ROLE OF AGRICULTURAL COOPERATIVES IN BIO-FUEL DEVELOPMENT FOR RURAL FOOD AND LIVELIHOOD SECURITY IN ASIA

Role of energy in rural development

Energy plays a central role in economic activity and inadequate or inequitable access to efficient, low-cost and sustainable energy affects the livelihoods of hundreds of millions of small farmers, landless and indigenous people in the Asian region. Rapidly rising fossil energy costs for farm inputs, local transport and agricultural machinery pose a major challenge to small farmers' households.

The bulk of rural energy consumption in Asia is by households of small and marginal landholders, tenants or landless. Farming and rural industries account for less than 20 percent of all rural energy usage in the region. Between 80 to 90 percent of Asia's rural household energy needs are met by wood fuels and crop residues. About one billion rural people in the region depend solely on traditional energy sources.[1]

The collection of biomass – mainly fuel wood – which is the main source of rural household energy, is primarily the responsibility of women and girls. This is a big burden on their time, energy and health, thereby depriving them of more economically productive work opportunities. It is also a major reason why a large proportion of Asian rural girls cannot get basic education.

Easy and affordable access to an efficient and sustainable energy source can also open up opportunities for small-scale rural industries which currently account for less than 10 percent of total rural energy demand.[2] The negative health, educational and income implications of the lack of access to such an energy source is undermining progress towards the UN Millennium Development Goals (MDGs) in Asia where an overwhelming majority of people live in the rural areas. Recognizing this crucial link, the 2002 World Summit on Sustainable Development agreed to "improve access to reliable and affordable energy services for sustainable development, sufficient to facilitate the achievement of the MDGs…"

Rural energy planning and development must take the rural household as the basic unit of rural energy demand and consumption within a territorial area. Clusters of households in a geographical area must be the focus of a wider rural development perspective integrating development and provision of energy services with basic health, education, agriculture, income/employment generation and rural infrastructure/institutions. The World Energy Council/FAO study *The challenge of rural energy poverty in developing countries* underlines (i) need for greater policy emphasis on rural development and rural energy inadequacy (ii) putting rural people at the core of rural energy planning and implementation, and (iii) integrating rural energy and rural development.

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[1] [1] *Energy services for sustainable development in rural areas in Asia and the Pacific: Policy and Practice. UN Economic and Social Commission for Asia and the Pacific (UNESCAP), Bangkok, Thailand 2005.*

[2] *Ibid.*

Easy access to sustainable and low-cost energy sources can vitalize agricultural productivity and help create multiple rural non-farm livelihood opportunities based on small and medium-scale rural enterprise development. "Energy services for poverty reduction are less about technology and more about understanding the role that energy plays in people's lives and responding to the constraints in improving livelihoods."[3] The inadequacy of the prevailing top-down, supply-side approach to rural energy development has highlighted the need for decentralized, stand-alone and renewable energy sources.

Role of bio-fuels in rural development

Bio-fuels offer an increasingly popular alternative to increasingly costly fossil fuels and several Asian countries have major national programmes underway to tap the potential of this new alternative energy source. In Asia, home to the majority of the world's food and income-insecure people, bio fuels can not only meet growing rural energy needs, but form the basis of large-scale rural livelihood promotion programmes.

"Modern bioenergy production and utilization systems, wisely implemented, can help alleviate poverty and simultaneously free many of the poorest and most vulnerable people from the drudgery and health risks of being dependent on unsustainable forms of bioenergy."[4]

China. India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Viet Nam have national biomass energy programmes and projects. In India, the rural administrative sub-division of *taluka* comprising a closed biomass and rainwater basin with an average population of about 200,000, is the basis of the 1997 National Policy on Energy Self-sufficient Talukas. India's talukas have the potential of producing 400 million tonnes/yr of agricultural residues which can not only meet rural energy needs but also animal feed and fertilizer. Last year, Indian launched the National Mission on Biodiesel based on plantation of *jatropha* on wastelands as a mass rural income/employment-generation.programme linked to commercial bio-fuel production.

Pros and cons of bio-fuels for rural development

<u>PROS</u>

- "The development of new bioenergy industries could provide clean energy services to millions of people who currently lack them, while generating income and creating jobs in poorer areas of the world."[5]Modern biofuels can replace traditional bionergy such as the burning of biomass which has health risks as the basic rural household energy source. Smoke inhalation during indoor cooking with traditional biomass is a leading cause of disease and death in developing countries, claiming more lives each year than malaria.[6]
- Unlike other renewable energy such as hydro, solar or wind, bioenergy can be coverted into several energy forms – heat for cooking, electricity, different types of mechanical power and steam production. Also independent of short-term supply fluctuations associated with wind and solar and in addition processes wastes.
- Bioenergy production has large rural job-creation potential in the farming, transport and processing of biofuels. "Because the vast majority of bioenergy employment occurs in farming, transportation, and processing, most of these jobs would be created in rural communities…The construction and operation of these facilities generates additional rural economic activity, since the weight and volume of most biomass crops usually

[3] *Ibid.*
[4] *FAO Draft Corporate Strategy for Bioenergy, 2007-09*
[5] *Sustainable Bioenergy: A Framework for Decision Makers.* UN-Energy, United Nations, 2007
[6] *Ibid*

makes it necessary to locate collection and conversion facilities close to where the feedstock is grown."[7]

- "On average, the ratio of investment cost per job created in the bioenergy sector is lower than that in the industrial, petrochemical, or hydropower sectors. Bioenergy projects based on agriculture tend to generate more employment and earning than their non-agricultural counterparts."[8]
- Small or medium-scale biogas or gasifiers and power generators running on locally available biomass can meet most rural energy needs. Liquid biofuels such as vegetable oils and biodiesel can be viable options for small and medium-size rural electricity production and distribution networks.[9]
- "…modern bioenergy by improving access to cheap energy services in remote rural areas, could support productivity growth in agriculture and other livelihood sectors with positive implications for food availability and access. *…the food security risks associated with biofuels are the mirror image of the opportunities."*[10]
- Cultivating inedible biofuel crops such as jatropha on degraded lands unsuitable for food production can also help rehabilitate such soils besides eliminating the competition with food crops for land. Energy crops could be rotated with food crops to improve productivity and disease and pest resistance while diversifying income opportunities for rural producers.
- Rotating leguminous nitrogen-fixing crops used as biofuel feestock with cereals, can improve the productivity of the cereal-based farm system.
- Biofuel production by reducing crop surpluses in industrialized nations will push up farm commodity prices which can boost income of developing country farmers.

CONS

- "Rapid growth in first-generation liquid biofuels production will raise agricultural commodity prices and could have negative economic and social effects, particularly on the poor who spend a large share of their income on food."[11] Diversion of land from food to bioenergy crops; large-scale production may be necessitated for achieving economies of scale as shown in the case of ethanol production in Brazil and the United States, pushing up food prices.
- Transition to liquid biofuels can especially harmful to landless farmers and rural poor who are net buyers of food. At best, liquid biofuel programmes can enrich farmers by helping add value to their products. But can also result in concentration of ownership, driving rural poor off their land into deeper poverty. Current-generation liquid biofuels for powering transport could affect food security at household, national and global levels.
- Possibility of oligopolistic control of biofuel production as with the global grain trade. Liquid biofuel growth pushing up maize and sugar prices. "Unless new policies are enacted to protect threatened lands, secure socially acceptable land use, and steer bioenergy development in a sustainable direction overall, the environmental and social damage could in some cases outweigh the benefits."[12]
- Competing demands on biomass such as farm residues for energy production and for animal feed and shelter, as manure and for construction purposes and may have higher priority for rural poor in the absence of alternatives, necessitating a participatory evaluation of local availability and access to biomass and priorities to plan localized bioenergy system.

[7] *Ibid*
[8] *Ibid*
[9] *Ibid*
[10] *Ibid*
[11] *Ibid*
[12] *Ibid*

Policy guidelines for participatory territorial bio-fuel development

- Development of policies and programmes focused on MDG1 achievement through harnessing of renewable energy, in particular bio-fuels, by rural poor.

- Promotion of income/employment opportunities and social equity, in particular participation by women, marginal/landless farmers and indigenous people; strengthening rural economy through small and medium enterprise (SME) development with ownership-based direct participation of small farmers.

- Sustainable agro-ecological development and management through participatory territorial bio-fuel development and local participatory planning.

Action areas (Pros)

- Building upon existing knowledge of local agro-ecological conditions through collaboration with farmers' organizations/agricultural cooperatives, NGOs and expert institutions at decentralized level; developing knowledge sharing systems at local, national, sub-regional and regional level; strengthening IT capacities of farmers' and other rural organizations, strengthening governmental inter-sectoral collaboration on local knowledge sharing.

- Building on institutional collaboration among farmers' organizations/cooperatives in Asia in the field of small and medium enterprise development focused on renewable energy; developing business management skills for production/marketing of renewable energy services; promotion of SME clusters specialized in production/marketing of renewable energy; collaboration with the International Cooperative Alliance (ICA) and Network for Development of Agricultural Cooperatives in Asia and the Pacific (NEDAC), International Federation of Agricultural Producers (IFAP), FAO regional rural finance/marketing networks AFMA and APRACA.

- Strengthening institutional capacities for participatory territorial bio-fuel development; promotion of strengths of India's *taluka* model across the region in collaboration with India's National Institute of Rural Development (NIRD) and the regional Centre on Integrated Rural Development in Asia and the Pacific (CIRDAP); developing national and sub-regional action plans for participatory territorial bio-fuel development; capacity building of relevant ministries/local governments, including elected local councilors.

Action areas (Cons)

- Informed decision-making based upon representative stakeholder consultations involving public and private sector, small farmers and indigenous people to develop socio-economically and technically appropriate, financially/market viable, and environmentally sustainable bio-fuel development.

- Strengthening IT-based information systems on experiences in bio-fuel development focused on impact on livelihood of small farmers and natural resources; need for participatory monitoring and evaluation.

Role of agricultural cooperatives in bio-fuel development for rural food and livelihood security

Membership-driven agricultural cooperatives are the most suitable platform for enterprise development by rural poor and provide food and livelihood security to tens of millions of people in a region which has two-thirds of the world's hungry people. The Network for Development of Agricultural Cooperatives (NEDAC) representing 3 million farmer cooperatives in 12 Asian countries offers a strategic platform for promoting synergies between agricultural/rural enterprise development by village-based cooperatives and production/use/marketing of biofuels for improving rural livelihoods in food and income-insecure Asian countries.

Being highly labour-intensive, bio-fuel production offers opportunities for small-scale rural producers' groups to be engaged in production and localized distribution. Local-level, small-scale bioenergy production can be locally consumed and excess production sold. Feedstock can be produced by small and marginal landholders and sold for processing in a central conversion facility or small and medium-sized feedstock producers can jointly own processing and distribution facilities.

Or the entire production chain can be owned collectively by small and marginal feedstock producers. The more involved farmers are in production, processing and use of biofuels, the more likely they are to share the benefits. When biomass producers have a stake in value-added segments such as processing, many benefits ensue. "The development benefits of bioenergy are enhanced dramatically when more people own more of the value-added chain."[13]

Small and medium-sized enterprises can play a pioneering role in developing bio-fuel markets in rural areas and clusters of such enterprises can link up with large-scale agro-industrial chains.[14] "Local benefits can be enhanced by organizing small-scale producers as a group to meet the feedstock volume and reliability needs of conversion facilities.

In areas where large corporations dominate the bioenergy industry, farmer cooperatives play a useful role in linking these to large firms to independent growers."[15] such as farmer cooperatives to link up with the large-scale bionenergy industry. In Brazil and the United States, farmer cooperatives have a role in ensuring benefits to smaller farmers from the biofuel industry dominated by large corporations. Brazil's social biodiesel programme is focused on small rural cooperatives. The Brazilian government is buying oilseed crops farmed by rural workers. There are several examples of successful cooperatives of SME biomass producers supplying larger markets.

"Each bio-energy program should be judged on case-by-case basis, taking into account the pertinent economic, ecological and social criteria. Bio-energy may represent an opportunity to innovate the rural sector. Moreover, second-generation technologies (for the production of cellulosic ethanol) may relax the pressure on resources bases and the risk of food security. New species adapted for marginal lands, can be introduced."

–Alexander Muller, Assistant Director-General, Natural Resources Department, Food and Agriculture Organization of the United Nations (FAO)

[13] *Ibid*
[14] *Ibid*
[15] *Ibid*

Bioenergy could drive rural development

Experts weigh bio-power impact

Rome, 23 April 2007– Top international experts met in Rome to consider the environmental and food security impact of the rapidly-expanding bioenergy industry and agreed that governments could use bioenergy as a positive force for rural development

"It was the first time that experts in bioenergy, food security and the environment came together to discuss the important linkages between those sectors," said Alexander Müller, Head of FAO's Natural Resources Management and Environment Department, commenting on last week's meeting.

'While there is legitimate concern among some groups that bioenergy could compromise food security and cause environmental damage, it can also be an important tool for improving the well-being of rural people if governments take into account environmental and food security concerns," he said.

Key role for governments

"In food security terms, bioenergy only makes sense if we know where the food-insecure populations are located and what they need to improve their livelihoods. Environmentally, we must make sure that both large- and small-scale producers of bioenergy fully take into account both the negative and positive impacts," Müller said.

"There is a key role for governments to play in setting standards of performance. International organizations such as FAO can also have a major role in providing a neutral forum and policy support," he noted.

"We need an international commitment to make sure that food security is not impaired and that natural resources are used sustainably," he added.

Last week's three-day meeting, which was attended by experts from round the world plus specialists from FAO and other organizations, agreed that FAO's International Bioenergy Platform should promptly draw up a series of guidelines for Governments and potential investors.

Landscape mosaics

Some experts considered biofuel production could benefit the environment and increase food security if smallholders farmed biocrops and biomass as a source of energy for themselves and their local communities or contributed to commercial production for national or international markets. Some biocrops or other feedstock are best produced in landscape "mosaics" where they are grown alongside food crops and other vegetation, those experts said. Biofuel areas within these mosaics could provide other valuable benefits such as windbreaks, restoration of degraded areas, habitats for native biodiversity and a range of ecosystem services, they added.

Agricultural Renaissance

Joseph Schmidhuber, Senior Economist with FAO's Agricultural Development and Economics Division, told the meeting that, if managed well, bioenergy could promote something akin to an agricultural "renaissance" in some developing countries where biofuels can be produced profitably.

Impact of the new bioenergy market on food security could be negative or positive, depending, at the country level, on whether the economy involved was a net exporter or importer of food and energy, Schmidhuber said. The same held true at household level, indicating that the rural landless and the urban poor were most-at risk. Special measures will be needed to protect both countries and groups, he added.

New data

The experts agreed to accelerate development of tools for analyzing the food security and environmental impacts of bioenergy production as well as to strengthen data and information needed by countries to assess their bioenergy potential and identify hot spots. Bioenergy crops that compete with land and water for food production should not be grown in areas facing food security challenges, they emphasized.

“The objective is bioenergy that is environmentally sustainable and socially equitable,” they added. “It is a challenge that can and must be faced.” Existing famine early-warning systems that include household food security assessments and hunger surveys are now well-established and can assist in understanding the risks to vulnerable populations.

“Bioenergy holds out enormous opportunities for farmers, especially in the developing world,” said Gustavo Best, FAO’s Senior Energy Coordinator, “but there are dangers too."

Global Bioenergy Partnership web site launched

Promotes information sharing on bioenergy

9 May 2007, New York/Rome -- The Global Bioenergy Partnership (GBEP) today unveiled its web site, which was launched at the GBEP’s 3rd Steering Committee meeting, taking place in New York during the 15th session of the UN Commission on Sustainable Development.

The site provides information on the Partnership, which was created in May 2006 to promote the use of bioenergy and whose secretariat is hosted at FAO. It also offers links to sources of information on bioenergy and features news and a regularly updated list of bioenergy events.

Global forum

The mandate of the Partnership, which is supported by the Italian Ministry for the Environment, Land and Sea, is to provide a global political forum to promote bioenergy and encourage the sustainable production, marketing and use of “green” fuels, with particular focus on developing countries.

The Partnership works to facilitate exchanges of know-how and technology, promote supportive policy frameworks and identify ways of fostering investments and removing barriers to the development and implementation of joint projects.

The overall aim is to respond to the growing need to develop renewable energy sources in the light of high oil prices and climate change.

GBEP is currently preparing a report on bioenergy policies, data and best practices in its member countries. The report will be published on the GBEP web site later this year. GBEP also continues its focus on methodologies for measuring reductions of greenhouse gas emissions from bioenergy and on raising awareness and promoting information sharing.

The Partnership brings together public, private and civil society stakeholders. Current GBEP partners are Canada, China, France, Germany, Italy, Japan, Mexico, Russian Federation, United Kingdom, United States of America, FAO, IEA, UNCTAD, UN/DESA, UNDP, UNEP, UNIDO, UN Foundation, World Council for Renewable Energy and the European Biomass Industry Association.

Italy currently serves as Chair and Mexico as Co-Chair.

Introducing the International Bioenergy Platform (IBEP)

The International Bioenergy Platform (IBEP) is being presented to the international community in the energy, agriculture and environment sectors as a mechanism for organizing and facilitating a multidisciplinary and global approach. IBEP is expected to provide analysis and information for policy and decision-making support; to build and strengthen institutional capacity at all levels; to enhance access to energy services from sustainable bioenergy systems; and to facilitate opportunities for effective international exchange and collaboration.

Four out of five people without electricity in the world live in the rural areas of developing countries. In many African, Asian and Latin American countries, rural women have to carry around 20 kg of fuelwood for kilometres every day. In sub-Saharan Africa, more than 92 percent of the rural population is without electricity.The number of people living on less than US$1/day is about the same as the number of those lacking access to commercial energy: two thousand million people. Extending an electricity supply grid to remote households in a rural setting can mean costs of up to US$0.70 per kilowatt-hour, seven times the cost of providing electricity in an urban area.

In this context, the availability of more bioenergy in its two main forms — wood energy and agro-energy — can help provide cleaner energy services to meet basic energy requirements. This century could see a significant switch, from a fossil-fuel-based to a bioenergy-based economy, with agriculture and forestry as the main sources of biomass for biofuels such as fuelwood, charcoal, wood pellets, bio-ethanol, biodiesel and bio-electricity.

Report of the 28th FAO Regional Conference for Asia and the Pacific
Jakarta, Indonesia, 15-19 May 2006

Bioenergy: a development option for agriculture and forestry in Asia and the Pacific

89. The Conference was informed of recent developments related to bioenergy and the potential opportunities for agriculture and forestry to benefit from renewed interest in alternatives to conventional energy sources.9 Recent spikes in the price of fossil fuels had motivated many countries to explore options for substituting bioenergy for conventional fuels. Improved production and utilization technologies, coupled with escalating costs of fossil fuels, meant that many forms of bioenergy were now cost-competitive with traditional energy sources.

90. The Conference noted the potential benefits of bioenergy, including: (i) clean and safe energy; (ii) potential cost savings; (iii) reduced dependence on fossil fuels; (iv) enhanced energy security; (v) new markets for agricultural and forestry products; (vi) reduced greenhouse gas emissions; (vii) enhanced environmental conditions; and (viii) rehabilitation of degraded lands.

91. The Conference also recognized the risks associated with bioenergy production: (i) potential trade-offs between energy production and food production; (ii) increased competition for land and water; (iii) higher food prices; (iv) dominance by large producers to the detriment of small farmers; (v) expansion of bioenergy production at the expense of native forests; and (vi) negative impacts of intensive biomass energy production on biodiversity.

92. The Conference was informed of FAO's recent launching of the International Bioenergy Platform, and of the potential to obtain FAO support for biofuel resources assessments and enhancement of productivity, supply and demand studies, review of possible impacts of bioenergy production on food prices and availability, formulation of national bioenergy programmes, management of bioenergy resources and production processes, and support for addressing social and institutional issues.

93. The Conference requested FAO to continue monitoring emerging issues related to bioenergy development, including the potential opportunities and challenges for agriculture and rural development, and to facilitate the sharing of information and experiences among member countries. It urged FAO to conduct studies and advise on the financial and economic viability of bioenergy development and the possible impacts on the prices and availability of food as a result of expanding bioenergy production.

BIO FUELS: Environmental and geopolitical effects

Clearly, a major move away from fossil fuels is destined to have resounding geopolitical repercussions with hopefully a broader international base of energy production and sources. But FAO's focus on the issue lies more with the likely impact on small farmers and the implications for food security and rural development.

"Farmers, particularly in tropical areas, are seeing new opportunities for increasing production and raising their incomes," Best said.

"But we also need to be careful. We need to plan," he warned. "Competition for land between food and energy production needs to be converted to positive common benefits."

One hazard, for instance, is that large-scale promotion of bioenergy relying on intensive cash-crop monocultures could see the sector dominated by a few agri-energy giants – without any significant gains for small farmers. But to date no comprehensive attempt has been made to address the complex technical, policy and institutional problems involved.

Bioenergy Platform

In order to fill this gap FAO has set up an International Bioenergy Platform (IBEP), to be officially presented at the United Nations in New York on May 9. The IBEP will provide expertise and advice for governments and private operators to formulate bioenergy policies and strategies. It will also help them develop the tools to quantify bioenergy resources and implications for sustainable development on a country-by-country basis.

It will further assist in the formulation of national bioenergy programmes, drawing on FAO's experience in promoting national, regional and global bioenergy development.

"The aim is to help us grow both enough fuel and enough food," Müller said, "and make sure that everyone benefits in the process."

Bioenergy web resources analysis

Géraud Servin and Britt Rasumssen
FAO, February 2007

This brief overview of bioenergy-related web resources includes a spreadsheet with detailed observations as well as a list of 21 sites we recommend for each specific audience. Out of the 50 web sites reviewed, 35 were kept for the analysis.

Please note:

- Nearly half of the web sites target policy-makers, particularly those in the EU. They focus on offering relevant updates on news and events as well as reports and position papers and European affairs documents. Very few offer analysis based upon actual research and data/statistics and nearly all sites focus on quantity rather than quality.
- Nearly half of the web sites provide basic information explaining the different types and uses of bioenergy to the "general public" although only a few see this as their sole purpose.
- Two-thirds of the web sites reviewed provide docs, news and events but only one-third publishes analysis and four web sites provide some data.
- The field of bioenergy is quite broad and there are several sites supporting and promoting specific sectors of the bioenergy industry with respect to research and development (R&D) as well as policy-making. However, many of these sites are consulting firms and therefore do not share the information on which they base their services.

In conclusion:

- statistical information and data (at the national and sub-national levels) are lacking; although all the web sites have their own approach and target, they generally lack constructive analysis based on hard facts.
- biofuels are addressed more often than other bioenergy products (cooking, heating, power); there is also a lot more research on this topic than on the others.
- Re: the information itself: quality, format, ease of retrieving and update frequency could be improved considerably for most of these web resources.
- More time would be needed to search and extract from each web site reviewed its best information resources. For example, which statistics/data are publicly available, what are the major publications or latest R&D on a subject, etc.

Recommended web sites

Policy-making
http://www.reeep.org
http://www.ren21.net
http://esa.un.org/un-energy

EU policy-making
http://ec.europa.eu/energy/index_en.html
http://www.euractiv.com/en/energy
http://www.energie-cites.org
http://www.fedarene.org

Educational
http://www.aboutbioenergy.info

R&D
http://www.ieabioenergy.com
http://www.nrel.gov
http://www.eurec.be
http://bioenergy.ornl.gov
http://www.worldenergy.org/wec-geis/default.asp

Industry
http://www.biofuelsjournal.com/

R&D and Industry
http://www.eubia.org
http://www1.eere.energy.gov/biomass

Cooperation advances in Industry and Policy-making
http://www.erec-renewables.org
http://www.aebiom.org

Specialized links
http://www.iphe.net
http://www.reegle.info
http://www.bioenergywiki.net/

UN weighs impact of bioenergy

Comprehensive report offers policy framework for decision makers

8 May 2007, New York/Rome – The fast-growing bioenergy industry offers many opportunities, but also involves a number of trade-offs and risks, the United Nations said today in its most comprehensive review of the likely impact of the emerging bioenergy market.

"The economic, environmental and social impacts of bioenergy development must be assessed carefully before deciding if and how rapidly to develop the industry and what technologies, policies and investment strategies to pursue," the report warned.

The document, "Sustainable Energy: A Framework for Decision Makers" was prepared by UN-Energy, a group of all UN agencies programmes and organizations working in the area of energy. It was sponsored by the Rome-based UN Food and Agriculture Organization.

Purpose of the study was to help ensure that "the energy needs of people are met and the local and global environment is adequately protected," said UN-Energy Chair Mats Karlsson of the World Bank. "We hope to use the collective strength of the UN system to affect change".

Key issues

The report pointed out the many benefits of bioenergy systems in relation to poverty alleviation, access to energy services, rural development and rural infrastructure. It reviewed the likely impact of bioenergy in terms of food security, climate change, biodiversity and natural resources, employment and trade. It also identified the vital points decision makers need to consider and stressed that, "Unless new policies are enacted to protect threatened lands, secure socially acceptable land use, and steer bioenergy development in a sustainable direction overall, the environmental and social damage could in some cases outweigh the benefits".

In an apparent reference to the use of some grains as a biofuel feedstock, UN-Energy noted, "In general, crops that require high fossil energy inputs (such as conventional fertilizer) and valuable (farm) land, and that have relatively low energy yields per hectare, should be avoided."

Sustainable bioenergy use

Moreover, even "sustainably"-produced energy crops could have negative impacts if they replaced primary forests, "resulting in large releases of carbon from the soil and forest biomass that negate any benefits from biofuels for decades," the report said.

To minimize greenhouse gas emissions associated with bioenergy production, policy makers needed to safeguard virgin grasslands, primary forests and other lands with high nature value, UN-Energy recommended. Governments should also encourage the use of sustainable bioenergy production and management practices. An international certification scheme, including greenhouse gas verification, should be set up to ensure that bioenergy products, and biofuels in particular, meet environmental standards all the way from fields to fuel tanks.

On food security, the report said that the availability of adequate food supplies could be threatened by biofuel production as land, water and other resources were diverted from food production. Similarly, food access could be compromised by higher basic food prices resulting from increased bioenergy feedstock demand, thus driving the poor and food insecure into even greater poverty.

Growing opportunity

On the other hand the market for biofuel feedstock offers new and rapidly growing opportunity for agricultural producers," the report said. "Modern bioenergy could make energy services more widely and cheaply available in remote rural areas, supporting productivity growth in agriculture and other sectors with positive implications for food availability and access".

Modern bioenergy can also help to meet the needs of the 1.6 billion people worldwide who lack

access to electricity in their homes, and the 2.4 billion who rely on straw, dung and other traditional biomass fuels to meet their energy requirements.

Overall, in taking decisions, policy makers "should ensure that food security considerations are given priority," the report stressed.

Bringing down trade barriers

The document was critical of tariff barriers currently erected against ethanol imports by some countries.

Impeding imports of more efficiently produced biofuels from abroad while simultaneously mandating the blending of biofuel with fossil fuels at home could divert more land than necessary from food production, it said.

Involving farmers

As to the implications for agriculture in general, the report noted that, "At their best, liquid biofuel products can enrich farmers by helping to add value to their products. But at their worst, biofuel programmes can result in concentration of ownership that could drive the world's poorest farmers off their land and into deeper poverty."

Mixed production

Most likely, "the biofuel economy of the future will be characterized by a mix of production types, some dominated by large, capital-intensive businesses, some marked by farmer co-ops that compete with large companies ... and some where liquid biofuels are produced on a smaller scale and used locally.

"Regardless of the scale of production, however, one thing is clear: the more involved farmers are in the production, processing and use of biofuels, the more likely they are to share in the benefits."

Kitchen killer

On health, UN-Energy said that modern bioenergy held out the promise of dramatically reducing the death toll caused in developing countries by the "kitchen killer" – smoke inhalation from cooking with fuelwood or traditional biomass, which is responsible for more fatalities each year than malaria. Women could also be freed from the drudgery of collecting firewood, thus providing them with greater opportunities for education and employment.

The Promises and Challenges of Biofuels for the Poor in Developing Countries

International Food Policy Research Institute

Joachim von Braun and R. K. Pachauri

In the past several years the changing world energy situation has generated intensive discussion about biofuels, much of it promising a source of environment-friendly energy that would also be a boon to the world's farmers. At the same time skeptics argue that biofuel production will threaten food supplies for the poor and fail to achieve the environmental benefits claimed. Based on the analyses below, we conclude that in order to make a difference in the lives of poor people as both energy producers and consumers, and to make strong environmental and economic contributions, biofuel technology needs further advancement, and investments and policies facilitating agricultural innovation and trade will have to be considered.

One reason that biofuels have achieved such a high place on the global agenda is that demand for energy is rising and is certain to continue to rise in the coming decades. Energy use is predicted to jump in many parts of the developing world, where use of marketed energy has been very low until now. Indeed, some 2 billion people still have little or no access to modern energy.
According to the U.S. Energy Information Administration's 2006 *International Energy Outlook*, global consumption of marketed energy is projected to rise by 71 percent between 2003 and 2030, from 421 quadrillion British thermal units (Btu) to 722 quadrillion Btu. Three-quarters of the increase will come from developing countries. In fact, the report projects that energy demand in the countries outside the Organization for Economic Cooperation and Development (OECD) will surpass that of the OECD countries in 2015. Much of the increase in demand in developing countries will come from Asia, including China and India, whose fast economic growth and enormous populations put them on track to become large energy consumers.

Given that energy demand is projected to keep rising, that oil supplies are constrained, and that instability in some major oil-producing countries shows no sign of abating, oil prices seem unlikely to fall much in the near future—if ever. With oil prices in 2006 between US$60 and US$70 a barrel and agricultural commodity prices increasing less than prices of other raw materials, biofuels have become competitive with petroleum in many developing countries' farm systems, even with today's technologies.

The International Energy Agency projected that biofuels would be competitive with petroleum at petroleum prices of between US$60 and US$100 a barrel. That point has been reached, and markets seem to be internalizing expectations of unstable and perhaps rising future oil prices. The competitiveness of biofuels, however, depends heavily on the relative prices of oil and of agricultural feedstock for biofuels. When the demand for biofuels increases agricultural prices, the competitiveness of biofuels will start to decline, and recent price increases for cereals in 2006 may signal such a trend.

Biofuels include fuel sources that have been used for millennia, like fuelwood and charcoal, as well as newer sources like ethanol, biodiesel, and biogas. These new sources depend on natural vegetation, crops grown specifically for energy, or agricultural or other forms of wastes and residues. Processing makes these biofuels cleaner and more efficient than traditional forms of biofuel, and if they are produced in a way that reduces net carbon emissions, they could contribute to mitigating global climate change.

Ethanol, for instance, can be made from sugars (like sugar beets and sugarcane), grains (like maize and wheat), cellulose (grass or wood), and waste products (like crop waste or municipal waste). Up to 10 percent ethanol can be blended with gasoline and used in standard vehicles, whereas specially made flexible-fuel vehicles can use any proportion of ethanol and gasoline.
Ethanol accounts for 40 percent of nondiesel fuel in Brazil, which produces nearly half the world's total production (16.5 billion liters of ethanol in 2005). Biodiesel, which can be blended with petroleum diesel, is made from oilseed crops, as well as from waste oils and greases. Biodiesel production is more land-intensive than ethanol production, and so far represents only a fraction of ethanol production. The European Union accounted for 89 percent of the world's biodiesel production in 2005.

Will Farmers Produce the Energy of the Future?

The growing potential of biofuels appears to create a substantial opportunity for the world's farmers. Can small-scale farmers and poor people in developing countries take advantage of this opportunity? Energy crops could provide farmers with an important source of demand for their products. About 80 developing countries, for instance, grow and process sugarcane, a high-yielding crop in terms of photosynthesis efficiency that can also be used to produce ethanol. With international sugar prices moving generally downward until recently, partly owing to protectionist sugar policies in some OECD countries, sugarcane production for ethanol has become a more attractive option for developing country farmers. Other energy crops include maize, soybeans, rapeseed, and oil palm, and many developing countries already grow or could grow these and other potential energy crops.

A modern biofuels industry could also provide developing-country farmers with a use for crop residues like stalks and leaves, which can be converted into ethanol or electricity. Emerging new technologies that convert cellulose to energy might lead to a much higher valuation of "residues," and may in fact

make “residues” history in agriculture. In some cases farmers can grow energy crops on degraded or marginal land not suitable for food production. An oil-bearing crop called *Jatropha curcas*, for example, produces a seed that can be converted into non-polluting biodiesel.

The crop is of special interest because it grows in infertile soil, even in drought conditions, and animals do not graze on it. India has 60 million hectares of waste land, of which it is estimated that half might be used for *Jatropha* cultivation. The cost of producing biodiesel from *Jatropha* is just Rs. 20–25 (US$0.43–US$0.54) per liter. The Energy and Resources Institute (TERI) of India announced in February 2006 that it is undertaking a 10-year project, in conjunction with BP, to cultivate 8,000 hectares of wasteland with *Jatropha* and install the equipment necessary to produce 9 million liters of biodiesel a year. The project will include a complete analysis of the social and environmental impacts of the approach.

Because biofuel production is as labor intensive as agriculture, it may be a boon to rural areas with abundant labor. In Brazil, one study showed that in 1997 the ethanol sector employed about 1 million people. Thirty-five percent of these jobs were temporary harvesting jobs employing many poor migrant laborers from the Northeast, but 65 percent were permanent. Moreover, the number of jobs in manufacturing and other sectors in Brazil created indirectly by the ethanol sector was estimated at 300,000. Many of the jobs created are unskilled, and this situation offers an opportunity for increased income to poor rural people. And small farmers are not left out: some 60,000 small farmers produce about 30 percent of the sugarcane in Brazil (see Box 1 for more information on Brazil’s experience with biofuels).

Will crop production for biofuels compete with and drive out food production, thereby increasing food insecurity? This question remains controversial. We concludethat energy crop production does not need to lead to increased food insecurity, for a couple of reasons. First, new ways of combining food production with energy production have been developed. Food crop residues like rice and wheat straw, maize husks, and sugarcane bagasse (a fibrous residue) can be converted into biogas, ethanol, and electricity. In other cases energy crops can be targeted to more marginal lands, while food crops can be grown on more favorable lands. In addition, farmers can rotate food and energy crops. Brazilian farmers are increasingly growing sugarcane in rotation with tomatoes, soya, peanuts, and other food crops. Finally, research can—and must—help enhance overall crop productivity, and this is a prime task for the Consultative Group on International Agricultural Research (CGIAR). (See Box 2 for scenarios of future food and fuel production.)

Second, it is now well understood that food insecurity is a result not simply of a lack of food availability, but poverty. Food insecure people do not have the income to buy the food that is available. If increased production of biofuels can raise the incomes of small farmers and rural laborers in developing countries, it may in fact improve food security. Still, risks for food security remain, particularly if the biofuel sector is not well managed and if oil price instabilities drive food price instability. Destabilizing oil price fluctuations that translate into food price fluctuations may actually be more worrisome than long-term price effects, as the poor have little capacity to adjust in the short run. Opening up trade opportunities for biofuels can dampen price fluctuations. Thus the effects of biofuel expansion on food security depend heavily on policies related to technology and trade.

What Are the Challenges in Creating a Biofuel Industry That Benefits Small Farmers and Poor People?

The high demand for energy and the apparent enormous potential of biofuels are no guarantee that small farmers and poor people in developing countries will receive the benefits.

Creating an industry that helps the neediest people improve their lives and livelihoods will require careful management at all levels. This management includes taking the necessary steps to develop a global market and trade regime with transparent standards for biofuels.

One of the arguments in favor of biofuels is their potential to serve as an environmentally sustainable source of energy. That added social benefit might even justify some level of subsidy and regulation, given that these external benefits are not internalized by the markets. But several environmental aspects of biofuels require attention.

First, biofuels must be produced in a way that results in an output of energy greater than the amount of energy used to produce them—that is, they should have a highly positive energy balance. Maize ethanol, of which the United States is currently the largest producer, has been controversial because until recently it had a negative energy balance. In 2002, however, the U.S. Department of Agriculture stated that maize ethanol had achieved an energy output-input ratio of 1.34:1, thanks to more efficient cultivation and processing practices. Brazil's large ethanol industry based on sugarcane is well established as a net energy producer.

Second, biofuel production must be managed in a way that substantially reduces greenhouse gases compared with petroleum. Maize ethanol produced in the United States may reduce emissions by 10 to 30 percent compared with petroleum, lignocellulosic feedstocks—derived from, for instance, trees, grasses, crop residues, and municipal waste—into ethanol. These feedstocks are, however, more difficult to process than starch or sugar crops. A major R&D effort is needed to develop cellulosic ethanol, which could contribute to a much greater expansion in biofuels without adverse consequences.

There are other challenges as well. Like any innovation, increased production of energy crops has the potential to exacerbate socioeconomic inequalities by concentrating benefits on the well-off. It can lead to deforestation, a loss of biodiversity, and excessive use of fertilizers and pesticides, thereby degrading the land and water that poor people depend on. Policymakers must take care to ensure that biofuel production is managed and regulated in a way that avoids these pitfalls. These risks are speculative at present. With improved access to finance and sound policies for support of cooperation and for contract security, most innovations in agriculture can be scale neutral. Under the assumptions of an aggressive biofuel growth scenario—which is not, it must be noted, a prediction—significant price increases for some food crops could emerge in the long run (135 percent for cassava, 76 percent for oilseeds, and 41 percent for maize by 2020) unless new technologies are developed that increase efficiency and productivity in crop production and biofuel processing (see Box 2).

Without technologies to improve productivity, the prices changes would adversely affect poor, net-food-purchasing households and would probably exceed the possible income gains by many small farm households. In addition, in many low-income developing countries, farmers are unaware of the opportunities presented by biofuel production and thus risk missing out on the potential benefits. Public-private partnerships could help raise awareness of these opportunities among farmers in low-income countries.

To develop a biofuels sector that is sustainable and pro-poor, actors at the international, national, and local levels have crucial roles to play. International institutions must help transfer knowledge and technology on developing an efficient and sustainable biofuels industry to poor countries.

The international community must also create a level playing field for trade in biofuels. By subsidizing their domestic agriculture and their biofuels industries, the OECD countries are raising the price of grains and feedstock in their own countries and are distorting the opportunities for biofuel production and trade in developing countries. At the national level, policymakers must take steps to create a well-functioning market for biofuels, to promote investment in associated areas like flexible-fuel vehicles and fueling stations, and to regulate land use in line with socioeconomic and environmental goals. They must also provide farmers who wish to grow energy crops with the same kinds of support needed for other forms of agriculture, such as research and extension services, credit, and infrastructure.

Finally, local institutions must participate in designing and managing projects to develop biofuels so that poor people and small farmers can gain benefits as both biofuel producers and consumers.

In response to concerns about energy supplies and prices, a number of countries have set standards or targets for biofuels use. The European Union has set a goal of 5.75 percent of motor fuel use from biofuels by 2010. The United States has mandated the use of 28.4 billion liters of biofuels for transportation by 2012. Brazil will require that all diesel contain 2 percent biodiesel by 2008 and 5 percent by 2013, and Thailand will require 10 percent ethanol in all gasoline starting in 2007. India mandates a 5 percent ethanol blend in nine states, and China is requiring a 10 percent ethanol blend in five provinces. Many other countries are taking similar steps.

As countries move to strengthen their energy security by increasing their use of biofuels, they should also work to ensure poor people's and small farmers' participation in the creation of a more sustainable global energy system. With sound technology and trade policies, win-win solutions—that is, positive outcomes for the poor as well as for energy efficiency—are possible with biofuels in developing countries.

Biomass-based energy programmes and strategies in the region

China. India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Viet Nam have national biomass energy programmes and projects.

Biofuel and Rural Renewable Energy Initiative of the GMS (ADB)
Mahfuz Ahmed, Senior Agricultural Economist, ADB
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

Goals

- Increased regional and national energy security (ENERGY)
- Enhanced Agricultural and rural development (AGRICULTURE)
- Increased GMS contribution to GHG emission reduction (ENVIRONMENT)
- Enhanced GMS Economic Cooperation and increased cross border trade (TRADE)
- Identify policy domains across various sectors
- Provide a coordinated approach to public-private sector investment

Development of Strategies and Options

- National and regional assessment (identification of issues, opportunities, threats and challenges)
- Networking and coordination with stakeholders
- Identify key areas of intervention

Capacity Strengthening

- Smallholder Farmers
- Government Institutions
- Non-governmental Institutions

Priority projects

1. Strategies and Options for Integrating Biofuels and Rural Renewable for Poverty Reduction
2. Developing Rural Renewable Energy for Poverty Reduction in the GMS

3. Public-private Partnership on Investment Cooperation for Biofuels in the GMS
4. Pilot studies on germplasm and crop improvements, and on-farm research on new biofuel crops suited for the GMS countries

ICRISAT & CIAT: The Technology Dimensions of Biofuel Development

Belum VS Reddy , Ceballos Hernan & Team
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

ICRISAT focuses on hybrids to fulfill both food and fuel needs

Jatropha

– Drought tolerant shrub, oil is used as biodiesel and has medicinal value

– Largest Jatropha cultivation in India was in Nashik

– Average yield in Nashik was low (<1 kg tree-1 ≈ 1-1.5 t ha-1) as against 9-12 t ha-1 reported yield

– Grown on productive land

– High labor costs

Pongamia oil used in power generators

– Carbon income through CDM
– 7.5 kVA generator produces 10-12 kWh daily from 5-6 litres of *pongamia* oil
– Power system run by village women
– Successful experiment being replicated by state government in 100 villages
– 900 t CO2eq sold to Germany
– Carbon income = 1 year income per family

IFAD- ICRISAT- CIAT- CIMMYT proposal

Harnessing water-use efficient bio-energy crops for enhancing livelihood opportunities of smallholder farmers in Asia, Africa and Latin America

- Developing biofuel market value chain

- Genes-Seeds- feed stock/grains- biofuel- pumps-engines

Targeted Crops and Countries

Country	Target crops
India	Sweet sorghum (SS), Jatropha & Pongamia
Vietnam	SS, Jatropha, Pongamia & Cassava
The Philippines	SS
China	Cassava
Mali	SS, Jatropha & Pongamia
Colombia	Cassava

Targeted outputs

- Improved sorghum and cassava cultivars and high yielding jatropha and pongamia clones suited to different agro-eco zones in target countries
- Molecular markers for total sugars and *bmr* traits in sorghum
- Institutional arrangements for collective community action to rehabilitate degraded lands and decentralized oil extraction at village level
- Agronomic crop production practices standardized and documented
- Seed/clone multiplication systems standardized
- Baseline information related to bio-fuel crops in the selected agro-economic zones collected and documented
- Existing input and market linkages studied and improved models formulated
- Improved technologies to enable year-round supply feedstocks
- The by-products after bio-fuels extraction evaluated for their use in animal feeding and/or crop fertilization and/or pesticides and documented
- Knowledge base of various stakeholders on the value chain of bio-fuel production including taking advantage of CDM built

Activities

1. Sweet sorghum hybrids and *bmr* sorghum hybrids, high-yielding and/or sugary cassava cultivars and jatropha and pongamia clones will be developed and evaluated/ characterized.

2. Mapping populations will be developed and molecular marker(s) linked to total sugars and brown midrib traits in sorghum will be identified

3. Multi-locational evaluation of sweet sorghum cultivars, cassava cultivars and nurseries of promising jatropha and pongamia clones and the best cultivars/ clones will be identified and multiplied

4. Organization of self help groups (SHGs) to undertake bio-diesel activities in villages and evaluation of decentralized extraction of oil and use of straight vegetable oil as energy source
5. The crop management practices will be standardized to maximize the productivity

6. The seed systems for multiplication of the identified sorghum and cassava cultivars and jatropha and pongamia clones will be built

7. The socio-economic conditions of the project participating farmers and their current knowledge/ constraint to the cultivation and the use of biofuel crops will be documented through participatory rural appraisal (PRA) and structured questionnaire surveys

8. The current linkages between farmers and the input agencies for crop production activities documented and improved/ modified; different models of linkages between the bio-fuel crops' farmers and the distilleries/ enterprises will be tested and the most appropriate model will be identified.

9. The local technologies will be improved to reduce the volume of feedstock (sorghum and cassava) for easy transportation and their storage to enable year-round supply

10. Evaluation of the stillage/ bagasse from sweet sorghum and cassava as a source of animal feed and/or organic manure and oil-cakes from jatropha and pongamia as a source of organic manure and/or pesticide

11. Government organizations will be sensitized to formulate farmer-friendly procedures to tap clean development mechanisms (CDM) and various stakeholders will be imparted knowledge on the bio-fuel production chain of and trained to take advantage of CDM

Phase II of project

- Scale the Phase I activities (sweet sorghum, cassava, jatropha and pongamia)
- Take up the activities related to the second generation technology through biomass based bioethanol production
- The wheat straw, sorghum and maize stover, the major crop resedues of Africa and Asia and biomass from switchgrass will be used in ethanol production in the second phase

Partners

- ICRISAT
- CIAT/CLAYUCA,

Partner countries

- India
- Vietnam
- Philippines
- China
- Mali
- Colombia

Cassava for bio-ethanol: Future opportunities and challenges

- Breeding and selection
- Further adoption of current and new high yield and starch varieties
- Use of high yield, high starch, and high moisture content materials rejected earlier on basis of drying
- Adaptation to a wider range of environments, altitude, cold, etc.
- Waxy (low amylose) starch varieties
- Small starch granules
- Sugary cassava

- Improved agronomy
- Extend the processing season, yield
- Penalty for early/late harvest
- Better fertilizer/fertility management
- More sustainable systems: intercropping, erosion control
- Scaling up to poor smallholders
- Adoption of new varieties and management
- Linking to markets – food, feed, processing
- Local distillation – not energy/Carbon efficient

Helping poor rural households benefit from the growing biofuel market

IFAD Newsletter March/April 2007

A US$250,000 programme titled Strategies and Options for Integrating Biofuel and Rural Renewable Energy Production into Rural Agriculture for Poverty Reduction in the Greater Mekong Subregion (GMS) was approved by IFAD's President in December 2006. The programme will seek to ensure that poor rural households in GMS countries reap the benefits of the growing market for biofuels. The combined IFAD/ADB effort will benefit households in remote and ecologically fragile areas.

The programme, financed by an IFAD grant of US$200,000 and an ADB grant of US$50,000, will cover all GMS countries. The programme aims to develop:

- an interim strategy to support the emerging biofuel subsector and that addresses policy, technological, institutional, market, and social and environmental issues
- local, national and subregional strategies and interventions that would steer developments in biofuel crops and rural renewable energy towards reducing poverty among resource-poor farmers and poor rural households
- a model for optimum use of biofuels that can be applied in local, national and subregional strategies for harnessing their benefits and scaling up successes

The programme expects to deliver the following outputs:

- analysis and projection of demand and supply trends for biofuel/bioenergy and their substitutes at the subregional, national and local levels
- analysis of market potentials for different biofuel/bioenergy products
- development of pro-poor strategies and options for the GMS countries to support the emerging biofuel subsector
- design of national strategies for pro-poor, farmer-centred biofuel development and a framework for optimum use of biofuels
- recommendations for a follow-up phase to guide IFAD, ADB and other organizations in further supporting the development of biofuel for rural poverty reduction
- guidelines on pro-poor, farmer-centred biofuel development approaches that would lead to the development of alternative sources of livelihoods, improved access to energy for both domestic and farming purposes and consequently better quality and standards of living for poor rural people.

The GMS Working Group on Agriculture Secretariat will be the programme implementing agency. The following agencies in GMS countries will assist in implementation:

- Cambodia – Ministry of Agriculture, Forestry and Fisheries
- Lao People's Democratic Republic – Department of Planning, Ministry of Agriculture and Forestry
- Myanmar – Department of Agricultural Planning, Ministry of Agriculture and Irrigation
- China – Department of International Cooperation, Ministry of Agriculture
- Thailand – Foreign Agricultural Relations Division, Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives; and the National Science and Technology Development Agency
- Viet Nam – International Cooperation Department, Ministry of Agriculture and Rural

Development

Reducing dependence on fossil fuels in the Greater Mekong Subregion

How can alternative sources of energy reach poor rural people and reduce their dependence on fossil fuels?

This was one of the topics taken up at the fourth meeting of the Working Group on Agriculture in which IFAD participated. Led by the Asian Development Bank (ADB), the Group met from 6 to 8 December 2006 in Siem Reap, Cambodia under the overall theme *'Strengthening strategic partnership for accelerated agricultural development and poverty reduction'.*

Delegations from all GMS countries – Cambodia, People's Republic of China, Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam – attended the meeting along with representatives from regional bilateral and multilateral organizations, including IFAD, the private sector, individual experts and consultants, and ADB.

Panel discussion on rural renewable energy

"About 50 million out of 300 million people living in the GMS have no access to network electricity," said Sar Chetra, Acting Chief of the Animal Production Office, Department of Animal Health and Production, Ministry of Agriculture, Forestry and Fisheries, Cambodia. "They therefore continue to rely on traditional fuels which are highly inefficient, inconvenient, costly and harmful."

The meeting's panel discussion on rural renewable energy focused on how to ensure that alternative sources of energy reach poor people and reduce their dependence on fossil fuels. Biogas from animal waste and biofuel from energy crops, in particular, can have enormous potential to reduce poverty. In his presentation, Thomas Elhaut, Director of IFAD's Asia and the Pacific Division, drew specific attention to:

- linkages between the Millennium Development Goals and access to local decentralized energy supply systems
- upward trends in investments in clean energy, related business opportunities and research, and their implications on pro-poor energy production and poverty reduction
- the importance of processing technologies that promote economies of scale
- energy sources that require minimal modification and adaptation of existing equipment and engines policy perspectives on decentralized energy supply systems, and policies concerning the competition between food production and energy production and the competition for land
- the importance of technology transfer and information transfer networks

Mahfuzuddin Ahmed, Senior Project Economist, ADB, concluded the panel discussion by pointing out that biofuels offer a win-win-win-win situation – for the environment, poor rural people, countries' energy security, and governments. Making significant investments is the way forward. Nevertheless, ADB recognizes that before investments are made, there is a need to:
thoroughly assess market potential identify, test and develop technologies extend policy support to assist GMS countries at national and regional levels

Mr Ahmed also noted a lack of cost-competitive information and revenue projections for investments in biofuels. In this regard, there are ongoing consultations between IFAD and ADB on a private investment fund for biofuels as a part of the GMS Core Agriculture Support Program (CASP).
A two-pronged strategy was proposed to:

- assess the market through national-level consultations
- organize a forum to examine policy issues and the capacity of smallholders to respond to the emerging trends in the renewable energy sector

Governments are interested, but need resources

Many governments are aware of the benefits of biogas for the rural population and are taking initiatives to integrate biofuels into their national energy policies.

The benefits of biodigesters

Since 2004, Cambodia and Lao People's Democratic Republic have been receiving technology and training support on biogas through the GMS cooperation in agriculture and the CASP. An example is the Chinese-modelled biodigester, based on the digestion of organic wastes – mainly animal wastes from pigs or cows. It is generally problem-free and requires low maintenance.

Small farmers adopt it readily because of its many benefits. When they use a biodigester, they eliminate smoke in the house, save time because they don't have to gather firewood and cooking is quicker, and also save the money that they would spend on buying fuelwood.
Strategic directions for agricultural cooperation in the GMS

The fourth Working Group on Agriculture produced a revised Draft Strategic Framework for the GMS Cooperation in Agriculture and the CASP for 2006-2010. The Strategic Framework and CASP are expected to be endorsed by the ministers of agriculture of the GMS countries at the Ministers' Meeting set for April 2007 in Beijing.

The Working Group on Agriculture is committed to mobilizing resources to implement the CASP. "Without resources, an agricultural support programme is meaningless," said Urooj Malik, Director of the Agriculture, Environment and Natural Resources Division, ADB. Programme priorities also have to be determined. "It would be ideal if the priorities matched those of the countries involved. For this, it is important that countries speak for themselves," he pointed out.

What are the implications for IFAD?

Bioenergy commodities are opening up markets that provide new options for poor rural people to lift themselves out of poverty. IFAD is committed to working together with ADB and other partners in implementing the CASP. It will support appropriate strategies and options that can drive and channel the development of the rural renewable energy sector towards reducing poverty among poor rural households.

IFAD benefits significantly from participating in the Working Group on Agriculture and related meetings. These fora enable IFAD not only to strengthen its partnership with ADB and other organizations, but also to acquire the knowledge needed to make future investments in the bioenergy sector.

Through its loan and grant-financed programmes, IFAD is increasingly engaging in activities that support rural renewable energy in the Asia and the Pacific Region.

UNDP and Total S A band together for alternative energy in Asia Pacific

12 October 2006

Bangkok - In the first Asia-Pacific regional partnership of its kind, the United Nations Development Programme (UNDP) and the multinational energy company Total S.A. have agreed to collaborate in a range of strategic development areas: access to clean and sustainable energy; and promotion of a better business environment through transparent governance, including leadership training for youth, and strengthening civil society networks.

One cornerstone of the partnership will be promoting community groups' access to energy, especially clean and renewable energies. UNDP and Total will work with community groups as well as home enterprise and micro-enterprise networks to improve both access to energy as well as information about energy efficiency and alternative sources of energy.

"It is important that international enterprises like Total, and UNDP, which addresses social and economic issues, exchange their experiences, combine their resources and join their efforts in this region in order to assist in the achievement of the Millennium Development Goals," said Bruno Weymuller, Total's Executive Vice President of Strategy and Risk Assessment, at the signing ceremony at the UNDP Regional Centre in Bangkok.

Already, a specific project in the Mahakam Delta of Indonesia has been identified. Its aim is to design a land use plan that will incorporate local community management of natural resources, and create employment opportunities that are environmentally sustainable.

The regional partnership agreement will also work to promote positive and transparent local business environments by working with governments, improving managerial skills and practices, and supporting entrepreneurship initiatives.

"This partnership brings together the strengths of both UNDP and Total to create sustainable development initiatives that will contribute to local communities and also protect the environment," says Elizabeth Fong, Manager of the Regional Centre in Bangkok. "We have a network of offices and projects across the Asia-Pacific Region that will benefit greatly from the potential of Total's support."

Another focus of the partnership is sharing of information and establishing means of dialogue between networks of civil society organizations and international agencies to foster better understanding of energy issues, challenges and solutions. Finally, the agreement will broaden an on-going programme to provide leadership training to young, active Asian leaders representing national and local governments, and civic and private organizations.

UNDP and Total have been working together for four years in Latin America and Africa on country-specific issues including sustainable development, sustainable energy and promoting a good business environment. This is the first regional partnership agreement between UNDP and Total.

CAMBODIA

Situation of Biofuel and Renewable Energy in Cambodia

Dr. SAR Chetra, Mr. CHOUN Chantethya, Mr. UNG Luyna3

Acting Chief of Animal Production Office, Department of Animal Health and Production, Ministry of Agriculture, Forestry, and Fisheries, 2Ministry of Environment, 3Ministry of Economic and Finance, Kingdom of Cambodia

[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

Potential Bio-fuel crops:

- Jatropha is potentially used for energy production
  - *Biofuel Application:*

- Jatropha Oil biofuel can be used for older diesel engines to generate electricity, power, water pump

Biofuel Project for Sustainable Development and Poverty Alleviation in rural Cambodia

Project Objective	To trail a business model based on Jatropha oil production in a small rural village setting.
Project Location	4 villages of Ponley District, Kompong Chhnang Province, Cambodia
Project Duration	17 months (start Nov. 2004 to end March 2006)
Project Funding	The Canada Fund plus Private Donor
Lead Organization	Development and Appropriate Technology (DATe) (Locally registered Cambodian NGO)
Partner Organization	GERES Cambodia (Locally registered French NGO)

Constraints to Development of Biofuels and Renewable Energy

Limited Information and low Level of Awareness

The level of awareness of renewable energy and bio-energy is low among policy makers, private sector firms, and in society at large.

Weak coordination between relevant agencies

- Energy development in Cambodia is not addressed as a cross-sector issue with link to climate change, environment, and human and economic development.

- This lack of an integrated approach in energy planning and development may lead to adverse social and environmental impact.

Lack of skilled personnel and training facilities

- Most government institutions responsible for renewable energy development and energy efficiency were recently established.

- As such, the technical capacity and work experience of their staff are still limited.

Commercial non-viability

- As Cambodian farmers are poor, so large sections of the population cannot afford the initial investment required for even the smallest renewable energy home systems.
- Because of the small size of the Cambodian market, these may not be achievable.

Inadequate Financing Arrangement

- The implementation of renewable energy technologies requires high initial investment cost.

- The Cambodian financial sector remains weak and unable

to perform efficiently basic savings and loans operations.

Unfavourable import taxes and tariff systems

- A tariff of 30% is currently levied on renewable energy and energy efficiency equipment imported into Cambodia,

- As a result, making such technologies a luxury product that the majority of consumers cannot afford

CHINA

The current status and prospect of China biomass development

Zhao li Xin

CEEPTD of MOA, CHINA Center of Energy and Environment Protection Technology Development Ministry of Agriculture 2006.1.19

China's biomass resource

Wastes: domestic waste, industrial organic waste, waste from livestock, etc.

Unused Biomass: agricultural wastes and wood cutting residues.

Energy crops: plants that are not grow on arable land, for non-food or non-wood purpose.

Domestic waste

(a) Urban garbage – 0.13 billion ton annually with high organic waste content (approx. 60-80%)

b) Industry organic waste – Annual, the total waste water and waste residue is 2.5 billion M3.

c) Waste from agriculture machining – Over 0.2 billion ton, including rice shuck, peanut shuck,etc.

d) Waste from forest machining –In 2002, total waste from forest machining was over 38.7323 million M3, from the total output of lignum

e) Livestock waste – Manure from livestock farms is about 1.8 billion ton, the total waste water is about 20 billion ton.

Unused Biomass

a) Crop straw –In 2004, 0.584 billion ton, where of 0.558 billion ton from corn, wheat, rice, oil plants and cotton.

Biomass energy resources

a) Firewood forest resource –In 2003, total area of firewood forest was 510.8 thousands ha, and cumulative was 8.75143 billion M3

b) Energy crops –For non-food purposes like sweet sorghum, cassava, sugarcane, jatropha, etc.

Situation of China's biomass energy: exploitation & utilization

Biomass energy plays a very important role in energy consumption. In 2003, total traditional biomass energy utilization was about 280 million tons of coal equivalents-about 14% of total energy consumption. Since 1980, many Chinese research institutes have been developing, promoting and disseminating new energy technologies.

Biomass energy use in china includes biogas, straw and stalk gasification, biomass power generation and liquid biofuels.

1. Biogas from livestock manure —household biogas digesters:

Until end 2004, the total digesters number was15 million, annual biogas production was 5.5 billions M3.

Large and medium scale biogas engineering:

Until end 2004, projects number reached 2,671, annual biogas production was 17.6 thousands M3.

Waste treatment was 7.19 millions ton, generated electricity was 6.515 millions KW, gas supply households were 479.4 thousands.

Until end 2004, large and medium-sized biogas engineering in livestock farms reached 2,671

Biomass gasification

Since 1990s, straw and stalk gasification station for villages have been established. Until end 2004, 525 village-scale gasification station, with annual gas production of 0.18 billion M3.

Anaerobic fermentation technology using crop straw as material had a new breakthrough.

Biomass power generation and heat supply

Total installed capacity is 2,000 MW, 1,700MW is from sugarcane-residue, the rest is from agricultural waste and forest waste.

Liquid Biofuel

From 1990 to 1999 the grain production in China increased fast, and the government spent large amounts of money to buy and store surplus grain. This situation was a main reason for the government to launch an ethanol fuel programme in 2000. The program was driven by 3 facts: grain surplus, fuel shortage and air pollution.

(1) Fuel Ethanol Production

In 2005, the total fuel ethanol production reaches 1.02 Mio ton 3600 corn 1200 An'hui
9000 Wheat /cassava 3000 He'nan 3300 corn 1000 Heilongjiang 9900 corn 3000 Ji'lin material consume (1000T/a) material Production (1000T/a) area

CAAE (China Academy of Agricultural Engineering) – National '863' Program -- Fuel Ethanol Production from Sweet Sorghum Stems Production bases have been established in Heilongjiang, Inner Mongolia, Xinjiang and Shandong provinces. The production is nearly 10,000 t/a .

The potential for bioethanol output in 2020 is 8 Mio t , which can almost cover 10% of gasoline (E10).

8.019 0.82 Total 6.019 and Energy crops 2 0.82 Food crops

In 2020 2004 Yield of fuel ethanol / Mio t/ a Variety
Bio-diesel

In 2004 the national production was 38,000-60,000 tons. It is expected to be doubled in 2005/2006. MOST is planning to achieve a national production of 1.5 to 2 Mio t/a of bio-diesel in 2010, and 12 Mio t/a in 2020

The prospect of China's biomass development

Development of an efficient and economic biomass industry by promoting a Cycle-economy , and also focus on the protection of environment, pollution prevention ,and building the environment-friendly society.

Technology issues

produce biogas from animal manure
Anaerobic fermentation technology with high solid content—reduce liquid residue
Land application technology with less GHG
Electricity generation technology and feed to grid

Biomass gasification

Improved anaerobic fermentation technology by using crop straw
Biomass gasification with less tar
biomass collection and transportation system
Biomass power generation technology of high efficiency burning

Liquid Biofuels: Bioethanol

Raw material and planting technology:breeding of high-quality seeds of main energy crops such as sweet sorghum, and their applicability to potential planting areas and large-scale field tests
Processing technology: producing bioethanol from fibrous material
Raw materials for biodiesel and planting technologies
Collection and transportation of feedstock: Most of forestlands in China are located in mountainous areas; collection and transportation of energy forestry crops is still difficult
Processing technology: increase the output of biodiesel from seeds

Recent primary work of MOA

Extend rural household biogas, plan to achieve the level of 27 million, that over 10 percent of the total rural household
Increase building anaerobic digester for mediumlarge- scale livestock farm
Building demonstration district in which the renewable energy replace the general energy
Increase the technology research and demonstration work about biomass liquid fuel

UN Praises China's Move to Ban Ethanol Made from Corn

BEIJING.— The United Nations Food and Agriculture Organization, FAO , praised the recent decision by the People's Republic of China to ban the use of food crops to produce ethanol, reported Prensa Latina news agency.

The FAO said that the step taken by such an important nation as China may accelerate the development of new technologies for making ethanol, which would be aimed at using biomass instead of basic foods crops. The Chinese authorities recently instructed businesses involved in the production of fuel to concentrate their efforts on the use of cellulose and other non-basic agricultural products.

The use of corn for the production of ethanol to substitute gasoline as a fuel for vehicles was one of the reasons why its price increased by 30 percent during the past nine months. In turn, the cost of animal feed and consequently meat, especially pork, also rose considerably. Information provided by the US Department of Agriculture stated that some 86 million tons of that nation's

corn crop for 2007 and 2008, are going to be used to make fuel. This will lead to a situation in which the internal use of corn for producing ethanol in the US is going to be greater than its corn exports.

Green technology to fight poverty in western China

An innovative initiative between UNDP and the Chinese government to reduce poverty and improve ecosystems for Chinese ethnic minorities

21 November, 2005- Beijing, China –

Communities living on the arid mountains bordering Guizhou, Sichuan and Yunnan may soon be able to use the seeds of a locally grown tree for bio-fuel production to increase their energy supply, through a 4-year United Nations project aiming to alleviate poverty in western China.

Jointly established by the United Nations Development Programme (UNDP) in China and the Chinese government, the US$ 8.585 million project was launched today in Beijing, aiming to use green technologies to reduce poverty and improve fragile ecosystems in western China, where the number of the total poor is growing.

Entitled “Green Poverty Reduction in China”, the project prioritizes communities of ethnic minorities living in ecologically fragile and remote regions of China. The aim is to create new sources of sustenance and to develop green energy for those areas involved in the project. “Fostering the potential of green industries and energy sources in remote mountain areas and deserts is an important vehicle which can generate income and employment opportunities, while protecting the environment," said Alessandra Tisot, UNDP Senior Deputy Resident Representative in China.

Through bio-diesel production in Guizhou, Sichuan and Yunnan, the project aims to create a market for the oil-rich seed of the Jatropha Curcas L tree. The tree grows wild in the mountainous regions of western China and is currently used on farms as hedging and to prevent desertification. Its wide-spread cultivation would hopefully lead to more fertile land in an area where soil erosion and aridity create difficulties for agriculture and the ecosystem.

Along with the production of bio-diesel, the project will develop Jarrah Dayun production in Xinjiang which is used as raw material for traditional medicine, and provide small-scale wind turbines to poor herdsmen in Inner Mongolia. Best practice and lessons gained through these pilot sites will be disseminated as the initiative aims to be extended across the country.

This initiative is jointly established between UNDP, the Ministry of Science and Technology (MOST), and the China International Center For Economic and Technical Exchanges (CICETE) under the Ministry of Commerce.

INDIA

- India’s National Mission on Biodiesel initiated in 2006 is based on the plantation of *jatropha* on wastelands

- The rural administrative sub-division of *taluka* comprising a closed biomass and rainwater basin with an average population of about 200,000 is the basis of the 1997 National Policy on Energy Self-sufficient Talukas. India’s talukas have the potential of producing 400 million tonnes/yr of agricultural residues which can not only meet rural energy needs but also animal feed and fertilizer. India has launched the National Mission on Biodiesel based on plantation of *jatropha* on wastelands as a mass rural income/employment-generation.programme linked to commercial bio-fuel production.

- *Rural microenterprise model for bio-fuel extraction in India*

The Integrated Research and Action for Development, India (IRADE) is demonstrating a business model for production and commercialization of biofuels at village level in three neighbouring villages of Haryana state. It comprises the extraction of straight vegetable oil from Jathropa seeds. Capacity building activities will be performed in order that the villagers conform and manage their own biofuel micro-enterprise. If successful the project will trigger the development of decentralized biofuel extraction business in rural areas of India and improve welfare of villagers.

Rabobank & CII (Confederation of Indian Industry) report "India: biodiesel a golden opportunity?, May 2007

- Difficult for India to grow biodiesel crops on farm land as it would most likely jeopardize national food security; but vast areas of land unfit for agricultural production can be used for cultivation of jatropha or similar species giving farmers a very important new opportunity to increase income and livelihood conditions; however, no agreement on the amount of degraded lands actually available and suitable for such cultivation – from 7 million ha to 42 million ha
- Strong interest to promote biofuels in India, primarily as a means to improve rural income and living conditions and also for environmental benefits, but no well-defined policy for development of biodiesel sector.
- Ministry of Rural Development lead ministry for National Mission on Biodiesel; Ministry of Agriculture, Ministry of New and Renewable Energy, Ministry of Finance, Ministry of Petroleum and Natural Gas also involved.
- No widespread large-scale commercial benchmark for jatropha plantations in India; no agreement on expected yields and oil content; Planning Commission estimate that 5.6 million ha plantations can produce oil for 10 percent diesel replacement by 2011-12
- One way to ensure that the rural population will be included and benefit to a maximum extent would be to encourage the creation of cooperatives which would facilitate the training of a large number of people and enable some degree of scale in production.
- If handled effectively, jatropha cultivation for biodiesel production could potentially generate millions of jobs in rural areas in the course of the next decade; estimates range between 218 and 311 man days per hectare – one person per hectare per year; if a mere 5 percent target for biodiesel were to be imposed and reached, it could generate at least 2.4 million jobs, the cultivation of at least 2.8 million ha of waste land and an additional combined annual farm income (from fourth year onwards) of nearly one billion US dollars; deploying wastelands for biodiesel production in India, therefore, seems like a win-win situation for both the government and farmers.
- Studies have cautioned that large-scale jatropha plantations can encroach on animal habitats, causing drinking water scarcity; pongamia also can overwhelm other vegetation in agroforestry as it tends to spread laterally.
- Lack of assured supplies of vegetable oil feedstock has stymied private sector efforts to set up biodiesel plants in India; at this point, farmers across the country are not convinced in large numbers that jatropha cultivation can be rewarding enough; farmers cite following problems – delay in publicizing, and explaining government policy, no minimum support price, no guaranteed off-take, lack of availability of certified seeds of higher yield.
- No agreement on right purchase price of jatropha seed, keeping farmers from taking up cultivation on a large-scale – important as jatropha cultivation is highly labour intensive and brings only costs and limited income for at least the first three years.

The National Mission on Jatropha Biodiesel

In April 2003, the committee on development of BIO-FUEL, under the auspices of the Planning Commission of India, presented its report that recommends a major multi-dimensional programme to replace 20% of India?s diesel consumption. The National Planning Commission has integrated the Ministries of Petroleum, Rural Development, Poverty Alleviation and the Environmental Ministry and others. One objective is to blend petro-diesel with a planned 13 Million t of bio-diesel by 2013 (>>l000 times compared to the present world Jatropha cultivation and production), produced mainly from non-edible Jatropha oil, a smaller part from Pongomia.

For this end, eleven millions ha of presently unused lands are to be cultivated with Jatropha (for comparison: annual loss of Brazilian rain forest 2.4 Mio ha). A similar program was started with Ethanol production from sugarcane molasses, which is to replace 5% of transport petrol in the first phase.

Announcements and discussion of this program have already now brought numerous institutions, private investors and some farmers to prepare and even start with work on a major Jatropha program. The move towards large-scale utilization of Jatropha is thus mainly coming from the energy discussion, with its increasing environmental and health burden and foreign exchange cost; but as well from the Forestry and Rural Development Sector, looking for future income potentials. In March 2004 a first portion for a National Program on Jatropha was released with RS. 800 Crore (161) Mio. S/Euro) to support cultivation of Jatropha on new fields and plantations of 200.000 ha. This is the first portion of a total program approved with a volume of RS. 1.500 Core (300 Mio S/Euro) and 400.000 ha, to be realized within five years. The program intends to replace 5% of diesel consumption by 2006 with 2.6 Mio t of Jatropha bio-diesel produced on 2.2 Mio ha, based on yields expected by the Government.

To plant 11 Mio ha Jatropha, the program is to become a "National Mission" and mass movement and wants to mobilize a large number of stakeholders including individuals, communities, entrepreneurs, oil companies, business, industry, the financial sector as well as Government and most of its institutions.

In the first phase, within a demonstration project, the "viability of all components" is to be tested, developed and demonstrated by Government with all its linkages in different parts of the country, sufficient production of seeds and a wide information and education of potential participants and stake holders to allow for a self-sustained dissemination. The demonstration project consists of 2 phases, each with 200.000 ha planted in 8 states of 2 x 25.000 ha "compact area" each.

Each state will have one estenfication plant, which is meant to be economical from 80.000 t of bio-diesel onward, expected to come from 50 to 70000 ha each. Compact areas in each state will he further subdivided into 2000 ha blocks of plantation to facilitate supply of planting material, procurement of seed and primary processing through expellers.

Expected outputs from 400,000 ha are meant to be 0.5 Million t of bio-diesel, compost from the press cake, and massive generation of employment (16 Mio days/year) for the poor. The program is meant to assist to achieve emission standards and climatic targets approved by Government, to improve degraded land resources, and income to 1.9 Mio poor families at 4 families per ha, on a base of 5 Rupees/kg of seed sold.

For 2007, when the process is meant to move self-sustained, a scheme of margin money, subsidy and loan is planned to be instituted. Expansion of processing capacities is meant to run on a 30% subsidy, 60% loan, and 10% private capital basis. Additional support for mainly market based "Phase II" from 2007 onwards, is sought from International Funding Agencies, since the program addresses global environmental concern and contributes to poverty alleviation. Spat~te legislation on bio-fuels is recommended.

Land available for Jatropha curcas plantations (million hectares)

Forest areas	Agriculture (boundary Planation)	Agriculture (agriforestry)	Cultirable fallow lands	Wastelands under intergrated watershed development	Strip lands such as roads, railways, canalbanks	Total	Additional wastelands
3.0	3.0	2.0	2.4	2.0	1.0	13.4	4.0

The National Mission on Biodiesel, is therefore proposed in two phases as below:
Phase I consisting of a Demonstration Project to be implemented by the year 2006-07 with an investment of Rs. 1500 crore ($300 million) on 400,000 ha.

As a follow up of the Demonstration Project, Phase II will consist of a self sustaining expansion of the programme beginning in the year 2007 leading to production of Biodiesel required in the year 2011-12.

Rationale for the Program

India is sixth in the world in energy demand accounting for 3.5% of world commercial energy consumption. A large part of the population has no access to commercial energy from hydrocarbons at all. India's import of crude oil is expected to go up from 85 million t to 147 million t by 2007. Hydrocarbons, in India predominantly diesel (ca. 80 *%,* in Germany >40%) are responsible for most of the transportation fuel in India; the transport sector is the most problematic as no realistic alternatives have been found so far. Overall transport crude oil demand was >50 Mio T in 2001.

In India, a larger share than in other countries is needed for transport purposes, in particular for diesel. Consumption is expected to rise at an annual 5.6% rate and by *65%* until 21) 11. Domestic supply can presently satisfy 22% of demand and dependence on crude oil imports (>18 billion $/a) is increasing. There is a growing demand gap between production and consumption. At the same time, per capita consumption with 480 kg oil equivalent and 260 Mio people below the poverty line (>20% worlds poor) is quite low. Indian petrol reserves arc expected to last for another 20 years plus. Rising and volatile prices and respective foreign exchange costs are one of the main risk factors of the Indian economic and social development prospects.

In Europe and the US blends between 5 and 20% of bio-diesel are used as well without engine modification, in the US so far a total of 400.000 m3/a. In France 135 *(5%* bio-diesel blend) is mandatory. Sometimes a low percentage additive for lubrication and sulfur removal from diesel fuel is used as well In Europe bio-diesel is mainly made from rapeseed, sunflower, in the US from soybean and in Malaysia increasingly palm oil is being utilized. Nicaragua is cited as an example where Jatropha oil is used for bio-diesel to replace petro-diesel.

From a total of RS 1500 Crores total Government contribution (300 Mio S/Euro) the major share (RS 1200 Crores) is earmarked to be spent for nurseries and plantations. Legislation is to secure that use of B5 (5% blend) and successively B20 (20% blend) become mandatory all over India.

Bio-energy, as a replacement for transport fuel can be alcohol, bio-oil or bio-diesel. Bio fuels are to reduce negative environmental effects through lower emissions and climatic impacts. Local production of bio energy is projected to have a broad range of positive economic, social and environmental implications. Upgrading eroded and deforested land, creation of employment and income is part of the argument. The national program wants to stop soil and forest degradation and its environmental implications, generate employment for the poor, in particular for women, reduce climatic change and improve energy security.

Alcohol, mainly in form of ethanol is planned in India in be made from sugar cane directly or from molasses and to replace *5%* of motor spirit for spark ignition engines. The alcohol program has started already. Bio-oil, without further processing, is only suitable for sturdy compression ignition engines (diesel), or asks for considerable motor modifications and maintenance. Therefore, the Indian Government focuses the processing to bio-diesel from plant oils. However, a direct use in rural engines, water pumps, tractors and generator sets to produce electricity are additional options to

provide rural energy and energy security to the rural population.

Bio-diesel, considered an equal replacement of petro-diesel (with 5% less efficiency), can be made after transesterification from virgin or used vegetable oils (both edible or non-edible). It is meant to be produced in India mainly from Jatropha curcas and, to a lower extent, from other non-edible virgin oils (in particular Pongamia pinnata, called honge or pinnata, as well as Neeni, Mahua). It requires little or no engine modification up to 20% blend and minor modification at higher percentage blends. The use of bio-diesel results in substantial reduction of un-burnt hydrocarbons, carbon monoxide and particulate matters. It is considered to have ahnost no sulphur, no aromatics and has about 10% built in oxygen, which helps to bum it fully. Its higher cetane number improves the combustion quality.

Almost all present emissions standards are expected to be reached with bio-diesel. While the country is short of petroleum reserve, it has large Arabic land as well as good climatic conditions, potential to produce biomass to be processed into bio-fuels. Demand of edible oil is higher than production, so edible oils, as mainly used in Europe and the US for transport oil, are considered not eligible. As well, edible oils are much more expensive, sometimes by a factor 3-5, in India.

Instrument to promote non-edible oils is hoped to be buy-back arrangements with oil companies to be put in place and mandatory use of bio-diesel blends. The Jatropha program is to be combined with other programs of the Ministry of Rural Development to attract growers, entrepreneurs and financial institutions so that a "self sustaining programme of expansion takes off? on its own, with the Government playing mainly the role of a facilitator. Hence, for the expansion phase, the Government will need "to give only marginal financial support". The rural community will have the first right of access to the oil for its own use. Responsibility for availability of sufficient processing units will be with the Ministry of Petroleum. Studies have revealed that "direct and indirect impact of bio-diesel e.g. employment generation, balance of trade, emission benefits etc. are substantial and need to be accounted for" while considering the duty structure on bio-diesel and HSD.

However, a clear comparison between the yields and economics of different edible and non-edible oils, and why production of non-edible oils for farmers is expected to be more viable than of edible oils, has not been found inside the program argument. Duty structure is meant to be designed in a way that the price of bio-diesel will be slightly lower than that of imported petro-diesel fuel.

Jatropha curcas is considered most suitable since it uses lands, which are largely unproductive for the time being and are located in poverty-stricken and watershed areas and degraded forests. Jatropha is planned as well to be planted under the poverty alleviation programmes that deal with land improvements.

For the planned 13 Mio ha Jatropha, 3 Mio ha are to be identified in 38 Mio ha under stocked forest, 3 Mio ha hedge equivalent from 140 Mio ha of agricultural land and 2 Mio ha for absentee landlords since, Jatropha does not require looking after and gives a net income of Rs 15000/ha". In addition, land comes from 2.4 Mio ha out of 24 Mb. ha of fallow lands; two Mio ha from integrated watershed development programmes; one Mio ha from stretches of public land along railway, roads/ canals and 4 Mio ha from "other waste lands".

As a by-product the oil cake and glycerol are to be sold to reduce the cost of processing biodiesel to par with the oil price. The sales cost of bio-diesel is expected to be very close to the cost of oil obtained for production, since the cost of trans-esterification is meant to be recoverable to a great extent from the income of oil cake (3-5 Rupees/kg) and glycerol (50 Rupees/kg). The cost of bio-diesel is expected to reach between 15 and 16.3 Rupees at an assumed price of RS 5 per kg of seed and at 3.2 kg of seed for I litre of oil. "Thus the plantation, oil extraction and production of bio-diesel are economically feasible". Overall oil bio-diesel recovery is expected to be 91% at an oil portion of 35%. There is a plant density of 2500 trees per ha assumed, in mixed forestry areas 2500 trees each are considered one ha. An average seed yield of 1.5kg/tree and 3.75 tiha are expected corresponding to 1.2 t of oil /ha and 2.5 t of fertilizer. Bio-diesel is expected to be available on the market from 2005/2006 onwards. Work created of 300 "man" days /ha would allow 550.000 people to escape poverty in the first part of the program. A transesterification plant is meant to cost Rs75 Crores (5/Euro 12.5 Mio; I crore is equivalent to Rs 10 Mio.), and procurement and expeller centre Rs 80 lakh (S/Euro 160.000; one lakh is equivalent to Rs 100.000),)NEEDS AND RESPONSIBILITIES

A number of research and development needs have been defined by the program:

Genetically improved tree species, to produce better quality and quantity of oil This includes tree improvement programs, identification of candidate plus trees,standardization of nursery raising techniques, (vegetative/seed/tissue culture)Scientific data for planting density, fertilization practices, planting procedures

Technology practices for adoption at grass root level.

- Research on inter-cropping for agriculture, agro-forestry and forestry application
- Processing techniques including bio-diesel and uses of by-products
- Utilisation of different oils and oil blends including potential additives needed
- Blending, storage and transport of bio-diesel
- Engine development and modification
- Marketing and trade
- Watering techniques, water and irrigation needs and wastewater use are not part of the program

There are some "micro-missions" or task forces planned for the different tasks:

- Ministry of Forestry; JFMCs (planting on forest lands)
- Novod (planting on non-forest lands)
- Ministry of Rural Development (other land implementation);
- Khadi Village and Industries Commission ? KVIC (procurement of seeds and oil extraction)
- Ministry of Petroleum (trans-esterification) and
- Different Research Agencies (research and development),
- All R&D activities are to be coordinated by a committee under the Planning commission.

Some of the institutions presently involved in R&D activities are the following:

- Punjab Agricultural University (PAU)
- Coiabatore Horticultural University with 250 I/day bio-diesel production facility
- institute of Petroleum (lIP)
- Indian institute of Chemical Technology (IJCT)
- Indian Institute of Technology (Delhi, Madras)
- Indian Oil Corporation (bC) with 60 kg/day bio-diesel production facility at Fardabad
- Mahindra&Màhindra (works on tractors from Karanji bio-diesel; pilot plant in Mumbai)

Talukas can provide critical mass for India's sustainable development

Anil K. Rajvanshi,
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http://education.vsnl.com/nimbkar/criticalmass.html

India's food and energy self-sufficient Talukas are groupings of about 80-100 contiguous villages pooled together to achieve a critical mass economically. A Taluka can be thought of as a closed biomass and rainwater basin, with a combined population of about 200,000 people. There are thousands of them in India. One Taluka studied produced 100,000 tons a year of surplus agricultural residues available for biomass energy production. In conjunction with energy plantations and energy crops this could produce the energy equivalent of 30 million litres a year of petroleum products, filling local energy needs and creating 30,000 local jobs.

Dr. Rajvanshi's study became the basis for India's National Policy on Energy Self-sufficient Talukas in 1997 and is being implemented nation-wide by the Ministry of Non-conventional Energy Sources (MNES).

It is suggested that Talukas in India can provide critical mass for sustainable development. A study

done for Phaltan Taluka in western Maharashtra has shown that all its energy needs of electricity, liquid fuels etc. can be met by judicious use of agricultural residues and other biomass resources grown in Taluka. The study also suggests that biomass energy-based supply options have the capacity of creating substantial wealth and employment in Taluka. An energy and food self-sufficient Taluka can be a new paradigm of rural development. Various technological and policy issues needed to move this concept forward are outlined.

What is a taluka?

Taluka is an administrative block generally comprising of about 90-100 contiguous villages and has a small town as its headquarters. On an average 8 to 10 Talukas make up a district. For example in Maharashtra there are 30 districts and 236 Talukas. The average area of a Taluka is ~ 1000-1500 km^2 and its total population is between 200,000 to 250,000. The town population is about 50,000. Data on commercial energy usage show that on an average a Taluka consumes about 10-15 MW of electricity and about 10-15 million liters/year of petroleum products[11] . There are about 3342 Talukas in India. The major economic activity in a Taluka is primarily agriculture based.

Since the geographical boundaries of a Taluka are fixed, it can be thought of as a closed biomass and rainwater basin. It is the thesis of the author that a Taluka can produce a majority of its demand of food, fuel, fodder and fertilizer from the natural resources and agro-based material available in it and hence the development can be truly sustainable. For some Talukas that do not have sufficient biomass, other energy sources like solar and wind can be used to produce energy.

Why a taluka based model?

Societies are living and dynamic structures. In an evolutionary process they can be thought to follow the laws of a natural living system. Hallmark of evolution of a dynamic system is its size reduction; increase in energy usage efficiency; increase in complexity; possession of critical mass, and its "punctuated equilibrium" with the surroundings. In the "punctuated equilibrium" phase the system stabilizes for a certain time[12] . One of the crucial conditions for the evolution of a dynamic system is the availability of critical mass. The critical mass enables the system to process materials and energy through it and hence allows it to grow. If the critical mass is not available, the system does not grow and dies off.

Societies can also be thought to be like Prigogine's dissipative structures[13]. For example a convection cell in a body of water heated from below is a dissipative structure and is energy dependent. The resulting shape of these structures therefore depends on the quality and quantity of energy passing through them[13] . The systems possessing a critical mass grow with energy input and go through a "punctuated equilibrium" phase after which they become unstable and collapse into smaller systems. These small systems then coalesce through time and again form a critical mass and the cycle continues.

However for the societal systems to grow in a sustainable manner, certain conditions have to be fulfilled. Thus sustainable systems can be compared to a chair[14] . The four legs of this chair can be thought to be made of four activities : Energy, Economical, Environmental and Equity (social/cultural issues). All of them have to be of equal size for comfortable sitting and interconnected to provide stability. The base (seat) has to be of the right size. Too big a base will make the chair sag and too small will make it unstable. Correct base size can therefore be thought of as the critical mass.

It is our thesis that because of its population size and its fairly developed infrastructure, Taluka has the ability to form a critical mass for a sustainable society for developing countries. With proper use of its agricultural and natural resources it can produce food, feed and fertilizer in a self-reliant, environmentally sound and economically attractive manner. Hence it can provide the four legs of the chair for sustainable development. As the energy and other resources available are decentralized in nature, Taluka can form an appropriate "dissipative structure" and can remain in "punctuated equilibrium" phase.

From the above evolutionary model it can also be conjectured that in future, with the increasing use of renewable energy, all societies will evolve to be decentralized, high technology dependent and

rural based. Similarly the megacities will break into smaller sustainable units. India is already a rural based decentralized society. Hence instead of going the way of megacity based model, it is better to arrest this trend by introducing high technology systems in Taluka areas. These high technology systems may include internet connectivity, desktop-manufacturing units, and micropower production systems like microturbines and fuel cells.

Taluka model

India produces in its Talukas ~ 400 million tons/yr of agricultural residues which theoretically can produce ~ 53,000 MW of power via biomass based power plants[11] . This power is 70% of the total amount available in the country as of today from all other sources[3] . Not only can these residues produce adequate power to supplement existing power production, but husbanding this resource properly, can also produce adequate animal feed and fertilizer. With increasing food production, the quantity of agricultural residues will also increase. Its judicious use will improve the rural economy and the quality of land. However this agricultural residue is spread all over the country and is very dispersed. This points towards decentralized power production systems.

Besides producing power, the challenge is also to maintain high quality and productivity of land so that food, animal feed, fertilizer and fuel could be produced in a sustainable manner from it. For this, water and soil conservation has to be implemented. It is possible to achieve this by rainwater harvesting and by planting of trees and grasses and general management of biomass resources in the Taluka. As the economic returns will be directly dependent on the increased biomass production, the landowners in a Taluka will take up such measures readily. The strategy will also help increase the income of the farmers (since they will get money from residues which are presently wasted), will provide jobs in each Taluka to labourers for collecting residues and will create employment in other biomass based industries. It is estimated that each Taluka can create about 30,000 new jobs from such activities[15] .

Following this approach an Energy self-sufficient Taluka model was developed[15] . This model was developed for Phaltan Taluka. However we feel that this methodology can be easily used for other talukas in the country. The strategy for taking care of energy needs was based on biomass resources. Based upon the historical data of energy needs for Phaltan Taluka[15] it was found that in 2000 AD it will require about 13 X 10^8 MJ of electricity and about 26 million liters of petroleum products (diesel, petrol and kerosene)[15] . It was established that all this energy can be easily met by biomass based power plants; production of ethanol from sweet sorghum and from existing distilleries; and pyrolysis oil production from agricultural residues and energy plantations.

Electricity from biomass based power plant would replace the MSEB supplied electricity while ethanol and pyrolysis oil would replace the liquid petroleum products. The technology for producing all these products already exists[16,17] . The details of the strategy are given in reference 15. This study also showed that with a capital input of Rs. 300 crores, Phaltan Taluka can produce wealth of Rs. 220 crores/year and provide employment to about 30,000 people year round.

This study became the basis of National Policy on Energy self-sufficient Talukas and was adopted by Government of India in 1996 [11] . As a part of this policy, presently all the states in India are collecting data on availability of biomass residues in their Talukas. This study therefore showed that it is possible to provide all the energy needs of a Taluka from its own resources thereby pointing towards sustainability.

One of the tragedies of rural areas in India and other developing countries has been the lack of production of value-added goods. This has resulted in very little remuneration to the farmers and hence the depletion of rural wealth. We feel that Taluka provides a critical mass for production of agro-based value-added products. With availability of power and raw materials (agriculture based), items such as fertilizers, chemicals, processed food products, etc., can be produced.

With smart "bench-top" production facilities available in future, it may be possible to produce substantial amounts of locally consumed items. This will further help in increasing the wealth of a Taluka and creating extra employment. Recently micropower projects like gas based microturbines and fuel cells are becoming available[16,18]. They will further usher in an era of efficient small scale manufacturing facilities. Identification and evaluation of such cutting-edge technologies for both

agro based and consumer products will help Talukas leapfrog into twenty first century.

Policy issues

The following policy issues will have to addressed before the above scenario can become a reality:

A policy decision will have to be made by the Government of India to set up a Taluka Development Corporation and invite private sector participation in setting up power and water utilities in Talukas. A partnership of corporate sector, local NGOs and government can be a new paradigm for rural development.

Policy will also have to formulated so that the corporate sector will not only produce power/water but will also be allowed to carry out its distribution. Most of the independent power projects have been bogged down by the disputes regarding distribution. Only possession of distribution rights will allow the utilities to make money and give good service.

Since both power and water production is from renewable sources (biomass and rain), existing norms, tax benefits and soft loans applicable and available to renewable energy sources should be made available to the corporate sector involved in Taluka program.

Policy decision will also have to be made by municipal corporations/bodies of Taluka towns to allow only environmentally sound vehicles to ply within the town. Since the area of Taluka and the number of vehicles running are small, we think it is possible to manage this issue.

It is our thesis that in a democratic society like India, sustainable Taluka development will decentralize economic and hence political power. Decentralization of economic and political power is the best bet against economic deprivation, corruption and unaccountable ruling elite and can be the engine for internal peace, stability and development of a compassionate society. It is my belief that development and democracy work best in a decentralized power structure, a message that was constantly preached by Gandhiji. I also feel that the Taluka plan has the potential of producing a sustainable society for $1/5^{th}$ of mankind (India's population) and in the process can show the world a new way.

One of the great strengths of India is the mentality of majority of its people being satisfied with few material comforts. This strength can become very useful in the new paradigm outlined in this paper. In a democratic setup one cannot force the population into a certain lifestyle. But the existing traditions, norms, strengths etc. can be used to guide the society into sustainable living. We hope this paper will help start a debate on this issue.

IOB, Classic Jatropha tie up to promote biofuel

Chennai, Dec. 1 – INDIAN Overseas Bank and Classic Jatropha Oil (India) Ltd of Coimbatore entered into an agreement here today to promote jatropha cultivation for biofuel production. Under the agreement IOB will provide crop loans to farmers identified by Classic Jatropha. The company is promoted by the PREM Group, a Tiruppur-based knitwear exporter with interests in dyeing, spinning and wind farms.

According to Mr Er P. Kandaswamy, Chairman and Managing Director, Classic Jatropha, the company hopes to bring under jatropha cultivation over 10 lakh acres in the coming years.
It is in the process of acquiring an oil mill in Vriddhachalam, Tamil Nadu, for processing jatropha seeds. It will expand capacity as required to process about 5,000 tonnes of seeds a day.

The company also plans to enter into an agreement with public sector oil companies and the Indian Railways to sell the biodiesel, he said. Mr T.S. Narayanasami, Chairman, IOB, said biofuels have attracted the attention of leading industrialists who hope to diversify into this area.
According to bank officials, IOB will provide crop loan at 7.5 per cent interest to the farmers.
Lower sugarcane prices, urges industry

Bio-fuel powered village
(*United News of India)*

A tiny, obscure tribal village in Chhattisgarh - Bairakh - will soon shine bright across the world when it becomes the world's first village to get power supply through biofuel. Thanks to Winrock International India, a non-governmental organisation, which had successfully completed the project within two years, the most ambitious Rs 40 lakh project would start generating electricity through biofuel from December 26. The Union Renewable Energy Ministry had sanctioned Rs 22 lakh for the project and the rest of the funds were borne by Winrock.

The village in hilly terrain, with 200 primitive tribals, was till now deprived of power supply as the grid could not reach there. "There are about 1,000 people, all tribals, in the village...they are extremely poor and find it difficult to make both ends meet," Winrock International India Programme Manager (Energy and Environment) Amit Kumar told UNI here.

"Immediately after getting the project from the Union Ministry for Renewable Energy in 2004, we swung into action and it took two months to survey and draw the plan. About 60,000 saplings were given to villagers to plant on the peripherals of agricultural fields and these plants have started bearing biofuel seeds. The seeds will be taken from the villagers and in return, electricity would be provided. This is the formula adopted, after convincing the villagers," he added.

Mr Kumar said after dividing the village into three clusters, diesel generators with 6.5 HP capacity each were installed in these clusters, poles erected, lines drawn and house wiring also done. All these works were done free of cost by Winrock. He said the plant had been constructed and bioseed would be directly used in the diesel engine. "We are using biofuel instead of diesel and not producing biodiesel by using Jatropha seeds.

Extensive technical tests have been done on the engines to ascertain whether the fuel was technically feasible or not." Mr Kumar said to maintain the plant, a Village Energy Committee would be formed by the panchayat after an year. The Committee members would be trained by Winrock to maintain the plant.

The cost over and above the bioseeds would be borne by the villagers and there would be no interference by either the State Government or Winrock. Even the market fluctuations of the seed price would not affect the villagers as they themselves produce the seeds. Stating that biofuel produced from the seeds could also be used for running irrigation pumpsets, instead of diesel, he said that as the village was situated in a hilly region, check dams were constructed to store water, which would be pumped to the field by pumpsets operated on biofuel.

The Centre had identified 40,000 such villages to be electrified through renewable sources of energy, he said, adding that Winrock was at present working on four similar projects in Hyderabad (two),Kurnool and Anantapur in Andhra Pradesh.

You can now have your ethanol and food too
Indian Express

NEW DELHI, June 13 – The food-versus-fuel debate in the global push for ethanol can take a little break — an institute has come out with new research that shows ethanol can be produced without compromising food security by making the biofuel from the juice extracted from stalks of sweet sorghum (jowar).

This project, being jointly implemented by the International Crops Research Institute for the Semi-Arid Tropics (Icrisat) and Rusni Distilleries at Mohammed Shapur village in Andhra Pradesh, uses no seeds in the process.

“This aims to provide the resource-poor farmers of the drylands with a source of additional income while ensuring there is no loss on the food security front,” said William Dar, director general of Icrisat.

Ethanol is being globally promoted as a possible substitute to fossil fuel whose prices have doubled

in past three years. India imports most of its crude oil need and pays a hefty Rs 1,60,000 crore bill every year for that. But while the government has acknowledged ethanol's benefits since 2001, there is still no clear policy to promote ethanol.

The biofuel is also a favourite of the green groups as it is a renewable source of energy and contains 35% oxygen that helps complete combustion of fuel, reducing harmful emissions.

In the Andhra village project, Icrisat's scientific input and Rusni Distilleries' enterprise is being complemented by grassroots organisation Aakrithi Agricultural Associates of India. The group is popularising the hybrids among farmers.

Sweet sorghum has other benefits over sugarcane and maize as feedstock for ethanol production. It requires only half the water required to grow maize and around one-eighth of the water required to grow sugarcane. It has the lowest cost of cultivation, around a fifth of what it takes to grow cane. Icrisat's sorghum breeders have developed hybrids

INDONESIA

Indonesia - Grid-connected community-based power generation for village development

Cinta Mekar is a remote rural community with 646 households in West Java Province in Indonesia where more than 100 poor households have no access to electricity. A grid-connected micro hydropower plant with installed capacity of 120 kW was built through a joint venture between the community and a private developer under a UNESCAP project to follow-up to the outcomes of the WSSD.

The electricity generated is sold to the State Power Company (PLN) and the revenue shared between the community and the private developer.

A social plan has been developed to use the community's income to facilitate the connection of electricity to the poorest households and for social development such as education, health, sanitation and soft loans as seed funds for incoming generating activities.

A parallel track activity towards the establishment of financing institutional mechanism on rural electrification has been initiated aiming at replicating the model elsewhere in Indonesia and in other countries.

Plantation firm expands area for biodiesel investment

August 18, 2006 -IJM Plantations Bhd (IJMP) shall implement an expansion program by buying 40,000 hectares in north-east Kalimantan, Indonesia within the next five to eight years.

According to chief executive officer and managing director Velayuthan Tan, the new area shall add to the company's current total plantation land bank of 30,000 hectares. The additional area is in line with the company's venture into biodiesel production, specifically in Sandakan, Sabah.

A RM74-million plant is now under construction and is expected to be fully-commissioned towards the end of 2007. The plant's output shall supply markets in Europe and the Asia-Pacific region.

Life is a lot sweeter for Mangat Nuan these days.
"This used to be my land," he said, waving an arm at the rows of oil palms. "But I rented it to a plantation company a little while ago. It was a good price - all the landowners round here did the same."

Mangat's plot in central Kalimantan now forms part of a new oil palm plantation, which covers 15,000 hectares of land, some of it former forest, according to a local NGO. The arrival of the plantation may have changed the landscape, but Mangat says it has also changed the lives of the people who live here.

"Life before was difficult," he said. "I couldn't even feed my family, not to mention send my kids to school. ”After the plantation took over, more people came and suddenly we had roads and schools. We've also opened a small shop, so it's improved our income significantly."

If the Indonesian government has its way, another 5m hectares (12m acres) of land in Kalimantan and elsewhere will be turned over to companies growing biofuel crops like oil palm, cassava or sugar cane. Global demand for alternative fuels is growing, and Alhilal Hamdi, head of Indonesia's new Biofuels Development Board, says now is the time for his country to tap into it. He said the plan will create between three and four million jobs, and will attract investment to the country.

That investment has already begun to increase. Since the beginning of the year, dozens of new deals to develop biofuels plantations have been agreed, including one involving the Chinese state-owned off-shore oil corporation, estimated to be worth $5.5bn.

Protecting the forests

But sitting on the little bench in front of Mangat's shop is someone who sees all this very differently. Pak Noordin works with the local pressure group Oil Palm Watch. To date, he says that around a third of palm oil concessions have been built on previously forested land.

"The threat to the forests today comes from palm oil," he said, "because in clearing the land, they have to cut everything, they leave nothing behind and that completely destroys the biodiversity. It's different with logging concessions - they leave a bit behind."

To try and quell critics like Noordin, the Biofuels Development Board says it is pushing new plantations to use so-called unproductive land - land which has been logged and left unused.
That means companies will not be able to make extra money from selling the timber they cut down.
According to Teguh Patriana, head of Indonesia's Palm Oil Industry Association, the focus on the forests is misplaced anyway. Plantation companies use only the land assigned to them by the government, he said, and any rainforest there is newly-grown - rather than original - forest.
Lack of clarity

Environmentalists like Noordin remain unconvinced. Indonesia's decentralised authority means that local district heads have been able to side-step the regulations in the past, he says.
The head of the local environment agency, Moses Nikodemus, believes official resolve has hardened, but that unproductive land is less popular with companies - not only because of the lack of timber, but also because they fear getting embroiled in complicated ownership tussles.

The task of protecting Indonesia's forests is made even harder by a lack of clarity - such as where forest land is mixed with agricultural land, or where forest has grown back after logging.
Hard data is sometimes difficult to come by - even at the provincial forestry department.

The department's head admitted that while he knew how much land has been set aside for oil palms and other crops, he did not know how much forest that land contained.
Back at his shop overlooking the young oil palms, Mangat spends his time smoking Indonesia's trademark clove cigarettes and passing round plates of lychees to anyone who will have them.

The new push for biofuels in Indonesia may have made him richer, and it may even help reduce carbon emissions by providing the world with a cleaner kind of energy.

LAOS

Rural Renewable Energy in Laos
Mr Bouathep MALAYKHAM
Chief of Electric Power Management Division
Department of Electricity, Ministry of Energy and Mines
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

1. Micro Hydropower plant (Electricity)
2. Hybrid Power System(Electricity) (Micro hydro + PV Solar + Water Pump) this is Research Project .
3. PV Solar (Electricity)
4. Biogas (Cooking , lightning and heating)
5. Biomass – Cogeneration (under promotion)
6. Bio Ethanol , Biofuel (under promotion)
7. Geothermal (Non)

– Biodiesel : there is no any existing production of biodiesel in Laos but now KOLAO company is going to construct biodiesel factory to produce 400,000 tons / year , Investment cost about 31 million US$ and there are also many companies would like to invest on the plantation of Jatropha.

– BioEthanol :Now there is only one mall existing sugar factory in Vientiane but there are two sugar factories in Savannakhet Province to be constructed

– Local people plant Jatropha as fen to protect animals or as the boundary for the garden or rice fields for long time ago

MALAYSIA

Current status of biomass utlisation in Malaysia

Koh MokPoh
Forest Research Institute Malaysia
52100 Kepong, Selangor
Malaysia
[*Presentation at Biomass Asia workshop, January 2005, Japan]*

Major agricultural crops:

Oil palm (43.67%),

Rubber (30.56%),

Cocoa (6.75%),

Rice (12.68%) and

Coconut (6.34%).

Major characteristics of the forestry and agricultural sector:

– large quantities of processing residues which have no economic value.
– major disposal problem

Agricultural Residues

– Rubber Word residues – 11.32 mil m3
– Oil palm residues 8.69 mil m3
– Rice husk residues3.41 mil m3

Total23.42mil m3

Utilization of residues

– Quantity of residues used: 9.30 million m3 or 27.0%

1 kiln drying of timber
2 manufacture of bricks,
3 curing of tobacco leaves,
4 drying rubber-sheets
5 manufacture of products such as particleboard and fibreboard.
6 rest disposed by burning. (use of biomass, particularly rubberwood, for the generation of energy has been going on for the past 30 years

Biomass Conversion

Energy in solid wastes particularly biomass can be extracted either by direct combustion or by conversion into a more valuable and usable forms of energy.

– Usually this will be in the forms of solid, liquid or gaseous fuels or upgrading into higher value added products for the chemical industries

– solid: harcoal, briquette
– liquid: pyrolyticoils
– gas : biogas (POME),
– landfill gas (MSW),
– producer gas (wood gasification)

Conclusion

– Peninsular Malaysia generates large amounts of wood and'agricultural residues,
– Bulk not being currently utilisedfor any further downstream operations.
– To fully tap the economic potential, the government has actively encouraged industries that are able to reduce the wastage.
– Various studies indicated that the use of biomass as a source of energy is one of the most promising ways of effectively using the residues.

Sarawak seeks Indian, Myanmar expertise on jatropha

KUCHING, May 17 2007 (Bernama) -- The Sarawak Land Development Ministry is looking to Myanmar and India for an alternative commercial cash crop, Jatropha, to be developed as potential biodiesel fuel, Assistant Land Development Minister Naroden Majais said today.

He said the state government was studying the viability following a recent request by Chief Minister Tan Sri Abdul Taib Mahmud to gather as much information on any possible crop that could be an alternative to oil palm.

"The Jatropha oil is used widely in making biodiesel fuel and is being promoted as an easily-grown crop in hundreds of projects throughout India and Myanmar, which have each cultivated one million acres for commercial purpose," he said when replying to Vincent Goh (BN-Pelawan) at the State Legislative Assembly sitting in Petra Jaya here.

Traditionally, the Jatropha plant which grows up to six metres high, has medicinal uses, with the seeds used to treat constipation, the sap from the stems for healing wounds, the leaves as tea against malaria, oil from the seeds as antispetic for coughs, skin diseases and as pain reliever from rheumatism.

"One hectare can take 1,600-2,200 Jatropha plants and produce 1,892 litres of fuel and it is a one-stage conversion to biofuel, meaning the conversion process is much simpler and cheaper compared to converting crude palm oil (CPO) into biodiesel," Naroden said.

He said oil palm might be stable as an edible oil, with production confined mainly to the tropical Asian region, but the supply of CPO could not meet the increasing demand for biofuel from China and Europe.

As such, he said, although oil palm could be sustained in terms of economic impact on the state and socio-economic well-being of the land owners, workers, contractors and populace at large, such optimitism might not be lasting due to new researches and findings as well as global economic changes.

In the last five years, however, he said oil palm had enjoyed its status as the "best planted crop" in the region, recording incremental returns annually with export value from RM0.9 billion in 2002 to RM2.3 billion last year, an increase of 250 per cent.

During the same period, the revenue earned by the state through sales tax also saw an increase of 380 per cent from RM20.5 million in 2002 to RM79.3 million last year.
Based on the annual incremental trends in the value of export earnings, he said the projected income from the industry for Sarawak was RM2.58 billion with sales tax of RM91.06 million for this year and RM3.70 billion (RM138.10 million) for 2011.

Government approves biodiesel project in Pahang state

August 23, 2006 - Malaysia's Ministry of International Trade and Industry has given the approval to Sesdaq-listed Advanced Holdings to build a biodiesel plant in Kuantan in the Malaysian state of Pahang

The 100,000 metric tones-per-year plant will have crude palm oil and refined bleached deodorized palm oil as its main feedstock.

According to Advanced's managing director Kar Wong, the plant's design and operation can be replicated and applied to other biodiesel projects in the region.

Biofuel research hub established
August 17, 2006 - *With the objective of becoming the frontline researcher in biodiesel products, Malaysia has set up a biofuel hub in Tanjung Langsat Port in palm oil-rich Johor state. The biofuel hub comprises the Tanjung Langsat Port and a 480-hectare biofuel park.*
Licenses for 52 biodiesel projects approved

August 17, 2006 - According to Malaysian Prime Minister Abdullah Ahmad Badawi, the government has already approved licenses for 52 biodiesel plants with a combined capacity of more than 5 million tonnes each year.

The challenge of the government, Abdullah said, is to avoid a glut in manufacturing capacity as well as to ensure sufficient supply of palm oil both for food and non-food purposes. Malaysia is due to start selling a blend of 5 percent palm oil and 95 percent diesel at domestic pumps in October this year

MYANMAR

U Boon Thein
Deputy Director, DAP, MOAI, Myanmar
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

Potential Biofuel crops

- Perennial crops – oil palm, coconut, Jatropha (Physic Nuts}, castor bean, neem seeds, thit-seit (Bastard myrobalan}, Sie-tha-pyay (Simerrula gluba}, Mese (Madhuca tree} etc.

- Seasonal crops – rape seeds, sunflower, sesame, groundnut, rice bran, niger, soybean, saff flower.

- *At present, domestic demand for edible vegetable oils is increasing and need to import 200,000 metric tons of palm oil every yr.

- * Among them, Jatropha is most potential and efficient crops for biodiesel production in our country.

Jatropha cultivation

- 3 years plan to cultivate 3.44 Mil: ha *8.5 mil: acres } at all States and Division as much as possible.
- 2007/08 Plan Target 1.304 Mil: ha
- Cultivated areas (up to end of May} 0.693 Mil: ha
  Performance 53%

(It is necessary to invite FDI to expand the areas of Jtropha cultivation}

- Ethanol Production
- Potential crops – sugarcane, maize, sweet sorghum, broken rice, wheat, sweet potato and yam.
- Research and trial have been carrying at 1 state sugar mill (Pyinma}.
- Present out put of mollasses from 17 sugar mills (State and Private} comprised of, 122,500 metric tons.
  (If 30 % of total mollasses could be diverted to ethanol – total out put of Ethanol would be 1.65 mil: Gallons.}

*Investment on good laboratory and research are necessary to boost ethanol production.

Constraints and Issues in Biofuels Production

- *Food security*: demand for food consumption (cereal and edible oils, sugar} and demand for feed consumption (coarse grains, broken rice} are increasing. Most potential crops can not be utilized for biofuel production.

*Both horizontal and vertical expansion are necessary to increase productivity and production.

- *Investment:* Inadequate capital investment (both government and private sector} for installation of medium scale biofuel plants. Private sector also needs capital for manufacturing of expeller and other processing materials. Establishment of laboratory also needs investment.
- *Access to credit*: seasonal loan for biofuel crops cultivation, long term loan for installation of small scale biofuel processing plant for small holders.
- *Cross border trade*: no clear act/ regulation is developed yet. *Transparency and MFN status should be development among GMS countries and dialogue partners.
- *Policy formulation*: community oriented policy for sustainable biofuels and renewable energy should be developed.
- *Inadequate Technology, research and trained person*:

*Varietials improvement, biotechnology, processing technology and HRD program should be strengthened.

Current policy on biofuel and renewable energy

- To produce biodiesel from potential crops especially Jatropha as much as possible and to substitute for imported fuel.
- To conduct research on potential biofuel crops.
- To save FE.
- To produce ethanol from potential crops especially from sugarcane and sweet sorghum.

Prospective policies

- To formulate the policy on “By 2020, all diesel and petrol imported and used for agricultural farms machinery will include 10 % locally-sourced bio diesel and ethanol produced by potential crops.”.
- To formulate policy on “Community-oriented policy for sustainable biofuels and Renewable energy to enhance rural development in Myanmar”.
- To allow local and foreign investors to invest in large-scale biofuel production including establishment of plantation.
- To make flexible in cross border trade on biofuel to give priority to welfare of rural community;
- To formulate the appropriate “Contract Farming policy/ act”.

NEPAL

One day National Seminar on Prospects of liquid Bio-fuel in Nepal
CES
[*Center for Energy Studies (CES) was established on January 21, 1999 (7 Magh 2055) under the umbrella of Institute of Engineering (IOE), Tribhuvan University (TU).]*

After the energy crisis in the world, with the crude oil production peaking high, record high oil price, deteriorating political situation of the major countries exporting petroleum oil and emerging issue of energy security, the need of alternative fuel has been a major concern worldwide. An estimate shows 4% sustained shortfall in global oil supply would raise the price of oil above US $ 160 per barrel. Global peak oil, though some studies predict it will occur in 2037 or in 2012 or some experts think that it may take several years to occur, but the bottom line is it will definitely occur and its occurrence is imminent.

With the increased evidences of adverse climate change and negative impact on the global environment and human health, global community is facing one of the greatest threats to its existence. The continuous depletion of fossil fuel and the increasing demand of energy in the world have posed serious question whether the oil reserve will be able to fulfill the energy demand ever. The unsustainable energy consumption and associated greenhouse gas emissions into the atmosphere resulting rise in temperature (Global Warming) posed a serious challenge to the global community to mitigate this effect. Due to strict regulation on exhaust emission in several countries, it is felt the necessity of alternative fuel as a substitution of fossil fuel especially in transport sector. Liquid biofuel has several advantages such as the possibility to produce locally, environment friendly and less polluting fuel, capable to perform equivalent to petroleum fuel, non-requirement of additional maintenance and repair facilities, and even it can improve the vehicle performance. In this context, many developed and developing countries have already recognized liquid biofuel as a potential alternative fuel to the fossil fuel.

The development of liquid biofuel is taking place at a faster pace in the world and in our negighbouring countries like India and China. Though we have evidences of using these liquid biofuel in Nepal since ages, we are not yet able to either estimate its potential or identify the indigenous oil bearing plants in Nepal. If we are not able to take immediate step in this area, then we would be left far behind than our neighbouring countries. Thus, with an objective of bringing all stakeholders into a common agenda for the development and promotion of liquid biofuel in Nepal, one day national seminar has been conducted at CES/IOE/TU.

Biofuels can lessen Nepal's oil woes

Kantipur online

2006-03-04

Megesh Tiwari

It has been estimated that 30 percent of Nepal's land is climatically favorable for the cultivation of Jatropha (Sajiyon). Sajiyon, also known as Sajiba or Sajiva, are non-edible oilseeds bearing shrubs. One plant can bear one to five kilograms of seeds depending on the quality of farming conditions and maturity of the plant. On an average, one-fourth of the seeds can be converted into crude oil.

Apart from Sajiyon, there are many other non-edible oilseed-bearing plants that can be cultivated on the wastelands of the country to reduce dependency over imported fossil fuels. The terai area of the country has potential for sugarcane cultivation. At present, 72 percent of the country's sugarcane is grown under rain-fed conditions. The productivity of sugarcane can be increased by improving the irrigation system in the country. Sugarcane production can be encouraged by using it for ethanol production. This will increase its value eventually making it a major cash crop for the farmers. Even the limited sugarcane being cultivated in the country at present is sufficient to produce ethanol (from molasses after producing sugar) enough to replace 20 percent of the petrol being used in the country. Similarly, even if only 10 percent of the climatically favorable area is used for Sajiyon cultivation, sufficient biodiesel can be produced to replace petrodiesel used in the country.

In January 2004, the cabinet has decided to blend 10 percent ethanol in petrol being used in the country. This decision has not yet materialized because of unsettled dispute over ethanol prices between NOC and sugar factories. Had there been an agreement, the country today would have been importing 10 percent less petrol from India. This would have resulted in 10 percent reduction in foreign currency drain over petrol imports and equivalent reduction in the environmental pollution caused by the burning of petrol. The socio-economic benefits of this action would have been tremendous.

Till date no policy decisions have been made on using biodiesel as a substitute to petrodiesel, the dominating fossil fuel in the country. If not for biodiesel, the crude plant oils can be directly used to run agroprocessing diesel mills, diesel generators, pressure stoves for cooking and floating lamps for lighting in the rural areas. Massive use of crude plants oil to provide rural energy and industrial

energy (mostly for boilers) can largely save the country's import bills on petrodiesel and kerosene.

At a time, when the country is facing serious economic problems over fossil fuel imports, efforts must be focused on indigenous alternatives. Biofuels, that are increasingly becoming economically feasible, can be the least costly alternative for lowering the nation's economic losses and ensure energy security. Switching to biofuels will not only be beneficial to the country but also provide employment opportunities to Nepali farmers and others involved in the value chain. Being carbon neutral, extensive use of biofuels can also collect hard currencies from industrialized countries through Clean Development Mechanism (CDM) and other carbon trade mechanisms.
It is never too late to start a good work. There is an urgent need for the government to bring in policies that encourage the production and the cultivation of biofuels in the country. Targeted programs must be put forth by the government by providing special incentives. This is also a good opportunity for donors who are eyeing programs that can generate rural employment opportunities. With biofuels already proved as potential substitutes for fossil fuels in countries like Brazil, Germany and the USA, it's time that we end our long-served oil woes and head towards an energy-economic revolution.

Bio-briquette production saves environment, increases income

People of Dumarwana VDC, Bara district have been producing and using briquettes for cooking as it greatly helps in reducing indoor pollution. Briquettes are used as substitute for firewood and kerosene and it hugely reduces carbondioxide emission.

The production of bio-briquettes has added a new dimension to the lives of women as it has also become a source of income for them. The women earn up to Rs. 6000 per month by producing briquettes. One group (3-4 women) produces around 1000 briquettes per day. “There is intensive labour involved in the production as everything is done manually but it is good to have something than nothing,” say the women. The income helps them to pay their children’s school fees and run the household.

In order to increase income and expand business, these enterprising women are still looking for further opportunities as the production of briquettes is seasonal only. The project is supported by UNDP/ GEF Small Grants Programme.

PHILIPPINES

An overview of the energy systems, renewable energy options, initiatives, actors and opportunities in the Philippines
August 2005

Australian Business Council for Sustainable Energy
Email: bcse@bcse.org.au; Website: www.bcse.org.au

Biomass

With extensive agricultural, forestry and livestock industries the Philippines has an abundance of bioenergy fuel sources at its disposal. Potential fuel sources include bagasse, coconut residues, wood, rice hulls and municipal solid waste. Fuel wood dominates as a household energy source in rural areas. Wood and wood charcoal are also utilised in bakeries, restaurants and other small-scale commercial operations.

In 1996 bagasse contributed 3.6% to the energy mix, with 39 operating sugar mills producing an estimated 4600 tons of cane daily. In the same year rice hull potential was estimated at 2.26 million metric tons. A 6 MW biomass combustor plant designed to operate using rice hulls is proposed for Panay Island. Traditionally rice hulls are disposed of along road sides, in rivers or by open-field

burning, with detrimental environmental impacts. Previously rice hull projects have failed as a result of poor maintenance, supply considerations and management constraints. Coconut residues including husks, shells and fronds are predominantly processed and exported as activated charcoal. Domestically shells are converted into charcoal and used for cooking, ironing and heating. Coco husks are used for industrial copra drying. Fronds may also be used for industrial drying or domestic cooking.

More than 653 biogas systems for generation from animal wastes are installed in the Philippines, with the technology having been used since the 1970s. Such plants are equally attractive for their pollution mitigation abilities as they are for their energy production. In 2000 there were nine local manufacturers and suppliers of biogas technology in the Philippines.
Municipal solid waste disposal is a growing problem in the Philippines, and in 2000 the Payatas dump site collapsed. Consequently the Presidential Task Force on Solid Waste Management is considering landfill gas generation and incineration as options.
Government Support for Renewable Energy
The Philippines has a number of legislative provisions that promote the commercialisation of grid-connected renewable energy power projects

Renewable Energy Power Program (REPP)

As a development from the small hydro legislation the government created the Renewable Energy Power Program (REPP) in 1993. REPP was designed to provide up to P750 million in financing for IPP projects using solar, wind, biomass and small hydro resources. Its target is 300 MW of capacity from renewable sources, with up to 50 MW installed annually over six years. Under the terms of the REPP program, small (<10 MW) power plants can apply to sell electricity to the NPC at a rate negotiated in a power purchase agreement (PPA). The DOE then guarantees the purchase of power generated by REPP projects.

However, NPC has suspended the REPP program due in part to the NPC's reluctance to acquire additional take-or-pay liabilities given the pending power sector restructuring and nder demand for new capacity. This program design flaw has obviously deterred serious private sector investment in renewable energy projects, and only two min-hydro projects have reached the point of accreditation and construction under the scheme.

Barriers to Implementing Renewable Energy Projects

In order to overcome the barriers to the commercialisation of renewable energy technologies in the Philippines and range of policy measures are required. These include:
- development of appropriate financing packages for rural households;
- information on available technologies (PV, SWH, bioenergy, pico-mini hydropower systems, etc) and financing packages tailored for these ;
- development of local competence;
- development of market awareness and acceptance;
- technical capability-building;
- formulation and enforcement of quality standards;
- information and education campaign;
- an integrated approach on the part of the government. To date it has not been as structured as it could have been and therefore the government still needs to foster the active participation of the private sector, especially in project development and implementation.

In addition, the topography and geography of the Philippines often acts as a barrier to the deployment of successful renewable energy projects. It has a vast archipelago of small islands; rugged mountainous countrysides, very remote locations; and a monsoonal climate which makes travel around the country difficult in certain months of the year. There are also local conflict situations which can make some areas safe.

However, the barriers to the implementation of renewable energy systems in the Philippines have been well documented over the last 10 years, and are starting to be addressed at a policy and implementation level.

Projects, Plans and Opportunities

The following are descriptions and extracts from existing or proposed projects, plans and business opportunities in the Philippines which are relevant to the sustainable energy industry.
The O -Ilaw Program

A barangay is the smallest unit of local government in the Philippians and a municipality will be composed of multiple barangays. This initiative aims to complete the electrification of all barangays by 2006. This would require1500 barangays to be electrified per year over five years.
Electrification has been a government imperative for more than 30 years, with progress impeded by geographic constraints. This aim provides specific opportunities for off-grid and mini-grid based renewables in remote areas.

Development Bank of the Philippines

The Development Bank of the Philippines (DBP) is the country's most progressive development banking institution. DBP offers loans of up to 85% of the total project cost for income-generating Local Government Unit (LGU) projects. If such a project were to be a renewable system, then this provides a financing avenue. The interest rate is 13% and must be repaid over 12 years.

In 2004, DBP, in partnership with the Global Village Energy Partnership (GVEP) and the United Nations Development Programme (UNDP), co-hosted a thematic workshop on the topic of micro-finance as a means to enhance access to energy services to consumers in rural areas held last May 19-21 at the EDSA Shangri-la Plaza. The workshop brought together various stakeholders from all over the globe to document different approaches to finance energy services. Attended by over 50 participants from countries in Africa, Asia, and Latin America, the Renewable Energy In Asia:

The Philippines Report August 2005 8 workshop drew upon the experience of practitioners and institutions in developing countries that have micro-finance and consum er credit programs to determine about various approaches appropriate for the GVEP.

DBP will extend a P134 million credit to Bohol I Electric Cooperative (BOHECO) for the project preparation component and construction of the 2.5 MW Sevilla Mini Hydro Projec t. This is in line with the Bank's current energy policy of promoting new and renewable energy that is environment-friendly and cheaper than diesel power plants.

The project also supports the Government's thrust of providing sustainable power supply in the countryside. BOHECO operates an electric light and power service covering 26 municipalities in the province. It has 77,013 consumers at present with a peak load of about 13 MW. DBP is implementing the Rural Power Project. Its long term purpose is to improve the quality of life in rural areas of the country through the provision of adequate, affordable, and reliable energy services. The goal is to increase the electrification of households from its present level.

Under the Rural Power project, the Stand Al one Renewable Energy System aims to provide a mechanism for rural energy consumers who are unlikely to gain access to grid electricity services, either from the main grid or mini grids, to obtain affordable electricity services. Also under the Rural Power project, it is envisioned that it will be possible to improve the efficiency of electric cooperatives such that about 90% of them would become financially self-sufficient from a current level of about 25%.

In january 2005, DBP committed to set aside P50 billion to help finance NRE projects in the country DBP also has a commitment to lower their spread by 2% to bring down the interest rate from 9.75% to 7.75% for wind projects.

Renewable Energy Project Support Office (Winrock)

Winrock International, with sponsorship from the Office of Energy and Infrastructure of the U.S. Agency for International Development (USAID) and the U.S. Export Council for Renewable Energy (US/ECRE), is building a global network of non-government organizations to help catalyze

the use of renewable energy technologies for rural energy supply in developing countries.

Known as Renewable Energy Project Support Offices (REPSO's), these in-country facilities are managed by local institutions in coordination with Winrock. REPSO's provide an array of technical and financial support services to help developers identify and evaluate opportunities for renewable energy projects.

The REPSO is an effective vehicle for matching the global interests of the renewable energy industry with the specific needs of the numerous rural populations, most living without electrical service, in the developing world. Winrock establishes a REPSO by collaborating with a local institution, well positioned in the energy community, to gather vital information and to identify project opportunities. The REPSO functions as a window for local project developers to commercially-proven technologies and services, and as a window for U.S. industry to local opportunities and expertise. Refer http://www.winrock.org/reep/Backup/REPSO.HTM. Preferred Energy Incorporated (PEI) manages the REPSO Office in Manila for Winrock.

Refer: http://www.pei.net.ph/ourprojects.htm#. REPSO-

Capacity Building to Remove Barriers to Renewable Energy in the Philippines (UNDP)

Project duration: five years, starting third quarter 2002. Total Budget: $23.774 million. Executed by the DOE in collaboration with the Philippine National Oil Company.

This project aims to remove key market, policy, technical and financial barriers in order to promote widespread electrification using renewable energy and reduce a growing dependence Renewable Energy In Asia: The Philippines Report August 2005 9 on fossil fuels. The project hopes to build capacity and lay a foundation for further new and renewable energy (NRE) projects in the Philippines.

The project consists of seven components. These involve increasing the capacity of the government to enact appropriate NRE policies; information dissemination; forming a market service centre; improving co-ordination between relevant bodies; providing market incentives; and improving the quality of renewable energy technologies.
Refer: http://www.undp.org/energy/prodocs/rbap/phi01g32.htm.

Rural Power Project (World Bank)

The objective of the proposed project is to assist the country in making available affordable, reliable and adequate electricity to meet the needs of rural communities in a sustainable manner over a 10-15 year period. The core investment component of the proposed APL1 will develop and implement new public/private partnership business models for decentralized electrification as well as improved energy efficiency in existing rural cooperatives. World Bank/GEF support for renewable energy under the first phase of the APL is estimated to be $6 million.

This project will also include WB/GEF -supported energy efficiency activities estimated to be $5 million. If successful, these models are to be replicated and scaled up in other parts of the country under subsequent phases of the APL.

This project aims to meet the need for adequate, reliable and cost-effective electricity in rural areas through sustainable partnerships with the private sector by supporting through loans and grants, the implementation of reforms and priority investments. The project consists of four phases to be implemented over a 14-year period. The initial s tage commenced in June 2004 and will end in June 2009.

Financing will be provided for rural electrification including stand-alone renewable energy technologies (RETs), partial risk guarantee for suppliers and purchasers of new and renewable energy, and reduction of market barriers to support the commercialisation of RETs for off-grid applications. Limited subsidies for solar home systems are also available.

This project, being implemented over the four years from July 21, 2004 to 2008, is working in eight

sites throughout the province of Negros Occidental to pilot test the production and use of renewable energy and energy efficiency in rural areas without access to the grid. The systems will be linked to community-based livelihood. The overall goal of the Project is to achieve poverty reduction through the provision and efficient use of sustainable renewable energy supply in support of promoting livelihood systems for poor local communicates in off-grid areas of the Philippines within the framework of public-private-civil society partnership.

Manila welcomes Asia's first big biodiesel plant

Manila, May 4 2006 01:01

The Philippines yesterday inaugurated Asia's first large-scale biodiesel plant, which can produce up to 60m litres a year of the alternative fuel from coconut oil, a big step for the poor south-east Asian country.

Chemrez Inc, a Manila-based oleochemicals maker, built the plant for 650m pesos ($12.6m, €10m, £6.9m) ahead of the passage later this year of legislation requiring petrol refiners and distributors to sell diesel fuel mix with at least 1 per cent coconut oil, and petrol containing at least 5 per cent of sugar ethanol.

The company expects initially to export up to 80 per cent of its output to Europe, the world's biggest biodiesel market, as well as to Japan and Australia, while local petrol distributors set up the infrastructure for pre-blending the biofuel, said Jun Lao, Chemrez president.

Across Asia, governments and companies are developing plans to build biofuel plants or expand production of palm oil, sugar, jatropha and other crops that could prove to be cheaper and more sustainable alternatives to fossil fuel-based petroleum products.

In Malaysia, palm oil plantation companies, in partnership with the Malaysian Palm Oil Board, are planning to build three 60,000-tonne plants to export biodiesel.

Kuala Lumpur is also considering a law requiring petrol stations to sell biodiesel using palm oil from 2007 in an effort to reduce state diesel subsidies.

"We expect to hold the distinction of being Asia's first large-scale biodiesel plant for only six to eight months because bigger projects, especially in Malaysia, are coming on stream later this year and early next year," said Mr Lao.

He said global demand for biodiesel was set to rise as European Union members switched to palm or coconut oil from more expensive rapeseed in producing biofuels.

The Philippines, which buys all its crude oil requirements from abroad, saw economic growth fall to 5 per cent last year from a 15-year high of 6.1 per cent in 2004 mainly because of inflationary pressures stemming from soaring crude oil prices. The country's trade deficit grew by almost a third to $7.5bn as its oil import bill surged.

Gloria Macapagal Arroyo, the Philippine president, welcomed the new biodiesel plant and said it represented a big step forward in the country's efforts to find a solution to soaring world crude prices.

Unable to cut taxes on petroleum, much less subsidise gas prices because of the government's large budget deficits, Mrs Macapagal is instead promoting private investments in alternative fuels such as biodiesel from coconut oil, ethanol from sugar and compressed natural gas.

Her cabinet recently rejected a proposal from an economic adviser to suspend the collection of the 12 per cent value added tax on petroleum products to provide immediate relief to consumers.

The move could lower the unleaded gasoline price by about a tenth but would also cost the government about 29bn pesos a year in forgone revenue, equivalent to about a fourth of its 125bn pesos budget deficit target this year.

Jeepney operators push three-month test of coco biodiesel

August 18, 2006 - A local association of Baguio City-based jeepney (a popular public transport vehicle) operators intends to hold a three-month experiment to prove the effectiveness of using biodiesel derived from coconut methyl ester (CME).

According to association leader Perfecto Iltiong, while 25 percent of jeepneys in the city already use diesel pre-blended with biodiesel, a majority still remains apprehensive over the use of the biofuel. Concerns have been raised that the lifespan of vehicle engines shall be affected with the prolonged use of biodiesel.

Bank allots $250 million for biofuel projects

August 18, 2006 -The Land Bank of the Philippines (LBP) shall make available around US$250 million in loans next year to fund renewable energy projects, including the development of the local biofuel industry.

The loan shall be targeted specifically at the agricultural sector, including the establishment of ethanol plants.

Off-grid community-based power generation for rural income generation

Polocón is a small farming community of around 100 households located in the southernmost part of the Philippines. The 15 kW micro hydropower plant has helped alleviate poverty in many ways. First, the plant helped increase agricultural productivity. Electricity is now used to grind corn and hull coffee beans. Such services, including battery charging, are also sold to non-electrified neighbouring communities, which has increased the income of the community.

The community cooperative owns and operates the plant, and its revenues are invested in community projects that help improve life in Polocón. Tariffs for corn milling and other uses are set at a level to cover maintenance costs, the salaries of the operators of the plant, and for community development projects.

Funds have been invested in the local school and in a bakery run by the community women's group. The project was supported by the UNDP-GEF-SGP.

Bank allots $250 million for biofuel projects

August 18, 2006

The Land Bank of the Philippines (LBP) shall make available around $ 250 million in loans next year to fund renewable energy projects, including the development of the local biofuel industry, the Manila Bulletin reports.

According to LBP acting president and CEO Gilda Pico, the World Bank approved in June a $100-million credit facility, which could be utilized for the development of renewable energy projects. Another $150-million loan shall be sourced from the Japan Bank for International Cooperation. The loan shall be targeted specifically at the agricultural sector, including the establishment of ethanol plants.

THAILAND

Bio-fuel and Rural Renewable Energy Development

Mrs.Vannapha Yongchareon
Director, Bureau of Agricultural Development Policy and Planning
Office of Agricultural Economics
Ministry of Agriculture and Cooperatives, Thailand
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

The Cabinet approved the strategies to address the energy-related problems.

- A target is set to discontinue the supply octane 95 gasoline which will be replaced by gasohol 95 nationwide from 1 January 2007.
- Agreed to the developing and supporting strategy to promote the use bio-diesel with target to replace the fossil diesel by 10% in 2012 or 8 million liters/day .

Government agencies involved in implementation of national action plan

Ministry of Agriculture and Cooperatives

- To determine possible area for oil palm planting expansion in the Southern and Eastern Regions
- To develop a pilot project to grow oil palm in the northeastern and the northern regions.
- To provide improved variety seeds of oil palm for oil palm expansion area
- To seek cooperation with the neighboring countries to establish oil palm plantation on the basis of "contract farming".

Ministry of Finance

- To undertake a feasibility study on the establishment of a special purpose vehicle (SPV) for promoting oil palm plantation and bio-diesel production.
- To support the Bank for Agriculture and Agricultural Cooperatives involvement in bio-fuel development

Ministry of Energy and Ministry of Industry :

- To the use of bio-diesel according to strategy
- To assign the structure of the bio-diesel plant policy to be in line with palm area, thus to prevent the effect from oil cooking and to decrease logistic cost from mixing bio-diesel.
- To set up tax measures to retail pricing of bio-diesel for differential from annual diesel price in the market.

Raw Materials

- Sugarcane
- Maize
- Cassava
- Sugar beet

Sugarcane & Cassava cover an area of 2 million ha. mainly in Central and Northeast Thailand

Raw Material Sources Available for Bio-diesel

- Rapeseed
- Sunflower
- Oil Palm
- Soybean

Oil Palm – 0.3 million ha.

Other oil crops were used for food & cooking oil

Bio-fuel Strategy:

- Availability of raw materials resources ; internal and external country (neighboring countries)
- Potential biofuel crop production ;
- Cost of Economic of biofuel.
- In addition, this strategy must be multifaceted. It should enhance the use of renewable and next generation energy resources; conserve energy resources by increasing fuel efficiency, and increase domestic supplies of conventional energy resources.

Research programs;

- Biofuel production technology
- Carbon balance study in the biofuel crops.

Small Power Producers (SPPs) in Thailand are small power-producing units using renewable energy, waste or residues as fuel.

New Thai govt to get biofuel plan

T*he Nation*

10 October 2006

The Energy Ministry will present the new government with a plan to develop oil-palm plantations in order to meet expected increased demand for biodiesel.

Speaking yesterday at a seminar entitled "Biodiesel: From Horticulture to National Energy," acting permanent secretary Pornchai Rujiprapha said the ministry was looking for ways to encourage more people to grow palm oil trees.

“The ministry will propose the new government support oil-palm growers with soft loans and palm seedling arrangements," said Pornchai, adding that retailers were keen to begin selling biodiesel.
Pornchai said the ministry would seek to speed up development of palm plantations on 4 million rai of land. Growing on these projects is expected to begin in 2009.
Currently, 420,000 rai of land has been registered by crop farmers to grow oil-palms. By the end of this year, 250 service stations are expected to be selling biodiesel. Of these, 100 will belong to PTT Plc with the rest operated by Bangchak Plc.

In addition, Pornchai said the ministry was in talks with other oil retailers including Shell, Caltex, and Esso, about selling biodiesel at their outlets.

Alongside the plantation development plan, Pornchai said the ministry would next year encourage more petrol stations to sell B5 biodiesel, which is diesel with 5 per cent biofuel. He said the ministry aimed to have biodiesel sold all over the country by 2011.

Ethanol plant by 2009

TAK : Construction of a new ethanol production factory will start near the Burmese border later this year. The plant will turn sugarcane, mainly planted on cadmium-contaminated areas, into ethanol for making the bio-fuel gasohol.

Construction of the plant, which is situated on over 500 rai of land in Mae Sot district, will be completed in 2009. It is near contaminated farmland, accounting for 13,000 rai, in tambons Mae Tao, Phrathat Phadaeng, and Mae Ku.

"Our target is to produce 200,000 litres of ethanol a day from 5,000 tonnes of sugarcane," said Prawit Prakritsri, director of Petrogreen Co Ltd. His company has joined a business venture with Padaeng Industry Plc and Thai Oil Plc to set up Mae Sot Clean Energy Co to run the plant.

Farmers have grown sugarcane on 6,000 rai of land since last year. Half of the farmland is in contaminated areas, where edible crop growing is not allowed, while the rest is in nearby unaffected districts.

Pumps to go all bio-diesel

Krabi, 11 June 2007-06-27

DPA

Thailand will enforce the mandatory use of 2% palm oil for all diesel vehicles fuelling at 10,000 service stations nationwide next April 1, the minister of energy said Saturday.
"Initially we will make B2 (bio-diesel) mandatory for the whole country by April 1, 2008," said Energy Minister Piyasvasti Amranand. He was referring to the bio-diesel fuel consisting of a mix of 2 per cent palm oil and 98 per cent diesel.

As part of Thailand's efforts to reduce oil imports and assist in cutting carbon emissions and global warming, the kingdom plans to replace 20 per cent of its vehicle fuel consumption with renewable energy sources such as ethanol and palm oil within the next five years.

"Our target is to cut our consumption of gasoline and diesel by 20 per cent within five years, substituting them with ethanol and palm oil," said Piyasvasti.

"That is better than the US target of 20 per cent replacement by renewable energies in ten years," noted the minister.

After making B2 mandatory in April next year, Thailand will thereafter push petrol pumps and vehicle owners to accept B5, or a 5 per cent palm oil and 95 per cent diesel mix, soon thereafter.

Piyasvasti, who was on a tour of palm oil plantations and factories in Krabi, which accounts for 40 per cent of the country's palm oil supply, revealed that all major automobile dealers in Thailand had agreed last week to provide warranties on new cars despite the fact that all vehicles will be forced to use B2 bio- diesel by April, 2008.

A similar government effort to force petrol stations and auto users to switch to gasohol in January, this year, failed because the automotive industry refused to provide warranties on their autos if they were using gasohol in their tanks, said Piyasvasti.

The minister said that gasohol, a mix of 95 per cent petrol and 5 per cent ethanol, was becoming more popular among consumers since the government had reduced its price by 10 per cent at petrol stations last March.

More than 60 per cent of Thailand's vehicles use diesel, because of the popularity of the one-ton pickup truck. By April 1, 2008, palm oil will account for 1 million liters of the 50 million liters of diesel now consumed by motorists.

The energy ministry is convinced that palm oil producers will be able to provide sufficient supplies to meet demand by the April deadline.

"Currently we have sufficient raw materials to produce 0.8 million liters of palm oil, but by the end of the year it will be up to 1.2 million," said Panich Pongpirodom, director-general of the department of alternative energy development and efficiency.

VIET NAM

Renewable Energy and Bio-energy in Vietnam

Nguyen Thanh Son
Deputy Director of Livestock Production Department
[Presentation at *Planning Workshop on Strategies and Options for Integrating Biofuels and Rural Renewable Energy for Poverty Reduction, 11-13 June, 2007, Bangkok, Thailand]*

NGOS, women's groups, community groups are involved in implementing national energy development policies and programmes.

- Up to date, none of studies has provided a comprehensive figures of bio-fuel potential in Vietnam.
- According to a reports[1] presented in Bio-fuel workshop, Hanoi, 19-20, September 2006, in Vietnam:
- Bio-diesel can be produced from oil-bearing plants (Jatropha, rubber seed, etc.), animal fat (catfish fat), etc.
- Bio-ethanol can be produced by fermentation of feedstock, starch and molasses.
- Bio-diesel from fat of catfish (basa fish).
- Bio-ethanol from sugar molasses.
- Possibility of exporting fuel to developed countries also make a number of bio-fuel projects in Vietnam become viable.
- 50 million liters of bio-diesel by 2020 (to blend 500 million liters of bio-diesel B10)
- 500 million liters of bio-ethanol by 2020 (to blend 5 billion liters of gasohol E10)[1].

No	Description	Location	Developer	Status
	Producing bio-diesel for exporting			
1	Harvesting Jatropha plants to export to Germany (2006-2008).	Hung Yen province	Viet Duc sausage company	Under implementation
2	Master Plan Study and Feasibility Study on producing bio-diesel in Vietnam, (2005-2006).	Whole country	Itochu, Japan company	Completed

No	Description	Location	Developer	Status
	Produce bio-fuel for self-consumption and for commercial trade			
3	Producing ethanol from sugar molasses to export to Japan, (2005-2008).	Thanh Hoa province	Lam Son JS sugar factory	Under implementation
4	Producing bio-diesel by blending fat of cat-fish with diesel to run diesel-engines (water pump, electricity generator, etc.), (2005-2007):	An Giang province	Agrifish JS company	Under implementation

No	Description	Location	Developer	Status
	Pilot project			
5	"Using gasohol for vehicle inside the city " (2005-2007).	Ho Chi Minh City,	a group of Saigon Petro, Saigon Beverage Company (SABECO), and Nguyen Chi Co. Ltd.	Under implementation
6	" Gasohol-Test & -Production" . The project, as a part of "Using gasohol for vehicle inside the city	Ho Chi Minh City,	Nguyen Chi Co. Ltd.	Under implementation
	R&D projects			
7	"Mix waste cooking oil with diesel to make a cheaper fuel", (2005-2007).	Hochiminh City	Centre for Petrochemical Technology	Under implementation

- Vietnam lacks of a comprehensive institutional framework to support use of bio-fuel.
- For legally using gasohol in transportation sector and bio-diesel in engines, Vietnam urgently needs a bio-fuel standard to allow trading and using bio-fuel in reality.
- For long-term plan of cultivation land use, Vietnam needs to take the role of bio-fuel into consideration.
- A comprehensive national master plan of bio-fuel should be carried out, which will provide bases for setting up a national strategy and policy for Vietnam bio-fuel development.
- Technology for producing anhydrous ethanol and blending gasohol is still concerns in Vietnam.
- Vietnam also has no purpose-built vehicle for solely running by gasohol.
- Vietnam lacks of infrastructure for widely using gasohol for transportation
- Promoting bio-fuel manufacture is that it strengthens the agriculture sector by creating demand.
- Wider use of bio-fuel leads to increase price of feedstock and spread wealthy from urban to rural area.

- Bio-fuel program needs to be integrated within a broader context of investment in rural infrastructure and human capital formation.
- The extend to which bio-fuel program can contribute to rural development is depend on whether it is able to be come financial viable without direct government financial support.
- Bio-fuel program can make significant change of cultivation patterns.
- The opportunities of cost land use, water, fertilizers, electricity and diesel for irrigation and powering farm equipment, labour, seeds, machinery used in feedstock production should be also taken into consideration.
- Vietnam biofuel potential has been developed at very modest level.

- Vietnam urgently needs a comprehensive institutional framework to promote use of bio-fuel,
- Incentives and supports should be given to bio-fuel activities imitated by none-state entities.
- A long terms plan for developing bio-fuel in Vietnam has to be set up.
- Close cooperation among GMS's member countries and international donors.

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The Roundtable on Sustainable Biofuels Launch

6 June 2007 - The Roundtable on Sustainable Biofuels comments process has begun! The RSB is asking for comments on its draft principles. Comments can be submitted directly on the BioenergyWiki or via email. See the RSB comments process page for details.
Also, to join the RSB working groups, *register online* by *June 15th!*

In the News

- **Sustainability Reporting within the RTFO: Framework Report**
- **Study of Greenhouse Gas Balance of Bioenergy Crops**
- **UK Government scraps duty on biofuel production**
- **Warning to producers of biofuel to give up sugar**
- **Japanese Biofuel Project in Brazil Creates 50,000 Direct Jobs**
- **OECD conference on biofuels (presentations available for download)**
- **G8 Leaders focus on biofuels**

See more news...
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Upcoming Events

- **26-28 June 2007**, Madrid, Spain: **Renewable Energy Europe 2007**.
- **26-29 June 2007**, St. Louis, Missouri, USA: **23rd Annual International Fuel Ethanol Workshop and Expo, St.** organized by BBI International.
- **27-28 June 2007**, Jakarta, Indonesia: **Biodiesel Forum 2007**.
- **28-29 June 2007**, Houston Texas: **Biodiesel Investor 2007**. Event organized by Platts.
- **2-6 July**, UNESCO Headquarters, Paris, France: **Twelfth Meeting of the Convention on Biological Diversity's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)**.

See more events...

Quote of the week: **"I don't believe that sugar and corn could possibly carry the weight of transport."**

-Sir Nicholas Stern, head of the UK's Stern Review of the economics of climate change, advocating concentrating biofuels production on crops that would not compete with food production. [1]
Read more voices...

Featured links

Today's Wiki tip: You may have noticed that there are now two search boxes on the left hand side of the screen. One of these is the original MediaWiki search bar and the other uses the google engine.

- The MediaWiki search bar will take you directly to pages or find your search string in the text of the "mark-up", like what you see when you edit a page. This function will not find strings shorter then 4 characters, so a search for "WTO" will not show anything.
- The Google search uses the standard google search engine to search the wiki.
- Both of these engines have their strengths,

- **Appropedia** - "the site for collaborative solutions in sustainability, poverty reduction and international development."

Check out these 4 interlinked blogs by Scott Miller:

- **Biostock Blog**
- **Bioconversion Blog**
- **Biooutput Blog**
- **Biowaste Blog**

weakness, and quirks. So we recommend trying both if you are trying to find specific information!

How to edit the wiki...

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