**Sustainable Agriculture**

**Thesis:** The world’s population is increasing faster and faster every decade, with nine billion people projected to be sharing this earth by 2040. Along with this exponential growth comes the demand for resources that will also sharply increase; primarily, the need to feed the population will become intensified. If we use the agricultural system we use today to feed the growing population, the land will eventually, and soon, be depleted it of all it’s nutrients, thus healthy food will eventually demise and so will the human race. This is why it is important for sustainable agriculture to become the prevalent system used for producing food, and it must take people to operate and gain the skill and knowledge behind it; the good news is, thanks to the many universities all over the country, the access to learn how to create a more sustainable world is not far.

**Background:**

* “By many estimates, the global population is going to reach 9 billion people by 2050 and food production will have to increase 70 percent to meet the demands of a booming population” (Thomas) → Increasing demand for food
* Food production will need to increase, thus so will the abuse of the land.
* Aspects of current unsustainable farming: land degradation (soil erosion, overgrazing, salinization, waterlogging), high levels of fossil fuels input, reliance on inorganic & synthetic fertilizers/pesticides, reductions in crop genetic diversity, excessive use of water & food transportation (Muir)
* Sustainable Agriculture entails the process of farming and producing food that is sustainable both economically and ecologically… “practices that not only allow for quality of life and agricultural production for this generation, but also for generations into the future” (Muir); “commonly understood to include three main goals: environmental health, economic viability and social responsibility in the long term” (CAFES)
* “Availability of information to the farmers, Removal of policy and other institutional barriers to the adoption of the practices, Availability of incentives (economic or other) to encourage grower adoption of the practices, often as enacted in the Farm Bills” (Muir) are ways to conquer industrial agriculture.
* Many schools offer programs to educate the world about these methods and move it towards a more sustainable agricultural system.

**How to prepare for a major in sustainable agriculture**:

* It is important to take as many science-related classes in high school as possible, as well as math classes. Such classes involve at least 2 years of writing and composition, statistics, biology, chemistry, and some colleges even look at AP Calculus scores (“Transfer”).
* Getting involved by volunteering or working at community agricultural sites, such as farms, gardens, or even just doing some sort of internships.

**Comparing colleges**:

* *UC Santa Cruz, UC Davis, CSU Cal Poly* (others: Oregon State University, Sterling College, Iowa State, North Carolina State, UC Berkeley)
* **UCSC**: Founded by Stephen Gliessman in 1981, the Agroecology Program at UCSC focuses on polycultures  vs. conventional monocropping systems; allelopathy (the ability of plant species to affect the growth of other plants, as a weed control option); finding alternatives to synthetic pesticides and fertilizers, etc. (Allen)
	+ The program was the first University of California project to focus specifically on “sustainable” agriculture
	+ Center focus now: “conserve nutrients on organic farms, minimize the impacts of farming on surrounding ecosystems, and manage pests and diseases with organically acceptable techniques” (Allen).
	+ Internships:
* *-Kresge Garden Cooperative-* Kresge classes incorporate this garden into their classes and curriculum; the garden is worked on by agroecology students who wish to get hands-on experience in the field (*Kresge).*
* *Program in Community & Agroecology (PICA):* Environmental Studies faculty member, Steve Gliessman, leads a two-unit PICA Seminar each quarter that introduces students to concepts of community and agroecology in the context of sustainability (Vadakan) **Gliessman:** “The underlying principle of our work is to understand better the ecological processes of natural ecosystems and apply our findings to what are -largely manipulative agricultural systems” (Allen).
	+ “Working together in the garden and eating with the people I work with shows me the organic way community develops and the importance of community… It has helped me establish a real sense of responsibility and independence" - Peter Isaksen ("What PICAn’s”)
* *The Agroecology Practicum*. Created in 2008, the Agroecology Practicum is a Summer Session that provides students with the opportunity to learn and experience the direct practices of sustainable agriculture and horticulture in UCSC’s own Farm & Garden. They also get to work with the Center’s Apprenticeship staff, which will teach students the logistics behind gardening and marketing practices (“Center”).
	+ *\*The People’s Farm & Garden:* Daniel Press, executive director of the Center for Agroecology & Sustainable Food Systems (CASFS), writes that he *“*encourage[s] anyone who might be interested in learning more about organic farming, gardening and sustainable food systems (Press).”
* Courses curriculum for majoring in Sustainable Ag. at UCSC**:**
	+ The History and Development of Agriculture
	+ Environmental Quality and Human Health Issues in Modern Agriculture
	+ Exploring Sustainability in Agriculture
	+ Basic Plant Anatomy and Physiology
	+ Soil Quality and Sustainable Agriculture
	+ Soil Fertility Management and Sustainable Farming Systems
	+ Sustainable Livestock-Based Agricultural Systems
	+ Pest Management and Sustainable Farming Systems
	+ Irrigation and Sustainable Farming Systems
	+ Biodiversity Conservation and Sustainable Agriculture
	+ The Adoption of Sustainable Farming Practices: Directions for and Obstacles to Change
		- Large course size= great experience and knowledge gained (“Course”).
* “High school students who plan to major in environmental studies need no special preparation other than the courses required for UC admission. AP scores for calculus may apply to the prerequisites (Environmental)”.
* **UC Davis**: The Agricultural Sustainability Institute (ASI) at UC Davis is a great program that focuses on ensuring access to healthy, organic food to the community, while also providing the opportunity for students interested in the field to get experience. Currently directed by Tom Tomich, ASI features many programs such as:
	+ The *Student Farm*, founded in 1977, is a farm that offers a wide range of opportunities for students to learn about and explore the many aspects of sustainable agriculture. It also provides internships, courses, and research projects for students pursuing the major. Internships can be accessed by attending an Introductory Tour, which allow students to tour the farm and get to know the kind of jobs they would be performing (“Internships”).
	+ *Russell Ranch* is another impressive agriculture feature at Davis; it is a 300-acre experimental farm that serves as a place to study and work the different types of sustainable systems and methods (“Internships”).
* Students also do research projects and reports based on experiments and lab work they conduct themselves. Examples of Davis students’ work: finding/calculating different environmental footprints; testing water and nutrient levels of field; “Integrating Sustainable Waste Management in Agriculture, Harnessing Ecosystem Services to Increase Agricultural Sustainability” (SAREP).
* There are no prerequisite courses required for the major at UC Davis; the courses involved in the curriculum are as follow:
	+ Introduction to Sustainable Agriculture
	+ Food Systems
	+ Sustainability and Agroecosystem Management
	+ Economics of Agricultural Sustainability
	+ Capstone: Workshop on Food System Sustainability

* **CAL POLY**: Cal Poly has a number of different and unique programs that offer good, hands-on experience for students majoring in Sustainable Agriculture. They manage nearly 9,000 acres “dedicated to instruction and research and serves as a living laboratory for assessing sustainability practices” (CAFES).
	+ Sustainable Stewards: interns are given opportunities to work on a “variety of topics such as composting and native plant landscaping” (CAFES). Students who intern can be paid working part-time, working 8 to 10 per week.
	+ Different types of classes offered: agritourism, bioconversion, cropping systems, alternative energy, grass-fed beef and lamb production, holistic management, integrated pest management, native plant landscaping, soil and water conservation, etc.
* Cal Poly has many scholarship opportunities that students can apply for, such as:
	+ **Agribusiness Department Merit Scholarship:** The Agribusiness Department Merit Scholarship supports the top incoming freshmen majoring in Agribusiness.
	+ **Civic Garden Club of San Carlos Scholarship:** The Civic Garden Club of San Carlos Scholarship supports junior or senior Environmental Horticulture Science majors.
	+ **Concord Farm Bureau Scholarship:** The Concord Farm Bureau Scholarship supports students enrolled in the College of Agriculture, Food and Environmental Sciences who show an interest in their major, Cal Poly and their community who are originally from Contra Costa county
	+ **Tony and Janet Marino Scholarship**: The Tony and Janet Marino Scholarship supports students majoring in Wine and Viticulture (“Scholarships”)…. And way more.
		- There are nearly over 100 different types of scholarships for different majors that fall under the Agriculture umbrella, which is a great incentive for students to pursue as far and wide as they can.
* Can *only minor* in sustainable agriculture (as a whole; it is too broad) by completing the following required courses:
	+ 4 Units - AG 315 Organic Agriculture
	+ 4 Units - AG 339 Internship in Agriculture
	+ Units - AG 360 Holistic Management
	+ 2 Units - CRSC 203 Organic Farming Enterprise Project
		- However, there are no required prerequisites except for basic GE courses.
* Can *major in* specific areas*:* an M.S. in Agribusiness, a Master’s in Agricultural Education & Communication, BioResource and Agricultural Engineering, an M.P.S. in Dairy Science, Food Science/ Nutrition, Ag. & Environmental Plant Species, Natural Resources Management & Environmental Sciences, Wine & Viticulture, etc (CAFES).
* Cal Poly has many partnerships that students can get involved with, such as the Center for Sustainability, the California Institute for the Study of Specialty Crops (CISSC), the [Coastal Resources Institute](http://www.calpoly.edu/~cri/), and more.

**Statistics:**

* General careers available under “Sustainable Agriculture”: Environmental consulting**,** Sustainable development, Environmental law, Environmental policy/research, Government, Journalism, Environmental/science education, Natural resource ecology/conservation, Natural reserve management, Land use research/ management, Science education, Restoration ecology, Agroecology, Integrated pest management, Environmental advocacy, Sustainable agriculture (Environmental).
	+ (*UCSC*) A survey was conducted in 2009 by CASFS to find the alumni’s activities after graduation, to find out whether students were able to apply degrees to careers.

Results: “The survey found that program graduates are making a major contribution to creating a more sustainable food system… 87% of respondents are currently or have been involved in the field of sustainable agriculture and food systems work… 80% volunteered for activities that contribute to sustainable food systems, and 99% used what they learned during the Apprenticeship in their personal lives. In addition, 48% of the alumni from the past 20 years had initiated, created, or started the work or effort in which they were involved, which speaks to the leadership role that many have assumed since graduating (Perez).”

* Primary job areas include food production (76%), education (40%), landscaping/gardening (29%), retail (18%), and work with non-govern- mental organizations (NGOs; 18%).

* Average Salary of Sustainable Agriculture: (“Average”)
	+ $48,000
* Average Salary of Jobs with Related Titles: (“Average”)
	+ Average salary of sust. ag. Specialist:  $45,000
	+ Average salary of Research management specialist: $61,000
	+ Average salary of a Secretary: $31,000
	+ Average salary of an Agriculture Teacher: ranges from $55,000 to $124,000
* The BLS reported the various annual wages for several agricultural careers in 2008. “The median annual salary of agricultural inspectors was $41,170. Conservation scientists earned a median annual salary of $58,720, while the salary for foresters was $53,750 (Bureau)”
* The demand for agricultural scientists and technologists is projected to increase with the growing population,;“food research is expected to increase because the public is more aware of nutrition, health, food safety… Most growth over the next 10 years for agricultural and food scientists will be in private industry (Bureau).”
* Most agricultural and food scientists work in research universities, private industry, or the federal government (Bureau)

Works Cited

Allen, Patricia & Martha Brown. “Sustainable Agriculture at UC Santa Cruz” CASFS: The

            Center of Agroecology & Sustainable Food Systems. *UC Santa Cruz.* Web. 11

            September 2013

“Average Salaries: Sustainable Agriculture Jobs” *SimplyHired.com.* Simply Hired, Inc. 2013.

            Web. 17 September 2013

Bureau of Labor Statistics. *U.S. Department of Labor*. Occupational Outlook Handbook, 2012-13

            Edition, Agricultural and Food Scientists. 29 March 2012 Web 17 September 2013

CAFES: College of Agriculture, Food and Environmental Sciences. California Polytechnic State

            University. 2012. Web. 17 September 2013

“Center Expands Opportunities for UC Undergraduates” The Cultivar. CASFS. *UC Santa*

*Cruz.* Vol. 37, No. 1 Spring/Summer 2009 Web. 19 September 2013

“Course Outline” CASFS: The Center of Agroecology & Sustainable Food Systems. *UC Santa*

*Cruz.* Web. 17 September 2013

 “Environmental Studies Major: Undergraduate Admissions.” Environmental Studies Department.

            University of California. 2012. Web 17 September 2013

Gold, Mary V. “Alternative Farming Systems  Information Center” National Agricultural Library.

*United States Department  of Agriculture (USDA)*. July 2012 Web. 17 September 2013

 “Internships and Volunteer Positions” Agricultural Sustainability Institute at UC Davis: The

            Student Farm. *ASI*. Web. 17 September 2013

Kresge Garden Club. UCSC. Web. 16 September 2013

Muir, Patricia. “What is Sustainable Agriculture?” Oregon State University: BI301 Human

            Impacts on Ecosystems. *Oregon State University.* 25 October 2012 Web. 11 September

            2013

Perez, J., D. Parr, and L. Beckett. “Achieving program outcomes? An evaluation of two decades of

 Apprenticeship in Ecological Horticulture at the University of California.” Santa Cruz Farm

 and Garden. Journal of Agriculture, Food Systems and Community Development, Volume 1,

 Issue 1, Summer 2010 Web. 19 September 2013

Press, Daniel. “The People’s Farm & Garden at UCSC” News and Notes of the UCSC Farm & Garden.

 Issue 136, Winter 2013. Web. 19 September 2013

SAREP. The Sustainable Agriculture Research and Education Program. *ASI.* Web. 17 September

            2013

“Scholarships: College of Agriculture, Food & Environmental Science” CAFES. California Polytechnic

 State University, San Louis Obispo. 2012. Web. 19 September 2013

“ Teach Agriculture” Cal Poly Pomona: Agricultural Science. California State Polytechnic

 University, Pomona. 2013  Web. 17 September 2013

Thomas, Andrea. “Why Sustainable Agriculture is Important to Everyone” The Blog. *The*

 *Huffington Post.* 8 December 2010 Web. 11 September 2013

“Transfer Requirements for Agricultural Sciences” Admissions for CALS. College of

            Agricultural and Life Sciences. *Cornell University.* 2013 Web 18 September 2013

Vadakan, Bee. Program in Community & Agroecology. *PICA.* Web. 16 September 2013

“What PICAns Have To Say” The Program in Community and Agroecology. *University of California*

 *Santa Cruz.* Web 19 September 2013