

SMALL-SCALE FARMERS AS POTENTIAL USERS OF CLIMATE INFORMATION: AN ANALYSIS OF STATISTICAL DATA FROM THE SOUTHEAST UNITED STATES

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INTRODUCTION

Local seasonal climate is variable and uncertain, as are climatic factors such as rainfall, temperature, and radiation. Knowledge of El Niño Southern Oscillation (ENSO) phenomena is being used to forecast seasonal climate with a relatively high degree of skill. The ENSO signal in Florida has been well documented in terms of its effects on climatic variables (Jones et al., 2000), where precipitation during an El Niño winter is 30% greater than of the average seasonal total across much of the state. La Niña has the opposite effect, with rainfall deficits of 10% to 30% lasting from fall through winter and spring. Florida and the Gulf Coast can expect to see average temperatures 2°C to 3°C below normal during El Niño years. La Niña has the opposite effect, with temperatures 2°C to 4°C above normal during winter months. La Niña's effect on temperature is especially pronounced in north Florida and south Alabama. Solar radiation decreases in association with higher rainfall during El Niño years.

The South East Climate Consortium (SECC) is a multi-institution, interdisciplinary consortium of six universities from Florida, Alabama, and Georgia, which conducts research and develops tools to translate seasonal climate variability forecast information into user friendly applications and decision support systems for farmers [<http://secc.coaps.fsu.edu>]. In order to help farmers deal with climate variability for decision making, the SECC developed an interactive web site [<http://AgClimate.org>], which is being implemented for operation in partnership with the Cooperative State Extension Services of Florida, Georgia, and Alabama. It includes climate forecasts based on the El Niño Southern Oscillation (ENSO) phase and climate-based tools to guide management decisions for crops, forestry, pasture, and livestock. The tool section of AgClimate contains applications that allow users to select a county and to evaluate the yield potentials for certain crops, given a particular climate forecast. Interpretative outlooks for selected agricultural commodities are also posted quarterly.

Climate forecast science funded by the federal government of the United States is meant to provide societal benefit by developing and disseminating information to mitigate negative effects of climate variability. However, not all communities or sectors of society have equal access or the ability to use such information (Stern and Easterling, 1999). Targeting these marginalized or underserved groups is difficult given the scarcity of data and the diversity of livelihood systems. Confusion arises as several such overlapping groups of farmers are variously referred to as

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small-scale, resource-limited, disadvantaged, marginalized, and minority farmers. These groups also overlapping categories based on ethnicity, income, and gender, including African-American, Native American, Latino, Asians, Pacific Islanders, elderly farmers, and women farmers.

Limited-resource minority farmers in the southeast U.S. faced greater obstacles than do other small-scale farmers. Many of these farmers have less education and lack sufficient resources to participate in alternative methods of production and marketing. They are often unable to access facilities that process livestock, thereby limiting their sales to traditional and often unprofitable markets (Colverson, personal communication). Socially-disadvantaged groups are defined by the 1987 Equal Credit Opportunity Act as groups whose members have been subjected to racial, ethnic, or other forms of prejudice because of their membership in the group. Using this definition, the US Department of Agriculture (USDA) includes women, African Americans, American Indians and Alaskan Natives (Native Americans), Asians and Pacific Islanders, and Hispanics among the socially disadvantaged groups. Several of these groups have sued U.S. government as documented on the World Wide Web. In 1999 African Americans filed a class action racial discrimination suit against the USDA [www.oxfamamerica.org/newsandpublications/news_updates/archive2003/art4066.html]. Through 2006 the USDA paid more than \$630 million to farmers and former farmers who could document that they were unfairly denied loans. Nonetheless, the USDA continues to delay and reject of thousands of loan applications submitted by African American farmers, which suggests a continuing pattern of discrimination in the loan approval process. Similarly, Hispanic and Native American farmers have filed separate class action suits against the USDA alleging that the USDA unlawfully engaged in discriminatory policies that favored white farmers, directly resulting in either smaller or no federal loans being awarded to Hispanic [www.classactionamerica.com/public/caseIndex.aspx?lngCaseID=2274] and Native farmers [www.cmht.com/cases_keepseagle.php].

We define vulnerability to seasonal climate variability as being susceptibility to negative socioeconomic impacts of climate variability; the more severe the impacts, the greater the degree of vulnerability. Additionally, vulnerability restricts the ability to recover from severe climatic events. A less vulnerable system has the capability of recovering faster and of adjusting so that future vulnerability to similar climatic events is lowered. Buffering is a process of technology adjustment and social restructuring that links public policy, social institutions and private decision making in such a way that it insulates a community of stakeholders from the impacts of climate variability (Finan et al., 2002). Seasonal climate forecasts can not insulate farmers from climate variability, but these forecasts may contribute to the decision-making strategy that farmers use to buffer their livelihoods. Arguments exist on both sides of the question of whether small farmers are more or less vulnerable to the vagaries of climate.

Research is needed to identify target populations that might use seasonal climate forecasts, to explore their felt needs, and to understand their farming systems. Additional research is needed to identify emergent properties of systems that reduce vulnerability, to model those systems, and to estimate the usefulness of climate information technology for improving their livelihood outcomes. This paper deals mostly with the first issue, namely identifying small-scale farmers as research targets for Florida, Alabama, and Georgia.

Small-scale farmers make up 89% of all farmers in the US. All three SECC states have large numbers of small-scale farmers, which makes this group of potential end-users a concern for research within the consortium. The objectives of this report are to provide an overview of the different groups as an aid to helping the SECC focus their outreach and research efforts to provide climate information to improve the livelihoods of these farmers. As an initial exploration into this area, we use statistical information from the US government and non-governmental organizations (NGOs). The report is limited to farm operators, that is, it does not include migrant farm laborers. The goals of this research were to identify: 1) which groups are most vulnerable to climate variability; and 2) which groups are in a position to take advantage of climate information from the SECC.

DEFINING SMALL-SCALE FARMERS

Multiple categorization or typologies of small-scale farms exist within government agencies and NGOs, and these categories are not consistent. In this paper, we will use the USDA definition unless otherwise noted.

Even though numbers of small farms have been declining for years, they are still an important contributor to the US economy. According to a report by the Economic Research Service, nationally small farms comprise about 91% of all farms, if defined as agricultural sales of less than \$250,000 annually (USDA, 1997; Table 1).

Table 1. Farm classifications according to the USDA.

Small farm	Less than \$ 250,000 in gross annual agricultural sales.
Limited-resource farmer	Less than \$ 20,000 from all sources in previous 2 years.
Limited-opportunity farm households	Gross household income less than \$20,000; farm sales less than \$100,000; farm asset value less than \$100,000.
Socially disadvantaged farmers	Have been subjected to racial, ethnic, or other forms of prejudice.

Sources: Small Farms@USDA (2005); ERS/USDA. (1997)

The small farm sector produces an enormous range of foods and other products. It also boosts local economies, strengthens rural communities, helps to ensure food security, and enhances the quality of life for urbanites by providing green space and fresh, locally grown foods. Many small farmers understand the need to increase their competitive advantage in the market place. They often create alternatives to traditional ways of doing business. Numbers of farmers' markets, community-supported agriculture, and specialty products directed at specific market niches, especially organic produce, increase annually. Agricultural sustainability depends on developing new approaches to working with this farm sector. One such approach may be to upgrade efforts to communicate decision support information generally available on the Internet

to resource-limited farmers. Seasonal climate information with 3- to 9-month forecast lead times is one type of technology that may be useful to them.

Most minority and women farmers operate smaller farms, but generalizing about minority farmers is difficult because characteristics of minority- and women-operated farms differ widely from group to group. Considerable overlap also exists among some of these groups, especially between women, organic growers, and any one of the ethnic groups.

Limited-resource or Limited-opportunity Farmers

Limited-resource and limited opportunity farmers are special groups within the small-scale farmer category. These farmers often have fewer years of formal education and are older than most other small-scale farm operators (Steele, 1998a). Although these categories earn less than other small-scale farmer groups, they comprise 16% of all small farms in the US and 45% of all farms owned by African-Americans in the US are considered to be limited-resource farms (Steele, 1998b).

While not all socially-disadvantaged and small farms fall into the limited-resource income category, the term limited-resource loosely refers to these types of farms as well as to limited-opportunity farm households.

Limited-resource farmers generally owe proportionally less money than other small farmers (20% of annual income compared with 48%), but are less able to service debt with their lower household incomes. The combination of lower levels of education, lower household income, older age, and less willingness to utilize government assistance places limited-resource farmers in a precarious position, particularly as they are also less likely to join cooperatives that can help them with purchasing inputs and marketing their products (Tackie et al., 1998). A lack of resources is generally understood to limit the resilience of farming systems and to increase their vulnerability. While limited-resource farm groups are defined based on economic resources, they may also have limited access to other resources, in particular, information. One resource lacking in the southeast US may be access to information on seasonal climate variability.

In 1992, there were about 185,000 limited-opportunity farm households in the US of total 2.1 million farms. Although these limited-opportunity farm households were less geographically concentrated than the farms of other socially disadvantaged groups, 60 % were in the South (ERS/USDA, 1997).

The Economic Research Service (ERS) of the USDA uses yet another set of criteria to define small family farms, with the broadest group having annual farm sales less than \$250,000. They define three further subcategories of small farms: 1) those less than \$10,000 annual farm sales; those with \$10,000 to \$100,000 annual farm sales; and those with \$100,000 to \$250,000 annual farm sales. Large farms are sorted into two sales classes, and all non-family farms are put in a single class [www.ers.usda.gov/Briefing/FarmStructure/Questions/smallfarmsinag.htm].

Socially Disadvantaged Farmers

Socially disadvantaged farmers are defined by the 1987 Equal Credit Opportunity Act as those whose members have been subjected to racial, ethnic, or other forms of prejudice because of their membership in the group. The USDA includes women, African Americans, American Indians and Alaskan Natives (Native Americans), Asians and Pacific Islanders, and Hispanics as socially disadvantaged groups.

African-American farmers

Most African-American farmers produce vegetables. Some also produce cotton, corn, peanut, and tobacco. Numbers of African-American farmers have declining drastically in the past century. Between 1920 and 1992 the number of African-American farmers in the US declined by 98%, from 925,710 to 18,816. Today some 23,000 African Americans own 2.5 million acres of land (Bureau of Labor Statistics, 2001). In 1984 and 1985, of the almost 16,000 farmers who received USDA funds to buy land, only 209 were African American. Lack of access to credit is one of the reasons that few young African-Americans seek farm ownership. In the late 1980s, there were fewer than 200 African-American farmers in the US under the age of 25 [www.coax.net/people/lwf/bfaa_org.htm].

Farms operated by African Americans are typically very small, compared with the average US farm or with farms run by other minorities. Almost half of all African American-operated farms are smaller than 50 acres. Only 3% of African-Americans farmers operated more than 500 acres. African American farms averaged less than \$20,000 per farm in gross sales per year, compared with the US average of \$84,500. Only 12% of farms operated by African Americans had annual sales greater than \$25,000.

Farm ownership numbers changed in 2002 when for the first time, up to two additional farm operators could be reported. When three operators per farm could be reported, a total of 30,605 farms in the U.S. had African-American operators in 2002. Of these, 23% are in Texas; 17% in Mississippi; 8% in Alabama; 7% in Georgia; and 6% in South Carolina. The farm land operated by African-Americans totaled more than 3.8 million acres with more than half of those acres located in the same five states. In 2002, Florida had 312 African American farms run by 543 operators; Alabama 2,289, and Georgia 2,390.

Approximately 44% of African-American farm operators reported farming as their principal occupation. Major farming types were beef cattle, oilseed and grain, vegetable and melon, and tobacco. African-American farmers sold nearly \$507 million in agricultural products in 2002.

Native American farmers

More than 81% of the 8,300 American Indian-operated farms are located west of the Mississippi River. The average farm operated by American Indians was over 5,000 acres. This average, however, includes farms owned or controlled by reservations. Some of these encompass thousands of acres of range and cropland. Sales averaged \$49,300, substantially less than the national average, and 64 % of American Indian-operated farms had sales of less than \$10,000 (NASS, 2002).

The governing council of the Seminole Tribe of Florida runs Big Cypress and Brighton Citrus Grove. These are groups of small, 40- to 85-acre citrus groves, which have been developed as community projects. Brighton Reservation is located on the northwest edge of Lake Okeechobee and covers about 36,000 acres. It has 25 ranches on 12,000 acres of pasture, which are grazed by approximately 6,500 head of cattle. Anecdotal evidence points out that agriculture is a minor source of revenue for the Seminole Tribe, as bulk of their income comes from casino operations (<http://www.epa.gov/owow/nps/Section319II/seminole.html>).

Today, Alabama has only 131 registered Native American farmers. Georgia has even fewer, 58 (Table 2). Florida has 241 registered American Indian farm with 306 operators [www.nass.usda.gov/census/census02/volume1/fl/st12_2_043_044.pdf]. The census merely asks farmers what they consider to be their ethnicity. In any case, numbers of Indigenous farmers in the three states of the SECC are relatively small compared with the western United States, where most reservations are located.

Table 2. Numbers of limited-resource farmers by ethnicity.

Ethnic group	US	FL	GA	AL	SECC†
African American	29,090	312	2,390	2,289	4,991
Hispanic	50,592	3,696	591	614	4,901
Native American	15,494	241	58	131	430
Asian or Pacific Islander	9,358	727	147	61	935
Women	237,819	8,116	6,455	4,821	19,392

Source: NASS (2002)

† SECC states include FL, GA, and AL.

Hispanic farmers

In this article the term Hispanic includes Spanish, Hispanic, and Latino farmers. With most emphasis placed on migrant labor when discussing the role of Hispanics in agriculture, the fact that many Hispanics are actually farm operators is sometimes overlooked. Numbers of Hispanics in the American population continue to grow as do numbers of Hispanic farm operators. Numbers of Hispanic origin farm operators have also increased by 50.8% in the continental US and Puerto Rico. Most Hispanic-operated farms are in California, Colorado, Florida, New Mexico, and Texas. Hispanic farms now comprise 1.5% of all farms in the country. The number of Hispanic farm operators in the three states in which the SECC operates is in Table 2. Hispanic farm activities are dominated by beef cattle production, followed by specialty crops and traditional commodities (Table 3).

Table 3. Principal farm activities of Hispanic farmers.

Farm type	Hispanic	US	Comments
Beef	41%	34%	
Specialty crops	22%	9%	Typically high-value crops.
Traditional crops	12%	28%	Low Hispanic participation in USDA programs.

Hispanic farmers are less likely to obtain USDA operating and farm ownership loans or conservation assistance. Hispanic farmers are also less likely to be eligible for USDA support payments because they are more likely to raise livestock or specialty crops, such as fruits, tree nuts, or vegetables, which are not covered by USDA farm programs (Hispanic Business, 2002)

The Hispanic population is growing more rapidly in South Florida than in other parts of the country. Communicating with and understanding the special needs of Hispanic and other non-English speaking customers is a priority issue for agricultural extension services and agencies that provide service to agriculture. Some Hispanics need to supplement their non-farm income; others seek the rural lifestyle of a small farm [www.farmcreditsfl.com/ybsmb.htm]. The USDA Farm Service Agency in Homestead has shown an increase of 35 new Hispanic small-scale farmers in their records for 2002. The new farmers registering indicated they had learned about the benefits of registering at a Small Farm Seminar that University of Florida Extension held in Homestead specifically for Hispanic small-scale farmers [<http://analysis.ifas.ufl.edu/2002/palmbeach2002.htm>].

Women farmers

Women across the world are becoming more involved in agriculture. In the US, women currently represent 15% of farmers and farm managers compared with 4.5% in 1970. More women are pursuing agribusiness management degrees, as well as off-farm agricultural jobs. Enrollment of women in agriculture at land grant universities ranges from 30 to 35% (Tevis, 2004). The average value of sales for farms operated by women is low, \$35,300, well below all other operator groups except African Americans. Two-thirds of farms operated by women had annual sales less than \$10,000, compared with half of all US farms; and only 20% of farms operated by women had annual sales of \$25,000 or more.

For many women living on farms, their roles consist of household chores, bookkeeping, and performing extra activities such as working off the farm to keep the household solvent. Recently, however, more women are working the farm. Women in agriculture are an underserved population that will continue to grow. Women are entering agriculture in great numbers for several reasons, including widows inheriting land, finding niche markets and alternative crops, and women becoming their own market managers and selling their own products (Celcee, 2004).

Farms operated by women were only about half as likely as all US farms to specialize in cash grains and were more likely than all US farms to raise livestock or high-value crops. This is an across-the-board overview of women operators and does not necessarily mean these farms are small-scale or resource-limited.

The average age of women farm operators is 58 years, about 5 years older than the US average. More than one-third of women farm operators are at least 65 years old, a much greater proportion than the one-fourth of all US farmers that are at least 65 years old. The relatively large proportion of elder women farmers is primarily because many of them inherit their farm operations as widows.

Organic Farmers

Organic farmers are one group of small-scale farmers who may be especially suited as a target population for research on the application of climate information. They have special needs for forecasts with good lead times because they cannot use chemicals to manage pests and diseases. During the 1990s, organic farming became one of the fastest growing segments of US agriculture. Organic farming offers a way to decrease reliance on nonrenewable resources, to capture high-value markets and premium prices, and to boost farm income. These specialized farming systems rely on ecologically based practices, such as cultural and biological pest management, virtually exclude the use of synthetic chemicals in crop production, and prohibit the use of antibiotics and hormones in livestock production (Swisher and Monaghan, 1995).

Certified organic acreage reached 2.2 million acres in 2003, with nearly 1.5 million acres used for growing crops. Despite its rapid growth, only 0.4% of all US cropland and 0.1% of all US pasture was certified organic in 2003 [www.ers.usda.gov/Data/Organic]. There were 8,035 certified organic operations in the US in 2003, with 99 organic farms in Florida, 31 in Georgia, and 6 in Alabama [www.ers.usda.gov/Data/Organic].

ASSESSING VULNERABILITY

Various measurable parameters may have implications for estimating farming system vulnerability to climate variation and ability to adapt to changing climate. Among these are income, farm size, specialization, age of farmer, and the full-time or part-time nature of farm work.

Income is generally considered to be the measure most directly related to vulnerability and adaptive capacity. By most criteria, socially disadvantaged farmers are among the most vulnerable. African American-operated farms averaged less than \$20,000 per farm in gross sales per year. Some 64% of American Indian-operated farms had annual sales less than \$10,000 (NASS, 2002). Only 27% of Hispanic-run farms had annual sales of at least \$25,000; which compares with 37% for all farms. Thus the typical minority farmer manages with a low income, which means that it is also likely, though not certain, that they have high vulnerability and low adaptive capacity. Research on the application of new information must be planned with caution to avoid choosing groups that are highly vulnerable to climate variability but have limited capacity to adopt climate forecasts as a means of reducing risks and increasing profits. The fact that these numbers are reported as averages indicates a distribution in which upper and lower tails exist. Research is needed to determine thresholds above which individual farmers or communities are somewhat less vulnerable and somewhat more able to benefit from climate forecast technology.

Farm size, though a potentially useful parameter, is difficult to research because characteristics of minority- and women-operated farms differ widely from group to group. Considerable overlap also exists among some of these groups, especially between women and the different ethnic groups. Farms operated by African Americans are typically very small, compared with the average US farm or with farms run by other minorities. Almost half of all African American-operated farms are smaller than 50 acres. In contrast, the average farm

operated by American Indians was over 5,000 acres. This average, however, included farms owned or controlled by reservations. Some of these encompass thousands of acres of range and cropland. On average, farms operated by Hispanics are larger than US farms in general, but this is mostly west of the Rocky Mountains. Hispanic farms are slightly larger than the average U.S. farm, and than those of most other minority groups. In 1997, the typical Hispanic-owned farm is around 592 acres whereas the national average was 487. Statistical data are of little help in this category as averages mask the large diversity among small-scale farmers.

Except for women, socially disadvantaged farmer groups tend to be concentrated in particular regions of the US. For example, approximately 90% of African-American operated farms are in the South. Minorities and women also tend to specialize in particular types of agriculture. Over 52% of African American-owned farms specialized in beef cattle, while 10% grew tobacco. Farms run by American Indians tended also to specialize in livestock. In North Carolina, however, operators tend to specialize in tobacco. Approximately 75% of Hispanic farmers lived in five states: California, Colorado, Florida, New Mexico, and Texas. The most common specialization for Hispanics, as for African Americans and American Indians and for US farms in general, was beef cattle. Nearly 40% of Hispanic-run farms specialize, compared with 32% of all U.S. farms. At 24%, the proportion of Hispanic-operated farms specializing in high-value crops was three times the US average (USDA, 1997). Compared with production of vegetables or row crops, beef cattle production requires comparatively less labor and is less sensitive to climatic variability. Moreover, cattle serve as a capital savings account and emergency fund. This suggests a direction that concentrates more on vegetable and row crop producers might be appropriate.

Age may also affect vulnerability or the capacity to adapt. Certain socially disadvantaged groups show a stronger aging trend than the US farm population in general. African-American and women operators tend to be older. The average age of African-American operators was 59 years, and 38% of all African-American farmers were 65 years or older, making African-American farm operators older on average than any other ethnic group. As with socially disadvantaged farmers, small farms are often associated with age. Nearly 60% of the operators of full-time small-scale farmer are over 65. Although age in itself does not cause farmers to be more or less susceptible to climate variability, these farmers tend not to access digital information. In recent research, several older farmers in the southeast US mentioned they did not use the Internet; their wives or children normally “took care of that” (Breuer et al., forthcoming).

Two criteria on which the USDA bases its small, full-time farm designation are: 1) that the principal occupation of the operator is farming or ranching; and 2) that the operator works off the farm fewer than 50 days per year. About 350,000 farms nationwide fit this definition. Among African-American principal operators, 56% listed farming as their primary occupation. Nearly 95% of African-American farms are operated by a family or individuals [www.usda.gov/nass/events/news/highlight_2_10_05.htm]. For many small-scale farmers, farm income contributes little to the total household income. Often, off-farm income offsets low farm income to provide protection against agricultural risks. In other cases, small-scale farmers use their off-farm income to effectively subsidize consumers. On the other hand, about half 50% of women and half Hispanics farm operators reported farming as their principal occupation, so these groups would have less off-farm income to buffer their agricultural activities.

DISCUSSION

The SECC holds working with all stakeholders, especially potential end-users as fundamental to its mission. An opportunity exists for two-way interaction to develop forecast products that are spatially-, temporally-, and activity-specific for resource-limited farmers. Small-scale farmers should participate in the development of these products so that the products respond to their felt needs and to help reduce their vulnerability to seasonal climate variation. A cost-effective way to include participation and adoption of climate information by resource-limited farmers would be to work with already existing NGO and government outreach programs.

Information available on the Internet has allowed the classification of small-scale farmers in each state. Beyond this, parameters such as land tenure, farm size, income, specialization, age, and the full- or part-time nature of working hours may be important to understanding vulnerability and how climate forecasts might assist in reducing it for certain groups. If numbers of farmers is the principal criterion, African Americans in Georgia and Alabama, and Hispanics in Florida should be targeted. Women farmers are numerous in all three states and it is clear that this group overlaps greatly with the different ethnic groups. Of the other criteria mentioned, income and specialization are perhaps the most useful in determining who is vulnerable and who might most effectively use climate information. Low income farmers, especially those who depend heavily on farm livelihoods for their income are most vulnerable. Vegetable producers, including organic growers, are more likely to be more affected by climate variability than are livestock farmers. Vegetable producers typically grow their crops during the fall, winter, and spring, which are seasons with the greatest predictability of climate in the SECC states.

Targeting the appropriate study populations for research is crucial to the success of the SECC as equitable provider of climate information to all sectors that might benefit from it. Perhaps some of these groups may be able to improve their ability to manage risk by using seasonal climate forecasts or other information provided by the SECC. Furthermore if climate information proves useful to mitigating losses or enhancing farm gains, some farmers may be better able to start or to remain in the farming life, allowing farming to become a more viable economic activity in a volatile economy. On the other hand, some or all of these small-scale farmer groups may have little use for such information, or that they could be potentially at a disadvantage if other farmer groups or agricultural sectors use of climate information.

CONCLUSIONS

The SECC has successfully partnered with the Cooperative Extension Services of Alabama, Florida, and Georgia to research and develop seasonal climate forecast tools to help reduce vulnerability of farmers to seasonal climate variation. However, the available products have been mostly driven by the needs of medium- and large-scale commercial farmers. Resource-limited farmers, including minorities and women who traditionally have been underserved by government agencies and research institutions can be reached with the same technology aimed at large-scale agriculture. In order to do this, new partnerships need to be developed with institutions already working to improve the livelihoods of these types of farmers.

A simple conclusion based on this study, such as African American farmers should be targeted in Alabama and Georgia, Hispanics in Florida, and women and organic producers in all three states, may prove to be misleading. It is highly unlikely that everyone within these categories will be vulnerable and at the same time possess the ability to gainfully utilize seasonal climate forecasts. Information on resource-limited farmers is typically compiled and reported only as averages, which masks the great diversity of farming systems and vulnerabilities among and within these groups. Further field research in rural sociology and anthropology is greatly needed to improve understanding of the small-scale farmer groups or parts of groups that should be targeted for climate forecast extension programs

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APPENDIX

Table A1. Selected programs and agencies in the Southeast Climate Consortium states of Florida, Georgia, and Alabama.

Target Group	NGO and Web Site	Activities and goals
Small-scale farmers	The Federation of Southern Cooperatives [www.federationsoutherncoop.com]	Economic issues, housing, production, marketing, credit unions
Hispanics, Native Americans, migrant workers, environmental groups	The Rural Coalition [www.ruralco.org]	Economic issues, environmental justice
African Americans, Hispanics, Native Americans, women	The Socially Disadvantaged Outreach Program [www.ars.usda.gov/services/docs.htm?docid=1275]	Provide training, develop loan plans, assist with debt restructuring, cooperative development, marketing.
Farmers, consumers, related groups	The Alabama Sustainable Agriculture Network [www.asanonline.org]	Improve farmers' economic well-being; provide consumers with fresh local products
Limited-resource African-American farmers	African-American Advisory Council [www.fsis.usda.gov/OM/CRD/pdf/advisory_councils.pdf] [www.bwni.comwww.diversitybestpractices.com]	Ensure opportunities, access and equity in program delivery and services
Limited-resource African American farmers in Alabama	Small Farmer Outreach, Training and Technical Assistance Project, Tuskegee Univ [www.tuskegee.edu/Global/story.asp?S=1115957]	Develop production and financial management skills, improve economic well-being of socially-disadvantaged farmers.
Farmers in the southeast U.S. (mostly African American)	Bioneers Restorative Development Initiative and Federation of Southern Cooperatives [www.bioneers.org/programs/food_farming/fedfarm.php]	Develop skills, create a sustainable agricultural economy, help farmers retain their land.
Echota Cherokee Tribe of Alabama	Small Farmers Outreach Program, Alabama A&M Univ [webpace.aamu.edu/smallfarmers/activityboard.html]	Improve rural livelihoods.
Hispanics and other minorities	Farm Service Agency [www.fsa.usda.gov]	Stabilize farm income, provide credit, and promote land and water conservation.
Organic farmers	Southern Sustainable Agriculture Working Group (SAWG-in partnership with USDA Risk Management Agency). [www.ssawg.org]	Internet-based services to assist moderate- to small-scale Southern farmers in marketing.
Organic farmers	Georgia organics [www.georgiaorganics.org]	Educate farmers, consumers, and ag professionals on sustainable ag; support community food systems