

PROBIOS: PROMOTION OF BIOFUELS FOR SUSTAINABLE DEVELOPMENT IN SOUTH AND SOUTHEAST ASIA

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ABSTRACT: India and neighbouring countries have become interested in promoting biofuels, as has been done with success in European Union. However, for them the barriers to the use of biofuels are still substantial. The ProBIOS project aims to promote biofuels for sustainable development in South and Southeast Asia. This was done by first a thorough review of issues related to biofuels in India and surrounding countries, as well for Europe in order to able to learn from experience. A second stage focused on knowledge exchange and capacity building through several working conferences and workshops in South and Southeast Asia and in the EU, and through a study tour for South and Southeast Asian biofuels stakeholders and policy makers in the EU. The ProBIOS project has raised awareness on the topic of biofuels in India and the neighbouring countries, especially through the organised workshops. Although the project has not been completed yet, from the review study and the workshops it was possible to identify several key issues: 1. There are opportunities to learn from European experience especially in the field of policy, biodiesel conversion technology and CDM. 2. Most of the barriers are for the farmers, who need support in overcoming them, otherwise they might loose interest. 3. There is a strong need for information, research and dissemination on jatropha cultivation. 4. The governments of India and neighbouring countries have not yet found a successful and affordable financial support mechanism for biofuels. 5. Biofuels can contribute to the reduction of poverty for the rural poor and to the reduction of oil imports, but it is difficult to reach both these objectives with the same measures.

Keywords: bioenergy strategy, developing countries, liquid biofuels

1 INTRODUCTION

In the European Union, the United States of America and Brazil biofuels have been on the political agenda for one or more decades. The use of biofuels for transport, such as biodiesel and bioethanol, contributes to the reduction of greenhouse gas emissions, the security of energy supply and it is seen as an opportunity for the development of rural areas. Several European countries have been active in promoting biofuels during the 1990s. The European Union has formulated its biofuels policy by a Directive on the promotion of biofuels in 2003, which will be updated in 2007 in the context of the EU energy package. The biofuel market has grown significantly in Europe and a few countries are already reviewing and revising their initial policies in order to make to more robust for long-term promotion of biofuels.

Lately, biofuels have gained increasing attention in other parts of the world as well. India and neighbouring countries have formulated policy goals, although commercial activities are yet scarce. The barriers to the use of biofuels are still substantial, as there is no financing mechanism in place, the awareness in the transportation sector of this clean technology is low, and the best technologies are not always available to Asian companies. Moreover, biofuels lack a firm policy framework. The ProBIOS project aims to promote biofuels for sustainable development in South and Southeast Asia.

2 AIMS AND APPROACH

The ProBIOS project is funded by the European Commission Asia Pro Eco Programme under the 'Operations and Practical Dialogue' component [1]. The project is being implemented by Winrock International India (WII), assisted by two EU partner organizations: the Energy research Centre of the Netherlands (ECN) and Research Centre for Energy, Environment and Technology (CIEMAT) from Spain. The Asian partners are Kranti Associates Ltd. from Bangladesh, Winrock International Nepal, the Asian Institute of Technology from Thailand, the Sri Lanka Energy Manager's Association and a consultant from the Maldives Ministry of Environment, Energy and Water. The runtime of the project is two years and it will be completed by June 2007.

The overall objective is to promote the use of biofuels in India and surrounding countries. In order to meet this objective, the project aims to raise awareness and develop adequate capacity in India and the neighbouring countries to increase the use of biofuels. Key considerations are the improvement of local environmental conditions and the promotion of sustainable investment. Co-operation between India and the European Union is a specific aim of the project, as it would encourage both technology transfer and investment flows. The aims will be achieved primarily by the following:

- Benchmarking of energy and environmental performance of the biofuels industry
- Identifying technology options available in India and Europe for the production of ethanol and biodiesel

- Evaluating the early opportunities for biofuels in India and estimating the potential for financing mechanisms such as the Clean Development Mechanism
- Documenting best practices for biofuels production and dissemination of information
- Capacity building of Indian biofuels industry through seminars, workshops, a study tour to the EU and by bringing to the table the EU expertise and experiences
- Sensitising the government officials and other important stakeholders for a sustainable Biofuels Programme for India, Bangladesh, Nepal, Sri Lanka, Thailand, and Maldives.

The project was executed in two stages. The first stage comprised a thorough review of the complicated and sector-overarching issue of biofuels in India and surrounding countries. Policy, regulatory, technological, financing, supply, distribution, socio-economic, environmental, and CDM issues were addressed. The European partners have done the same, surveying the introduction of biofuels in Europe. The second stage focused on knowledge exchange and capacity building through several working conferences and workshops in South and Southeast Asia and in the EU, and through a study tour for South and Southeast Asian biofuels stakeholders and policy makers in the EU.

Since the final report of the project has not been concluded yet, this paper includes only preliminary observations.

3 REVIEW STUDY

3.1 Europe

From the study on Europe the most interesting parts were in the fields of policy, biodiesel technology and the possibilities for biofuels within the Clean Development Mechanism.

3.1.1 Policy

Several European countries had already introduced biofuels into their market before the EU Directive was issued in 2003. Some had done so successfully (e.g. France, Germany, Spain and Sweden), others have struggled to create a stable market (e.g. Czech Republic, Poland and Slovakia) and some have formulated policies very hesitantly (e.g. Malta, the UK and the Netherlands). Based on analysis of the past experiences with biofuels policy in these ten European countries, it can be concluded that the following factors have been crucial for the successful introduction of biofuels [2]:

- Political commitment to biofuels.
- Active market actors and/or lobbying groups initiating biofuels activities.
- Financial compensation to bridge the financial gap between biofuels and fossil fuels.
- End-user market for pure or blended use of biofuels.

Political commitment to biofuels for a longer period of time is crucial for creating a favourable investment climate and market conditions. This political willingness should be translated into effective biofuels promoting policies that are clear, non-bureaucratic, consistent for a longer period of time and specific for the national context to optimally utilise the country's assets.

Market parties taking the lead and willing to invest are very important for developing a biofuels market. Which parties may be the initiators and what partnerships they could involve is strongly dependent on the local context. The establishment of consortia between fuel suppliers, biofuel producers, farmers, industrial companies, oil companies, car manufacturers, research institutes, consumer associations etc. also largely determines what biofuels will develop and to what extent.

A longer-term fiscal support system, bridging the financial gap with fossil fuels, is a very effective means for creating favourable market conditions. However, possible risks of such a system are overcompensation and state budget implications, especially if there is no limit on the biofuels volume eligible for the tax exemption. This can be prevented through monitoring and introducing a maximum to the biofuels volumes that can make use of the exemption. Moreover, a fiscal support system cannot guarantee in advance that the targets for market penetration of biofuels will be achieved. Being aware of these drawbacks of fiscal support system, some EU Member States are introducing mandatory biofuels targets to fuel suppliers. Mandatory targets can have drawbacks as well, e.g. that they might not work in early markets and that there is limited experience with them.

Another important prerequisite for successful introduction of biofuels is the presence or creation of an end-user market for biofuels. This may be a large market able to use biofuel blends, such as all passenger cars running on petrol or diesel. A possibility is to use vehicle fleets that are equipped with adapted engines for the use of pure biofuels, for example captive governmental fleets. In any case, end-users of biofuels need the guarantee that biofuels can be used in their cars without damage or loss of performance. Therefore, generally the involvement of the car industry (use of pure biofuels), the oil industry (use of biofuel blends) or both is necessary for reliable and effective biofuel distribution and use. Also, it requires quality standards for biofuels and biofuel blends, since their absence or their inapplicability is an enormous barrier to market introduction.

3.1.2 Technology

Whereas the technology used for bioethanol production is available universally, technology for biodiesel production was mainly developed in Europe and is offered mainly by European companies. Austria initiated the research for biodiesel technology after the first oil crisis and is still the leading country in biodiesel know-how. After the first pilot plants and non-dedicated plants in the late 1980's and early 1990's, the industry has now developed to maturity. The increasing requirement to produce high quality according to strict biodiesel fuel standards has been the driving force for switching from batch processing to continuous process technologies with fast liquid-liquid separation of methyl-ester and glycerine, and with accurate cleaning steps for the final biodiesel. Especially, the separation of the products has been improved, since this is a very important part of the process. High yielding process technologies have obtained preferential attention because of their impact on profitability [3].

The lack of knowledge about successful implementation of biodiesel on national and international markets limits the further development. To overcome this barrier, an overview has been made by the Austrian Biofuels Institute of best cases of biodiesel plants, which

identified thirteen factors in the areas of feedstock supply, marketing, process technology, location and financing as important factors for the realisation of a successful biodiesel plant [4].

3.1.3 Clean Development Mechanism

The targets to reduce greenhouse gas (GHG) emissions under the Kyoto Protocol can be met by domestic action and by the so-called flexible mechanisms, of which one is the Clean Development Mechanism (CDM). Under this mechanism a project developer may implement clean technology in a developing country and sell the resulting 'carbon credits' to a country that can use these to meet their GHG emission target. Another goal of the CDM is to promote sustainable development in the host country. CDM has received a lot of attention in the last years and appears to be an important factor in climate change policy around the globe. However, using CDM in biofuel projects is to date not very successful [5].

As of mid-2006, over 800 projects are in an advanced stage of development: validated projects. They account for more than 1000 MtCO₂-eq reduction up to 2012. The largest share of the GHG reduction is taken up by non-CO₂ projects, while in terms of numbers renewable electricity projects have the largest share. The project pipeline is increasing fast.

No biofuel projects are included in the CDM project portfolio. The main reason is that, until 2007, no biofuel baseline and monitoring methodology had been approved by the CDM Executive Board, which is a necessary requirement for validation. Five such methodologies have been submitted. Other barriers include high abatement cost, additionality proof and calculation of the GHG reduction by the project. On the other hand, biofuel projects may have clear co-benefits in terms of energy security of supply, employment, conservation of natural resources and possibly air pollution. Therefore, biofuel CDM projects have the potential to strengthen the sustainable development goal of the CDM, which is currently under-achieved.

Future developments in the CDM may increase opportunities for biofuels. These include a possibly stronger demand for carbon credits and extension of the scope of eligible activities into sectors and/or programmes or policies.

3.2 India

India is increasingly giving importance to biofuels. The rationales for a major promotion of biofuels given by India's Planning Commission are that [6]:

- There are no other (short term) alternatives for oil-products in the transport sector.
- They are environmentally superior to fossil fuels and necessary to achieve future emission norms.
- They contribute to combating climate change.
- They can increase energy security.
- They can reduce imports.
- The production of biofuels generates employment for the poor.

Since India is becoming a net food importer, the Indian government is very clear that no land used today for edible agriculture should be diverted into land for producing biofuels. This leaves limited options: for biodiesel only waste oils and crops that can be grown on

marginal lands; for ethanol by-products from the sugar and food industry.

India's ministry of petroleum and natural gas announced a policy in September 2002 that 5% ethanol would be blended with petrol from January 2003 in nine states and four Union Territories. However, the program did not start as expected due to shortage of molasses supply. In addition, a large number of production facilities were still being set up. Moreover, ethanol price negotiations between the sugar industry and the oil companies delayed the program. The blending program is now made compulsory from November 2006 in almost all Indian states. Research is being conducted by various agencies to blend 10% ethanol with petrol and blend ethanol with diesel.

The report by India's Planning Commission in 2003 recommended a very ambitious program for development of biodiesel [6]. It envisaged that in the first phase a demonstration program would be taken up for undertaking plantations of jatropha on 400,000 hectares of land, mainly on degraded/wasteland and fallow lands. In the second stage it recommended a target of 5% of blend of biodiesel in diesel by 2006-07, involving a yearly production of 2.6 million tonnes with jatropha plantation on 2.2 million hectares. It further projected that a blend of 20% biodiesel could be achieved by 2011-12, which would require 13.4 million hectares of jatropha plantation. However, the progress has so far been slower than desired.

The production of biodiesel from jatropha involves many stakeholders (see Fig. 1), which obviously calls for coordination. A few states such as Uttaranchal, Chhattisgarh, Andhra Pradesh have launched Biofuel Development Boards. These boards have set targets to grow jatropha and pongamia on wastelands and have taken the coordinative role.

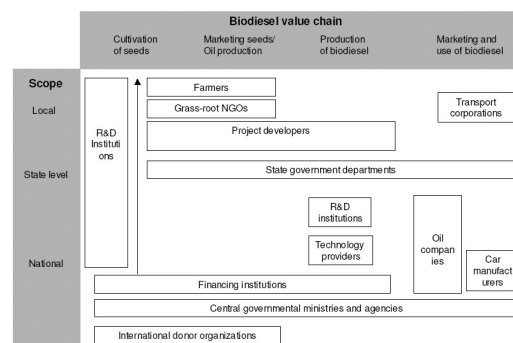


Figure 1: Stakeholders in biodiesel in India (indication)

The ministry of petroleum and natural gas announced a biodiesel purchase policy in October 2006. This means that public oil marketing companies (OMC's) will buy biodiesel at a fixed price of 25 Rs/l (ca. 0.45 €/l) at their 20 established purchase centres, each of the public OMC's responsible for a number of purchase centres. The delivered quantity has to be at least 10,000 litres and the biodiesel has to meet the prescribed specifications; the costs for testing of quality should be borne by the OMC's. The price will be reviewed every six months and has been increased in July 2006 to 26.5 Rs/l. The ministry of new and renewable energy sources is formulating the national policy on biofuels.

3.3 South and Southeast Asia

Nepal has, as an agricultural country, a significant potential for biofuels, mainly for ethanol from sugarcane, but also for oilseeds cultivation on wastelands. The cost of sugar production in Nepal is higher than in India due to economies of scale and higher sugarcane productivity in the latter country, which has resulted in shutdown of many sugar mills in Nepal. Lobbying by the sugar industry has resulted in a cabinet decision in January 2004 to mix 10% ethanol into petrol. This has not resulted in use of biofuels since the state owned oil company and the sugar factories could not agree on a price for the ethanol. The oil company itself is facing a serious financial crisis because of state regulated low oil prices. Lack of government prioritization and favourable policies have discouraged private entrepreneurs that were willing to get into the biofuels business three years ago.

In Bangladesh indigenous (traditional) biomass fuels contribute to about 60% of the country's energy requirement, but knowledge about biofuels for transport is non-existent. In such a densely populated country as Bangladesh, it is almost impossible to establish plantations for biofuels, although the climate is good for oil-seeds as *jatropha* or castor-oil. There are a few regions where large-scale plantations are possible, but these are restricted due to political and other reasons, whereas small-scale plantations are not likely to be economically viable to the farmers. Government land under the department of forestry and railway could be an option. Feasibility studies on biodiesel and the suitability to grow tree-borne oil plants are under way.

Sri Lanka is for the transport sector totally dependent on imported oil, which is processed in a state owned refinery. Sri Lanka does not have a policy on biofuels, but biofuels could contribute to existing policy goals, such as improving fuel quality and air quality. There is no ministry or agency responsible for making policy on biofuels, but around eight ministries have direct or indirect relations with the topic. Sri Lanka has the capacity to produce ethanol from sugar molasses at its sugar factories, although this is currently only done for the alcoholic beverage industry. Coconut oil could serve as feedstock for biodiesel, but Sri Lanka is currently facing a shortfall of local edible oil.

Maldives is a small country with 1190 islands out of which only 199 islands are inhabited. The main source of income is fisheries, tourism and coconuts. Maldives is a net importer of petroleum. The government is conducting feasibility studies to produce biodiesel from coconut shells. Used cooking oils are another possible feedstock.

Thailand's ministry of energy established a policy to increase the share of its renewable energy from 0.5% to 8% by 2011. Biofuels should contribute significantly and are also considered to have a very positive impact on economic growth and clean environment. Other ministries are involved as well in the biofuel programme, which has been successful so far: Halfway 2006, Thailand's nine oil companies sold 110 million litres gasohol per month. Driven by the lobby of the sugar industry, there were plans to replace all petrol with gasohol on the short term, but this has been delayed due to concerns about fuel compatibility for old cars. About 300,000 litres per day of biodiesel from palm oil will be produced in 2007. The country's target for biodiesel is 5% of the diesel demand in 2011, an estimated 8.5 million litres per day.

4 KNOWLEDGE EXCHANGE AND CAPACITY BUILDING

4.1 Conference and study tour in Europe

The project partners organised a special session on Biofuels in South and Southeast Asia at Europoint's 5th European Motor Biofuels Forum in Newcastle, UK, in September 2006 [7]. Several Indian and European speakers spoke on the latest developments in biofuels with relation to South and Southeast Asia. The session and conference were also attended by ten Indian officials working in the area of biofuels, invited by the partners of the ProBIOS project. For this delegation a study tour to Europe was organised by the EU ProBIOS partners after the conference in Newcastle. The objective of the study tour was to understand the European biofuels program and implement similar programs in India and neighbouring countries.

The study tour started with a visit to a Dutch research dairy farm producing biogas with (one of) the aims to inject upgraded biogas gas in the grid and produce automotive fuel from the gas. Next was the presentation by the alderman of the Dutch city of Leeuwarden on the promotion of biofuels and renewable energy in general, both realising projects as well as creating awareness in the community. In Leeuwarden the waste management company Omrin, which used waste pick-up trucks run on pure plant oil, was visited. Finally, two German biodiesel plants were visited: the plant of Rheinische Bio Ester in Neuss and the one of Natural Energy West in Marl.

4.2 Workshops in India, Sri Lanka and Thailand

After the initial working conference in Delhi, workshops were held in Raipur (in the Indian state of Chattisgarh), Mussoorie (Uttaranchal, India), Bangalore (Karnataka, India), Hyderabad, (Andhra Pradesh, India), Colombo (Sri Lanka) and Bangkok (Thailand). These workshops were organised in cooperation with local bodies that work in the field of biofuels where these existed. At these workshops presentations were given by participants of the ProBIOS project, by government bodies such as the Indian Petroleum Conservation Research Association (which also co-sponsored several of the workshops) and by local organisations and persons active in the promotion of biofuels. The number of participants of the workshops varied from ca. 40 to 300.

The participation of farmers in several of the workshops gave a good feedback on the current status and barriers on *jatropha* cultivation. Farmers presented their difficulties in establishing a *jatropha* plantation. These concerned in many cases economics, such as the high costs of planting material, although some Indian states offer this at no cost. But also the availability of good planting material was a problem. Furthermore, they argued that the price for selling the oil seeds was often too low and that it did not discriminate on the actual oil content of the seeds. Some farmers expressed their discontent over the information they had gotten when they started with the cultivation of *jatropha*. They said they had been promised too much: that *jatropha* was a plant which needed no irrigation and that it was resistant against pests and diseases, which appeared no to be true. They were also disappointed about the initial seed yields.

Several university researchers argued that the choice for *jatropha* and *pongamia* as feedstock for biodiesel production nation-wide in India was made too hastily without proper research into all the ca. 300 tree-born

oilseed species. Since these trees have a life of several decades this could cause a lock-in into a suboptimal situation. They said that more research is needed to clarify issues as yields, irrigation, diseases etc. and to find or breed the optimal species.

Furthermore, farmers and also other participants were unsatisfied with current government policy as a whole. They argued that the policy for biofuels in Europe, the USA and Brazil was much more supportive for biofuels, especially where it concerns subsidies. Participants representing government bodies or local biofuel boards argued that all mentioned issues had their attention and that they were satisfied with what had been reached so far. They stated that developing countries such as India cannot afford high subsidies on biofuels and have to find their own way of promoting biofuels, although much can be learned from experiences in other parts of the world.

Finally, there was clearly need for more information exchange. There were calls for platforms facilitating information exchange information. Participants were very enthusiastic that these workshops gave a (temporary) platform. For participants in Sri Lanka this was even the very first experience with biofuels.

5 RESULTS & ANALYSIS

From the review study and the knowledge exchange, several key points were identified as important for the promotion of biofuels in South and Southwest Asia. The focus in this analysis is mainly on India, although most of it applies to the other South and Southwest Asian countries as well. Secondly, the focus is largely on biodiesel, as there appear to be more barriers for biodiesel. However, bioethanol is not excluded from the analysis and some of the key points identified apply to both biodiesel and bioethanol.

5.1 Opportunities from European experience

There are several areas where European experience or actual European support can be very useful for the promotion of biofuels in South and Southwest Asia. The most important areas are policy, conversion technology and the Clean Development Mechanism. In some other areas, such as agricultural production for biofuels, the conditions are very different in Europe and Asia.

In policy there is the opportunity to learn from Europe's success stories and from its mistakes. The success stories depend on several factors: a clear policy, consistent for a longer period and non-bureaucratic in its implementation, bringing necessary actors together, creating an end-market and overcome the financial gap between fossil fuels and biofuels. Pitfalls can be hasty decisions (e.g. due to high ambitions) leading to parts of the policy being in place while other parts, e.g. biofuel quality standards, are still missing. This can work counterproductive for stakeholders.

In conversion technology, Europe has developed very efficient transesterification process technology for biodiesel production. This is available for South and Southwest Asia in cooperation with European companies. Several companies have already started activities in India. Examples are Naturol Bioenergy Limited (a joint venture of the Austrian biodiesel technology company Energea and US's Fe Clean Energy) and the German company Lurgi Life Sciences, both involved in the planning of biodiesel plants in the state Andhra Pradesh

[8]. In addition, lessons can be learned from the best practises in Europe on biodiesel plants on how to optimize biodiesel production and accompanying logistics.

The Clean Development Mechanism provides a mechanism for additional funding from European countries or companies for biofuels in Asia. Biofuel projects under CDM also have the potential to strengthen the currently under-achieved sustainable development goal of the CDM.

5.2 Barriers for farmers

Most of the barriers for production of biodiesel are for the farmers (see Fig. 2). This is not very surprising as cultivating energy crops and especially jatropha is new to farmers. However, this became again extra apparent from the participation of farmers in the workshops. Farmers have to overcome problems such as investment costs, limited availability of high quality planting material, uncertainty of government policies, etc. The farmers are the pioneers in the field of jatropha and vital for a necessary growth in biodiesel production. However, if they do not get support to overcome their barriers, they might loose interest in cultivation of jatropha and other species for biodiesel production.

Overcoming these barriers requires at least a coordination and information body at a regional level which can help farmers with their questions and problems. The Biofuel Development Boards that have been launched now in the states of Uttaranchal, Chhattisgarh and Andhra Pradesh could take this role.

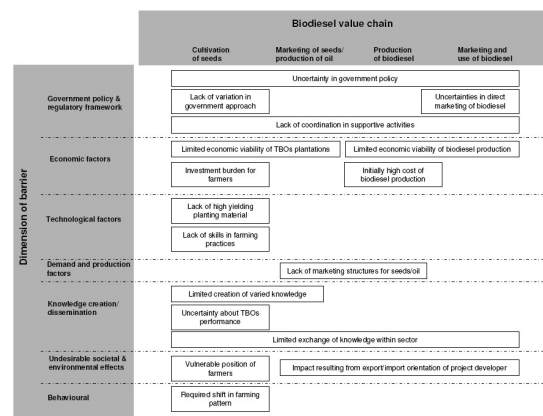


Figure 2: Identification and mapping of barriers (indication)

5.3 Disinformation and uncertainties

From the organised workshops, it became clear that there is a need for information and dissemination on jatropha cultivation. For one part this requires research to obtain the necessary information; for the other part it means collecting the information and making it available for farmers. The latter could be done through conferences, but also through local biofuel boards.

Further, as mentioned by researchers, jatropha and pongamia might not be the optimal species for oil seeds production, certainly not for every region. This implies that other natural or bread species should be investigated at a laboratory level and in practice at established plantations. In the view of this, it might be considered to let the expansion of plantations be a managed growth in order to gain experience with tree-born oil-seeds, but to prevent a full lock-in into a suboptimal situation.

5.4 Generic financial support

Financing mechanisms and subsidies are available for several specific parts of the biofuel chain, mostly at a sort of ad-hoc basis. However, biofuels come at an additional cost and experience in Europe has shown that a generic financial support, such as a tax exemption, is necessary to create a market for biofuels. India has tried to introduce such a generic financial support with their biodiesel purchase policy. However, the government set price for biodiesel in India is not high enough to cover current production costs. Similarly, the oil marketing companies and bioethanol producers in India and Nepal have not been able to agree on a price for the bioethanol.

It is clear that it is difficult to cover the additional costs of biofuels in countries like India and Nepal, which have many other important priorities. Still, large-scale promotion of biofuels requires a sufficient generic financial support mechanism until the costs of biofuels in South and Southeast Asia comes down to a level where they can compete with fossil fuels.

5.5 Conflicting objectives

Although the strong synergy of rationales generally makes the case for promoting biofuels, there can be some conflict between them as well. In the case of India and most other South and Southeast Asian countries it seems that it is difficult to obtain the objectives to generate employment for the poor and to reduce oil dependence at the same. The rural poor would benefit from biofuel projects on a community scale with a participative approach and a relatively decentralised, bottom-up organisation. The jatropha oil could be used for local applications, such as replacing firewood for cooking or electrification, which is executed in a project by Winrock International India in three rural villages [9]. However, this use does not contribute to a reduction of oil imports.

This same dilemma is the topic of a recent report on the possibilities of cultivating jatropha in Cambodia which looked at the differences between national scale biofuel production, plantation scale production and community scale production [10]. It concludes that producing biofuels on a national scale can decrease dependency on fossil fuel imports, create job opportunities, reduce air pollution in cities and possibly increase income per capita. However, when the production process is highly centralised, the rural poor will not benefit from these advantages.

6 CONCLUSIONS

The ProBIOS project has raised awareness on the topic of biofuels in India and the neighbouring countries, especially through the organised workshops. Although the project has not been completed yet, from the review study and the workshops it was possible to identify several key issues:

- There are opportunities to learn from European experience especially in the field of policy, biodiesel conversion technology and CDM.
- Most of the barriers are for the farmers, who need support in overcoming them, otherwise they might lose interest.
- There is a strong need for information, research and dissemination on jatropha cultivation.
- The governments of India and neighbouring countries have not yet found a successful and affordable

financial support mechanism for biofuels.

- Biofuels can contribute to the reduction of poverty for the rural poor and to the reduction of oil imports, but it is difficult to reach both these objectives with the same measures.

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