WINTER 2001

R.E.A.P. - CANADA NEWSLETTER

RESOURCE EFFICIENT AGRICULTURAL PRODUCTION

A note from the Executive Director

Dear friends,

It has been almost one year since I arrived in Montreal and this newsletter provides a good opportunity to reflect on REAP's achievements. You should find a broad overview of our work; more detailed reports are found on our website. Thanks to the tireless and unselfish efforts of Lloyd Grant, we now have a world class computer and information system.

One of the interesting challenges at REAP is managing the transition from a membership organization to one delivering services. In the late 1980's and early '90s, REAP did on-farm research on cropping systems and had a strong core of farmer members. The research direction then shifted towards fibre and bio-energy crops and more of the research was located at experimental sites. Membership continued to be strong, however, based on subscriptions to our former newspaper, Sustainable Farming. Over the past few years REAP has developed a strong international program, but we no longer share our most recent publication of Eco Farm and Garden, with the Canadian Organic Growers. We therefore find ourselves in the curious position of having a larger and broader constituency than before, but a declining membership.

A significant development this year was a second, CIDA development project "Conservation and Utilisation of Crop Residues in the Philipinnes as a Greenhouse Gas Mitigation Strategy." The project combines energy, agronomy and greenhouse gas reduction initiatives in one comprehensive project designed to benefit small farming communities and the planet at large. Recently, REAP was put on the short list for a new sustainable agriculture project in China with the Shell Foundation. Other opportunities abroad exist and international development will continue to be an important component of REAP's work.

Once again we were able to lure two very competent CIDA-sponsored interns to join REAP for a 9 month stint (4 in Quebec, 5 in the Phillipines). Acknowledgement from last year's interns satisfaction with the program comes by way of Trevor Helwig's decision to join the REAP office full time.

The announcement this year for the Organic Agriculture Centre of Canada at the Nova Scotia Agricultural College provided a great boost for organic farmers. Research funding, however, remains scarce as hens teeth. REAP finds itself playing mainly a supporting role on several important initiatives. We continue our sponsorship of the annual Guelph Organic Conference and serve on the program committee for the 14th World Congress of the International Federation of Organic Farming Movements (IFOAM). The congress, hosted by the Canadian Organic Growers (www.cog.ca) will be held in Victoria, British Columbia, in August, 2002.

Working in international development, bioenergy research and organic agriculture is a challenge for an organization our size. Over the next few months we will assess our direction and plot a course for the coming decade. Obtaining sustainable, long-term funding is a priority. We welcome your input and participation. The REAP Annual General Meeting will be held at the University of Guelph, January 26, 2002. In the meantime, we welcome new members who share our vision. We are unable to provide membership services other than this newsletter, but may we suggest a donation to support the important work we are doing? Our Philippine programming usually requires 25% of costs to be generated by REAP. Tax receipts will be issued for donations over $25.

Reflecting on the tragic events over this past autumn in New York and Afghanistan, it becomes clear that agriculture must not only be resource efficient, but community supported. At REAP we hope our work not only enriches the environment, but also feeds the human spirit. By working together we can move this process forward.

Best wishes.

Rupert Jannasch

Report on Bioenergy Research Program

High energy prices and political tension in the Middle East generated considerable interest in REAP's bioenergy program this past year. Helping matters is the search by farmers for alternative crops to food in the face of record low commodity prices. Combined with growing awareness about the benefits of biomass fuels over fossil fuels with regard to greenhouse gas emissions, the production of agricultural biomass has become a hot topic.

Roger Samson with switchgrass pellets at the Belcan Mill, Ste. Marthe, Quebec.

REAP's research emphasis has been on manufacturing biofuel pellets from switchgrass. The pellets are modeled after wood pellets which are increasingly popular in Europe and North America as a clean burning source of energy. A shortage of wood fibre, however, is preventing this industry from expanding.

Warm season grasses such as switchgrass can be grown in many parts of North America for $3-4 per GigaJoule. Between 150-200 GigaJoules (the energy contained in 20-30 barrels of heating oil) can be harvested per hectare of farmland. About 88 percent of the original energy in a switchgrass crop is available for heating purposes. Switchgrass pellet heating represents a tremendous opportunity to displace high grade energy forms such as propane, heating oil, and electricity with a low grade, clean burning fuel.

After two years of laboratory trials, REAP conducted commercial-scale pellet runs in December, 2000, and August, 2001, at a commercial alfalfa dehydration plant in Ste. Marthe, Quebec. About 12 tonnes of pellets were produced and these have been distributed across Canada for trials. Unlike sawdust, spring harvested switchgrass does not require drying before pelleting. However, there is an added cost for bale breaking. Switchgrass pelleting qualities are comparable to those of wood. Minor fine tuning of the pelleting process is needed to increase pellet hardness and durability.

A market study being prepared for Eastern Ontario reveals broad interest in pellet heating systems. An Ottawa-area farmer and wood pellet distributor, Walter Bunda, plans to establish a switchgrass plantation next year to produce pellets for a home heating demonstration. Using a multi-fuel pellet stove (34,000 BTU) produced by Dell-Point Technologies (www.pelletstove.com), we estimate an annual heating cost of $1200 compared to $2234, $1664, $882 and $2302 for electricity, heating oil, natural gas and propane, respectively. The close coupled gasification combustion technology incorporated by Dell-Point, is capable of burning moderate high ash pellets at an efficiency of 82% This is equivalent to most modern oil burners. A larger scale demonstration heating project planned for Alfred College is on hold until a large capacity pellet furnace can be obtained. A Prince Edward Island company, Grove Wood Heat Inc., is currently testing a 1 million BTU pellet burner with Shaw Resources in Nova Scotia.

An exciting opportunity in the pelleting area is the development of mobile pelleting systems. The Italian company "Ecotre" has a range of tractor mounted and semi-portable units on the market. VIFAM Pro-Services Inc., Kirkland, Quebec, has recently developed a prototype pelleting system that fits inside a semi-trailer. These innovations could greatly reduce infrastructure development costs for a grass biofuel pellet industry.

This year marked the end of our willow and switchgrass plantations at Macdonald College. Research funding for these projects ran out and further switchgrass trials can now be conducted on-farm with established growers. Our long-term switchgrass variety trials and plant improvement selections are still located on campus.

Several hundred acres of switchgrass were planted in Renfrew County over the past few years to supply the pilot cellulosic ethanol plant operated by Iogen Corporation, Gloucester, Ontario. After several delays, this plant should be fully functional by early January, 2002. Iogen will be testing switchgrass and a variety of feedstocks over the coming months as it brings the plant up to full production.

REAP's comparisons of switchgrass and Short Rotation Forestry willow revealed that both crops yielded, on average, about 10-12 tonnes per hectare. Willow was harvested every 3 to 4 years and switchgrass once every year. Overall, the willow plantations were more prone to weed and insect infestation and management was more difficult. Willows, however, are more suited to imperfectly drained soils than switchgrass. Both crops have applications on the large areas of marginal unfertilized farm land in eastern Canada.

Our plans at REAP are to continue

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The Agro-ecological Village in Action

In the mid-1980s, a dramatic drop in world sugar prices caused a major crisis among Philippine sugarcane farmers. Severe food shortages and deteriorating living conditions encouraged the people of Negros Island to increase the production of food for local consumption and decrease the production of cash crops destined for global markets. REAP-Canada and their Philippine partners devised and implemented a simple and ecologically conscious strategy to create self-sufficient communities: the Agro-ecological Village.

An agro-ecological village is a community that is largely self-reliant in food through the adoption of integrated and ecological food production methods. DIFS (Diversified Integrated Farming Systems) is a simple ideology behind the agro-ecological approach that involves growing crops such as vegetables on land once used for sugarcane monoculture. DIFS encourages the intercropping of several crop species, using nature's example to enhance biodiversity and provide biological control of insects and diseases.

A Basic Orientation to Sustainable Agriculture (BOSA) training illustrates how organic farming increases soil fertility, crop productivity and prevents soil erosion. The importance of a stable and nutritious diet including a variety of fresh organic vegetables is promoted to improve health and nutrition.

The agro-ecological approach promotes the use of community seed banks to distribute local crop varieties. These are usually more adapted to local soil and climatic conditions and promote diversity rather than monoculture. The collection of seeds and development of nurseries, as well as trainings on grafting and asexual reproduction of citrus varieties, are an important component of REAP's efforts.

For a village to achieve complete self-reliance, alternative energy sources such as solar energy for household needs, animal power for crop production, and bio-residues such as rice hulls for cooking fuels are promoted instead of fossil fuels. In one case, a work shop employing six workers has been constructed to produce farm tools for use with draft animals and weed control. With modifications to local conditions, this type of programming can be applied almost anywhere in the world.

The agro-ecological program was initiated by REAP in 1999. Two sites in Negros Occidental have been selected to participate in the project over the next year: the upland community of Tapi involving 45 farmers and their families, and an area near Himamaylan with 25 families. These communities were selected because of a high level of impoverishment caused by reliance on sugarcane monoculture. A Participatory Rural Appraisal (PRA) seminar was conducted in each community in September, 2001. Farmers were explicit in stating their desire to improve food security, self-reliance and the environment.

Over 80% of the land in both communities is currently under sugarcane production. Sustainable cane farming techniques such as trash farming (see next page) are advocated as an intermediary cropping phase to allow time for communities to adapt to growing other crops. Tapi currently has a very small amount of ecological sugarcane. Successful training sessions, however, have convinced nearly all the farmers to switch to trash farming and their efforts have already greatly improved soil fertility.

The Oray family farm in Tapi has been enlisted as a model farm, and 10 additional demonstration sites are planned. Construction of infrastructure will begin in February using the "daggio" or communal labour system.

Many important lessons have been learned to date. The need for organization at the community level is essential, as is the need for the programming to be driven and managed by the farmers themselves. The process of project design and implementation is usually as important to the success of a program than the concepts or practices being introduced. REAP has placed emphasis on fostering a collective understanding of environmental and socio-economic concerns by way of farmer-to-farmer training sessions supplemented with materials written in the local dialect. A cornerstone of this approach is the development of demonstration sites within the communities to highlight the reliability and replicability of the technologies. The effectiveness of the trainings has been reflected in a gradual acceptance of the agro-ecological concept in the communities. The villages are becoming increasingly self-sufficient in fuel and energy and provide a working example of how sustainable agriculture can promote rural development.

Report on Bioenergy Research Program . . .

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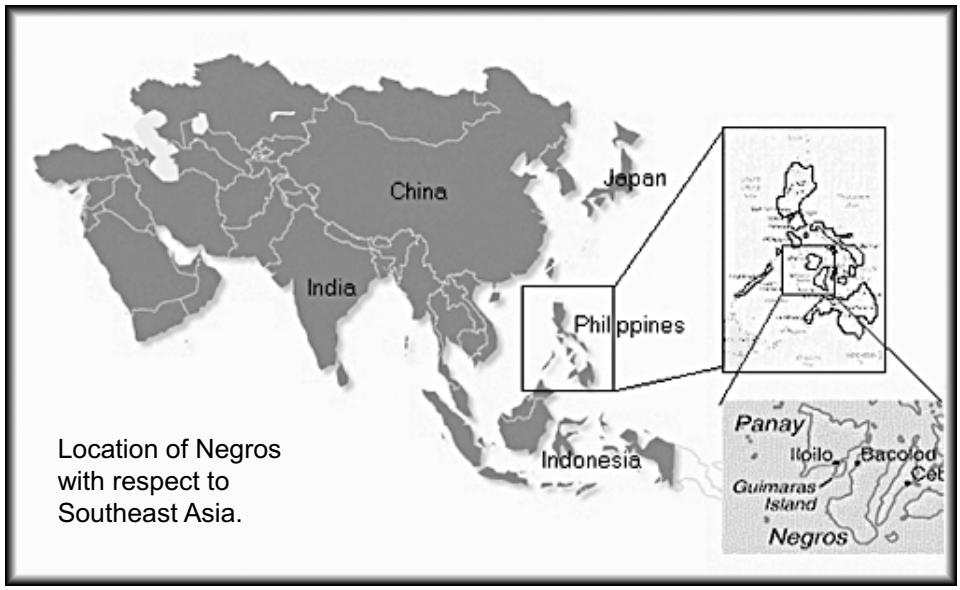
work in the biofuel area, hopefully by way of some additional demonstration projects of grass pellet heating. We do not expect rapid adoption in the short term, but believe that it will become an attractive energy source as fossil fuel supplies diminish and prices increase. In the meantime, we continue deliberations with our long-time supporters, Natural Resources Canada, on determining the best available options for on-farm energy production.

Filipino farmers adopting ecological sugarcane farming techniques

For years, farmers in Southern Negros have disposed of sugarcane crop residues by field burning. Recently, however, some farmers have switched to trash farming which means mulching the residues directly in the field. The decomposing trash improves soil structure and mitigates erosion. Water retention and nutrient availability are increased. The trash also releases nitrogen (N) and other important macronutrients.

Furthermore, during the decomposition process, N-fixing bacteria become active. Research has shown that between 50 and 100 kg N per hectare can be obtained by this process. Fertilizer accounts for about 25% of cane production costs, so promoting N fixation directly benefits cash-strapped farmers.

Other benefits of trash farming include reduced tillage requirements, less weeding (the mulch suppresses weeds between the cane rows), and better quality canes (higher sugar content). Trash farming makes organic production possible, improving the health of workers. The biodiversity of animal life in the agricultural landscape is increased. The main disadvantage is a higher labour requirement because trash must be moved aside to provide room for regenerating shoots and cultivation.



Location of Negros with respect to Southeast Asia.

In sugarcane farming, the cropping cycle consists of a plant crop harvested in the establishment year and ratoon (stool beds remaining at the base of the plant) crops for 1-3 subsequent years.

During the plant crop, costs are very high due to land preparation and the expense of planting the cane points. During the ratoon years the cane grows from ratoons and production costs are greatly reduced. Trash farming has been shown to increase yields in ratoon crops in eastern Asia by between 5 and 33 percent. This allows farmers to extend the cropping cycle and reduce spending on

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tillage and fertilizer.

In partnership with *Paghida-et sa Kauswagan* Development Group (PDG), REAP-Canada is implementing a series of trainings and demonstrations aimed at promoting sugarcane trash farming among small farmers. Most of the farmers are agrarian reform beneficiaries and members of the *MAPISAN* farmer's alliance. Emphasis is placed on upland cane growing regions where poverty and soil degradation are more pronounced than in lowland areas.

Twenty field site demonstrations have been established as well as 5 replicated variety trials. The sugarcane trash farming training program projects the adoption of trash farming by 1200 farmers with an estimated land base of 1000 ha at the end of the three year project.

Trash farming also reduces greenhouse (GHG) gas emissions in several ways. The main reduction is achieved by the elimination of residue burning and the storage of carbon in the soil. The signatories to the Kyoto Protocol in July 2001, agreed to include natural carbon sinks, such as agricultural soils, and emission reduction credits, as legitimate GHG reduction strategies.

Emissions are futher reduced by; (1) decreased N fertilizer applications (natural gas is burned to manufacture synthetic N fertilizer), and (2) lower activity by soil denitrifying bacteria which release increased levels of gaseous N with applications of nitrate fertilizer.

The conversion of 1000 ha of conventional sugarcane to trash farming would prevent the emission of 19,051 tonnes of CO_2 when increased biological N fixation and reduced synthetic fertilizer use are accounted for.

Leaf litter turns black during composition, indicating the presence of nitrogen-fixing fungi.

With support from the Canadian International Development Agency, REAP-Canada is achieving the double benefits of helping build Canada's reputation as a leader in the mitigation of climate change and enhancing our poverty reduction commitments in developing countries.

Crop Residues for cooking!

A growing shortage of firewood means many Filipino women are buying more expensive fuels such as gas or charcoal for cooking. REAP observed, however, that in Panay and Negros there are abundant quantities of rice hulls at mills which are habitually burned as a disposal technique. This past year, a new project was launched with the assistance of the Canadian International Development Agency to use rice hulls for cooking fuel.

The cooking device is a modified version of the Lo-Trau stove first developed in Vietnam. Features include low fuel consumption (1 to 1.5 kg/hour) and good thermal efficiency. Iit takes 7 minutes to boil 1 litre of water, using only 180 g of rice hulls. The stove can be started easily with a piece of burning paper using dry rice hulls. The cost is about $10 Canadian – about the cost of one sack of rice. A farmer purchasing fuel wood can pay for the stove in about one month by switching to rice hulls. These are free at any rice mill.

Farmers on the islands of Negros and Panay are building and distributing the stoves through farmer's associations. In-kind contributions are accepted as payment for the stove (including produce such as rice) which fits in well with the group in Negros where the farmer's alliance is marketing organically produced MASIPAG rice.

To date 1,114 stoves have been purchased and distributed to rural households. A total of 60 farmers, including 20 women, are working as trainers for their respective associations providing instruction to local users. Farmers are conscious that by using the stoves they are helping to reduce deforestation and at the same time reduce their dependence on imported fuels. The ash that is produced by the stoves is most often used as a soil conditioner; some farmers also claim that the ash is an effective insect repellent for eggplants.

A woman in Negros cooks her lunch on the rice hull cooker, collecting the ash on the ground.

A good flame can be maintained by tapping on the stove to release ash and allow fresh rice hulls to fall into the fuel bed.

While household savings might be the primary reason for burning rice hulls, Filipino farmers are also reducing greenhouse gas emissions by displacing kerosene, charcoal and light petroleum gas. The average yearly greenhouse gas reduction associated with the stove over conventional cooking fuels is estimated to be 1,200 kg of CO_2 per stove.

A few of our research reports and invited talks

Strategies for enhancing biomass energy utilization in the Philippines. R. Samson, T.Helwig, D. Stohl, A. de Maio and P. Duxbury, and T. Mendoza and A. Elepano, University of Los Banos. Prepared for the National Renewable Energy Laboratory, Golden Colorado.

Changing the energy climate: clean and green heat from grass biofuel pellets. R.Jannasch, R. Samson, A. de Maio, T. Adams and Ho Lem, C. Proceedings of the Climate Change 2 – Canadian Technology Development Conference, Canadian Nuclear Society, Oct. 3-5, Toronto, Ont.

Development of bioenergy feedstocks: agronomy data from eastern Canada. R. Jannasch, P. Duxbury, and R. Samson. Final Report, prepared for Natural Resources Canada.

Switchgrass fuel pellet production in Eastern Ontario: a market study. R. Jannasch, R. Samson, A. DeMaio. Prepared for the Agricultural Adaptation Council of Ontario.

Roger Samson was invited to London, England, by the Shell Foundation for consultations on sustainable energy in developing countries.

From sugarcane monoculture to agro-ecological village: The Flora community in transition. Mulkins, L., Roger Samson, Louie Amongo, Emmanual Yap, Teodoro Mendoza and Ben Ramos, 2001. ILEIA Magazine for low external input and sustainable agriculture. February 2001, Volume 16 No. 2.

Rupert Jannasch in collaboration with John Henning, Chair, Dept. Agricultural Economics, McGill University, was invited to Guadeloupe by the Lycee Agricole for a conference presentation on opportunities for organic agriculture in the Caribbean.

Trevor Helwig traveled to Victoria, British Columbia for the CIDA-sponsored New Horizons conference hosted by One Sky Canadian Centre for Sustainable Living.

Join REAP for an afternoon on

Agriculture and International Development

At the Guelph Organic Conference,

Saturday January 26, 2002

University of Guelph

The threes workshop titles are:

Opportunities Overseas in Organic Agriculture for Youth, former interns from REAP and IDRC will describe the trials and triumphs and opportunities in their work.

Agroecological Villages as a Development Strategy, featuring Ms. Georie Pitong, Southern Negros, The Philipinnes

Analog Forestry: The Basis of Forest Eco-Village Development, moderated by Jean Arnold, Fallsbrook Centre, N.B.

For more information contact REAP-Canada, or the REAP website *www.reap-canada.com*
or the conference response line:
519-824-4120, Ext. 2558, or
www.guelph2002.organicfarms.ca

Filipino farm leader to deliver lecture series in Canada

Farmers of the world unite! Most Canadians are aware of the obstacles facing farmers at home in Canada, but can we relate to the complications and adversities facing farmers in developing countries? Small farmers in the Philippines are struggling to transcend the obstacles on their path to development and self-reliance, yet few of us understand the challenging social, political and economic situations they face or the seriousness of deteriorating environmental conditions in rural areas.

Since 1998, REAP Canada has been working in partnership with two Philippine NGO's, PDG (Paghida-et sa Kauswagan Development Group) and MASIPAG-Visayas (a farmer-scientist partnership for development). Both of these agencies have been working for more than 14 years to assist marginalized farmers. Their programming activities range from advocacy work on land reform to achieving food security through sustainable agriculture. In early winter 2002, a speaking tour has been arranged for **Ms. Georie Pitong**, director of MASIPAG Visayas and a founding member of PDG. Canadians will learn first hand about how community organizing through the agro-ecological village development model can help agrarian reform beneficiaries in the Philippines improve their livelihoods and protect and rehabilitate their local environment

The schedule includes REAP's international development workshops at the Guelph Organic Conference on January 26th 2002, as well as lectures during the following week at the University of Guelph, York University in Toronto, and McGill University in Montreal, and stops in Ottawa with a session hosted by the International Development Research Council with CIDA Ag-Net. The itenerary also includes seminars during the week of February 4th at the Canadian Centre for Organic Agriculture in Truro, Dalhousie University, Halifax, and at a workshop with Montreal area NGO's.

Trevor Helwig

The public engagement will be supported through internet postings, newsletter articles and case study documents. The dates and venues for the lectures will be posted on the REAP website at *http://www.reap-canada.com/lectures.html*

REAP is grateful for the support of CIDA's Environment and Sustainable Development Program Public Engagement Fund.

REAP-Canada thanks the Sierra Club of British Columbia for coordinating the international internship program.

Dear Reapers,

I hope that all is well in Canada and you are not buried under a blanket of snow! Alejandro and I have been enjoying the tropical heat, but sadly, a major typhoon last month caused extensive damage and food shortages. Nonetheless, the first two months of our internship on the island of Negros have been very rewarding. We have a basic grasp of the local dialect of "Illongo" and can now participate in the day-to-day life of the farmers. During the next several months Alejandro will be concentrating on ecological sugarcane production and distributing the rice hull stove, and I will be assisting in the development of the agro-ecological villages. The upcoming months promise to be very active and full of surprises as we learn about this very different way of life. We do our best to help the farmers increase their self-reliance, but sometimes I wonder who learns more. The food is good, but we need more spices!

Wish you were here!

Claudia

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