LAND-GRANT INSTITUTIONS AS SETTINGS FOR INSTRUCTIONAL VIDEOS ON SUSTAINABLE AGRICULTURE PRACTICES

by

KATHLEEN MARIE RAVEN

(Under the Direction of Carl F. Jordan)

ABSTRACT

Land-grant institutions, by mandate, educate communities on best agricultural practices and provide counsel through extension services. Such universities make good use of online information websites to disseminate agricultural techniques and know-how to the public. Few have yet incorporated video learning modules into their rich collections. This research proposes that instructional videos, created through partnerships between video communication professionals and agriculture researchers on campus at land-grant institutions, as well as local farmers, could effectively disseminate much-needed information. This paper explores the current use of video at selected land-grant institutions, provides detailed suggestions for creating successful video modules, offers ways to incorporate video learning into current land-grant extension educational systems, and discusses the next step for video as a tool to spread sustainable agriculture farming techniques to farmers.

INDEX WORDS: Sustainable Agriculture, Farming Practices, Land-grant Institutions, Communication, Video

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KATHLEEN MARIE RAVEN

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KATHLEEN MARIE RAVEN

Major Professor: Carl F. Jordan

Committee: Paul Hendrix
Rick Watson

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
May 2012

DEDICATION

This work is dedicated to Arjan Raven and Sugar. Both saw me through dark hours and sunshine.

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CHAPTER 1

INTRODUCTION

Elected members of the U.S. government passed the first Morrill Act in 1862 and with it created the original land-grant institutions in the country. The act decreed that in exchange for free federal land, the designated universities would educate communities in the areas of agriculture, military, and the mechanical arts (Brunner, 1966). Today each of the 50 states, the District of Columbia, and U.S. territories host land-grant institutions, totaling 187 public and land-grant universities. Land-grant institutions historically educated local farmers in best practice farming techniques and are expected to continue to be the nexus of agriculture research education of the future (APLU, 2012). Colleges of agriculture within land-grant colleges are well-positioned to "respond to complex issues, such as…preserving the security and safety of our food supply, protecting the environment and using natural resources efficiently" (National Research Council, 2009). In time, universities have expanded their agriculture curricula to include farming methods deemed "sustainable." An agreed upon definition of sustainable farming has endured much debate in the literature. Sustainable and organic agriculture have, for better or worse, been used interchangeably (Rigby, 2001). For the purpose of this paper, however, sustainable agriculture will draw from the United States Department of Agriculture definition:

> An integrated system of plant and animal production having a site-specific application that will over the long-term: satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agriculture economy depends; make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole (USDA, 2012).

Climate change, food safety concerns, rising input costs, agricultural pollution, and a host of other factors, have spurred an interest in more sustainable approaches to agricultural ecosystem management (National Research Council, 2010). Among these approaches are conservation tillage, winter cover crops, and use of perennial legumes (Jordan, 1998). However, small-scale farmers may not know how to carry out these management techniques for two main reasons: 1) lack of access to latest sustainable agriculture information; and 2) costs associated with attending in-person training.

In 2012, the USDA will conduct a new Census of Agriculture. For now, according to 2007 numbers, the most recent year data are available, most farmers in the United States run small-scale operations. In 2007 (USDA), small farms, classified as those with $249,999 or less per year in sales, made up 91 percent of all farms in the country. With the increasing presence of the Internet on farms, distance learning is accessible to farmers more now than in the past. In 2011 (USDA), the percentage of U.S. farms with Internet access was 62 percent. Online video can serve as a tool to more efficiently and effectively teach farmers about sustainable agriculture practices.

Significant advances in video recording and sharing technology allow growers who have an Internet connection via their smartphone, tablet device or computer to learn sustainable farming techniques without sacrificing the time, money, and resources required by attending on-site training.

The possibility of forging new working relationships between the communication departments, agriculture schools, and local farmers, as this research purports, holds much promise. Such a project envisions high-quality, organized, coherent video instruction modules accompanying the already rich database of agriculture research and knowledge at land-grant institutions.

CHAPTER 2

LITERATURE REVIEW

Land-grant institutions are expected to be the nexus of agriculture knowledge in the network of educators, researchers, farmers, and agencies. Efficiently and effectively teaching sustainable agricultural skills will become only more important in the coming years as the world population continues its ascent. Video may be the best format for teaching and sharing for the current generation of farmers with Internet access.

General Review of Video In Agriculture Instruction

For some time, education leaders have called for renovating the way information is taught and shared. Ramaley writes, "We must rethink yet again what learning means, who our students are … and how to support the continuous learning that modern society demands" (p. 64, 2005). While land-grant institutions often employ cutting-edge, well-studied agricultural techniques, a review of the literature suggests that agriculture college instructors and extension office staff are reluctant to embrace video learning. This paper supports the idea that agriculture schools at land-grant institutions do not need to make videos by themselves. Instead the departments can form partnerships with communication specialists on campus to create the videos. A better relationship between those two groups could facilitate some of the best distance learning for small farmers and growers.

Research has shown that video instruction can be beneficial as an education and extension tool among farmers (Van Mele, 2006). Video instruction provides the small grower with valuable and science-driven small farming methods. At the same time, there is a need to provide farmers with knowledge that is pertinent to them. At least one study has shown that "the more the underlying scientific principles presented in the video resonate with what farmers know and do, the more video becomes useful as a stand-alone method" (Van Mele, 2006, pp. 140-141). The international Food and Agriculture Organization (FAO) has used video extensively for training programs, especially in rural areas. The ability to capture information and instantly replay it to check for accuracy has meant that the FAO prefers the medium above others (Coldevin, 2001). Videos made with professional video personnel—such as those found in the communications departments at land-grant institutions—that rely on the expertise of local farmers can be a success (Van Mele, 2010). Sharing information via videos, rather than static photos or webinars, is much more effective where in-person training is not available. Video is a low-cost alternative to in-person conferences or workshops. Also, since video is associated with entertainment, it usually increases the learner's alertness and ability to remain engaged in the material (David and Asamoah, 2011). Video adds to any current methodology already in use for sharing knowledge on land-grant institution or extension websites (Bentley, et. al., 2003).

Use of Video Instruction At Selected Land-grant Institutions

Land-grant institutions were subjectively selected based in part on geographic location. They were also chosen because they could be expected to have high-end use of video and could serve as mini case studies. In order to know if instructional videos are included on the agricultural outreach or extension sections of these universities' websites, a general keyword search was conducted using the general search engine Google. The university name combined with the terms "agriculture" and "video" were entered into the search field. Three examples of national-level organizations using video for instruction were found via a similar general keyword search. This brief review was conducted to assess the current state of video use in 13 land-grant institutions. A table is shown below, but more detailed descriptions are provided in the section: Description of Current Agriculture Instruction Videos.

Some of the institutions chose to showcase their videos via the use of Apple's "iTunes U" service, also known as iTunes University. Others used the more widely known YouTube online video sharing website. Other colleges and at least one of the organizations embedded the video directly into their website so that the viewer did not need to leave the page. An evaluation of the best method of presentation is beyond the scope of this paper, but would fit in well with this research. In the table below, the term "webinar" denotes the use of slides of information, but no moving images, or video, as part of the module.

Table 1 - Survey of instructional video modules at selected land-grant institutions

Name	***Module Type***	***Brief assessment***
University of California System	Webinar	Could be helpful but needs more work. Lacks organization and modules are not coherent.
Iowa State University	Webinar	Pixelated, poor quality. Audio fades in and out and could be improved.
University of Kentucky	Some video	Could be an excellent example with more work. This may potentially serve as a role model for future programs.
Michigan State University	Some video	Excellent information, but none of the videos relate to each other.
Rutgers	Some video	The topics vary from news releases of research to personalized instructions, so no uniformity.
North Carolina State	Some video	Has a great potential for video instruction and vast array of information, but will need more work.
Cornell University	Some video	Wealth of printed information, but no local videos. There is a lot of potential on the site.
Texas A&M University	Some video	Not well organized, mostly in the form of webinars. However, a wide network and pleasing visuals that offer hope.
University of Vermont	Webinar only	The webinars cover a variety of topics, but nothing is covered in great depth.

Video As An Effective Teaching Tool

Part of the solution of how to most efficiently and effectively teach farmers about sustainable agriculture relies on video communication. In at least one classroom experiment, creating a video among assigned groups resulted in participants retaining knowledge better than a control group who learned without video. The task of creating videos also facilitated strong interpersonal bonds in order to complete the project (Jensen, 2012). Significant advances in video recording and sharing technology allow growers who have an Internet connection via their smartphone, tablet device or computer to learn sustainable farming techniques without sacrificing the time, money, and resources required by attending on-site training. Previous research has shown that video instruction can be beneficial as an education and extension tool among farmers (Van Mele, 2006). Video instruction provides the small grower with valuable and science-driven small farming methods. Any grower with access to Internet or a mobile wireless device can access a video. At least one study has shown that "the more the underlying scientific principles presented in the video resonate with what farmers know and do. Previous research has also shown that videos made with a professional video services, but relying on the expertise of local farmers can be a success and shared across different cultures (Van Mele, 2010).

One question has arisen during past agriculture instructional video projects is: Would a farmer who farms in one part of the world be receptive to a video filmed in quite a different location? Would a farmer who works in the northeastern U.S. be receptive to a video filmed in the southeastern states?

Researchers who have worked in farmer-oriented videos and film-making have found that different geographic locations, and even different national cultures, do not have a negative impact on farmers being able to understand and learn material from videos (Bentley and Van Mele, 2011).

Sharing information via videos, rather than static photos or webinars, is much more effective where in-person training is not available, due to time and resource restraints. Video adds to any current methodology already in use for sharing knowledge on well-developed, extension land-grant institution agriculture or extension website (Bentley, et. al., 2003). Video is a low-cost alternative to in-person conferences or workshops. Also, since video is associated with entertainment, it usually increases the learner's alertness and ability to remain engaged in the material (David and Asamoah, 2011).

A study conducted by Snelson (2011) found that agriculture, agricultural operations, and related sciences had significant representation in a review of the use of YouTube for instructional learning. Zhang et. al. found that video alone is not always an effective teaching tool and that interactive video that provides opportunities to test what has been learned "may lead to better learning outcomes and higher learner satisfaction" (2006, p. 24).

Description of Current Agriculture Instruction Videos

University of California System

The tagline from the iTunes channel is that the UC Agriculture and Natural Resources (UC TV) delivers "documentaries, faculty lectures, cutting-edge research symposiums… from each of the ten University of California campuses," according to the iTunes U page of UC TV. However, none of the 29 videos are geared specifically to teach farmers about sustainable agriculture. They cover topics such as acorns, grassland changes, and the velocity of climate change, to name a few examples. Two videos briefly cover pesticide use as it relates to organic agriculture, but the primary audience for the videos, as it indicates, are master gardeners. The information is organized in the easy-to-understand format of the iTunes U program, but, unfortunately, is not helpful in the area of agricultural outreach and extension.

http://itunes.apple.com/us/itunes-u/uc-agriculture-natural-resources/id382095232

Iowa State University

The Iowa State University Brenton Center for Agricultural Instruction and Technology Transfer could be a great example of how to meld knowledge of sustainable agriculture and video instruction. For example, the iTunes U website of Iowa State has a specific channel entitled "Organic Agriculture Theory and Practice." The description advertises the channel as a way to understand the "historical origins and ecological theories underpinning the practices involved in organic agriculture." However, the format of this class, in addition to the poor, pixelated transfer of the videos, is one that, again, lacks any instruction directly to farmers.

No other videos on the Iowa State iTunes U appeared to cover organic agriculture or farming-related techniques.

http://itunes.apple.com/institution/iowa-state-university/id436828741

University of Kentucky

This may be the best example so far that demonstrates how a professional communication service at a land-grant university can help make videos. The college has a website called UK AG Video. One of the videos actually showcases the different cameras available to use in the field. And in it, the agricultural communication experts explain how to create a good film, which is one of the ideas posited in this paper.

The site has a section dedicated purely to "instructional" videos, with a total of six videos present. Overall, the quality of videos is excellent, with clear audio and lots of information. The videos are standalone and do not relate to each other in terms of a topic, which is what this paper proposes to be done. In addition, the videos do not cover sustainable agriculture techniques in an in-depth way. For example, a video entitled "Grazing Alfalfa," provided a history of this grazing grass gives anecdotal advice, but does not give step-by-step instructions on how to plant it.

https://citc.ca.uky.edu/video/2010/08/26/grazing-alfalfa/

Michigan State University

The MSU program contains a website called the MSU "Organic Farming Exchange," which contains very important information such as soil building, organic certification and crop production. The amount of information is excellent, however, all of the presentations are in PDF format. http://www.michiganorganic.msu.edu/

Rutgers, The State University of New Jersey

Rutgers has a website dedicated to the New Jersey Agricultural Experiment Station located in New Brunswick. The organization maintains a YouTube video channel, which contains a mix of news reports, public information announcements, and some instructional videos. The six instructional-type videos cover soil testing, nutrient management on small farms and centralized composting. This site showcases perhaps one of the best examples of how instructional videos can be incorporated into extension offices. http://njaes.rutgers.edu/ag/

Cornell University

On the university's College of Agriculture and Life Sciences website network is a website entitled "Worldwide Conservation Agriculture Knowledge Resources." This website contains a collection of videos from different organizations on various topics of agriculture. As has been mentioned before, the website contains a wealth of information: detailed definitions of farming terms for the beginners, an overview of equipment needed, frequently asked questions and links to additional information. But the video qualities and structure are uneven and vary widely. So while some of the videos are good, there is again a lack of organization, chronological, step-by-step instructions on sustainable farming techniques. Some of the videos are contributed by eOrganic, which is discussed later in the paper. http://conservationagriculture.mannlib.cornell.edu/media/videos.html

North Carolina State University

The university maintains, along with North Carolina A&T State University, a cooperative extension website, called "Growing Small Farms," with a collection of websites created both by the state's extension service, as well as by culling resources from an array of national and state organizations, but it appears that all of the information is web-based and text and still photos only.

http://www.ces.ncsu.edu/chatham/ag/SustAg/index.html

Texas A&M University

On the Texas AgriLife Extension Service website is a link to a YouTube channel entitled "Texas AgriLife Video." Almost 70 videos are featured on the website, ranging from in-house presentations and speakers to videos covering the latest videos. There are some instructional videos here and there, such as descriptions of plant diseases, but nothing that would allow a small vegetable farmer to learn and master techniques of sustainable farming. http://agrilifeextension.tamu.edu/

University of Florida

The University of Florida and Florida A&M University both administer the cooperative extension service located in the Institute of Food and Agriculture Sciences and the website is called "Solutions for Your Life." The highly organized "Organic Production" portion of the website provides sections that include how to use organic fertilization, pest management, and cover crops. But no videos could be found in this section or on separate dedicated site called "Center for Organic Agriculture."

http://solutionsforyourlife.ufl.edu/

The University of Vermont

The UVM Center for Sustainable Agriculture offers the sale of DVD videos that do not appear to be accessible via purchase and downloadable from the web, but can be purchased individually for $15 by submitting an order form. The topics of the videos include "Farmers and their Weed Control," "Vegetable Farmers and their Sustainable Tillage Practices," and "Farmers and their Innovative Cover Cropping Techniques." All of these videos sound very pertinent to helping small vegetable growers learn techniques of sustainable farming, but the lack of access to them is problematic. However, of all of the universities surveyed, these DVD-only videos seem to be organized according to modules, last long enough for farmers to learn from them, and cover a wide variety of topics. http://www.uvm.edu/vtvegandberry/

National Center for Appropriate Technology

A quick look at national organizations, including National Center for Appropriate Technology (NCAT), reveal that some videos are available online, and some contain instructional information. However, the existence of a step-by-step series of modules explaining various aspects of sustainable agriculture are not described. ATTRA, National Sustainable Agriculture Information Service, has been hosting webinars for the past two years, according to the video about no-till conservation. The video, sponsored in part by the National Resource Conservation Service, is called "Innovative No-Till: Using Multi-Species Cover Crops to Improve Soil Health." But the video is really a webinar, and so while it has dynamic audio of different speakers talking about the subject, the one-hour-long "video," does not have any moving images, which are important for learning. https://attra.ncat.org/

eOrganic

One particularly interesting hybrid of a website, which appears to be web-based, is called eOrganic. eOrganic is a YouTube channel in partnership with eXtension.org. By far a site with the largest collection of videos—228 total—but they, too, are often webinars with very little video components. And the videos are not organized according to any overall umbrella topics, such as soil health, cover tops, and tillage. http://www.youtube.com/user/eOrganic

Rodale Farm Institute

Finally, the topic of sustainable video production would not be complete without a mention of the Rodale Farm Institute, which is seen as a powerhouse of sustainable agriculture information. It is a nonprofit that has contributed research and long-term studies to the field of sustainable agriculture for six decades. It is perhaps best known for the Farming Systems Trial, which is "the longest-running side-by-side U.S. study comparing conventional chemical agriculture with organic methods," according to a description on their website. But while the information is thorough, no videos seem to be embedded into the website itself. The organization does maintain a YouTube video channel. http://www.youtube.com/rodaleinstitute

In summary, all of the above land-grant institutions and samples of national organizations show great promise with video instruction for sustainable farming techniques, but thus far, none of the videos are of advanced quality and organized in coherent ways.

CHAPTER 3

DESCRIPTION OF SETTING

Geographic Location

The video created as part of this research project was filmed at the Agroecology Laboratory of the University of Georgia's Odum School of Ecology. The lab is located at Spring Valley EcoFarms, which is a five-minute drive from the university's main campus, in Athens, Georgia. Situated in the state's Piedmont region, the 100-acre farm mirrors the challenges that farmers across the region, and the country, face: soil leached of valuable nutrients from exploitative farming—in this case, cotton—periodic droughts and increasing costs of petroleum fuel and other inputs.

It is important to know that land in the Piedmont region of Georgia has been leached of nutrients due to decades of over-farming without allowing time for the soil organic matter to rebuild. The video that accompanies this thesis is to show farmers how to rebuild this region's nutrient starved soil, which can then support cover crops and cash crops and improve the chances of success on a farm.

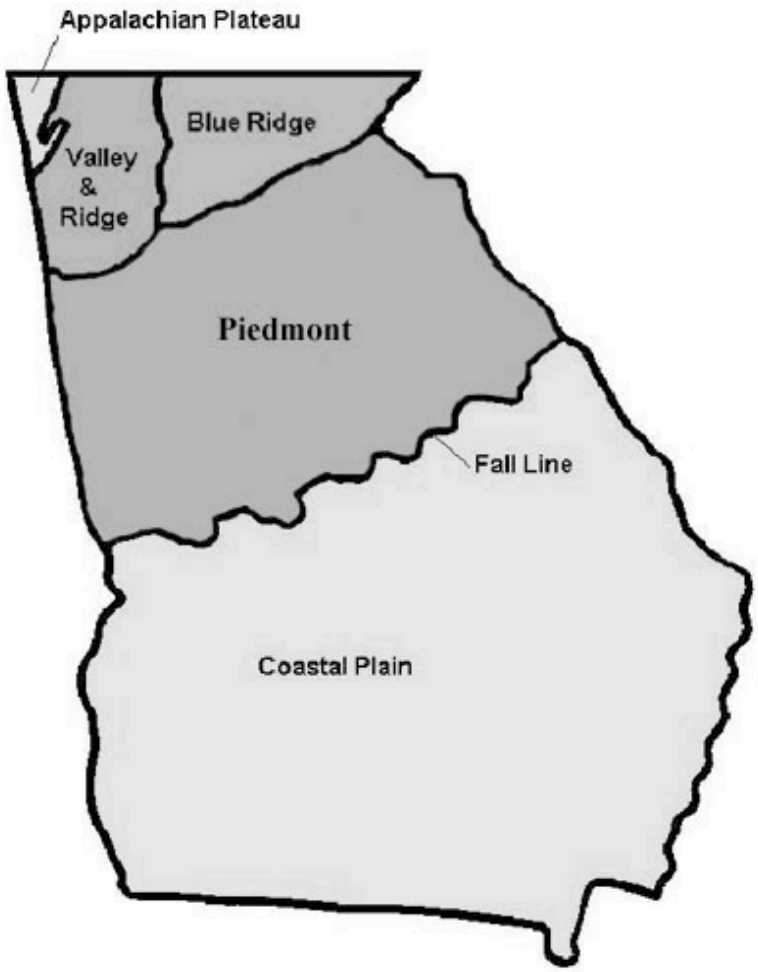

Figure 1 Piedmont Region in Georgia Farmland

Forming A Cross-Disciplinary Partnership

This project captured on video the techniques of conservation tillage for the small-scale organic farmer as a proof-of-concept demonstration of the role that videos can play in promoting sustainable agriculture. This is something that is not being done enough at land-grant universities, most of which have plenty of technology and resources on campus to produce and distribute a professional video such as the one created as part of this research.

The University of Georgia is one of the original land-grant institutions founded by the Morrill Act of 1862. Like many such universities, the University of Georgia boasts strong agriculture-related and communications programs on campus. A professional communicator, Katie Smith, who studied broadcast journalism degree at the Grady College of Journalism and Mass Communication at the University of Georgia, was enlisted to guide the creation of a video instructional module for this project.

The single module, entitled "Conservation Tillage for the Small Scale Organic Farmer," was produced through a unique partnership which will be described in greater detail in the following section. The ability to borrow broadcast-quality video and audio equipment from the university's communications department for filming was easily arranged and free of charge. Care was taken to schedule filming sessions at the farm on weekends or during non-business hours to avoid conflicts with the equipment on loan. While the film was made using a research farm associated with the Odum School of Ecology, a similar partnership could equally have been forged with the College of Agricultural and Environmental Services, which houses the university's extension office.

CHAPTER 4

METHODOLOGY

One of the main goals of the video was to show how to improve the long-term sustainability of the farm through restoration of degraded soils while eliminating external fertilizer inputs without sacrificing crop yield.

How To Create An Instructional Video Module

Before beginning work on a video, the farmers, researchers, and extension staff planning the module must consider how they view their audience and which approach is considered the best. Does the demonstrating farmer or researcher have preconceived notions of potential viewers of the video? Do producers of the video expect a certain baseline of knowledge from their audience? When formulating assessments, what are the researchers aiming for? Will the team assume that farmers already want to know about sustainable agriculture, or will each video be conducted as if a grower has happened upon the website by accident?

If videos are uncreative, boring, and patronizing to the farmer, the result will be quite different than if videos treat farmers as knowledgeable lifelong learners who appreciate creativity in presentation. This is where the webinars mentioned earlier fail to help push forward learning.

Before even starting filming, the videographers and agriculture researchers need to map out the learning objectives and plan what will be included in filming.

In the filming parlance, this is known as creating “story boards,” or images accompanied with text describing each scene before the camera is turned on. The learning objectives of this project video included: 1) identify the equipment necessary for the task; 2) formulate a rough timeline of when tasks should occur; 3) demonstrate an understanding of how to complete a task; 4) apply the knowledge directly to use in their fields; and 5) successfully communicate advantages and possible disadvantages of using a particular sustainable farming technique.

Filming of the module began in August 2009 and concluded in September 2010. Two areas were chosen on an overall 3-acre plot to be featured in the video. One plot was already dedicated for experimental use. The other plot lay fallow at the start of video production and so it was useful to use this blank slate to illustrate the different aspects of conservation tillage. The video is organized around the four seasons of autumn, winter, spring, and summer. For each of the seasons, the required steps for conservation tillage was described.

A full year of filming was required in order for the viewer to see the different processes of ecosystem management practices. An important aspect of creating successful videos is that a farmer, who could also be an academic researcher, as in the case of this project, needs to be the primary subject and focus of the video. Providing technical information from the perspective of a farmer increases the chance that other fellow farmers will be more open to the use of video technology online and retain the information (David and Asamoah, 2011). It should be noted that rarely will a single video module require an entire year of filming. Most modules are contained within one season.

During the year of filming, the videographer visited Spring Valley EcoFarms to record the different stages of conservation tillage management as the tasks changed with the seasons. The opening scene of the film occurs in the early autumn. The farmer is clearing a plot of land and planting a cover crop on the open soil. The primary piece of equipment featured during the autumn season is a rototiller. Viewers are educated about the pros and cons of the use of a rototiller. For example, churning the soil with the motion of a rototiller can disturb and prevent the creation of soil organic matter. In the same season, a broadcast seeding of the cover crops rye and clover are filmed. The next scene occurs in the winter. The video shows the progress of the cover crops contrasted with land that has been exposed to the elements and has no cover crop. The land without a cover crop is eroded. With this simple contrast, the video clearly shows how cover crops effectively hold in place the top layer of soil and therefore preserve soil structure and nutrients. The instructional module highlights the fact that much of the soil in Georgia's Piedmont region, as well as in the former cotton-growing states in general, have so little soil organic matter. The final video is 7 minutes in length. The videographer and researcher agreed that a video longer in length might allow for attention spans to wander.

The next major filming session occurred in the spring. By that time, the clover was in bloom and the rye had grown almost four feet high. During this segment, the farmer showed how to roll down the cover crop to form a weed barrier over the length of the farm bed. The videographer gathered many different viewpoints with the camera, including close-up images of what the rye looks like after it has been crimped. The next scene takes place in the summer.

The videographer filmed the no-till and strip till methods of planting the summer crops. After the summer crops were harvested, the process can begin anew.

Table 2 - Key Action Points for Filming

	Autumn	*Winter*	*Spring*	*Summer*
Task	Prepare fields	Monitor erosion	Plant seeds	Roller-crimp
Film point	Wide angle	Close-up	Wide and close	Wide and close
Key idea	Rototilling can damage soil organic matter	Cover crops prevent soil erosion	Important to time the planting	No need to tear up cover crops for planting

The equipment necessary to produce a professional video module include a broadcast-quality camera, tripod, and wireless microphones. These tools are crucial for a successful video because they allow for two qualities that must be found in any good video: 1) a steady camera shot, i.e., no movement besides the action happening within the shot; and 2) clear, crisp audio, which will keep the viewer more engaged than video quality. Below is a very rudimentary listing of available video equipment. The camera used in this project is the mid-range Panasonic DVX100.

Table 3 - Video camera equipment arranged by price

Camera Type	***Film Format***	***Price Range***	***Brief description***
Canon VIXIA HF M500	Compact flash card	$500-700	Excellent starter camera
Panasonic DVX100	Mini cassettes or compact flash	$1900-2100	Broadcast-quality film
Canon XF300	Compact flash	$6000-7000	Top-of-the-line quality, ease of storing

It should be noted that a more expensive camera does not denote better quality of videos.

Indeed, lower-cost digital video cameras available on the current market have great quality. It is advisable, if the farm or teaching lab is starting out without the help of professional broadcast videographers at the university, to begin with a cheaper camera model. As time goes on and the modules begin to show success, then it would be appropriate to invest in even better equipment.

The additional equipment needed for filming, include, but are not limited to, a tripod, audio recording equipment, lighting, and a ladder for use in shooting wide, sweeping shots. This remaining equipment can be purchased on an as-needed basis if the communications department cannot offer the equipment. However, if money should be spent anywhere, then special care should be given to the purchase of audio equipment. Without good audio, the listener and viewer will not be able to comprehend all of the sustainable agriculture lesson and the effort will be wasted. Later, the role of each person in producing the video module will be discussed. For now, it is enough to say that the worker in charge of audio, which may also be the videographer, needs to remain alert to possible disturbances such as wind noise, during the filming of the project. Audio is much more difficult to "clean up" in editing software compared with video. No filming should be done without the tripod, unless it is physically impossible to film a portion of the lesson with one. Some examples include walking behind the roller crimper to get close-up shots and following a planter as it drops vegetable seedlings into prepared holes. These things should be kept in mind—the importance of a steady video and high-quality audio.

Planning and Mapping the Module

Van Mele (2006) discusses the importance of showing intimate detail associated with an aspect of farming, while also constantly showing the farmer the larger picture, and how the detail fits into it. He has created a model called "Zooming In/Zooming Out" to describe this approach to creating an instructional video. The primary focus of such a method to use local context. Choose a topic that is relevant to farmers in the region. Use local farms and farmers—as well as other actors, if need be—in the films (Van Mele, 2006).

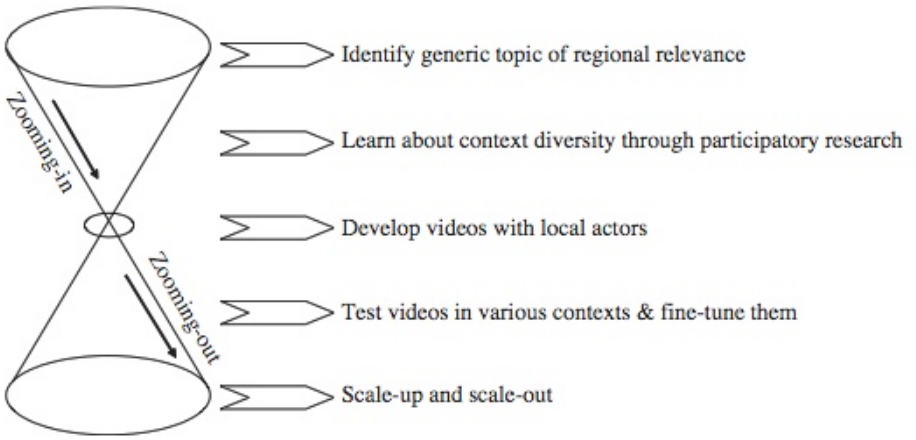

Figure 2 – Zooming In, Zooming Out Model

In all cases, videos should be tested with a local audience first to make any adjustments that will allow the material to be better understood. With the video made for this project, we used all local actors.

Role of People Involved In the Project

At least one advantage of cross-disciplinary work is that each group member needs only his or her skill set and an open mind to complete a project. An agriculture researcher is not expected to know how to frame a good shot with a video camera. The videographer may not understand the nuances of why crimson clover is a preferred cover crop during the winter season. A farmer does not need to speak the specialized language of either group, but rather is expected only to show off his or her know-how. At minimum, a video can be produced with two people: the videographer and researcher/farmer. However, there are additional crucial roles that if fulfilled by additional people will make the process go more smoothly and take less time overall.

Table 3 - Role of Each Person During Filming

	Videographer	**Sound person**	**Interviewer**	**Farmer**
Key responsibilities	-Ensure good footage -Keep on time	-Constantly check audio -Review script	-Create script -Make sure ideas are conveyed clearly	-Ease of speaking -Convey clearly
Frequency of appearance	-Each session	-Each session	-May be optional on some days	-Each session that requires speaking part
Skills required	-Ideally a steady hand and an eye for good visuals	-Patience and ability to stand still for long periods of time	-Clear voice and acumen for understanding how to communicate	-Strong voice and ability to speak clearly and concisely

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Overall, videos on land-grant institution websites were mostly used as catalysts for promotion or featuring a single event related to agriculture. At least one consistent shortcoming of videos found online, and including the module associated with this project, is a lack of interactivity with the viewer.

The next challenge in constructing useful video modules will be to show farmers the video module and record feedback on how the video could be improved or changed. The presentation of the video would work best if it could be presented as a series of video modules and organized according to levels, including novice, intermediate and advanced farming skills. At the conclusion of each module, the farmer would be asked questions to answer in order to see how much knowledge was retained from short-term memory. The potential to use these modules as part of a certificate training program is significant. For example, the video modules could be linked to a nearby continuing education program, in this case, the University of Georgia Center for Continuing Education, or perhaps with the extension office itself. In order to achieve complete certification, the farmer would have to demonstrate that she/he completed each module on his/her area of land—which could range from a raised bed garden to several acres.

This could be accomplished through submitting digital photographs or even video to the certification website and also by scheduling visits, within a reasonable distance, for the director of the certification to visit the farm and observe the effects of the video modules.

Implications of Work

Conservation tillage is just one aspect of many potential lessons for sustainable farming. Others could cover aspects of the conservation tillage in greater depth, such as planting cover crops and how to know which cover crops to plant. Other topics could include integrated pest management (IPM) and crop rotation. It is possible that farmers could be offered a discount for getting certified naturally grown if they have completed the module series. Each module could be focused around a theme. The first theme would be conservation tillage. Each module would contain 10 videos lasting seven minutes or less in order to keep the attention of the viewer.

In today's world, organizations and companies are connected, at least superficially, more than ever with the public through social media outlets such as Twitter and Facebook. Video is also a way of increasing interaction. Interaction in all forms contributes on some level to relationship-building, and if the public is able to see and recreate cutting-edge techniques of sustainable farming, then it may hold the local land-grant institution in higher esteem.

Future Research

One of the shortcomings of this research is that it does not include a component that tracks and quantifies the number of times the conservation tillage video is viewed, who is viewing it, and what, if any, opinions the viewer may have. This type of feedback would be necessary in future video module and fits in with Van Mele's method of relying

on “screenings” of instructional farm videos for local people before releasing the film to the general public (2006). Additionally, in the future, video modules could be accompanied with written materials that could be downloaded from the site. Video serves as a good way to initiate interest and give sweeping instructions, but details can be further elaborated in printed text and documents.

One of the more ambitious goals of this collaborative project is to create, around the video modules, a community online that further learns from one another. For example, via an application on the website, farmers could upload photographs and even live video taken with a digital camera or smartphone of their own farms. This way, agriculture researchers could have anecdotal evidence of which modules are in greater demand and which type of techniques need to be added to the database.

Conclusions

This research shows that videos can play a major role in facilitating sustainable farming education. Despite the immense promise and popularity of video, agriculture education and extension programs at land-grant universities use it too infrequently to be effective. The most successful videos will be those of high image quality due to a steady shot with a tripod and good lighting, as well as clear audio. Professional videos are generally difficult to produce, but the process becomes much easier with an expert at the helm. Before starting a video module, researchers and videographers need to outline expected learning objectives and discuss the best ways to accomplish those goals. With the possibility of allowing viewer-produced photo and video submission, researchers will be able to keep producing content that is relevant and in demand. More feedback means fewer videos that go unwatched.

These new channels of interaction between farmers, researchers, and videographers can only improve the relevance and usefulness of each group to the next.

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APPENDICES

Appendix A – Map of Land-grant Institutions in the U.S.

Source: *Colleges of Agriculture at the Land Grant Universities,* National Academy Press (1995)

Appendix B – Link to Conservation Tillage Video Module

http://www.youtube.com/watch?feature=player_embedded&v=SRQxczVh8Gk