

## Why Students Should Study Abroad?

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The Department of Biosystems and Agricultural Engineering has faculty involved in two study abroad offerings: *Renewable Bioenergy Systems in Germany/Sweden* and *Food, Environment and Social Systems in Australia*. As faculty members we often get asked questions such as, “Aren't these just glorified fieldtrips?” or “Why should I go on a study abroad, I'm going to work in the US? Both of these are legitimate questions; however, from an academic standpoint study abroad programs broaden a student's mind and critical thinking skills.



Students plant 2,000 native species plants in the Douglas Shire / Daintree National Park area.



A similar planting after 2 years of growth for stream bank stabilization and erosion control.

In the photos above, the 2006 Australia group planted 2,000 native trees to improve water quality and negate the effects of prior agricultural practices of land clearing and sugar cane production plus over fertilization of golf courses. The project occurred near two World Heritage areas, the Daintree National Park and the Great Barrier Reef and was part of the Water Quality Improvement Program aimed at improving environmental quality for the Great Barrier Reef . Currently, the two largest threats to the Great Barrier Reef are climate changes caused by global warming and nutrient accumulation in rivers and seas. Over the past 20 years, changing agricultural practices such as less tilling and "trash blanketing" have resulted in less sediment, nitrogen, and phosphorus in rivers. The planting of trees is aimed at taking nitrogen and sediment out of the water so that the water will be of higher quality entering the reef. This learning opportunity exposed students to erosion, runoff, water quality, sedimentation, sustainability, community service, human impacts, and environmental quality within a span of only three hours. The experience brought life to learning and was instantly relatable to dirty hands and earthy smells. As a group we contributed something back to improving our environment and earth's sustainability while at the same time learning about the complex interactions between agriculture, tourism, indigenous culture and the environment.

Yes, some of the same learning could happen in the US, but when a person is taken out of their context and comfort zone the inconspicuous becomes blatantly obvious. For example, one student last year on the Australia program wrote in their journal that US hotels should place signs in the bathroom about using towels and linens multiple days to conserve water. The reality is that most US hotels already have those signs but it took traveling in a country where toilets have a half flush and whole flush option for someone to notice water conservation measures. An Associated Press article this week on MSNBC is titled, "Aussie drought means recycling sewage water." Study Abroad programs are designed to get students to critically think about differences in a proper context – not as a

right or a wrong but as differences and why. Much of the student's learning is from the academic components, but significant growth occurs from pre- and post- program activities, cultural exchanges, housing experiences, meals, foods, and inner-group conversations. The Australia program has the following student academic goals:

1. Translate their learning into a written, oral, and web-based formats for others;
2. Develop their critical, creative, and reflective thinking skills;
3. Enhance their ability to understand and interact with cultural differences and consider issues from diverse perspectives;
4. Challenge, understand, and appreciate their own culture and experiences and the influence of these experiences on their worldview;
5. Further their understanding of food, environmental, and social systems in Australia and the United States;
6. Understand the interrelatedness of food, environmental, and social systems on a global-scale; and
7. Understand one's personal and professional impact on local, national, and global issues.

In comparison to the Sweden program, the Australia and New Zealand program is traveling almost daily on a bus with a much more diverse student group which has included majors such as pre-med, animal science, kinesiology, environmental sciences, dietetics, food science, agribusiness management, Lyman Briggs, etc. As our society has become more removed from the basic understanding of their food production and natural resource reserves, we have citizens making assumptions or decisions without correct factual data. I once overheard a student in an orchard in Tasmania say, "I didn't know that it took this much to grow an apple," while another student the next year said, "What's runoff?" after about 2 weeks of content on conservation and sustainability issues. The beauty of these questions in a study abroad context is that our Agricultural and Natural Resources and Engineering students were able to share their knowledge base in a meaningful peer context. However the learning and sharing isn't one way. The environmental science students can share with the agricultural students why clearing a 1,000 year old rainforest for dairy farming is a bad idea while we're standing in a 90 year old re-growth area. Social science students can relate the current indigenous culture perils to the European settlement and practices brought into the counties for agriculture or sport. Books and pictures are one thing, but seeing in real time and space combined with smelling, hearing, tasting and touching generates true perspective, reality and critical thinking all key for successful professional careers. The answers aren't simple but demand a multi-disciplinary systematic approach which demands the expertise of many academic majors.



Wind energy is an important part of renewable energy.

The Sweden program is a more intense study in one specific topic, renewable energy. The program was first offered in 2006 with 12 students and only went to Sweden. The next program scheduled for 2008 will include Sweden and Germany and will look at energy in a broader context. Biobased renewable energy will play a critical role in meeting the ever-increasing global demand for energy. It is estimated that it took us 125 years to consume one trillion barrels of oil. It will take us less than 30 years to consume the next trillion barrels at the projected rate of consumption. It is vital that we develop and adapt renewable sources of energy that minimize dependence on the imported oil and reduce global warming. Sweden and Germany are among the most advanced of the developed countries in adopting energy policies that encourage the use of renewable energy. For example - over 20% of the total energy consumed in Sweden comes from biobased resources – a goal for the United States by 2020. This program will be technical in nature and will address various forms of renewable energies and associated technologies, economics, safety, and environmental impacts. Lectures and laboratory experiences will be provided by engineering faculty. In addition, students will visit a sustainable non-fossil fuel community and several sites where renewable energy is being used.



Students are learning about combined heat and power (CHP) generation using wood waste as feed material.

Because of the technical basis of the content, this program is specifically limited to engineering and science students with proficiency in physics, chemistry, and mathematics. Appropriate majors include applied engineering sciences, biosystems engineering, chemical engineering, mechanical engineering, physics, chemistry, forestry and resource development.

The course topics for this program include:

1. Global Overview of Energy (global demand and supply)
2. Wind Energy (technology application, limitations and cost)
3. Biomass (types, conversion technologies and applications)
4. Fuel Cells (principles, current status, and future role)
5. Renewable Energy (a systems approach)

However, one might argue that energy too is a multi-disciplinary area that includes cultural, social science and political components to name a few. Below are five sample reflective journal thoughts extracted from the 2006 Sweden program:

"There were many more people riding bikes than expected. The designs of some the bikes were quite interesting. There were tricycles with one wheel in the back and two in front, between the front wheels was a large bin that could be used to carry things."

"One of the first things I noticed that at cross walks no one crossed when it said do not walk even when there was no traffic. This is different from the US ."

"With all the talk about scarcity of oil, I am concerned with the way the general population of the United States consumes mass quantities of it."

"Today's lecture on forest residues was helpful in my understanding of what type of biomass can be used to produce energy. ...the speaker did a really good job of realistically showing how in the short term we will still be dependent on fossil fuels because new technologies cannot be widely implemented in a short period of time."

"...I have been thinking about the role of politics in energy policies. It seems the solutions that are needed are long term and long term policies are suicidal to politicians."

In summary, are these glorified fieldtrips and why study abroad? No, these are not glorified fieldtrips, but rather well planned academic experiences in a different context. We don't and can't live in a vacuum. Solutions take multi-disciplinary approaches. The world is truly flat, and our graduates must be able to critically think in a global context. Students can't afford not to go on a study abroad program – the correct question is when will they go and where? Study abroad with change a student's perspective for life. For more information on the Australia program, you can visit:

<https://msu.edu/course/be/475/australia/>

For more information on the Sweden and Germany program, you can visit:

<https://msu.edu/course/be/475/sweden/>