "Others" refers to those in none of the other categories. **Includes only survey data.

7

Social Issues and Concerns

Survey participants were asked about the social issues they believe will be important to sustainable farming in the future. Related questions in the interviews elicited similar responses. All but one of the social issues listed in the survey were rated very important by at least 50 percent of respondents. The exception is credit union development, which was rated very important by 39 percent of respondents. Since the survey respondents rated most of the social issues quite highly, the interview responses were used to help clarify priorities.

Economic, Environment, and Community Concerns

The survey and interview results concerning social issues can be divided into three groups – economic, environment, and community.

Economic issues include a fair price for crops, ethical trade, input reduction, and cooperative development. Although sustainable farmers are interested in more than profit, they are determined to create economically sustainable ventures that, in most cases, will support a family. For example, a fair price for crops and ethical trade were rated very important by 92 percent and 83 percent of the respondents, respectively. Conversely, only 43 percent of the educators and 45 percent of farmers rated farm worker rights as a very important issue.

The responses to open-ended questions in the survey and interviews also reflect the view that to support sustainable farms and the social benefits this type of farming generates, sustainable farming must be profitable. One farmer wrote that a fair price for crops was the most important social issue, “because without fair prices, there is no way that farmers can get behind changing their farming methods.” Another farmer wrote, “Unfortunately it comes down to dollars. If I can get a fair price for my crops – one that covers all costs: health insurance, living wage, proper care for land, animals, environment – other things will fall into place. If not, there won’t be sustainable farms, farmers, or rural communities.”

One of the differences between sustainable farming and conventional farming that many survey respondents and interview participants offered was the reduced level of inputs – financial, chemical, and mechanical – that often reflects the sustainable farmer’s interest in not

only “working with nature accompanies sustainable farming. This lower level of inputs, not against it” and producing “safe, healthful food,” but also limiting costs in order to maximize profits and providing greater control over the operation’s finances.

In the surveys and interviews, several participants also contrasted the differing levels of financial input and output associated with sustainable agriculture and conventional agriculture. One respondent wrote that conventional farming requires “huge dollar inputs” that, according to another respondent, lead farmers on an “economically and environmentally disastrous course.” One farmer made the distinction that, “If you’re sustainable, you don’t go bankrupt financially.” Because of this limited reliance on high-levels of outside financing, some study participants commented that sustainable farmers had more control over their farm, finances, and future. Another said that sustainable farmers are “less reliant on resources over which they have no control.”

***Cooperative
Development Is
Important***

The establishment of cooperatives was also a key economic issue identified in both the survey and the interviews. Eighty-three percent of respondents rated cooperative development as very important to sustainable agriculture. Several participants commented on the importance of cooperatives in the interviews as well. One person highlighted the economic importance of cooperatives, “Farmers acting in cooperative-type situations may be more successful in gaining access to the market place.” Another emphasized that cooperatives will help farmers “determine our destiny and economic worth.” Linked to cooperatives is the need for greater networking among farmers.

***Environmental
Concerns***

The second major category of social issues is concern for the environment, often the most visible attribute of sustainable farming. Both the survey and interviews identified a clear link between sustainable farming and environmental issues. Related to environmental issues were health concerns.

In the survey, 94 percent of respondents rated biodiversity as very important. Input reduction, nutrition, and food safety were rated as very important by 88 percent of respondents. Biotechnology was rated very important by only 57 percent of respondents, the lowest share for the survey’s environment and health category. In both the surveys and interviews, participants emphasized the important role sustainable farmers play in protecting the environment. Among the definitions of sustainable farming that highlight this link to the environment are: “Earth friendly practices are essential;” “improving quality of land;” “draws on nature as a way to solve problems;” and “leaves water cleaner, soil more fertile, better habitat, cleaner air.” Others commented

that given the large volume of land farmers manage, they must be environmentally responsible.

Community

The final category of social issues is community. Most of the interview participants mentioned that sustainable farmers play an important role in the communities in which they live. They often serve as educators, community builders, and food providers. One participant said that the role of the sustainable farmer is to “develop and maintain an intimate community.” Others emphasized that sustainable farming is healthier for communities since it often means more people living on the land and participating in the local economy and society.

Several participants also discussed the need for greater community support for sustainable farming. Some respondents cited the lack of social acceptance both locally and in society as a barrier to sustainable farming. One respondent said that the “social stigma of doing something different is a major barrier” to the adoption of sustainable farming practices in his area. Another said “there should be community pride and support for a system where they can purchase locally grown produce, where they know how those products were grown.” However, the same respondent added that he does not expect or want the community to support or subsidize his operation if he is not meeting a specific need or demand.

Rural-Urban Connections Are Needed

Many study participants defined community more broadly to include the system of producers and consumers. These respondents emphasized the need for understanding and communication between producers and consumers and more “rural-urban connections.” They believe farmers require a greater understanding of what consumers want. As one participant mentioned in an interview, “the system must be consumer-driven; it has to be what they want. If it is producer-driven, it will destroy itself.” Many respondents also believe that consumers need a greater understanding of where and how their food is produced.

Although the survey included issues such as hunger and homelessness, survey and interview participants laid out a different set of community issues that likely have more to do with the communities in which the farmers live than the issues themselves. Although hunger and homelessness were viewed as important social concerns, they were neither rated as highly as other issues in the survey nor discussed much in the interviews. The reason for this may be that these are not the most pressing issues in the communities in which the farmers surveyed and interviewed live, which are generally rural areas. These issues were more important to survey respondents living in urban areas. Since many future farmers may

come from urban areas, issues such as homelessness and hunger may become increasingly important to sustainable farming in the future.

Table 5. Social Issues and Sustainable Agriculture

Issues	Combined	Farmers	Educators	SAP*	Others*
Justice					
fair price for crops	92%	74%	71%	92%	100%
ethical trade	83%	63%	86%	85%	93%
animal treatment	79%	66%	57%	85%	87%
health insurance	75%	58%	43%	69%	87%
gender equality	75%	58%	57%	85%	87%
farm worker rights	74%	45%	43%	77%	87%
indigenous rights	74%	50%	57%	85%	87%
Environment/Health					
biodiversity	94%	84%	86%	92%	100%
input reduction	88%	79%	100%	85%	100%
nutrition	88%	74%	86%	85%	100%
food safety	88%	76%	71%	85%	100%
biotechnology	57%	40%	29%	39%	93%
Community					
cooperative development	83%	71%	57%	92%	93%
hunger	65%	55%	57%	69%	67%
homelessness	51%	40%	43%	54%	60%
credit union development	39%	13%	0%	46%	53%

Table shows percentage of survey respondents rating each social issue as very important to sustainable agriculture. *"SAP" refers to sustainable agriculture professionals. "Others" refers to those in none of the other categories.

How Sustainable Farmers Acquire and Maintain Their Skills

The sustainable farmers surveyed generally did not acquire their skills through the land-grant system or in other higher education institutions. These farmers developed their skills through independent learning, trial and error, and observing and working with more experienced farmers. The same appears to be the case with respect to how farmers maintain their skills. Ninety-two percent of the farmers surveyed acquire the information they need to maintain their skills from other farmers. Only 13 percent obtain that information from land-grant universities.

Three Most Common Ways Farmers Acquired Their Skills

The three most commonly cited means through which sustainable farmers acquired the skills they need to farm are: other growers, trial and error or experimentation, and reading and research.

Table 6 summarizes the results to the survey question on how farmers acquired the skills they need to farm sustainably. The vast majority of the farmers gained their experience through informal, on-farm experience or through independent experimentation and research. Ninety-four percent of the farmers surveyed reported that they acquired their skills through trial and error, experimentation, independent research and reading, and self education. Ninety-one percent of the farmers gained experience through observing and working and talking with other farmers, including their parents. Fourteen percent of farmers wrote that they gained their skills from seminars and workshops, and only 11 percent cited formal education or technical school courses.

Table 6. How Sustainable Farmers Acquired Their Skills

How Farmers Acquired Skills	Number of Farmers	Percentage of Farmers*
other growers	14	40%
trial and error, experimentation	14	40%
reading and research	11	31%
working on other farms, apprenticeships	9	26%
self-taught	8	23%
raised on a farm	6	23%
seminars/workshops	5	14%
organizations	3	9%
formal education	3	9%
observation	3	9%
technical school courses	1	3%
Extension Service	1	3%
luck	1	3%

Note: Data are from surveys. Most farmers selected more than one source. *Percentage of farmers who responded to the question.

Other Farmers a Key Source of Information

In the survey, farmers were also asked to select the sources they use to obtain information they need to maintain their skills. The options were: magazines, seminars, other farmers, extension agent, land-grant university, and other. Thirty-five sustainable farmers, or 100 percent of those who responded to the question, reported that other farmers are a source of information they use to maintain their skills. Sixty-six percent of the farmers selected magazines and newspapers, and 46 percent selected seminars. Land-grant universities and the Extension Service trailed these three major sources. Fourteen percent of the farmers

marked the land-grant schools box, and only 3 percent checked the Extension Service box.

Table 7. Information Farmers Use to Maintain Their Skills

Sources of the Best Information	Number of Farmers	Percentage of Farmers*
other farmers	35	100%
magazines	22	63%
seminars	16	46%
land-grant university	5	14%
books	3	9%
experimentation	2	6%
observation	2	6%
farming newspaper	1	3%
Extension Service	1	3%

Note: Data are from surveys. Most farmers selected more than one source. *Percentage of farmers who responded to the question.

Opportunities for Educational Institutions

As reported in the previous section of this report, many sustainable farmers do not look to land-grant and other formal educational institutions for the education and training they need to farm sustainably. The explanation most often given for this in the surveys and interviews was that the programs these institutions offer do not meet the needs of sustainable farmers. As one farmer explained, “schools are teaching mostly conventional skills,” and there is “too much training and not enough educating.” Another said that the university, “does not give much attention to sustainability issues.”

The Way in which Educators and Farmers Define Skills May Differ

One educator suggested that the problem may be that educators think they are offering programs and courses farmers want, such as marketing and management. However, the way in which educators define marketing and management may be different than how farmers define these terms. Consequently, the material taught in these courses is apparently not what the sustainable farmer wants. The courses are geared more to commodity production. A couple of farmers, expressing a similar concern, also believe that the state University is too focused on commodity production. To help address this problem, some study participants mentioned that “practicing farmers at the University or Extension would be helpful.”

Two key findings highlight the opportunity land-grant institutions have to help prepare the sustainable farmers of the future. One, sustainable farmers want to learn and believe that sustainable farming requires “continual learning, relearning, and rethinking.” Two, farmers are not opposed to turning to land-grant institutions for this education and training. Indeed, they would welcome the opportunity if the university provided information they needed. As one farmer said, contact with land-grant education through Extension and agricultural experiment stations “provides a connection to a larger picture of agricultural practices and research.”

Others agreed that land-grant universities have a role to play. However, they do not believe these institutions have assumed this role. One farmer said, "The university is a broker for information...but they first need to have the information we need." Another said that "Universities and Extension Service have the forum to present sustainability issues," however, "they don't seem to have the desire. Perhaps it is a matter of time."

***Land-grant
Institutions
Are Changing***

Other study participants have already begun to detect a change at land-grant institutions. One farmer said, "I'll tell you where I didn't go – the University... Now I do go to the University." Another farming couple said that "Extension has been very helpful in the last couple of years, especially one individual who is livestock and sustainable agriculture oriented." Still another said that Extension employees are "getting more interested in sustainable farming."

***Role of Land-
Grant
Institutions***

In order to meet the needs of future sustainable farmers, land-grant institutions must offer a variety of courses and programs aimed at a diverse audience. Education and training needed to help sustainable farmers maintain and improve their skills must be offered at times and locations convenient to farmers. The subject matter for these courses needs to be developed through research that is driven by sustainable farmers and what they have identified as their needs. Several farmers expressed an interest in having information flow in two directions, not just from the university to the farmer.

Special courses and education are also needed for adults who currently work in other fields, but are preparing to become farmers. Many of these people do not have time for a full-time program, nor do they have the background and experience that current farmers have. Several study participants emphasized the need for on-farm experience and internships. These programs can be useful to those with little farm experience as well as those with on-farm experience who want to learn new techniques or a different way to farm. The university can help match farmers with these part-time or non-traditional students.

Finally, land-grant institutions have an important role to play in educating young future sustainable farmers, particularly those just entering college. These and some older students may have both the need and time for a more comprehensive program. Like many future sustainable farmers, these students may require on-farm experience to help them develop or update their skills. Several study participants suggested that scholarships and internships be established to

encourage young future sustainable farmers to gain on-farm experience.

***More Information
and Training for
Children and
Teenagers***

Several study participants also believe that children and teenagers need more sustainable farming information and experience. They suggest that 4-H, the Boy Scouts and Girl Scouts, and Future Farmers of America arrange more activities around sustainable agriculture. Some also recommend that sustainable farmers should get more involved in these organizations as well. These programs should help provide children and teenagers with the support and encouragement they need to follow what many of their friends and families may view as an unusual or even undesirable career and way of life.

The sustainable farmer of the 21st Century will likely look different than the conventional farmer of yesterday and today. The future sustainable farmer may come to farming from any number of backgrounds and may have had little or no on-farm experience as a child. He or she will choose to farm for reasons other than family pressure or just profit. In addition to providing a secure income and high quality of life for his or her family, the future sustainable farmer will want to produce safe and healthy products, protect the environment, and build a strong community.

Summary of Skills

To be a success, the future sustainable farmer will require knowledge of specific sustainable farming techniques as well as communication and business skills. He or she will require an holistic management approach and must be willing and able to explore natural solutions to farming problems. The future sustainable farmer will have to understand marketing and not just selling. He or she will have to help educate consumers about the importance of a sustainable food system, while responding to their demand for specific products. Finally, the future farmer will need to be able to work with both neighbors and other producers to ensure that sustainable farming, good health, and communities all flourish.

Role of Land-grant Institutions

Land-grant institutions have important roles to play in both helping sustainable farmers acquire the knowledge and skills they need and working with farmers to educate the public about the benefits of a sustainable food system. Unfortunately, many sustainable farmers do not turn to land-grant institutions for the education and training they need to begin farming or to maintain their skills. Sustainable farmers find that these institutions do not offer the programs, courses, or research that address their needs.

Finally, if land-grant institutions are to meet the needs of the people they are supposed to serve and help build healthy communities, they will need to listen more carefully to sustainable farmers, offer the courses and programs they need, and reach out to and help prepare the sustainable farmers of tomorrow.

Endnotes

- ¹ Northwest Area Foundation. 1994. *A Better Row to Hoe: The Economic, Environmental, and Social Impact of Sustainable Agriculture*.
- ² Lockeretz, William. "Open Questions in Sustainable Agriculture" *American Journal of Alternative Agriculture*, Vol. 3:4, 174-181. 1988.
- ³ Crosson, Pierre. "What is Alternative Agriculture?" *American Journal of Alternative Agriculture* Vol. 4:1, 28. 1989.
- ⁴ Keeney, Dennis. "Towards a Sustainable Agriculture: The Need for Clarification of Concepts and Terminology." *American Journal of Alternative Agriculture* Vol. 4:3/4, 101-105. 1989.
- ⁵ Ikerd, John. "On Defining Sustainable Agriculture for the National Training Program." *Everyone a Teacher, Everyone a Learner*. North Central Region Sustainable Agriculture Research and Education Training Program.
- ⁶ Keeney, Dennis. "We're Listening...". *Leopold Letter*. Vol. 7:1. Spring 1995
- ⁷ "Economic and Quality of Life Issues in Sustainable Agriculture." Sustainable Agriculture Systems Program. University of Missouri. *Everyone a Teacher, Everyone a Learner*. North Central Region Sustainable Agriculture Research and Education Training Program.
- ⁸ *The Profitability of Four Sustainable Farms in Minnesota*, a report by the MN. Department of Agriculture's Energy and Sustainable Agriculture Program, and the Land Stewardship Project. October 1994.
- ⁹ (Northwest Area Foundation.)
- ¹⁰ (Northwest Area Foundation.)
- ¹¹ (Northwest Area Foundation.)
- ¹² Allen, Patricia et. al. "Expanding the Definition of Sustainable Agriculture" Agroecology Program. University of California, Santa Cruz. 1991. *Everyone a Teacher, Everyone a Learner*. North Central Region Sustainable Agriculture Research and Education Training Program.
- ¹³ (Keeney, Dennis.)
- ¹⁴ (Keeney, Dennis.)
- ¹⁵ (Northwest Area Foundation.)

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- ¹⁶ Flora, Cornelia Butler. "Social Issues Related to Agriculture, Communities, and New Technologies." 1995. *Everyone a Teacher, Everyone a Learner*. North Central Region Sustainable Agriculture Research and Education Training Program.
- ¹⁷ (Crosson, Pierre.)
- ¹⁸ Madden, J. Patrick. "What Is Alternative Agriculture?" *American Journal of Alternative Agriculture* Vol. 4:1, 32. 1989.
- ¹⁹ (Ikerd, John.)
- ²⁰ (Northwest Area Foundation.)
- ²¹ Biodynamics. *Internship Report*. No.200. July/ August 1995.