Abstract: Biofuels and Ecoagriculture — Can Bioenergy Production Enhance Landscape-Scale Ecosystem Conservation and Local Livelihoods?

The following is a summary from a draft document by Jeff McNeely of the World Conservation Union, Jeffrey C. Milder of Cornell University, and Sara Scherr and Seth Shames of Ecoagriculture Partners. Reproduced here courtesy of EP.

The term “biofuel” refers to any energy source derived from recently living plants, animals, or their by-products. For thousands of years, humans have used traditional biofuels such as wood, charcoal, and dung to cook, heat, and manufacture goods. In the early 20th century, liquid biofuels began to be used as transport fuel, and, in fact, ethanol and vegetable oil were originally envisioned as the fuel sources for combustion and diesel engines.

In recent decades, biofuels have become regionally important sources of electricity and liquid transport fuels in some parts of the world, while traditional biofuels continue to provide 70-97% of all energy in African nations and in many rural parts of Asia (Ramachandra et al. 2004, Kgathi & Zhou 1995). In short, the production, processing, and use of biofuels is both local and global, small-scale and large-scale, subsistence and commercial—and we believe that dialogues on biofuels should reflect these many forms.

Recent dialogue around biofuels, stimulated by its rapidly growing attractiveness as an alternative to fossil fuels throughout the world, however, has tended to focus on large-scale bioenergy production to supply the global market for liquid fuels, and analyses have tended to be national to global in scale. For example, previous environmental analysis around biofuels has focused on global issues such as pressure for land conversion,

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Supporters of the deal don’t deny the potential conflict of interest for the school, but point out that the research gained...could be invaluable.

The deal will fund UCB’s Energy Biosciences Institute (EBI) for the next ten years and will conduct research based on biotech and genetic engineering for biofuel production. Of the $500 million, Berkeley will use $350 million to grant to their researchers and professors as they see fit – in collaboration with BP. BP will use the remaining $150 million in UCB laboratories with their own researchers and will not be required to share the results of their research with UCB.

Student groups and many professors on campus are protesting the conflict of interest to academic integrity that...
Several governments have resorted in recent years to subsidizing the production and requiring the utilization of biofuels. These actions are motivated by rising fuel prices, driven by growing demand for fuels resulting from economic growth primarily in Asia, as well as concern about climate change and fuel security. Brazil has led these efforts. Currently, about one third of the fuel that Brazilians use in their cars is ethanol produced from sugar cane. Corn is the main source of ethanol in the USA, which allocates 30% of its corn acreage to produce this biofuel. The main biofuel used in Europe is bio-diesel, and European states are importing palm oil to meet their bio-diesel requirements. Legislation supporting the introduction of biofuel has been supported in several developing countries and the volume of production of biofuel is growing throughout the globe.

Biofuels are not new products. Although fossil fuels have become the main sources of energy in the recent past, they are non-renewable resources and their term as the main source of fuel is finite. In contrast, biofuels are renewable. Also, the production of their feed stock (corn, sugar cane, etc.) is sequestering carbon and reduces the climate change impacts of their end-use while providing the same quantities of energy, relative to fossil fuels. However, biofuels do have their drawbacks. Economic logic suggests that allocation of lands for biofuel will reduce the supply of food in the world; thus, the production of energy to meet the needs of the middle class may hurt the poor.

Indeed, there is evidence that these concerns are justified. Rajagopal et al estimate that corn biofuel production contributes to a 21% increase in the price of corn. That results in a $5.5 billion dollar loss to food consumers worldwide and a gain of $6.6 billion to corn producers. Furthermore, there are growing pressures to remove lands from conservation activities in the U.S. and Europe, and to convert forest in developing countries, all to accommodate the demand resulting from the introduction of biofuels.

While the production of biofuels from sugar cane results in a 40% emission of greenhouse emissions, in comparison to gasoline with the same energy content, production of ethanol from corn results in emission of more than 80%; little variation from gas emissions. As such, the main gain from ethanol has been economical. Ethanol provided 1.5% of the energy content of gasoline used in the market and expanded the supply of fuel. That resulted in a 3% reduction of fuel prices and savings of about $30 billion to motorists. That’s a substantial gain but the contribution of biofuels to the energy situation is still limited and costly. Expansion of biofuel production based on using current technologies is limited in its potential to address energy problems and may have severe impacts in terms of food availability and environmental conditions.

The limitations of the current biofuel technologies suggest the need for research and adoption of technologies that will increase both food and biofuel productivity. The ‘UC Berkeley/University of Illinois/British Petroleum research initiative’ aims to develop new types of biofuels that will take advantage of the celluloid in plants. The feedstock considered for these biofuels include perennial plants, like miscanthus and switch grass, that will produce more than thrice the amount of ethanol per acre that corn is currently producing and will provide extra benefits in terms of carbon sequestration. However, even with these improved technologies, biofuels are limited in their potential to solve the energy challenges facing humanity. They can be an important element of a diversified strategy that must also include strong incentives for energy conservation.

Related literature:

The term biofuel includes mainly bio-diesel and bio-ethanol; the two biofuels widely in use worldwide. Bio-ethanol is used in spark ignition engines as a replacement of, or in blends with, gasoline. Bio-diesel is used in compression ignition engines and it is therefore used for blending in or in replacing petroleum diesel. Both biofuels are derived from plants. Thus, an expansive biofuels industry demands large-scale cultivation of fuel crops and a corresponding processing infrastructure.

Another biofuel whose production technology is mature is bio-hydrogen, derived from biomass. It admits a wider variety of biomass sources and so its commercial use is expected to rise considerably, partly in tandem with increasing use of hydrogen engines. Hydrogen production processes overlap a bit with bio-ethanol’s.

Bio-diesel is a fuel made from renewable materials such as vegetable oils or animal fats, is biodegradable, non-toxic, and has significantly fewer emissions than petroleum-based diesel when burned. With a flashpoint of 160°Celsius, bio-diesel is classified as a non-flammable liquid by the Occupational Safety and Health Administration of the U.S.A. This property makes a vehicle fueled by pure bio-diesel far safer in an accident than one powered by petroleum diesel or explosively combustible gasoline. Bio-diesel is mostly superior to fossil diesel: it is safer to handle, is non-toxic to humans and the environment, lubricates engines better and extends engine life, and produces lower emissions than fossil diesel.

The worldwide move toward the use of bio-diesel is well under way. Brazil is a major producer and consumer of bio-diesel, and large commercial companies such as Dow Chemical in the United States are investing highly in bio-diesel and production facilities. In various developing countries, bio-diesel plants have been proposed or established as a means of generating income and reducing dependency on imported oil.

Factors that Motivate Developing Countries’ Interest in Biofuel:

- Diversification of energy sources and lower exposure to the price volatility in the international oil market;
- Rural development;
- Reduction in harmful pollutants from vehicle exhaust;
- Climatic change reduction due to greenhouse effect(s);
- Potential for bio-diesel development in Kenya.

Kenya’s rapid urbanization was expected to reach 23% in year 2003. Apart from Kenya’s high population growth rate, the little available agricultural land limits Kenya’s agricultural and agro-forestry development. Kenya has no fall-back plan should fossil fuels become unavailable for any reason. Such a crisis would devastate the economy. Further, Kenya is a signatory of the Kyoto protocol; biofuels create the opportunity to reduce greenhouse gases.

Use of indigenous non-food crops

Kenya’s indigenous trees that will likely provide the lion’s share of the raw vegetable oil are croton megalocarpus and yellow oleander (thevetia peruviana). Found growing scattered across the central region of the country, croton megalocarpus, known in the region as “mukinduri”, has fairly open canopy architecture, meaning that crops tolerant of partial shade can be grown beneath it. Croton also has a lengthy lifespan, producing oil-bearing nuts for about 55 years. Yellow oleander (thevetia peruviana) is economically important and is more adaptable to harsh agro-ecological conditions prevalent in the semi-arid lands (ASAL) in the tropics.

Greenfuels Company of Kenya Ltd. is pursuing a biofuels strategy for Kenya. It has identified three indigenous oil-bearing plants - croton, yellow oleander and jatropha curcas - as sources of the precursor vegetable oil. While many current proposals push the idea of jatropha curcas as the vegetable oil source, they recognize the implausibility of establishing a jatropha plantation of sufficient size because of the immense labor of such an endeavor. Furthermore, there is the fear that a large jatropha plantation is likely to be spread beyond its boundaries. As an invasive species, jatropha can become a pest and ecological catastrophe.

Presscake is the remnant of the croton nut and yellow oleander seeds after the oil is extracted and may be incorporated as a high-calorie, high-protein supplement in chicken feed. It can also be used to generate biogas, which can be burned to power the bio-diesel refinery or to produce steam and electricity in a co-generation process, and incorporated with the hull of the croton kernels and converted through a composting stage to an organic fertilizer which can replace the equivalent amount of imported chemical fertilizer. The possibilities for biofuels are great indeed. #
“We don’t eat soybean; we eat rice, beans, manioc flour, chicken and fruit”.

This was a statement written on a banner during one of the parades against soybean growing in Brazil and the large corporation Cargill. The protest brought people together in Santarem, Eastern Amazon, in April 2006 – all from peasant and river communities.

It may sound like a strange protest to a vegetarian who is concerned about being healthy and environmentally friendly, but not to the woman who was banished from her land and forest and now has her family living in a poor and dusty district in the outskirts of a big city.

Contradiction among such Brazilian opinions becomes apparent from the following statement by someone who knows what the presence of a transnational company like Cargill in the heart of the Amazon Region represents: “Get out Greenpeace; The Amazon belongs to the Brazilian people”. This is written on the car stickers of Brazilian urban dwellers who believe that soybean agro-business may bring development to the region and also, of course, on the SUVs and trucks of the soybean farmers. The farmers moved from the South, attracted by the ‘opportunities’ that could be found around the newest ‘agriculture frontier’ of Brazil; opportunities such as the cheap price to obtain Amazonian farmlands, opened and sold by profiteering land dealers.

In this case the local people, threatened by biofuels production, approach the situation of biofuels/agriculture-sector growth more realistically; they see the threat of violent land grabbers who steal their land and force them to leave. After the seizures, and after their land is deforested, the formerly sustainable, livelihood-based land is sold as a “farmland” to soybean farmers. It is more socially and environmentally meaningful and important to the political sphere to consider the locals’ opinions on the situation.

Deforestation in Brazil continues to be a problem. A problem that could worsen with growing biofuel plantations.

Amazon people are very aware of the real risks and benefits of biofuels-agriculture... Learned by practice is the knowledge that to advance monoculture over the natural forest ecosystems and traditional ways of living can be a danger to ecosystems and the populations they support.
Fuel, especially the biofuel issue, has become so dominating in our policy-making sphere that many of the negative externalities associated with biofuel production are being ignored. Jatropha (Jatropha curcus) cultivation – presents such an example. Recently, Rajasthan, one of the biggest states in India, had its Cabinet allocate 4.9 million hectares of “cultivable wastelands” to private companies, cooperative societies, BPL (below poverty line) families etc., for planting of Jatropha. This brings almost 45 per cent of the state’s 10.56 million ha. of “wastelands” into jatropha cultivation.

Allotting “cultivable wastelands” means that most of the Orans – forests that provide vital livelihoods and basic needs for economically vulnerable rural communities – and whose numbers are approximated at 25,000, covering more than 600,000 hectares area – would be snatched away from the pastoralist communities; most of the Orans legally fall under the “culturable wasteland” category. It is estimated that 7.5 million pastoralists in Rajasthan who are directly dependent on Orans will be badly affected since the Orans are a source of natural wealth (grazing/fodder, water, fuel, timber, berries, roots, herbs), sustain essential ecological processes and life support systems, and provide medicinal plants and green cover for the villages. According to the Forest Department of the Government of Rajasthan, only 5,370 square kilometers are occupied under Orans in the Thar Desert area, which covers 9 districts out of the 32 districts of Rajasthan. Also, Orans are the best example of the inter-linkages between forest cover and protection of water sources, which offer the pastoralists and local population a genuine incentive to invest in forest protection in the form of ‘Orans’. According to one study, 41% of livestock is dependent on Orans in the Barmer district of Rajasthan. Orans also benefit the villages through their bodies of water and diversity of trees. During a survey of 163 Orans in Alwar district, KARPAVIS observed that every Oran has a water body.

Another category of land is Gaucher (pasturelands), which account for as little as 2% of the total land in Rajasthan. Grazing is mostly done on the land belonging to the revenue department. 90% of the 10.56 million ha. of wasteland lie in the Jaisalmer district. This region also has catchment areas that help irrigate rabi crops and provide water for humans and animals. If this area is cultivated, the catchments areas would be clogged, creating drought-like conditions. A study carried out by an NGO found that most of the actual wastelands are rocky barren lands, ravines, and deserts that are unfit for cultivation, while the remaining “wasteland” / pasturelands were heavily encroached upon. Hence if unfit areas, which are actual wastelands, are removed from the list, then the only land remaining is the village common land. Then this new biofuel policy is nothing but an excuse to grab Orans / villages’ common pastureland by calling it wasteland. In the past, private companies have tried to grab village commons and grazing lands.

Therefore, since it would wreak havoc in pastoralist communities, pastoralists in Rajasthan are much concerned about the manner in which the government is leasing out their land for Jatropha cultivation. Even though Jatropha may not always be harmful to plant, the manner in which the government is leasing out land is mainly at the cost of the poor, and it ignores two important issues; food production for pastoralist communities and the quality of environment for all. And the governments intent to consider BPL families for land allotment under this new bio-policy is merely an attempt to win points among NGO / civil society organizations while compa-
Dr. Anthony M. Penaso, who recently completed the 2007 Beahrs ELP, joined no less than Her Excellency Philippine President, Gloria Macapagal-Arroyo in a ceremonial jatropha planting held at the Jatropha Seed Production Center of Central Mindanao University on August 28, 2007.

Aside from being the University’s Vice President for Research and Extension, Dr. Penaso is the Project Director of its Biofuel Research and Enterprise Development Project. The project is funded by the Commission on Higher Education, and has received some financial assistance from the Department of Science and Technology.

The President visited the project site at Central Mindanao University which consists of an 11-hectare demonstration farm, and seed production and nursery centers. The visit was highlighted by a ceremonial planting led by Pres. Arroyo. National and local officials participated; the said ceremony calls on Filipinos to “grow oil on soil”.

The increasing trend in the price of crude oil and the depletion of fossil fuel supplies have prompted many countries such as the Philippines to look for fuel alternatives, particularly biofuels. A source quickly becoming popular as a suitable fuel alternative is Jatropha curcas. There is a growing interest among countries, including oil-producing ones, to plant Jatropha on a wide scale.

In January 2006 in the Philippines the President signed into law the Biofuels Act. This act provides that all liquid fuels for motor vehicles sold in the country “shall contain locally produced bio-fuel components”. It also provides an incentive of zero-rated specific tax on the biofuels component of blended gasoline or diesel. Aside from the value-added tax exemption for the sale of raw materials in the production of bio-fuels, there is a provision for exemption from wastewater charges under the Clean Water Act in the production of biofuels as well as extension of financial assistance from government financial institutions for the production, storage, handling and blending of biofuels.

The said project implemented by Central Mindanao University is aimed at contributing to the country’s initiative in pursuing energy independence. It is also consistent with the country’s sustainable economic growth model which would expand opportunities for livelihood – with due regard to the protection of public health and the environment. By mandating the use of biofuels as a measure to develop and utilize indigenous renewable energy sources to reduce dependence on imported oil, toxic and greenhouse gas emissions are mitigated and rural employment and income can increase. #
A myth or solution to poverty, the energy crisis, a fuel price rise, unemployment, environmental degradation and climate change? Biofuel plant cultivation, the production of fuel from plant and animal matter, has gained ground in Cameroon. There are three types of biofuel: biodiesel, obtained from oil in plant seeds, ethanol, produced from the fermentation of sugars found in plants and biogas, from the composition of plant organic matter. Biofuel can be produced from these plants: corn, sugarcane, palm oil, sunflower, soy beans, and groundnuts and from non-edible plants like jatropha and eucalyptus trees. All of these biofuel plants are present in Cameroon. Ethanol is already being produced from sugarcane in our country, though in small quantities. There are already exploration activities being carried out by some Western companies on how to get palm oil from Cameroon converted into biofuel. In many countries in the Global North there are already biofuel filling stations for vehicles and machines that use biofuel to run. Italy, France, and Sweden are some examples.

Some companies in Cameroon with affiliates in Europe are already promoting biofuel production, especially from the jatropha curcas plant. The cultivation of jatropha is rapidly growing as many farmers getting involved. Jatropha has a rich non-edible seed, is a drought-resistant perennial plant, grows relatively fast in marginal/poor soil, and can produce seeds for up to 50 years. It flourishes in the tropics and sub-tropics. Biofuel produced from jatropha can run simple diesel engines.

A nonprofit Association called GREENERY (www.greenery-cm.org) is working with communities in the Bui Division of the Northwest Province of Cameroon to promote jatropha cultivation and provide technical assistance to farmers who are being supplied with seedlings for planting. These seedlings are obtained from nurseries owned by GREENERY, which has given employment to villagers in the community. GREENERY says lives are bound to change in the region since this will be a source of employment and income for communities where they operate - especially when the jatropha crop starts producing. GREENERY also says they will buy back the seed produced for biofuel production. It is not yet clear whether biofuel production (refinery) will be in Cameroon or not. It’s argued that jatropha will help reduce biodiversity loss by combating desertification and creating sustainable income-generating opportunities for rural communities. It should be noted that the Bui division is found in the Bamenda Highland Forest region which hosts a fragile savannah vegetation (with patches of montane gallery forest) suffering from overgrazing, over-exploitation of resources, and bushfires from slash and burn farming. Land conflict is high in the region between families, people, villages, and tribes.

Biofuel plant cultivation can pose the following major threats if care is not taken:

- Agricultural land could be converted to biofuel crop cultivation, leading to a reduction in food crop production and denying communities their food sovereignty.

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Several Indonesian colleagues and I recently organized a renewable energy regional congress that was held on 5-7 November 2007. The theme was Forest and Agricultural-Based Bioenergy for People and the Planet.

Within the context of the Forest and Agricultural Based Bioenergy for People and the Planet we addressed the issue of biofuel. As one important source of renewable energy, biofuel is quite familiar in Indonesia. Some people were reluctant to accept the issue of biofuel since they indicated that this situation is linked to conversion of the forest.

Indonesia is transitioning itself towards greater utilization of renewable energy sources, driven by the depletion of its oil reserves, the desire to be self-sufficient regarding its energy supply and by environmental considerations, especially climate change and the need for carbon mitigation.

Indonesia is one of the few nations that contains mega-biodiversity and has an abundance of agricultural crops and forest-based biomass that is ideal to use for the production of energy. Increasing the use of bio-energy is one strategy to achieve a sustainable supply of energy while being concerned about the environment. Many countries are exploring the use of biomass to generate energy because of their desire to eliminate their reliance on fossil fuels for energy production. In addition, they want to diminish the emissions of greenhouse gases that result from combusting fossil fuels. Indonesia, like other countries with considerable land area in agriculture and forests, has the potential to economically utilize biomass for energy production while diminishing their environmental footprint.

In response to these problems, The Government of Indonesia, e.g. the Ministry of Mines and Energy, has pledged to accelerate the process by promoting alternative energy uses. Regulatory processes are in motion and cooperative efforts are occurring among the government agencies to find and promote the use of alternative energy. The Ministry has also introduced programs to maximize the use of natural resources to produce energy and diversify Indonesian energy sources.

Increasing the use of bio-energy is one strategy to achieve a sustainable supply of energy while being concerned about the environment.

Relevant link: http://bioenergy-conference.bfuel.biz/
The recent troubles in the Middle East and Africa, the rapidly growing demand for oil in China and the consequent rises in crude oil prices have highlighted the dependence on and complete lack of control over prices and availability of oil for developing countries that have no resources of their own. It is under these conditions that the need to look to new and environmentally friendly alternatives for other energy sources has become even more important. The Lao Government plans to designate more than 2 million hectares of idle land for the development of bio-fuel feedstock plantations in an effort to produce enough bio-fuels by 2020 to replace fuel imports. The trade policy of the Lao government is based on the promotion of commercial production with the main goal to substitute imports and increase exports. Therefore, the Government proposes empowering Lao businesses by cultivating crops of jatropha, soybean and coconut, processing this raw vegetable matter into oil and then, by the process of transesterification, converting it into bio-diesel. The Lao PDR has also become a party to the ASEAN Free Trade Area (AFTA) agreement and Common Effective Preferential Tariff (CEPT) scheme. As part of its market liberalization efforts, the Lao PDR also signed bilateral trade agreements with 16 countries, including Thailand and the USA. Currently, the Government has also committed to accede to the World Trade Organization (WTO) to increase its integration into this multilateral trading system.

There are many types of plants that can be used to produce bio-diesel. The original diesel engine was run on peanut oil. Products that are already grown in Laos include corn, rice, coffee, opium poppy, soybean, palm, and coconut. These different raw materials yield varying quantities of oil and have inherent advantages and disadvantages.

**Possible disadvantages of biofuels**

There are real concerns about additional environmental and social impacts associated with some growing plants for biofuel. In broad terms the main biodiversity impacts are as follows:

- Conversion of natural forests to monocrop plantation;
- Expansion of jatropha oil industry in areas where prominent endangered species exist such as elephants and others;
- Land clearing fires for the establishment of new plantation;
- Soil erosion and increased sedimentation;
- Pollution through use of fertilizers and pesticides;
- Pollution though jatropha oil mill effluents;
- Potential use of genetically modified varieties in the industry;
- Use of land targeted for alternative uses such as nature conservation.

Land for the sole use in making fuel “ties up” this land for up to 50 years. The land is then unsuitable for any other purpose for this approximate 50 years cycle. Depending on the crop/tree/shrub used the land also forms an ecological/environmental organism in tune with the particular tree/bush/shrub grown over the long term on the particular land. This makes for microorganism changes, perhaps slight and subtle in some cases, but change does take place. Ultimately this can lead to an increased depletion of those organic materials/microorganisms that could have otherwise be used to produce edible crops. In addition, the rejuvenation of that land could take an additional 50 years, thus increasing the total time the land is removed from other use by 100 years.

When considering land for fuel as opposed to land for food perhaps looking at alt crops is the most essential thing that can be achieved. We should be careful not to grab at “quick” solutions that can make longer term multi-generation problems that increase on a logarithmic scale. By using sticky rice, mountain side dry rice, sweet potato, cassava, sugar cane and other such crops it is possible to achieve better productivity from the land without the need to use fertilizers.

The experiment to date with naturally grown jatropha indicates that in “dry” land the plant is extremely susceptible to white ant infestations. This then requires further destruction of the microorganisms through the addition of pesticides. As the earth is a living entity the white ants and worms make up a major part of this life by letting air and other penetrations into the topmost layers of the soil. This is the layer from which most, if not all, food sources for all life on the planet is dependent. As many countries now striving to reduce pesticide use have found, using chemical pesticides to kill off the ants also allows trace levels of such pesticides to contaminate ground water, the sole supporter of life for the production of food in this soil.

**Possible advantages of biofuels**

Jatropha fences not only control straying animals, they also reduce wind erosion and, if planted parallel to slope, can help reinforce small earth or stone dams, thus helping control water erosion. The plant’s roots grow close to the ground surface, anchoring the soil like miniature earth bunds. These bunds effectively slow sur-
Fianarantsoa is one of the poorest provinces in Madagascar and suffers from a high incidence of diarrheal diseases and infant mortality. Establishing good hygiene and sanitation practices among school-age children and providing them with potable water reaps long-term benefits sustainable development. Since very few schools in the area are equipped with the full complement of potable water, latrines, and hand-washing stations, the Sekoly Madio SGI project, in partnership with USAID, Association Angia, and UC Berkeley, aimed to implement a low-cost water sanitation program with easily replicated technologies. All 15 schools in the commune participated, a total of 3760 students, in the application of the holistic WASH messages (Water, Sanitation, and Hygiene). There are four components to the program (3 materials-based and 1 based on education):

- Access to point-of-use potable water via SODIS (Solar Water Disinfection);
- Construction of latrines with locally available materials for safe feces disposal;
- Establishment of boboka hand-washing stations (traditional clay pots) and soap or ash;
- Creation of a set of lessons ("Health Is In Your Hands") for teachers to use about water, sanitation, and hygiene.

Sixty six teachers have been trained and a monthly reporting system has been established. The most unexpected aspect of the project has been the motivation of selected teachers and parent associations to improve students’ health. For example, upon learning about Sekoly Madio, certain schools, teachers and parent associations took actions to install hand-washing stations, treat drinking water, and rehabilitate existing latrines, and nearly all of the school parent associations committed to purchasing buckets, ladles, cups, and important chemical water-treatments.

The Kagitumba district of Rwanda is comprised of stressed land that has been depleted by a growing population, the majority of whom are very poor and are mainly widows and orphans. Few legal or sustainable economic activities occur in the area. With this harsh environment and high level of poverty, parents of Kagitumba are not able to provide sufficient food to their school-aged children. As a consequence, school performance and attendance is seriously affected. A new school was recently funded and is expected to be ready for students by January 2008. However, because backward farming systems continuously damage the environment there is cyclic famine every season due to drought and poor harvests. As a consequence, parents cannot meet the nutritional needs of their families, and undernourished children are not able to fully benefit from the new school.

With the introduction of a school feeding and gardening program through this SGI project, children can attend school and learn to grow food crops and animals, respect their natural environment, and will develop a sense of unity from eating with peers. 120 school children are fed during school days while their parents participate as gardeners in selling or giving agricultural products to the school and maintaining a kitchen and garden. Local stakeholders, such as the government of Rwanda, are encouraged to join the program.

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Ecoagriculture is fundamentally a landscape approach based on understanding and intentionally managing the inter-relations among different parts of an agricultural mosaic landscape, including cropped areas, grasslands, natural forest patches and reserves, and aquatic resources. A mosaic arrangement of such land uses can not only provide diversified income sources and conserve native biodiversity, but also maximize the production of ecosystem services that sustain agricultural productivity such as pollination, water purification, and soil fertility enhancement.

As suggested above, bioenergy production can be part of a strategy for diversified land use to achieve multiple objectives at landscape scale; similarly, it can contribute to a diversified financial strategy for rural households and communities. For this to happen, however, will require careful landscape planning based on local data and scientific analysis used in the service of stakeholders’ goals. Key decisions include siting of biofuel production areas, selection of energy crops, farm and landscape configuration, and integration versus segregation of crops and land uses. Some design considerations related to landscape configuration, biodiversity management, and soil fertility. Many of these factors are illustrated in existing bioenergy cropping systems in different parts of the world. Examples include:

- Harvest of biomass from grasslands as a way of maintaining the financial viability of extensive production systems in parts of Europe;
- Producing biodiesel for local energy use from jatropha in India and West Africa enhancing habitat value;
- Raising native mixed grasses in the American Midwest as a replacement of monoculture cornfields. Brazilian farmers growing sugar in rotation with tomatoes, soya, peanuts and other food crops.

There are, however, benefits of biofuel over food crops. They tend to carry lower production risks and greater adaptability to drought periods than many food crops. Non-perishability also allows farmers the option of selling at anytime of year when they can get the best price. But such benefits are maximized with a diversified biofuel/food system, not a wholesale shift away from food crops. It may be necessary to establish rules limiting the scale and proportion of monocultures in the landscape to ensure that land is left for left for food and nature.

There is enormous potential for biofuels to be integrated into multi-functional landscapes that can sustain production, ecosystem services, biodiversity and local livelihoods. Ideal mosaic landscapes would feature a mix food crops with deep-rooted biofuel crops, such as prairie grasses and fast-growing trees. These systems could reduce land degradation, enhance biodiversity habitat, sequester carbon, increase water infiltration and retention, and use fewer fertilizers and pesticides. These design characteristics would be accompanied by a supply chain that maximized benefits for farmers.
The agrarian, infra-structure, and even environmental, public policy trends are oriented to the commitment of the Brazilian government to supply the growing global demand for biofuels. It matches well with Europe’s goal of 10% biofuel use, and the U.S.’s 35 billion gallons of biofuels being pumped to car tanks every year.

After the last convention between Lula and George W. Bush, such commitment to fuels production became very clear. Of course the U.S.-based energy and agribusiness corporations are grateful to its Brazilian counterparts in “opening” such amazing “opportunities”.

Going back to the powerful communications strategy of the encroaching farmers in Santarem… From the stickers seen around, the latest one brings this statement: “plant soybean and sugar-cane: more fuel and less pollution is equal to a better environment”.

Yet the civil society organizations and social movements are well mobilized, showing that Brazil knows what to do and what kind of response has to be given; the Amazon people are very aware of the real risks and benefits of biofuels agriculture.

It’s known that Brazil is the fourth biggest greenhouse gas emitter due to deforestation. Also, learned by practice, is the knowledge that to advance monoculture over the natural forest ecosystems and traditional ways of living can be a danger to ecosystems and the populations that they support. That lady who doesn’t eat soybean wants to continue living in the forest, to keep her small and diversified crops, her chickens around her backyard, and also… keep paddling her canoe! So probably her next banner will be: “I don’t drive a Hummer…”
Some food crops like palm oil, corn, sugarcane, etc. could be cultivated and converted into biofuel. But hunger and malnutrition would still reign in some of our communities. This could all lead to a staggering rise in food prices - disadvantageous to Cameroon’s high poverty levels.

Virgin forest or biodiversity (Cameroon is found in the Congo Basin which hosts a rich tropical forest, “the lungs of the earth”) could be destroyed to give way to biofuel plant cultivation and thereby undermining the need for environmental sustainability.

With these three major points in mind, it is necessary for the government of Cameroon to prepare a document of principles to regulate, control and coordinate biofuel development in the country. This document should involve the Ministries of Agriculture, Environment and Energy with contributions from the civil society, private sectors like the biofuel companies, and academic institutions in Cameroon. It is also worth noting that the document should also look into the following issues that have been a call for concern where biofuel plants are cultivated:

- Protection of the culture, tradition, language and spiritual values of indigenous and rural communities by operating biofuel companies.
- Avoid the contamination of native plant species by genetically modified plant material brought in to improve biofuel plant cultivation.
- Biofuel corporations should be held strictly liable for any social and environmental damages that they cause.
- The conversion of primary forest to biofuel plantation and human rights violations should be forbidden.
- Food sovereignty should be protected as people’s right to produce their own food in accordance with their food culture.
- Land conflicts that could result due to confiscation of land without compensation should be addressed.
- Set rules guiding employment and contract rights in biofuel development.
- Legally binding social and environmental standards, and a set of enforceable regulations.
- Make sure that economically marginalized people are not deprived of their natural resources such as water and forests.

While we need to make biofuel development sustainable, there is also a need to ask people from the Global North to reduce their energy consumption to sustainable levels. Sometimes the cost involved in the production, transportation, marketing and distribution of biofuel can be so high that it’s a question whether biofuel is a renewable energy and sustainability. While fighting global warming, there is need to make sure that our activities are cost effective, otherwise our fight against climate change will be undermined. Biofuel can be a blessing if it integrates the socio-economic and cultural lives of the people by addressing poverty, hunger, environmental sustainability and climate change. There is a need to encourage fair trade in biofuel between the people of the Global South and North. #
such a deal with a huge multinational corporation presents. Opposition to the deal comes at a time when government funding to colleges throughout the United States is drastically decreasing; universities, especially those with research capabilities, are presented the opportunity to re-gain funds through corporate sponsorship instead of through historically public financial support. Opponents further state that biofuel plantings and production could have drastic socio-economic and ecological effects worldwide, especially for the countries most closely involved.

Supporters of the deal don’t deny the potential conflict of interest for the school, but point out that with the research gained after the ten years of collaboration invaluable information on biofuels, a field about which little is known, and potential alternatives to U.S. dependency on oil could be presented. #

Debate continues among those on the UCB campus. But it remains to be seen what results this collaboration will bring and to whose benefit. #

Continued from page 9: Environmental Impacts of Trade Liberalization in Laos

face runoff during heavy rain, thus causing more water to penetrate into the soil. Another advantage is that the press cake which remains after oil extraction has proved to be an effective organic fertilizer, with mineral composition equal to those of chicken manure. This supports agriculture in many parts of the country as does the entire biofuels production. These advantages cannot be ignored. #

Continued from page 1: Academic Integrity and Corporate Funding: The Debate at UC Berkeley.

Continued from page 10: SGI Project: Katigumba School Feeding Program in Rwanda

and their links to local farms. The capacities of farmers to produce enough for consumption and new practices to enhance food production, plus development strategies for fundraising were examined. The end goal of the entire Katigumba program is to improve livelihoods of locals through their involvement in the school kitchen and garden, and to empower parents and farmers by feeding school children—thus relieving parents to engage more in productive and beneficial activities for their families and the greater community. #

Continued from page 5: Jatropha and Pastoralists’ Livelihoods.

points among NGO / civil society organizations while companies like D-oil (Britain), Reliance, Indian Oil, Hindustan Petroleum etc. are major applicants trying to grab the newly available land.

NGOs, civil society organizations, and pastoralist communities have started lobbying and questioning how the government plans to make jatropha a profitable venture for both communities and private companies. Regrettably, scientists and pessimists fear that lack of technical knowledge may render the scheme unsuccessful. #

Rwandan women attend training sessions about school gardens
Emmanuel Mukanga ('01) has recently joined EmSam Systems (U) Ltd. as CEO/Communications Consultant specializing in energy saving ICT, communications, PR, and environmental education consulting.

M. Gopakumar ('01)
“…When you have a moment to spare, please lookup a website that I have created www.rootcause.in” It includes a series of articles and ecozines that concern you and that are based on published research findings. Examples of pieces that question our lifestyle of consumption and waste include: “How A Coke Can Is Made” and “Asbestos Should Be Greek To Us”. There is also a series of links in which action can be taken such as, for example, to save India’s forests.

Abou B. Bamba ('03)
“While working for Ramsar, I am completing a Ph.D. on the ‘Evaluation of African Public Environmental Policies Since the Rio Summit’ at the Center for Diplomatic and Strategic Studies of Paris, France. I am also quite busy with Ramsar (coordinating wetlands, poverty reduction and water related projects all over the Africa region and preparing for the next Pan African Pre-COP10 meeting).…. Ramsar, which is likely to become the key UN Convention that deals with Freshwater and its resources….this will be a decision of the contracting parties in one of the coming COPs. The next COP will take place in Korea next year with the theme ‘Healthy Wetlands, Healthy People!’

Mireille Linares ('03) has just joined the staff of the Mexican Ministry of the Environment in the Coordination Office of International Affairs as Borders Sub-director.

Kazim Niaz ('03)
“I am presently working in the volatile tribal areas of Pakistan. My designation is Political Agent Mohmand Agency. I am in charge of security as well as development. It is hell of a job. We are facing a serious security threat and the next few months would decide the future course of the Pakistani society. I need all the prayers of friends and well wishers in this assignment which seems the most challenging of my life as yet.”

Siti (Nungky)Nurwati ('03)
“In 2006, I worked in Women Research Institute that was responsible for arranging and managing gender budgeting issues. In January 2007, I moved to SCNCREST that cooperates with SEARCH Hong Kong. My occupation is Research Coordinator and consultant for Women’s Empowerment in Moslem Context Project. (My baby was due Sept 15).”

Eka Otarashvili ('03)
“This Summer I was honored to receive scholarship from the Reform and Development Fund of the President of Georgia. This scholarship made it possible for me to enroll at PACE University Law School, New York to pursue my LLM degree in Environmental Law. PACE is a great school and Environmental Law Program is recognized by the University as its most important curricular specialty. I am positive that participation in the program is a great opportunity to continue my education in the USA. I am expected to graduate in December 2008. By that time, my husband’s posting at the Georgian Mission to the UN should be finished and we will return home to Tbilisi, Georgia.” See the picture of her baby in this issue.

Nguyen Van Tri Tin ('04)
“I am living in Hue city now and working at Hue Forest Protection Department. I have just been offered a scholarship by Ford Foundation (CEEVN) to pursue my Masters Degree in Environmental Policy and Science.”

Pieter Terpstra ('04)
“I got married this summer to Sanne Bloemarts. Some of the ELP 2004 alums know her as she was in Berkeley just before the end of the course. And I will be moving to Dhaka, Bangladesh in December. I’m still working for the Netherlands Ministry of Foreign Affairs. I will continue my career within the ministry in Dhaka as Policy Officer of Water Management. I’m looking forward to meet all the Bangladeshi alums in the 3 1/2 year that I will be posted in Dhaka.”

Chris Aldridge ('05)
“I am in the UK and have been here since July last year. I got married to a Chinese colleague, Yan, a karst malacologist from Guizhou Province, P R China. I spent 2005/06 at the prestigious Lanzhou University in Gansu Province (and now the location for Ren Xiaodong’s (ELP ’01) part-time doctorate studies. I have a 2-visits a year contract to support Xiaodong’s and my Lan Da Centre. Now serving 2 centres, as adviser, developing a UK-based website forum, with my China...”

(Continued on Page 16)

Sayed Hashmat (‘04) is now the Regional Director for DAI in Afghanistan. The project he is working on is Local Governance and Community Development. The goal is to extend the presence of the government of Afghanistan in to new areas and to provide development assistance to at-risk populations. Further aims are to encourage and enable communities in his region to take an active role in their development.

Alejandro Mendez (‘05) ran for Governor of the State of Michoacán (Mexico) on the Green Party ticket. “Instead of giving away tons of paper with political promises which no one reads, we presented voters with 100,000 little tomato plants, so they can grow (organic) tomatoes on their kitchens or their backyards. The idea here is to present a more "sustainable" political campaign and to improve the ecological consciousness of our fellow citizens.

I knew that I had no chance to win the campaign since the beginning (I received 1.6% of the vote), so two days before the campaign ended I made a political agreement with the left-wing candidate. That campaign was successful, and the right-wing candidate (very bad environmental record) was defeated.

The idea of the agreement was to ask my voters to vote for the left-wing candidate, instead of me, but to keep voting green for representatives and municipalities. Despite the political storm that my decision created, through the agreement we won the opportunity for 15 of our main our agenda to be applied and we managed to win in a municipality (with an indigenous candidate), to keep one representative out of 40, and to increase our representation in the collegiate body of several municipalities.”

Francis Magbanua (‘05)
“I am currently in Dunedin, New Zealand to go back to school to earn my PhD in the Department of Zoology, University of Otago with a post-graduate scholarship. I will be here for three years.

My research focuses on quantifying the relative impacts of organic, integrated management and conventional agriculture on stream ecosystems here in New Zealand. My proposed thesis is part of the ongoing research programme of the Agriculture Research Group on Sustainability (ARGOS) (www.argos.org.nz).”

Yohannes Izmi Ryan (‘05)
“I had a change in my job position which I want to share with you. At the end of 2006 I moved from Environment-Riaufiber to the Millennium Development Goals (MDGs) Program-Riaupulp. We are developing the program to support the MDGs, focusing on poverty alleviation.”

Siddique Siddiqui (‘05)
“I have quit my job at HAASHAR to move to Canada to attend University of Guelph in Ontario, Canada for graduate studies in International Development. My research interest areas are related to the rehabilitation of earthquake victims, joint forest management, issues and challenges etc.”

Karin Svadlenak-Gomez (‘05)
“I'm in Austria...no longer affiliated with
UNV, though I do occasional consultan-
cies for them ranging from writing issue 
b Briefs on conservation and society matters 
to more mundane managerial tasks. I 
guess you could say I am a free-lancer/
student right now.”

Mohamed Bakarr (‘06)
“I am delighted to inform you all that I am 
in the process of taking up the position of 
Executive Director of the Center for 
Applied Biodiversity Science at Conserva-
tion International. Some of you may know 
that I worked at CI for 6.5 years before 
going to ICRAF-the World Agroforestry 
Centre in 2003. So this is like 
‘homecoming’ for me even though it 
meant leaving behind the motherland, 
which I so dearly cherish.

Martine Ngobo Nkongo (‘06)
“I was very busy changing jobs and 
changing countries! I am now working 
with the World University Service of 
Canada (WUSC). They just launched 
a 42-month research initiative called 
AFRRI (African Farm Radio Research 
Initiative) - funded through the Bill & 
Melinda Gates Foundation, that will 
look at how radio-based communica-
tions/tools can be best used to im-
prove food security in rural areas of 
Ghana, Mali, Malawi, Tanzania and 
Uganda. I am the lead Researcher in 
this Initiative, based in beautiful Accra 
(Ghana), where I moved some weeks 
ago.”

Kristen P. Patterson (‘06)
“I started a job in September as the Pro-
gram Officer for The Nature Conserv-
ancy’s new Africa Program. I’m based in 
TNC’s Arlington headquarters (near 
Washington, DC). TNC is starting conserv-
ation work in Africa by partnering with 
established organizations such as the Jane 
Goodall Institute, Green Belt Movement, 
and African Wildlife Foundation, among 
others. Our initial work will be in Na-
mibia, Botswana, Tanzania, Kenya, and 
Zambia.”

Zoely Ramanase (‘06)
“After 10 years of rich experience with 
USAID, I will be moving to MCA-Land 
Tenure Modernization and Decentraliza-
tion project based in Antsirabe. I have 
enjoyed my years at USAID. My experi-
ence here broadened and consolidated my 
analytical skills and helped me to profes-
sionally grow. I benefited from the oppor-
tunity to support Environment and Rural 
Development activities and to find ways to 
help these activities to be sustainable and 
profitable to local communities. I enjoyed 
being part of the ENV-RD team as the 
synergy person and the focal point for 
Communal level activities, and other ac-
tivities that are very important and rele-
vant for the development of this beautiful 
country. Now it is time to move on to 
other challenges.”

Miabiye Kuromiema (‘07) 
and his team met with the Governor of their province 
and got wide approval for their project to 
go ahead. “The Governor also said we 
should convene the process of public con-
sultation that will lead to developing a bill 
for an act of parliament (Assembly) on 
creating laws and enforcement mechanism 
on waste management practice in the 
State and get him to send it to the assem-
bly as an executive bill. He also supports 
alternative funding for a mass public edu-
cation initiative that we can put in place, 
and will also provide an environment of 
business incentives to allow for a profit-
able initiative. We are working out the 
details now with the Government. This is 
present level of progress on my work 
here.”

Pushkin Phartiyal (‘07) has been awarded 
the prestigious Commonwealth Professional 
Fellowship of United Kingdom. “The Fellow-
ship will enable me to work on preparing a 
training module for communities in the Indian 
Himalayas for adaptation practices with re-
gard to climate change. I will be working with 
LEAD International in London, UK, from 
December 01, 2007 to February 29, 2008.”

Arona Soumare (‘07)
“I will move to the WWF headquarter in 
Gland (Switzerland) for 3 months (mid Sept 
to December). I will be doing a secondment 
as Africa manager within WWF International 
Secretariat. During this interim position, my 
main role will be to coordinate our opera-
tions in Africa and Madagascar as MPA Pro-
gramme Manager, Western African Marine 
Ecorégion.”

ANNOUNCEMENT: We are 
now accepting applications 
for the upcoming 2008 Be-
ahrs Environmental Leader-
ship Program! Application 
materials can be downloaded 
at our website: http:// 
cnr.berkeley.edu/BeahrsELP.
There are also new inter-
views with participants at the 
2007 summer certificate 
course in Berkeley. Check 
them out!

ALUMS: Please remember to 
contact us with your email 
changes and other updates. 
Updates are made monthly to 
the ALL PARTICIPANTS LIST 
on the ELP website at http:// 
cnr.berkeley.edu/beahrselp/All 
Participants List.pdf
On Sustainable Agriculture in SE Asia, Reunions and New Leadership Courses in Central America

By Robin Marsh, Co-Director ELP

In my September trip to Southeast Asia (Indonesia, Vietnam), with the SANREM Agroforestry and Sustainable Vegetable Production Project, I had the pleasure of working in the field with ELP alumni Gerhard Manurung (Ind., 2007), and Loan Le Thanh (VN, 2007), in my capacity as theme leader of socioeconomic monitoring and impact assessment. Our goal is to ensure that the tree-vegetable interaction trials being conducted by the SANREM scientists, such as shade tolerant vegetables, integration of multi-purpose trees in vegetable gardens, low-cost drip irrigation, no till, etc., lead to farmer recommendations with a positive benefit/cost ratio, and are feasible in terms of labor, credit and knowledge constraints. We are setting up monitoring systems to accompany the women and men farmers during the adoption process. Local universities in Indonesia (IPB) and Vietnam (Nong Lam) are teaming with local government, farmers associations, US based universities (among them UC Berkeley), and the World Agroforestry Center to carry out this work.

In addition to the SANREM work, it was a pleasure to participate in two wonderful reunions with ELP alumni in Jakarta and Hanoi (see photos below and above). In Jakarta, we had a fruitful discussion about developing an Indonesian Environmental Leadership Program, its framework and possible funders (UNDP, USAID, Tanoto Foundation, among others). The Indonesian ELP would be focused on building capacities of young leaders in the provinces who have a great need and potential to influence change, but rarely have the opportunity to participate in innovative training.

Finally, I wish to inform you that the ELP has partnered again with Ecoagriculture Partners, and with the Interamerican Institute for Cooperation on Agriculture (IICA), to offer a new leadership course in Spanish for Central America. The course took place in Costa Rica this past November, with 28 participants from six countries. We will be posting the main outputs of the course on our website. Note from the photo below that ELP alumnus Ronny Roma (Guatemala, 2006) was a participant in this course. We enjoyed a moment together at the beautiful Volcan Arenal.

Warm regards to all, and happy holidays.

Ronny Roma ('06) and Robin Marsh at Volcan Arenal, Costa Rica.