

Course Syllabus CDAE 295, 395, NR 385, MPA 395, Topics em Agroecossistemas PPGA/UFSC Brazil.

Agroecology, Farmer Livelihoods and Ecosystem Services in Brazil's Atlantic Forest

Spring, 2015

Instructors: Joshua Farley and one other instructor from UVM

Abdon L. Schmitt-Filho – Agroecologist and Alfredo Fantini - Forest Ecologist, both from PPGA/Universidade Federal de Santa Catarina.

E-Mails : Joshua.Farley@uvm.edu

Web Page www.uvm.edu/~jfarley/Agroeco (NOT YET LAUNCHED)

Course Background:

Brazil's Atlantic Forest, one of the highest diversity terrestrial ecosystems on the planet, has been reduced to less than 10% of its original extent, resulting in the degradation of ecosystem services that are vitally important to the two-thirds of Brazil's population living within its original borders. Recent years have seen a dramatic increase in devastating floods and landslides that have been attributed in part to deforestation. Ecologists estimate that failure to restore forest cover to 30% of the ecosystem will result in ecological collapse. The Brazilian forestry code formerly mandated restoration of ecologically important areas such as riparian zones plus an additional 20% of Atlantic Forest properties, which would result in approximately 30% Forest cover. However, many small family farmers in the coastal mountains of Santa Catarina state would lose so much arable land if they complied with this law that they would be forced into poverty. In 2009, the governor of Santa Catarina declared that the state would no longer obey the national forestry code, which set off a national debate and triggered federal legislation to weaken the code. Much of this legislation was vetoed by the President, but the code was nonetheless weakened, and there is an ongoing debate about further weakening the code. With current agricultural technologies, Brazil's goals of forest restoration, economic growth and poverty alleviation appear to be in direct conflict.

This situation has profound global importance. Both agricultural production and healthy ecosystems are essential to human survival, yet agriculture is among the greatest threats to global ecosystems. From an economic perspective, the marginal ecological costs of agriculture are immeasurably high, while to the one billion malnourished individuals, the marginal benefits of additional food are also immeasurable. In economic terms, this translates into supply and demand curves that do not intersect. Global society must develop new agricultural technologies and economic institutions to address this problem.

Course description:

This transdisciplinary, problem-based service-learning course involving faculty and students from UVM and the Universidade Federal de Santa Catarina

(UFSC) will contribute to an ongoing project intended to develop and disseminate an agroecological silvopastoral system using native species that is capable of improving the livelihoods of small family farmers while restoring degraded forests and the ecosystem services that they generate. Our goal is to contribute to careful scientific comparisons of the ecological and economic impacts of conventional and agro-ecological farming systems, and to the design of economic policies (with an emphasis on payments for ecosystem services) that support the development and dissemination of sustainable agricultural practices. In preparation for the field experience, we will review the progress that has been made on the project, and explore the ecological, economic, political and social context. We will then review and select appropriate methods for conducting baseline assessments of ecological and economic conditions in areas where we plan to implement pilot silvopastoral projects. During the field portion of the course in coastal Santa Catarina, we will initiate these baseline assessments. The project takes place in one of the most beautiful, friendly and safe regions in Brazil.

By their very nature, problem-based courses must be flexible. Our precise field activities will depend on the schedules of local participants, weather, project demands, changes in the Brazilian policy debates, support from government ministries, and a variety of other factors. Classroom material will be adapted to these constraints.

Course Objectives

- To explore the conflict between agriculture and ecosystem services, and the necessity of both, at both the global and local scale
- To assess the potential for agroecosystems in general and for agroecological high biodiversity silvopastoral systems in Brazil's Atlantic Forest to increase food production, improve farmer livelihoods and reduce dependence on non-renewable inputs into agriculture while simultaneously enhancing ecosystem services.
- To explore the economic, ecological, social and political challenges involved in the large scale development and dissemination of sustainable agricultural systems.
- To evaluate the suitability of different economic institutions for addressing the conflict between agriculture and the environment, and for financing the development and dissemination of agroecosystems capable of mitigating the conflict.
- To apply what we learn in the classroom to a real life situation involving small family farmers in one of the planet's most threatened ecosystems.
- To develop professional skills by working on real problems and publishing the results, and to foster group work and research skills.

Expectations:

This course is part of an ongoing project with Brazilian partners that is intended to help address one of the most serious problems facing human society. You will be interacting extensively with Brazilian professors, students, farmers, agricultural co-operatives and/or local politicians. We have high expectations for your role as researchers/problem-solvers and your role as cultural ambassadors to Brazil. In terms of academics, we expect you not only to conduct professional quality research, but also to communicate your results in one of three formats, all publication quality: an internal project document that carefully describes the problem you are addressing, specific objectives, field work methods for achieving those objectives, and results; an article for submission to a peer reviewed journals; or an editorial for local or national newspapers related to general course themes. In our experience, the work of writing a journal article is unlikely to end when the semester ends, but also contributes far more to your CV and to science than a typical course. You will also be asked to write periodic reflections.

Grading :

Class participation: 25%

Maturity and professionalism: 15%

Reflections: 15%
Working group contracts and peer evaluations: 5%
Final course project: 30%
Final presentations: 10%

This grading scheme may be modified if required.

Readings:

In this course we pre-select only core texts. Working groups will be responsible for extensive literature reviews on their specific topics.

General Introduction to the problem

De Schutter, O., 2010. Report submitted by the Special Rapporteur on the right to food. United Nations Human Right Council, NY.

Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., O'Connell, C., Ray, D.K., West, P.C., Balzer, C., Bennett, E.M., Carpenter, S.R., Hill, J., Monfreda, C., Polasky, S., Rockstrom, J., Sheehan, J., Siebert, S., Tilman, D., Zaks, D.P.M., 2011. Solutions for a cultivated planet. *Nature* 478, 337-342.

Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J.A., 2009. A safe operating space for humanity. *Nature* 461, 472-475.

Introduction to agroecology (suggested by Ernesto Mendez)

Méndez, V.E., C.M. Bacon and R. Cohen (Guest Editors) (2013). Agroecology and the transformation of agri-food systems: Transdisciplinary and participatory perspectives. Invited Special Inaugural Issue of *Agroecology and Sustainable Food Systems* 37(1) <http://www.tandfonline.com/toc/wjsa21/37/1>

Wezel, A., S. Bellon, T. Dore, C. Francis, D. Vallod & C. David (2009) *Agroecology as a science, a movement and a practice. A review.* *Agronomy for Sustainable Development* 29: 503-515.

Méndez, V. E. (2010). *Agroecology*. In B. Warf (Ed.), *Encyclopedia of Geography*. Thousand Oaks, CA: Sage Publications (in press).

Altieri, M.A. and V.M. Toledo (2011). *The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants.* *Journal of Peasant Studies* 38(3): 587-612.

Case study readings

Farley, J., Schmitt Filho, A., 2012. Ecosystem Services, Agriculture, and Economic Institutions., in: Brouwer, M. (Ed.), *The Ecosystem Promise*.

- Partner in communications and sustainable development, Bunnik, the Netherlands.
- Farley, J., Schmitt Filho, A., Alvez, J.P., Rebola, P.M., 2010. The farmer's viewpoint: Payments for ecosystem services and agroecologic pasture based dairy production. *Advances in Animal Biosciences* 1, 490-491.
- Farley, J., Schmitt Filho, A., Juan Alvez, Ribeiro de Freitas, N., Jr., 2012. How Valuing Nature Can Transform Agriculture. *Solutions* 2, 64-73.
- Schmitt F., A., Farley, J., Alarcon, G., Alvez, J., Rebollar, P., 2013. Integrating Agroecology with Payments for Ecosystem Services in Santa Catarina's Atlantic Forest, in: Muradian, R., Rival, L. (Eds.), *Governing the provision of environmental services* Springer.
- Schmitt F., A., Murphy, W., Farley, J., 2010. Grass based agroecologic dairying to revitalize small family farms through student technical support: The development of a participative methodology responsible for 622 family farm projects. *Advances in Animal Biosciences* 1, 517-518.

Field methods

- Jeanes, K., Noordwijk, M.v., Joshi, L., Widayati, A., Leimona, F., Leimona, B., 2006. Rapid Hydrological Appraisal in the context of environmental service rewards. , in: *World Agroforestry Centre - ICRAF, S.R.O. (Ed.), Bogor, Indonesia.*
- Kuncoro, S.A., Noordwijk, M.v., Martini, E., Saipothong, P., Areskoug, V., Putra, A.E., O'Connor, T., 2006. Rapid Agrobiodiversity Appraisal (RABA) in the Context of Environmental Service Rewards. *World Agroforestry Centre, Bogor, Indonesia.*
- van Noordwijk, M., 2008. Rapid Carbon Stock Appraisal (RaCSA): a rapid but integrated way to assess landscape carbon stock, in: *World Agroforestry Centre - ICRAF, S.R.O. (Ed.), Bogor, Indonesia.*

Tentative course schedule

Week	Topics	Readings
1	Introduction to the global conflict between agriculture and ecosystem services	De Schutter, O., 2010. Report submitted by the Special Rapporteur on the right to food. United Nations Human Right Council, NY. Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., O'Connell, C., Ray, D.K., West, P.C., Balzer, C., Bennett, E.M., Carpenter, S.R., Hill, J., Monfreda, C., Polasky, S., Rockstrom, J., Sheehan, J., Siebert, S., Tilman, D., Zaks, D.P.M., 2011. Solutions for a cultivated planet. <i>Nature</i> 478, 337-342. Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F.S., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C., Schellhuber, H.J., Nykvist, B., de Wit, C.A., Hughes, T., van der Leeuw, S., Rodhe, H.,

		<p>Sorlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J.A., 2009. A safe operating space for humanity. <i>Nature</i> 461, 472-475.</p>
2	<p>Agroecology and the environment; Introduction to Brazilian partners via Skype;</p>	<p>Méndez, V.E., C.M. Bacon and R. Cohen (Guest Editors) (2013). Agroecology and the transformation of agrifood systems: Transdisciplinary and participatory perspectives. Invited Special Inaugural Issue of <i>Agroecology and Sustainable Food Systems</i> 37(1) http://www.tandfonline.com/toc/wjsa21/37/1</p> <p>Wezel, A., S. Bellon, T. Dore, C. Francis, D. Vallod & C. David (2009) <i>Agroecology as a science, a movement and a practice. A review. Agronomy for Sustainable Development</i> 29: 503-515.</p> <p>Méndez, V. E. (2010). <i>Agroecology</i>. In B. Warf (Ed.), <i>Encyclopedia of Geography</i>. Thousand Oaks, CA: Sage Publications (in press).</p> <p>Altieri, M.A. and V.M. Toledo (2011). The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. <i>Journal of Peasant Studies</i> 38(3): 587-612.</p>
3	<p>Introduction to the Brazilian case study; Organize initial working groups: agronomy, ecology, social sciences. Outline for website</p>	<p>To be chosen from:</p> <p>Schmitt F., A., Farley, J., Alarcon, G., Alvez, J., Rebollar, P., 2013. Integrating Agroecology with Payments for Ecosystem Services in Santa Catarina's Atlantic Forest, in: Muradian, R., Rival, L. (Eds.), <i>Governing the provision of environmental services</i> Springer.</p> <p>Farley, J., Schmitt Filho, A., 2012. Ecosystem Services, Agriculture, and Economic Institutions., in: Brouwer, M. (Ed.), <i>The Ecosystem Promise. Partner in communications and sustainable development</i>, Bunnik, the Netherlands.</p> <p>Farley, J., Schmitt Filho, A., Alvez, J.P., Rebola, P.M., 2010. The farmer's viewpoint: Payments for ecosystem services and agroecologic pasture based dairy production. <i>Advances in Animal Biosciences</i> 1, 490-491.</p> <p>Farley, J., Schmitt Filho, A., Juan Alvez, Ribeiro de Freitas, N., Jr., 2012. How Valuing Nature Can Transform Agriculture. <i>Solutions</i> 2, 64-73.</p> <p>Schmitt F., A., Murphy, W., Farley, J., 2010. Grass based agroecologic dairying to revitalize small family farms through student technical support: The</p>

		development of a participative methodology responsible for 622 family farm projects. <i>Advances in Animal Biosciences</i> 1, 517-518.
4	Review of rapid field assessments for biodiversity, water quality, and carbon sequestration; Review of ongoing economic surveys	Kuncoro, S.A., Noordwijk, M.v., Martini, E., Saipothong, P., Areskoug, V., Putra, A.E., O'Connor, T., 2006. Rapid Agrobiodiversity Appraisal (RABA) in the Context of Environmental Service Rewards. World Agroforestry Centre, Bogor, Indonesia. van Noordwijk, M., 2008. Rapid Carbon Stock Appraisal (RaCSA): a rapid but integrated way to assess landscape carbon stock, in: World Agroforestry Centre - ICRAF, S.R.O. (Ed.), Bogor, Indonesia.
5	Review of rapid field assessments for erosion regulation and other ecosystem services; organize narrower working groups for field project	Jeanes, K., Noordwijk, M.v., Joshi, L., Widayati, A., Leimona, F., Leimona, B., 2006. Rapid Hydrological Appraisal in the context of environmental service rewards. , in: World Agroforestry Centre - ICRAF, S.R.O. (Ed.), Bogor, Indonesia.
6	Discussion of appropriate methods for field portion of course	TBA
7	Final preparation for field portion, review of safety issues etc.	
8	Field portion of course	Feb. 27-March 8
9	Debriefing on results of fieldwork	
10-15	Content to be covered in final meeting times depends on results of field portion of course	
16 and exam period	Presentation of student projects	

Tentative Schedule for Field Work

Date	Activity	Location
Feb. 27	Depart for Florianopolis	BTV
Feb. 28 (Sat)	Arrive in Florianopolis, go immediately to Garopaba. Tour of project, beach time, dinner.	Floripa→Garopaba
Mar 1 (Sun)	Travel to Santa Rosa de Lima, visit initial pilot projects (Seu Lauro, Seu Sebastião, and/or Zenir farm), lecture with agroeco (Lúcio) and Epagri (Jaírson)	Garopaba→ Santa Rosa de Lima
Mar 2	Field day in SRdL. Lunch. Travel to Imarui.	Santa Rosa de Lima→

(Mon)	Visit sites of Seu Amilton. Return to Garopaba.	Imarui→Garopaba
Mar 3 (Tue)	Project site (Imarui; possibly Garopaba, Paulo Lopes, or Santa Rosa de Lima). Plant understory acai, plant pioneers, mark off riparian zone.	Project site
Mar 4 (Wed)	Lecture with MDA (Ide Alfonso) and Epagri (Carlos). Baseline data collection	Project site
Mar 5 (Thu)	Baseline data collection. Afternoon recreational activity (e.g. visit Laguna to see dolphins helping fishermen; surf lessons; hiking)	Project site
Mar 6 (Fri)	Baseline data collection (tentative); return to Floripa for project wrap up.	Project site, Floripa
Mar 7 (Sat)	Project wrap up, beach, depart for BTV	Floripa→btv
Mar 8	(If student schedules permit, we'll depart for BTV on Sunday, arriving about 2PM on Monday)	Floripa→btv