

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

**Agroforestry Education:
The Status and Progress of Agroforestry Courses in the U.S.**

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Abstract

Many agroforestry leaders today believe that an increase in agroforestry coursework, certifications, and institutional degree programs would help agroforestry professionals gain the proper education and training needed to better promote agroforestry implementation (Gold, 2015; USDA, 2011). In 1990, thirty-nine SAF forestry accredited institutions were surveyed throughout North America. The survey revealed that at least fourteen schools were offering a course in agroforestry (Warren & Bentley, 1990). In order to determine the current status of agroforestry course offerings today, we sent an electronic survey to one hundred and twenty-seven institutions throughout the U.S. Focusing on land-grant and SAF forestry accredited institutions, the survey findings indicate growth in the number of institutions that are offering agroforestry coursework today. In addition, the number of temperate agroforestry course offerings has increased significantly and may now exceed tropical agroforestry course offerings by institutions in the U.S. The survey results also indicate a thorough adoption of interdisciplinary teaching methods by agroforestry educators. Nonetheless, there is still considerable room for improvement. While most institutions that are currently providing agroforestry courses would like to continue offering them, the number of institutions that have discontinued their offerings since the prior 1988 survey is concerning. In addition, while SAF and 1862 land grant institutions are the strongest proponents of agroforestry, most institutions still do not provide agroforestry courses and are not likely to offer them in the near future. Lack of resources, lack of student interest, and lack of faculty expertise were often cited to this end. A much needed contribution to agroforestry education, this project provides a clearer picture of institutional agroforestry offerings today

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Agroforestry Education: The Status and Progress of Agroforestry Courses in the U.S.

Chapter 1 Introduction

Agroforestry is a sustainable agriculture practice that uses trees in conjunction with raising other agricultural products in order to enhance one's agricultural production (National Agroforestry Center, 2008). Some of the benefits may include; erosion control; nitrogen fixation and sequestration; carbon sequestration; water retention; soil improvement; sustainability; and the potential for additional income (Smith, Pearce, & Wolfe, 2012). Resonating primarily as an affordable alternative to more popular land intensive, environmentally degrading, and mechanically driven approaches to agriculture, agroforestry has found most of its support in areas with poverty stricken farmers with limited means (Antagana, Khasa, Chang & Degrande, 2014).

The benefits of agroforestry are well recognized by agriculturalists and educators alike, but agroforestry practices are still drastically underutilized in agriculture (Smith, et al., 2012). Though the reasons are many, lack of agroforestry education is central to this problem (Graves, et al., 2009; Workman, Bannister, & Nair, 2003; Strong & Jacobson, 2006), despite a significant increase in the number of college educated farmers within the U.S. (O'Donoghue et al., 2011). Many agroforestry leaders advocate for providing coursework, certifications, and degrees in hopes of strengthening agroforestry education at the institutional level. In addition, it has been suggested that institutional progress in terms of agroforestry education offerings should be cataloged and updated as often as possible (Lassoie, 1990).

In 1988, thirty-nine Society of American Foresters (SAF) accredited institutions were surveyed throughout the U.S. and Canada in order to assess the status of agroforestry education at that time. The survey revealed that fourteen schools were offering a course in agroforestry. While most of the courses were established by faculty members that were conducting agroforestry research, several courses were likely in response to an increase in student interest, especially from those that had desires to serve internationally in tropical areas. Several organizations including: the U.S. Peace Corps and Cooperative for American Relief Everywhere (CARE), to name a few, were also recruiting students and providing training in agroforestry principles and techniques (Warren & Bentley, 1990).

Similar to Warren & Bentley (1990), the purpose of this project is to determine the extent that agroforestry coursework is being offered in the U.S. today. In order to gain an understanding of the current status of agroforestry education, this study focuses on SAF accredited institutions and land-grant institutions alike. Several factors were analyzed including: the number of courses offered, degrees offered, past offerings, and plans for future offerings. In addition, student population, institution location, institutional department, and instructional method were recorded. Whether offerings pertain to tropical or temperate agroforestry was also ascertained in this study and a series of qualitative questions were incorporated to gain insight on respondent sentiment regarding the practice of agroforestry and the adequacy of their respective institution's offerings.

Findings demonstrate that the number of agroforestry course offerings has increased, and there is high regard for agroforestry education in general. Most agroforestry courses are highly interdisciplinary and provided by institutions that have both 1862 land-grant status and SAF accreditation. In addition, coursework is most frequently provided by the forestry department of

an institution, and there are now more courses devoted to temperate agroforestry rather than tropical agroforestry. Despite the growth in course offerings, several institutions have also withdrawn their offerings in recent years. Institution size and location does not seem to be a factor when it comes to providing agroforestry courses, but lack of faculty expertise, resources, and student interest were frequently cited as reasons for withdrawn coursework and lack of offerings.

Chapter 2

Literature Review

Agroforestry Education History

Sustainable agriculture has grown in popularity since the 1970s. During that decade agroforestry was identified as a promising, sustainable land use system with many benefits for farmers (Bene & Cote, 1977). Rapid land development, forest destruction, and the deterioration of food supplies were significant factors that led to an increased support for agroforestry (McNamara, 1973; Nair, 1993; Rudebjer et al., 2001; York, 1990). Community based organizations, agroforestry centers, universities and Cooperative Extension services took the lead and have been the primary advocates supporting the adoption of agroforestry in the U.S. (Jacobson & Kar, 2013). Since then there have been numerous agroforestry conferences, technical training, and sponsored research, which have provided many opportunities to network and share ideas on how to promote the adoption of agroforestry around the world.

In 1975, the International Development Research Center of Canada (IDRC) assessed the then-current condition of agroforestry education and training around the world. Several initiatives were set forth by IDRC including: identifying gaps in agroforestry research and training, recommending institutional structures that could carry out agroforestry training

expeditiously, and developing a plan for soliciting international support. Findings indicated that, despite a growing appreciation for agroforestry, there was very little research being conducted around the world. As a result, the IDRC project report recommended the development of an international organization that could collaborate on a world-wide platform to further the development of agroforestry research. In 1977, the International Council for Research in Agroforestry (ICRAF), (now the World Agroforestry Center) was assembled to begin institutionalizing agroforestry (Nair, 1993). International training courses, workshops, and various conferences were held, which provided ground work to discuss the current status of agroforestry education and to develop an action plan for the future (Zulberti, 1987). During that time, agroforestry education and training could only be sought in a non-degree format (Zulberti, 1990), and only one or two agroforestry courses were in existence around the world (Warren & Bentley, 1990).

Temperate Agroforestry Education

Realizing that many scientists with agroforestry expertise were being trained informally in the U.S., Gold & Hanover (1987) suggested that temperate agroforestry education would bridge the gap between scientists in developing tropical countries and those in temperate industrialized countries. In the decades that followed, temperate agroforestry research and development ensued and made progress that was comparable to that which had been made in tropical regions. For example, the University of Nebraska developed and offered windbreak short courses in the late 1980s. In the early 1990s, The University of Missouri began offering day courses, and also developed an agroforestry training manual in 1998, which has been updated periodically from 2001 to 2015 (Gold, 2015). The USDA (2011) recently published a strategic framework for advancing agroforestry practices. Among the many objectives and

strategies, one is to help natural resource professionals gain proper education and training, so that they can better serve farmers and landowners and increase agroforestry implementation in temperate zones.

As the need for trained professionals increased, so did the demand for agroforestry courses (Gold 2007; Lassoie et al. 1994). In February 1994, the Association for Temperate Agroforestry (AFTA) published a report summarizing the findings from a national assessment, which served as a synthesis of five regional assessments that had been conducted throughout the U.S. The document examined the potential for agroforestry in the US, and made recommendations on how to advance agroforestry on a national level. Agroforestry course development and improvement was a general request among all five regions, at least one region specifically identified a need to offer/improve agroforestry college courses at the region's land grant universities (Merwin, 1997).

Current State of Agroforestry Education

Demand for agroforestry courses prompted the study by Warren & Bentley that cataloged the status of agroforestry courses in the late eighties. In addition to the SAF institutions located in the U.S., they also surveyed Canadian institutions. At that time fourteen SAF accredited institutions were offering a course in agroforestry (Warren & Bentley, 1990). Since then, it has been suggested that agroforestry course offerings be cataloged and updated as often as possible in order to monitor the progress of agroforestry at the institutional level (Lassoie, 1990; USDA, 2011). One such update was provided by the Centre for Studies in Agriculture, Law and the Environment (CSALE) in 2000. With a comprehensive listing of institutions that were currently teaching agroforestry courses, the article provided an overview of agroforestry education in Europe, Australia, Canada, and the U.S. It appears that nineteen U.S. institutions were providing

agroforestry courses during this time. Coursework in Warren & Bentley (1990) and CSALE (2000) was primarily provided by SAF institutions. Although not specifically mentioned, many of the institutions in Warren & Bentley (1990) and CSALE (2000) were also land-grant institutions, many of which incorporate interdisciplinary instruction method.

Interdisciplinary instruction synthesizes multiple disciplines, which leads to an integration of disciplinary insights (Haynes, 2002). Interdisciplinary instruction also poses inquiries and focuses on real-work problems. Many believe this enriches the overall educational experience and a student's lifelong learning habits, academic skills, and personal growth (Jones, 2010). In general, there are five different categories of interdisciplinary instruction method, which includes: problem-based instruction, synthetic or integrative skills and perspectives, thematic instruction, comparative insights, and team teaching (Jones, 2009). Many of these techniques are relied upon by land-grant institutions, which have been identified as logical facilities for carrying out agroforestry education (Zulberti, 1990).

Chapter 3

Methods

With one exception, this project encompasses all of the SAF accredited schools located within the U.S. that are mentioned in Warren & Bentley (1990) and all land grant schools located within the U.S. and its territories. The University of Michigan was included in Warren & Bentley (1990), therefore it was included in this project as well, but the institution is not a land grant institution, and is not currently SAF accredited.

The USDA's National Institute of Food and Agriculture (NIFA) provided a listing of land grant institutions for this purpose (USDA, 2014). In addition, the *Guide to Forestry and Natural Resource Programs*, which encompasses SAF accreditations through 2017, was utilized

to identify a current listing of SAF institutions beyond those identified in Warren & Bentley (1990).

Once an institution was identified using the resources mentioned above, additional internet searches were conducted via GoogleTM in order to ensure that the most logical representatives from these institutions were identified to take the survey. Professors that research and/or teach agroforestry were considered most ideal for this purpose. Search terms including “agroforestry” and “professor” were used in conjunction with the institution’s name. Internet searches were also conducted within the website of the corresponding institutions with relative agroforestry terms such as: “silvopasture,” “windbreaks,” “alley cropping,” “riparian buffers,” and “forest farming”.

Individuals that were selected were sent an introductory email that explained the purpose of the project. The survey included fourteen questions, sent to 127 institutions. Forty-three percent of the institutions completed the survey. Each email contained a weblink to the survey, which was generated with Qualtrics software. The email requested the individual to complete the survey, or forward the survey to a more qualified faculty member. Non-respondents received a follow up email one week after the initial request, and a third email was sent a week after the second request. In some cases, more qualified individuals were identified by the original survey recipients. When this occurred, the abovementioned contact process was conducted for the individuals noted by the original recipients, which included an initial introductory email and subsequent reminder emails when necessary.

The survey began by describing the purpose of the project to the respondents and the intention to collect institutional data. Respondents were assured that personal information and identities would not be collected. The initial question ascertained whether or not the

respondent's institution provides "agroforestry specific," courses. For the purpose of this project, respondents were informed that "agroforestry," and/or the term of an agroforestry component should be present in the course title, or course description, in order for the course to be deemed agroforestry specific. In addition, the following components of agroforestry were provided: alley cropping, windbreaks, silvopasture, riparian or upland forest buffers, and forest farming.

Survey questions were then determined by the respondent's reply to the initial question. If respondents indicated that their institution provides agroforestry specific course(s) they were asked a series of follow-up questions to draw out more details about their offerings. These respondents were prompted to indicate which institutional department provides the course(s), the quantity of courses, number of years offered, whether a degree program was in place, and whether their course(s) pertain to tropical or temperate agroforestry. After providing a description of interdisciplinary instruction method, they were also asked to indicate if their agroforestry course offerings are interdisciplinary. A different series of questions was issued if the respondent indicated that they do not offer agroforestry courses. Respondents were prompted to indicate whether past offerings were provided, and the reason(s) for discontinued offerings.

All respondents were asked to indicate whether agroforestry courses would be provided in the future. Finally, a Likert Scale was used to capture the respondent's opinions of agroforestry. On a scale from one to five where one equaled strongly agree and five equaled strongly disagree, respondents were asked to indicate the importance of agroforestry as it pertains to agriculture, and sustainable agriculture, and to provide their sentiment on the current status of their institution's agroforestry course offerings.

For those institutions that did not respond to the survey, additional measures were taken to assess whether they were offering agroforestry courses. At a minimum, the following internet searches were conducted. In conjunction with “agroforestry,” “silvopasture,” “windbreaks,” “alley cropping,” “riparian buffers,” and “forest farming,” supplemental search terms including: “sustainable agriculture,” “agriculture systems,” and “farming systems” were also utilized within the respective search engines of each non-respondent institutions’ website and course catalog. Confirmation was easily obtained in this manner for several non-respondent institutions that currently provide agroforestry courses.

Based on this search method it seemed highly unlikely that any of the remaining non-respondent institutions were offering agroforestry courses, however, a process for contacting the most logical of the remaining non-respondent institutions by phone was developed and implemented as well. All of the non-respondent institutions which held previous agroforestry course offerings were given highest priority and were contacted first. Since agroforestry is a combination of forestry and agriculture, all non-respondent land grant institutions with SAF accreditation received a phone call as well. Finally, a phone call was placed with many of the non-respondent institutions that, via internet search, appeared to promote and support agroforestry by any other means including extension, outreach, trainings, and partnerships.

During phone call follow-ups, efforts were made to speak with the most logical departmental representative or faculty member at each institution. In some cases, the department representative that answered the phone was able to confirm the status of their institution’s agroforestry course offerings, and in some cases, provide contact information for another more appropriate representative. On several occasions the person that answered the phone requested that the survey be sent to them directly, so that they could transfer it to the best candidate for this

purpose. When subsequent contact information was provided, a phone call was placed with, and/or an email containing the survey link was sent to the identified representative.

Chapter 4

Results

Twenty-seven institutions reported offering agroforestry courses. Twenty of the institutions were confirmed via survey and seven non-respondent institutions were determined to be offering agroforestry courses as well via internet searches and subsequent phone calls. Overall results indicate that there are thirteen more institutions providing agroforestry courses today than there Warren & Bentley (1990). Six of the institutions that reported having course offerings in Warren & Bentley (1990) still offer agroforestry courses, but eight institutions are no longer offering them. Twenty-nine institutions began offering agroforestry courses after the Warren & Bentley (1990) survey, but only twenty-one of those institutions still offer agroforestry courses today. One hundred of the surveyed institutions do not provide agroforestry courses. Only one survey respondent indicated that a degree in agroforestry is offered at their institution, however, supplemental internet searches indicate that at least two additional non-respondent institutions offer a degree in agroforestry as well. No agroforestry degree programs were noted in the Warren & Bentley (1990).

Agroforestry courses are offered throughout the U.S. and its territories and are not correlated to a specific location or region. The location and distribution of institutions is provided in Figure 2. Institution size, in terms of undergraduate population, does not influence whether or not an institution provides agroforestry courses. Findings show that fourteen (52%) of the institutions that provide agroforestry courses serve an annual undergraduate population that is greater than twenty thousand students. Meanwhile two (7%) of the institutions serve

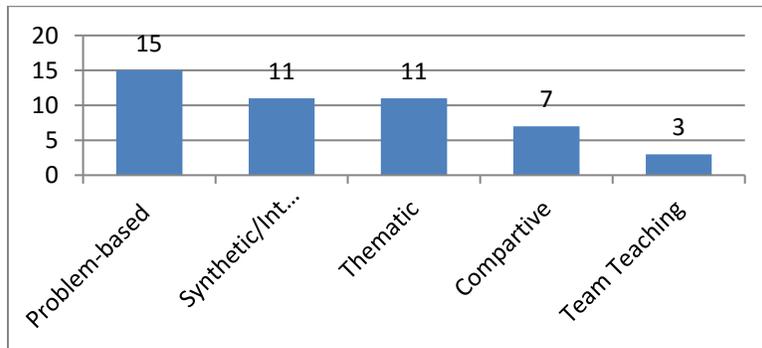
undergraduate populations of ten to twenty thousand students. Finally, eleven (41%) of the institutions have undergraduate populations of less than ten thousand students. In short, approximately half of the institutions that offer agroforestry courses serve undergraduate populations that are greater than twenty thousand students and approximately half serve undergraduate populations that are less than twenty thousand undergraduate students.

While location and size seem to be of little relationship to agroforestry course offerings, it is clear that such courses are primarily advocated through forestry. Two-thirds (18) of the institutions currently offering agroforestry courses are SAF accredited. In addition, agroforestry courses are most often represented by the following institutional departments: Forestry (44%), Natural Resources (27%), and Agriculture (22%). Many respondents (33%) selected more than one department and/or indicated that their offerings are cross listed between multiple departments. Of the respondent institutions that provide agroforestry courses, 83% of them offer a single agroforestry course, while the remaining 17% indicated offerings of two to three agroforestry courses. Sixteen of those SAF accredited institutions are also represented as 1862 land grant institutions. There are only two 1890 land grant institutions, and one 1994 land grant institution, however, that currently offer an agroforestry course.

All of the respondent institutions currently offering agroforestry courses indicated that their offerings are interdisciplinary. Again, respondents were allowed to select more than one answer and were prompted to indicate all of the interdisciplinary methods that they use. Approximately 65% indicated that they incorporate multiple interdisciplinary instruction methods. The results indicate that problem-based instruction is utilized by fifteen of the institutions, while eleven institutions incorporate synthetic or integrative skills and perspectives that are not unique to any single discipline. Thematic instruction where methods and insights of

more than one discipline are applied separately is also demonstrated by eleven institutions, while seven institutions rely on comparative insights of one discipline to critique and sharpen the insights of another discipline. Finally, three institutions provide instruction through team teaching where courses are taught jointly by representatives from multiple disciplines. The results suggest that a variety of interdisciplinary methods are being used to discuss and convey the principles of both temperate and tropical agroforestry.

Figure 1 Institutional Interdisciplinary Instruction Totals



In general, tropical agroforestry is most often associated with developing countries, while temperate agroforestry pertains to more industrious regions that are located in temperate zones. In 1988, many of the institutions surveyed by Warren & Bentley indicated that they offered a tropical course that included agroforestry as a topic (Warren & Bentley, 1990). While tropical agroforestry courses still make a strong showing, it appears that there are more temperate agroforestry courses being offered today in the U.S. Given the opportunity to select all that apply, three (15%) respondents indicated that their courses only pertain to tropical agroforestry courses, while seven respondents (35%) exclusively offer temperate agroforestry courses. Ten (50%) of the respondents indicated that their offerings reflect aspects of both tropical and temperate agroforestry.

Agroforestry in general appears to have gained legitimacy among academics albeit at varying rates, depending on whether agroforestry courses are offered at the respondent’s institution. Not surprisingly, institutions that currently offer agroforestry courses strongly agree (mean = 4.77) that agroforestry is an important agriculture practice, while institutions that do not currently offer agroforestry courses only agree (mean = 4.05). A similar trend in responses was noted for the statement, “Agroforestry plays a significant role in sustainable agriculture.” Those institutions that currently offer agroforestry courses strongly agree (mean = 4.88) and those that are not currently offering agroforestry courses agree (mean = 4.05). In response to the statement, “My institution provides adequate agroforestry coursework,” institutions that currently offer agroforestry courses are indifferent (mean = 3), while institutions that do not currently offer courses disagree (mean = 2). The noted dissatisfaction with their institution’s lack of offerings may indicate that improvement is desired by most of the institutions that do not provide agroforestry courses. However, their responses to the statement, “additional agroforestry coursework is needed at my institution” were not as conclusive. While institutions that currently offer agroforestry courses lean towards agree (mean = 3.56), institutions that do not offer courses lean towards indifference (mean = 3.29), which seems to parallel a lack of motivation by these institutions to provide future coursework. Refer to Table 1 for details.

Table 1
Respondent sentiment toward agroforestry/course offerings

Question	Means (Currently Offering Courses) N=18	Means (Not Currently Offering Courses) N=34
Agroforestry is an important agricultural practice.	4.77	4.05
Agroforestry plays a significant role in sustainable agriculture.	4.88	4.05
My institution provides adequate agroforestry coursework.	3	2
Additional agroforestry coursework is needed at my institution.	3.56	3.29

Of the sixteen institutions that have rescinded their agroforestry course offerings, eleven responded to the survey. With the ability to select all that apply, lack of resources was the most common reason provided, which was noted by four institutions. Three respondents cited lack of student enrollment, two respondents indicated a change in curriculum, and two respondents indicated that agroforestry courses had been abandoned after the departure of an influential faculty member. When asked if future agroforestry courses would be offered, lack of resources was again heavily cited, which was indicated by fourteen respondents. Lack of faculty expertise was also noted by fourteen respondents, lack of student interest was indicated by ten respondents, and six respondents selected limited employment opportunities.

Table 2
Reasons Given for not Providing Agroforestry Courses

Institutions that have Discontinued their Offerings			
Lack of Resources	Lack of Student Enrollment	Change in Curriculum	Faculty Member Left
4	3	2	2

Institutions that are not likely to provide future offerings			
Lack of Resources	Lack of Faculty Expertise	Lack of Student Interest	Lack of Employment Opportunities
14	14	10	6

Seventeen (85%) of the institutions with current agroforestry course offerings intend to sustain them, but three (15%) indicated that they will likely discontinue their offerings. Only five institutions (15%) that do not offer agroforestry courses indicated that they would like to incorporate them into future curriculum. One institution stated, “Plan to offer,” but the other responses, which included, “Maybe,” “Hope to offer,” and “Depends on faculty interest,” were not as convincing. Meanwhile thirty (85%) of the institutions that do not provide agroforestry

courses have no future intentions to implement them. In short, when all responses are compiled, 40% of the respondent institutions have intentions to maintain or initiate agroforestry courses, but 60% are not likely to provide them in the future.

Table 3
Future Offerings Forecast

Respondent Institutions	Currently Offering	Not Currently Offering	Percentage
Likely to Sustain/Implement	17	5	40%
Unlikely to Continue/Implement	3	30	60%

Chapter 5

Conclusion and Discussion

In general, agroforestry appears to be highly regarded by academics. Findings from this research demonstrate that progress has been made at the institutional level in terms of agroforestry course offerings when compared to Warren & Bentley (1990). Although more institutions provide agroforestry courses today than in 1988, the vast majority of institutions in this survey do not provide agroforestry courses. Furthermore, progress has been hindered by the deletion of sixteen (37%) agroforestry course offerings since 1988. In addition, as indicated above, three of the respondent institutions of this project intended to drop their agroforestry courses and only five institutions indicated that they would like to incorporate agroforestry courses into their future curriculums. At best, findings imply that growth in future agroforestry course offerings may be slow.

Institution size does not appear to be a factor in terms of undergraduate population. As reported, 40% of the institutions that are currently providing agroforestry courses are serving undergraduate populations with less than twenty thousand students, while 48% have undergraduate populations that are greater than twenty thousand students. Perhaps, this information would aid future researchers in determining the validity of “lack of resources” as an

explanation for not supporting agroforestry courses. Future research should assess whether or not there is a correlation between institution size and available resources for establishing curriculum.

The apparent surpassing of tropical agroforestry course offerings by temperate agroforestry course offerings appears to reflect the research initiatives that have taken place in recent decades (Gold, 2015; York, 1990). Initial agroforestry research in the U.S. during the 1980s and early 1990s was predominantly focused on tropical agroforestry. During that time, however, a number of notable workshops and conferences were conducted to promote temperate agroforestry research. Since then, several short courses and academies have been developed to train extension agents, educators, and other professionals in temperate agroforestry (Gold, 2015).

As noted, there is still a strong relationship between forestry and agroforestry. This is demonstrated by the fact that the majority of agroforestry courses are still provided by SAF accredited institutions as they were in 1988; moreover, the results indicate that most agroforestry courses are still provided through the forestry departments of the respective institutions. Nonetheless, most of the institutions that offer agroforestry courses are not only SAF accredited, but are also 1862 land grant schools. This demonstrates the importance of the land grant model as it pertains to teaching agroforestry. The 1890 and 1994 land grant institutions, however, are not well represented in terms of agroforestry course offerings. As it stands, sixteen (80%) of the land grant institutions that currently offer agroforestry courses were established under the Morrill Act of 1862. There are only two (10%) land grant institutions represented by the Morrill Act of 1890, and one (5%) institution that gained land grant status under the Land-Grant Status Act of 1994. Future research is needed to determine what may be driving this skewed representation of agroforestry course offerings by land grant institutions.

In addition to “lack of resources,” “lack of faculty expertise,” was often provided as an explanation for not offering agroforestry courses, which was noted by fourteen (40%) of the respondent institutions. Many institutions’ inaugural agroforestry courses may have been the product of informal interest and discussion among enthusiastic faculty members. In short, the courses were likely developed opportunistically, as opposed to being part of a mandated institutional curriculum (Lassoie, Huxley & Buck, 1994). Incidentally, at least three agroforestry course programs in this survey were abandoned upon the departure of an influential faculty member. Whether measures were taken to maintain, or reinstate agroforestry courses at these institutions was not ascertained in this project. Future research in this area may be able to shed light on the process by which agroforestry courses are established and maintained at an institution. This information could be useful to those institutions that have had difficulties with agroforestry course initiation and retention.

Finally, as a combination of forestry and agriculture, agroforestry is inherently interdisciplinary. Therefore, interdisciplinary instruction has long been advocated as ideal for teaching agroforestry (Lassoie, 1990; Lassoie et al, 1994). According to Rousch, Hibbs, William, Cordray, Sharrow, & Seiter (1999), “a meaningful course in agroforestry must be interdisciplinary,” As previously mentioned, all of the respondent institutions that maintain current agroforestry course offerings indicated that their courses are being taught in at least one interdisciplinary format. Supported by the literature, this phenomenon is very likely a positive reflection of agroforestry education (Jones, 2010), but agroforestry implementation in the U.S. is still considered stagnate by many (Workman, et al. 2003; Strong & Jacobson, 2004). Moreover, some interdisciplinary instruction researchers warn that over-popularity may lead to sacrificed quality of the interdisciplinary methodology (Kleinberg, 2008). In short, future research on the

quality of interdisciplinary instruction at the respective institutions is needed in order to determine the impact of this type of instruction on agroforestry implementation.

In conclusion, this project contributes to agroforestry education research by providing an overview of the institutions that currently provide agroforestry courses. Findings demonstrate that the number of institutions providing agroforestry course offerings has increased by thirteen since 1988. While most academics surveyed in this project highly regard agroforestry education, future expansion of agroforestry course offerings remains undetermined. While most institutions that provide agroforestry courses intend to sustain them, there is limited intention to implement them at the remaining institutions, which suggests that progress may be hindered. The interdisciplinary instruction method has become a very popular tactic and is the primary means by which agroforestry courses are taught. While most agroforestry courses are provided by 1862 land grant institutions that are also SAF accredited, the vast majority of institutions in this study were without agroforestry course offerings. Institution size and location does not seem to be a factor when associated with the availability of agroforestry course offerings. More typically, lack of faculty expertise, lack of resources, and lack of student interest were cited to this end. In turn, the forecast for future offerings may be bleak if more is not done to retain the current courses and to support their development at additional institutions.

As with any project, this one is not without limitations. This study specifically targeted institutions that were either land grant or SAF accredited; however, there may be institutions outside of these parameters that offer agroforestry courses. In addition, it is possible that the most ideal representative at a given institution was not identified or did not respond. Finally, a non-respondent institution could be offering agroforestry courses as well, but were not identified,

despite the efforts made in this project to identify them. These conditions should be taken into consideration for future agroforestry education research.

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**Table 3
Institution Status of Agroforestry Course Offerings**

Institutions Currently Offering Agroforestry Courses			
Offered in Warren & Bentley 1988 Survey - Present			
Michigan State University (SAF/LG 1862)*	University of Minnesota (SAF/LG 1862)	University of California, Berkley (SAF/LG 1862)	University of Florida (SAF/LG 1862)*
Oregon State University (SAF/LG 1862)*	Yale University (SAF)*		
Post 1988 Offerings - Present			
Iowa State University (SAF/LG 1862)*	Paul Smith's College (SAF)*	University of Nebraska (LG 1862)*	University of Illinois (SAF)*
California State Humboldt (SAF/LG 1862)*	Pennsylvania State University (SAF/LG 1862)*	University of Wisconsin-Stevens Point (SAF)*	California Polytechnic State University (SAF)
North Carolina A&T State (LG 1862)*	Kentucky State University (LG 1890)	Virginia Tech (SAF/LG 1862)*	American Samoa Community College (LG 1974)
Southern Illinois University (SAF/LG 1862)*	Cornell University (LG 1862)*	University of Hawaii (LG 1862)*	Stephen F. Austin State University (SAF)*
University of California, Davis (LG 1862)*	Florida A&M University (LG 1890)*	University of Missouri (SAF/LG 1862)	Michigan Technological University (SAF)*
Sitting Bull College (LG 1994)*			
Previously Offered But Not Currently Offering Agroforestry Courses			
Offered in Warren & Bentley 1988 Survey			
University of Idaho (SAF/LG 1862)*	Texas A & M University (SAF/LG 1862)	University of Arizona (LG 1862)*	Colorado State University (SAF/LG 1862)
Louisiana State University (SAF/LG 1862)*	Utah State University (SAF/LG 1862)*	Washington State University (LG 1862)	University of Michigan**
Post 1988 Offerings			
North Carolina State University (SAF/LG 1862)*	University of Georgia (SAF/LG 1862)*	Purdue (SAF/LG 1862)*	Kansas State University (LG 1862)**
State University of New York (SAF)*	Bay Mills Community College (LG 1994)*	Northern Marianas College (LG 1974)*	University of Wisconsin, Madison (SAF/LG 1862)*
No Apparent Previous or Current Agroforestry Course Offerings			
Mississippi State University (SAF/LG 1862)	University of Alaska Fairbanks (SAF/LG 1862)*	University of Massachusetts (SAF/LG 1862)	University of Montana (SAF)
Montana State University, Bozeman (LG 1862)*	University of Nevada, Reno (LG 1862)	Rutgers-the State University of New Jersey (LG 1862)	University of New Hampshire (SAF/LG 1862)*
New Mexico State University (LG 1862)**	New Mexico Highlands University (SAF)**	Duke University (SAF)	North Dakota State University (LG 1862)*
South Carolina State University (LG 1890)	The Ohio State University (SAF/LG 1862)	Oklahoma State University (SAF/LG 1862)*	Prairie View A&M University (LG 1862)
University of Rhode Island (LG 1862)	University of Kentucky (SAF/LG 1862)*	Clemson University (LG 1862)*	South Dakota State University (LG 1862)
University of Connecticut (LG 1862)	West Virginia University (SAF/LG 1862)	University of Tennessee (SAF/LG 1862)	University of the Virgin Islands (LG 1862)*
University of Wyoming (LG 1862)	University of Guam (LG 1974)	University of Puerto Rico (LG 1862)	University of Arkansas (LG 1862)
University of Washington (SAF)	University of Maryland College Park (LG 1862)*	University of Maine, Orono (SAF/LG 1862)	University of Delaware (LG 1862)*
University of D.C. (LG 1967)	Alabama A&M University (LG 1890)	University of Vermont (LG 1862)	Auburn University (LG 1862)*
Virginia State University (LG 1890)	Delaware State University (LG 1890)*	Alcorn State University (LG 1890)	Tuskegee University (LG 1890)
Tennessee State University (LG 1890)*	Southern University and A&M College (LG 1890)	Central State University (LG 1890)	Langston University (LG 1890)
University of Maryland Eastern Shore (LG 1890)	Northern Arizona University (SAF)*	Lincoln University (LG 1890)*	University of Arkansas Pine Bluff (LG 1890)
West Virginia State University (LG 1890)*	Northwest Indian College (LG 1994)	Louisiana Tech University (SAF)*	Fort Valley State University (LG 1890)
Community College of Micronesia (LG 1974)	Little Priest Tribal College (LG 1994)	Llisagvik College (LG 1994)	Little Big Horn College (LG 94)
Salish Kootenai College (LG 1994)	Sinte Gleska University (LG 1994)*	Oglala Lakota College (LG 1994)	Saginaw Chippewa Tribal College (LG 1994)
Southwestern Indian Polytechnic Institute (LG 1994)	Tohono O'odham Community College (LG 1994)	Sisseton Wahpeton College (LG 994)	Si Tanka University (LG 1994)
Stone Child College (LG 1994)*	White Earth Tribal and Comm College (LG 1994)	United Tribes Technical College (LG 1994)	Turtle Mountain Community College (LG 1994)
Lac Courte Oreilles Ojibwa Community College (LG 1994)	Institute of American Indian Arts (LG 1994)	Nebraska Indian Community College (LG 1994)	Leech Lake Tribal College (LG 1994)*
Fort Peck Community College (LG 1994)	Nueta Hidatsa Sahnish College (LG 1994)*	Aaniih Nakoda College (LG 1994)*	Haskell Indian Nations University (LG 1994)
Diné College (LG 1994)	D-Q University (LG 1994)	Navajo Technical University (LG 1994)	Fond Du Lac Tribal and Comm College (LG 1994)
Chief Dull Knife College (LG 1994)*	Cankdeska Cikana Community College (LG 1994)	Blackfeet Community College (LG 1994)*	College of Menominee Nation (LG 1994)

**Completed Survey *
Phone or Email Confirmation ****

Figure 2
Map of Surveyed Institutions

