

AGRICULTURE AND NATURAL RESOURCES PROGRAM REVIEW 2011-12

Program Mission Statement

We envision a program that will provide high quality instruction in agriculture, horticulture and natural resource management with an emphasis on sustainability.

I. Quantitative Indicators

Refer to the 2011-2012 data at

<http://www.hawaii.edu/offices/cc/arpd/instructional.php?action=quantitativeindicators&college=MAU&year=2012&program=118> for the following discussion:

The Overall Program Health is rated as Healthy. The Demand Indicators show a drop in New and Replacement Positions. The drop from 247 Statewide positions to 71 indicates that there has been some change in how these were tabulated. However this new number does align with the number of majors such that the program became healthy in this category. The number of majors has increased slightly from 09-10 to 11-12. The number of SSH program majors in program classes has also increased in this timeframe. The number of SSH non-majors in program classes also indicates demand as students take these courses for general education and area of interest electives.

The Efficiency Indicators have remained steady over the course of three years and remains healthy. It is important to note that although there are 2 faculty - one is based on Maui and one is on Molokai. Therefore the program cannot leverage the resources of two faculty - sharing non-teaching duties for instance - that a single-island program can do. Also each faculty has to teach virtually all the various courses in Agriculture which are in very different disciplines. Therefore the data does not reflect the "on the ground" reality that the two locations act as single faculty programs that cannot share teaching responsibilities, facilities and field maintenance or supplies.

The Effectiveness Indicators are Cautionary. The program continues to have low rates of graduation. All years posted indicate 9 unduplicated degrees and certificates awarded. In AY11-2, 7 AAS degrees were awarded which is a significant increase from 2 in 10-11. Successful completion of 78% was a slight improvement. It would be interesting to compare this rate with other biological science courses on campus. Persistence has continued to hover in the mid-60% range over the past three years. Retention, Completion and Persistence and getting students all the way to a degree continue to be challenges. The program has multiple pathways which can cause confusion to students on what courses to take. Also with only one faculty, courses

are usually taught every other year, so students can easily “miss the boat” which causes them to take longer to get a degree. Many of our students are also part-time which can lengthen time to graduation, although since 09-10 the number of full-time students has increased. The low rate of graduation is reflected as well in the Perkins 2P1 indicator not being met.

No distance courses were offered. Most of the courses have a hands-on lab component so distance offerings have not been a focus. This could change in the future as hybrid course designs might be appropriate within UHMC islands and/or other UH campuses but this type of instruction would take resources to develop, coordinate and implement.

I. Outcome and Goal Achievement

A. Program Learning Outcomes

1. The Program Learning Outcomes for the Associate in Applied Science in Sustainable Tropical Crop Management are as follows:

Knowledge	<i>Use basic business principles to manage projects or design a horticultural business enterprise.</i>
Skill	<i>Recommend cultural practices, solve problems, plan projects, and cultivate horticultural crops in a sustainable manner based on sound biological and technological principles.</i>
Value	<i>Explain the relationships between agroecosystems, economics, human culture, and natural environments.</i>

The Program Learning Outcomes for the Associate in Applied Science in Horticulture and Landscape Maintenance are the same as above including the additional PLO:

Value	<i>Design gardens that demonstrate aesthetic principles</i>
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2. Program Map

Assessment of Intended Program Learning Outcomes													
Courses in Program	AG 122	AG 174	AG 200	AG 201	AG 230	AG 235	AG 250	AG 251	AG 260	AG 269	AG 281	AG 264	AG 266
1. <i>Use basic business principles to manage projects or design a horticultural business enterprise.</i>	1	1	2	1	3	1	1	2	1	0	1	1	1
2. <i>Recommend cultural practices, solve problems, plan projects, and cultivate horticultural crops in a sustainable manner based on sound biological and technological principles.</i>	2	2	3	2	0	2	2	3	2	0	2	1	2
3. <i>Explain the relationships between agroecosystems, economics, human culture, and natural environments.</i>	2	2	2	2	1	2	1	1	1	1	3	1	1
(Landscape and Horticulture only)													
4. <i>Design gardens that demonstrate aesthetic principles.</i>	0	0	0	0	0	1	3	0	1	1	1	0	0
CODE	3 = A focus of course			2 = Evaluate Using Outcome			1 = Not evaluated			0 = Not included			

3. Assessment Plan

Associate in Applied Science Sustainable Tropical Crop Production

PLO	F 2011	SP 2012	F 2012	Sp 2013
1		AG 230		
2	AG 200 and/or AG 235		AG 200 and/or AG 251	
3			AG 174	AG 281

Associate in Applied Science Horticulture and Landscape Maintenance

PLO	F 2011	SP 2012	F 2012	SP 2013
1		AG 230		
2	AG 200 and/or AG 235		AG 200	
3			AG 174	AG 281
4		AG 250		

A. Analysis of Student Outcome and Goal Achievement

By chance due to changes in course offerings we assessed all four PLO's in AY 11-12.

In Fall 2011, the PLO#2 was assessed in AG 200 and AG 235. The results are as follows:

Program Assessment Rubric for AG 200 FALL 2012				
PLO: Recommend cultural practices, solve problems, plan projects, and cultivate horticultural crops in a sustainable manner based on sound biological and technological principles.				
SLO: Demonstrate knowledge of horticultural principles in the cultivation of plants.	Exceeds	Meets	Needs Improvement	No Proficiency
Square foot garden	71%	28%	0%	0%
Poinsettia production	75%	21%	4%	4%
SLO: Describe and explain general plant structure and function in relation to plant growth and development.				
Test question 72	90%	N/A	N/A	10%
Test question 78	65%	N/A	35%	0%
Final Essay	33%	29%	33%	19%
Average SLO Score for the Course	67%	26%	18%	7%

There was as a class an improvement in exceeding the SLO both in the hands-on portion and the test questions. The final essay on the relationship between plants and global warming was new. We had brief discussions about this in class but this was mainly a question if they could use reasoning and critical thinking to apply what they learned in class about photosynthesis, plant anatomy and biochemistry to atmospheric CO₂ and global warming. Three did not answer the question and one student did not complete the class so these were the no proficiency numbers. Overall, the majority of students (93%) met the SLO objectives.

Students took more of their tests online with open book – the grades did not change much but students expressed that they learned more because they researched and were not as stressed. Based on their understanding of the material as they were questioned and tested in class, I am inclined to agree.

Program Assessment Rubric for AG 235 FALL 2012				
PLO: Recommend cultural practices, solve problems, plan projects, and cultivate horticultural crops in a sustainable manner based on sound biological and technological principles.				
SLO: Design a sprinkler and micro irrigation system(s).	Exceeds	Meets	Needs Improvement	No Proficiency
Landscape Irrigation Design Project	29%	29%	11%	22%
Average SLO Score for the Course	29%	29%	11%	22%

The Irrigation Design project has students choose a house and lot and create an irrigation design for that landscape. This a very comprehensive project that involves measurement, scale drawing and drafting, information gathering and decision making, creativity, mathematical computations, and an explanation of reasoning. Based on a grading rubric 58% met or exceeded the learning objective. However the no proficiency number is four students who were unable to complete the class. If one only looks at projects actually turned in then the Exceeds, Meets and Needs Improvement numbers are 43%,43%, 14% respectively. Most students did well but students with large outside commitments with family and jobs have difficulty as this project takes many outside

class hours. The math involved also is difficult and a math or compass test prerequisite should be made as a curriculum change.

Program Assessment Rubric for AG 230 Spring 2012				
PLO: Use basic business principles to manage projects or design a horticultural business enterprise.				
	Exceeds	Meets	Needs Improvement	No Proficiency
Create a Business Plan	25%	63%	6%	6%
Average SLO Score for the Course	25%	63%	6%	6%

Students do a comprehensive business plan for either an existing business they operate or as a start-up growing a crop or a landscape maintenance business. This is a challenging assignment. The instructor made a great effort to work with the students on the financial aspects. The business plan template was improved and students overall did better than the last time – 14 out of 16 met or exceeded the SLO and only one needed improvement and one student did not turn in the assignment or finish the course.

Program Assessment Rubric for AG 174 Fall 11 <i>Explain the relationships between agroecosystems, economics, human culture, and natural environments.</i>			
PLO: Explain the relationships between agroecosystems, economics, human culture, and natural environments.			
	Exceeds	Meets	Does not meet
Student can identify common insect pests	20%	50%	30%
Final Exam results Pest ID	20%	50%	30%

Student Insect Collections	31%	38%	31%
Midterm: student identify 3/4 cultural control methods used in Hawaii	13%	63%	25%
Final Exam: Student can identify 2/3 of important parts of IPM program	15%	63%	22%
Final Exam: student can identify 3/4 different cultural control methods used in Hawaii	15%	63%	22%
AVG SLO for Course	19%	55%	27%

Program Assessment Rubric for AG 250 Spring 2012

PLO: <i>Design gardens that demonstrate aesthetic principles.</i>				
	Exceeds	Meets	Needs Improvement	No Proficiency
SLO: Use design principles in a landscape design or renovation.	55%	18%	9%	18%
Average SLO Score for the Course	55%	18%	9%	18%

AG 174 was offered an extra year due to demand. With this thorough assessment of PLO#3, an average combined 74% of students met or exceeded the required SLO.

In Landscape class, students visit a house site, measure the area, and interview the homeowner. They produce scale drawings and follow a design process to create a final landscape design. They also present this design to the class and homeowner. This year a whopping 55% exceeded the SLO and only 9% (1 student) needed improvement. Two students did not finish the class and turn in this project. The project is time consuming and challenging. I have found if students are not interested in design they tend to not put much effort or work to finish it. The class needs to be renamed as it implies the course is about horticulture not landscape design and maintenance. The name change will be put to curriculum committee in Spring 13. (this course is not scheduled until Spring 14).

Overall students did well and we did quite a bit of work in class. Students who were challenged with scale drawing were given extra time and attention by the instructor to work through the difficulty and this helped. They had group support as well in class.

C. Action Plan

Curriculum Changes: The Sustainable Tropical Crop Management degree underwent curriculum revisions to promote entrepreneurship and the New Farmer Network

initiative. Production oriented courses were added as well as a required internship to provide more hands on production experience and entrepreneurship skills. A greater focus on networks and the regulatory aspects of production were included. These program and course changes will be implemented in Fall 12.

Changes in pedagogy have been based on earlier assessment: Development of better rubrics, such as the one for work skills for AG 251 is ongoing. Creating embedded questions within exams that provide assessment is another area that needs adjustment.

The assessment process that develops SLO's that support PLO's assists us in creating and implementing curriculum that provides students with skills and knowledge they need to become employed or transfer to a Bachelor degree granting institution.

Assessment of PLO's allows us to evaluate the level of student understanding and make adjustments if necessary to increase student learning.

Our program strengths are a strong hands-on learning component that increases student learning. The program is developing workers for an industry that is embedded in Hawaiian culture and has the potential to be a real diversified economic engine for Hawaii. We are also able to generate funds by producing plants and food crops. This generation of funds has supplied all of our supply needs so that we have used very few, if any, G-funds for running our labs and buying supplies and tools. We have also been aggressive in seeking outside funding for the past few years. This support from Perkins Grants, USDA NIFA ANNH grant, and RDP has allowed us to upgrade our equipment and hire some support staff to recruit and track students, find internship opportunities, and assist with facilities maintenance. By building infrastructure we hope to support our students in developing skills for a changing economy.

III. Engaged Community

The Agriculture and Natural Resources department reaches out to the general community and the agriculture community in several ways. The department cooperated with the Maui County Farm Bureau and Maui Economic Development Board to put on the Agriculture and Natural Resources Awareness Day on campus for High School Agriculture students. About 200 High school students from Lahainaluna, Molokai, Hana, Maui High, and Baldwin visited the exhibitors and attended seminars. Exhibitors come from various fields in agriculture and the resource management fields. This also gives us an opportunity to touch base with these members of the industry. UHM College of Tropical Agriculture and Human Resources (CTAHR) also came and gave a joint lecture on educational opportunities.

The department also plants pumpkins in the summer for a pumpkin patch activity for children in October. About 250 preschool and grade school children visited the pumpkin

patch. Each group goes through 5 to 6 activities to learn more about agriculture and science. A day for the public is held with fun activities and educational displays as well as a "pick your own" sale. This gets people out in the field to see how crops are grown.

We have various high school groups visit. This year we provided worm composting and seed scarification activity for the students. We did a worm composting event for the faculty development "WILD" day. We were invited to a science day for second graders at Kahului school and did 6 mini workshops on soil components.

We have an annual plant sale for the public the first Saturday in December. This provides most of our supply money to run our program. In addition it brings the public to campus and provides us a chance to interact. We answer questions and provide growing advice. In Spring 12 we have an additional plant sale as we had a greenhouse production course.

The department also had a table at the educational tent at the Maui Agriculture Fair in April. This is another chance to informally talk to not only the public but the other agriculture professionals who are there at various exhibits and sale booths. The Farm Manager is President of the Maui Cattleman's Association and a board member of the Maui County Farm Bureau. The Maui faculty is a board member of the Maui Association of Landscape Professionals. All of the faculty and staff attended the Hawaii Department of Labor's Ag Skill Panel conference where groups of agriculture professionals examined some of the barriers facing producers in Hawaii.

A meeting with the Agriculture Advisory committee was held in April 2012. The revisions to the STCM curriculum was discussed and approved. The New Farmer Network and the internship/mentoring goals were the other topic. The advisory committee felt that the internships were vital for authentic student learning and that the industry does need more new farmers to start businesses to increase local products. Networks with existing farms were important and need to be built. Business and marketing skills are a must and a support network to facilitate start ups was essential. The advisory committee also wanted the program to strengthen relationships with the high schools both to attract students and to support the High School AG teachers.

IV. Recognize and Support Best Practices

The Agriculture and Natural Resources program has a long history of integrating hands-on experiences with science based classroom learning. The SLO's and teaching practices focus on practical, real world situations and solutions. As is evident from the assessment tools evaluated in this report, project based learning is incorporated; both informal such as growing a crop or garden to structured projects such as a business or landscape plan. Students work both individually and in groups.

Other skills such as communication and math are also integrated into many of the classes. In several classes, students write research papers and do oral presentations using powerpoint. They develop spreadsheets and gather information online. All classes use Laulima for posting lectures, handouts and other resources. Some classes use online quizzes and tests. The Agriculture lab/classroom is not a computer lab but does have a wireless router. The program purchased a router for the greenhouse to extend wireless connectivity to the greenhouse and part of the field. Technology could be more integrated into the program - this is an area that is currently being explored. More faculty time is needed to develop increased integration of technology and to create online hybrid courses.

Innovative sustainable practices such as cover cropping, biological control, minimal tillage practices, composting, and grafting of vegetable crops are explored during and between classes. A new field was prepared to become an organic production area in Fall 12.

Awards:

Nicolette Raleigh - May 2012 Graduate AAS Horticulture and Landscape Maintenance: Regents Award; scholarship Landscape Architecture Pennsylvania State University.

William Jacintho - Academic Support Specialist- Maui Farm Bureau "Outstanding Member of the Year" award.

V. Planning and Policy Considerations

Curriculum changes in STCM and New Farmer Network initiatives align with State goals of increased Food Security. The focus on sustainability align with the goals and mission of the campus and University System.

VI. Budgetary Consideration and Impact

Agriculture or Natural Resource Management have become more attractive to students as a career choice in the area of sustainability. Enrollment in the agriculture program has grown both on Maui and Molokai. Growing green jobs, including increasing local food production, is a goal of the State of Hawaii. Current farmers are aging and will need replacements. There are also many other agriculture related jobs that will need to be filled.

As the program increases and expands course offerings - an additional faculty in Agriculture and Natural Resources is needed. The program originally had two faculty positions on Maui, however at the retirement of the senior faculty member about 15

years ago, the position was transferred to another area. This caused a drop in the number of AG courses taught in a semester and a corresponding drop in AG majors.

Currently with only one faculty member, most courses are only offered every other year. Students find it hard to graduate in a timely manner if at all as indicated by our low rates of graduation. Lecturers with the background necessary to teach courses are difficult to find. As many of the courses have labs, the preparation time makes the lecturer compensation very unattractive, so keeping a lecturer has been difficult in several areas. An additional faculty would improve the number and quality of course offerings. They could also share much of the other work such as student advising. This would also lead to better graduation rates. An agriculture faculty would have enough biology or related sciences that they could also teach in those areas (examples Botany, Biology, Ecology, Hawaiian Field Biology, etc).

The program is in desperate need of a 15 passenger van. We have many classes with outside field trips. A new course, AG 103 being taught in Fall 12, is designed to take students out to farms, nurseries, and distribution centers. However, we have no real way to get the students there. Carpooling has been used but this is difficult and many students are "car-less" as they now use the bus as their form of transportation. Often the sites are far (think Auwahi), remote and don't have much parking. Students often "skip" these class times because they can't get to the site. In addition, the agriculture department needs to pick up supplies such as potting soil, fertilizer, pots, etc. Currently we are using our own vehicles to do this without compensation.

Originally the campus supported the program by using G funds for supplies. The program has even purchased all its own faculty and staff computers and other technology equipment such as clickers. For at least the past 15 years the AG&NR program has not used G-funds for supplies. Generally supplies to run the program are approximately \$5,000 per year. The program has been earning that money through plant and vegetable sales. This has saved the college \$75,000 over the years. The AG&NR program humbly asks that the two request above; a van and an additional full or part-time faculty, be considered for funding.