

OPEN FORUM ON POVERTY

Growing our Food or our Fuel?

Based on two presentations

Food security in the context of Land availability

by *Dr. Wasanthi Wickremasinghe,*

Senior Researcher, Hector Kobbekaduwa Agrarian Research and Training Institute

Growing our own energy

by *Mr. Parakrama Jayasinghe,*

President of the Bio energy Association of Sri Lanka.

**Documentation of a discussion held on 09th October 2008
at the Center for Poverty Analysis
Colombo, Sri Lanka**

MAY 2009

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1. Introduction

CEPA's objective in hosting the Open Forum on Poverty is to provide a platform for groups of professionals to discuss research/expertise on poverty and related issues and to create a medium for knowledge dissemination. The thirty-fifth Open Forum hosted by CEPA focused on an emerging topic - food versus fuel, and the possible consequences of this debate in the context of land scarcity in Sri Lanka.

The forum presented two views: Dr. Wasanthi Wickremasinghe, Senior Researcher, Hector Kobbekaduwa Agrarian Research and Training Institute presented on the food security aspect in the context of land availability while, Mr. Parakrama Jayasinghe, President of the Bio energy Association of Sri Lanka presented the possibilities and potential for cultivating bio fuels in Sri Lanka. The discussion was chaired by Ms. Karin Fernando, Senior Professional of CEPA's Poverty Impact Monitoring Programme.

The aim of this Open forum was to explore the implications of the food and fuel crisis that is being debated globally and what it means for Sri Lanka, in terms of meeting our food requirements and the potential to grow our own energy within the country.

2. Summary of Presentation

Food security in the context of land availability

Dr. Wasanthi Wickremasinghe began by defining food security "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". She went on to discuss Sri Lanka's attempts to reach paddy self sufficiency and noted that the availability of fertile land has been a constraining factor for the expansion of paddy cultivation.

The paddy sector is a primary focus of Sri Lanka's development agenda and achieving self-sufficiency in paddy production has been an objective of successive governments. As such, an array of policies and programmes have been put in place to increase the paddy production in the country. Large scale irrigation systems, fertiliser subsidies, research and development activities, extension and development and paddy purchasing at a guaranteed price are some of the programmes and interventions implemented at various levels with larger budgetary allocations and donor assistance.

Despite the limited land availability in the country and the maximum usage of available land for paddy cultivation by the 1980's, statistics indicate a continuous increase in the quantity of paddy produced in the country. The reasons for this increase are attributed to a combination to irrigation patterns, use of nitrogen responsive, high yielding varieties, use of urea and other fertiliser that are important determiners of paddy productivity.

Within the general thrust of increased food security, Sri Lanka has also attempted to develop other food crops like sugar but these attempts have been hampered by poor productivity, lack of knowledge in processing, resource deficiencies of poor farmers and the high cost for marketing for the crops. Paddy has therefore continued as the focal point of Sri Lanka's attempts at ensuring self sufficiency in food. The rise of energy prices is the latest

challenge that food crops such as paddy are now facing. Rapid increases in energy prices have constantly affected agricultural prices mainly through increase in cost of inputs - i.e. fertiliser and pesticides and transport cost. It also affects the agricultural output prices due to the increase of the opportunity cost.

A new energy related challenge to food production has come through the competition of land for cultivation of both bio-fuel crops and agricultural crops. Although this phenomena is relatively new to Sri Lanka there is some speculation that agriculture land will be used for farming bio-fuel, especially if bio fuels becomes a profitable enterprise. This speculation on bio fuels is also set within the context of rising food prices in the world market which is generating a call for increased domestic production, but where countries such as Sri Lanka are facing growing concerns regarding the limited land availability for agriculture.

Growing our own energy

Mr .Parakrama Jayasinghe discussed the potential of bio fuels and the role they could play as an alternative to fossil energy.

Like food, energy has become an essential item for the contemporary lifestyle. Although mankind has been using fossil fuels for its energy production, and have benefited greatly from it, it is a finite resource that is fast depleting. However the demand for energy is increasing and the per-unit cost for fuel is rising. As a result, alternatives for fossil fuel are being sought. Some countries have started to use sugar cane and food grains extensively as a base for fuel and this has been argued as a contributing factor for increasing food prices. Recently in the global arena there has been much attention and debate on the conversion of food crops to energy crops and the likely impacts on food security. There is a fear that this increasing demand may lead to increasingly identifying agricultural land for cultivating fuel crops over food crops.

Ethanol has been proposed as a better alternative for energy production. It is sourced from corn, Soya bean and sugar cane. Use of "Algea" has been suggested as an even better alternative for Ethanol, as it can be grown in water bodies, and does not compete with conventional agricultural lands. However this energy source is still at the experimental stages.

Sri Lanka's energy mix has become more dependent on fossil fuels leading to a huge drain on foreign exchange. While hydro power is used widely, other alternatives are also being proposed to replace the dependency on fossil fuels. *Dendro* power is suggested as an alternative for generating electricity, while Bio fuels such as Bio Diesel, Ethanol and Methanol are suggested for transport. While biomass in terms of fuel wood is already widely used in Sri Lanka for cooking, *Dendro* power refers to energy produced from wood to generate electricity using advanced methods that are cleaner and more efficient.

The Bio energy Association promotes *Dendro* power as a renewable and viable alternative to fossil fuels that can save valuable foreign exchange while also having the added advantages of fodder, fertilizer and income generation that can have a positive spin-off in terms of reducing poverty. Therefore growing energy crops is promoted not as a replacement of food crops but as a complementary crop that can boost agriculture and livestock production while also improving soil fertility and revitalizing degraded land (with use of tree crops such as *gliricidia*).

Dendro fuel is made by burning the *gliricidia* trees which are easily cultivatable in Sri Lankan soil mixed with selective other crops like paddy, tea or coconut. Since the trees don't require strict maintenance, the production cost is less and can have an impact on poverty eradication by providing an additional source of income to smallholder farmers. As the Dendro cultivation is done with existing food crops there can be a boost in agricultural production. There is also synergy with agricultural and livestock production as *gliricidia* leaves makes good fodder for livestock and fertilizer for agriculture.

3. Summary of discussion

Based on the presentation, the floor discussion focused on whether in fact there is a food-fuel trade off. While the ceiling of paddy lands has been reached, there is a decreasing trend in relation to other food crops, resulting Sri Lanka being dependent on imports of other food items. However, whether Sri Lanka can be considered as self sufficient in rice production was also questioned. The concept of cross elasticity should be looked at as a means of looking at the demand for goods. Food habits should also be considered. There are people who stick to rice as their staple food in rural areas. There are people who are moving to wheat based products in urban areas. Is there any impact on self sufficiency by this trend? Recent studies shows that there is a trend towards increased consumption of rice based products. The issue with food is less about (land for) production, and more about price, as one participant argued that we should be paying less for our food.

From the energy perspective, it was suggested that there is no implication for food cultivation as ethanol can be derived from any tree grown on lands which are not suitable for food crops, for example Algae. Some participants felt that the question therefore is not food OR fuel but food AND fuel.

A question was also raised regarding how far we have come after 10 or more years talking of bio-energy sources. There is not much production but it was argued that the cultivation of *gliricidia* has taken root. An estimated 100,000 ha is under dendro. There are also many factories, especially tea factories, which have converted from the use of main-grid electricity. However, for a large-scale dendro power plant, there is a need for state intervention because of the risk and scale of investment needed. There was also a question on whether provincial councils can be empowered to start small-scale operations.

Farmers should be encouraged, not to switch to the cultivation of *gliricidia* but to cultivate it as a complementary crop to his/her other crops/farming activities. It can make the land more fertile for the cultivation of the food crop and it can also be done to complement the rearing of livestock. Cultivation of small plots of *gliricidia* can make the farmer self sufficient in his energy source, but this concept can't result in dendro feeding the national grid.

In this regard, it was also discussed that incentives, in the form of right price for dendro, would need to be in place to encourage farmers to cultivate. At present about 200,000 kilos of *Gliricidia* are sold per day, and most of it is produced by smallholder farmers. There is no credit and other financial support for this activity as it is not in the formal sector. These are all major barriers to the spread of dendro power generation in a systematic way.

Overall, some concerns were expressed that there is insufficient systematic promotion of renewable energy sources. The participants agreed that acceptance of new ideas by the public is finally the main issue.

Annexes

Annex 01: Presentations -

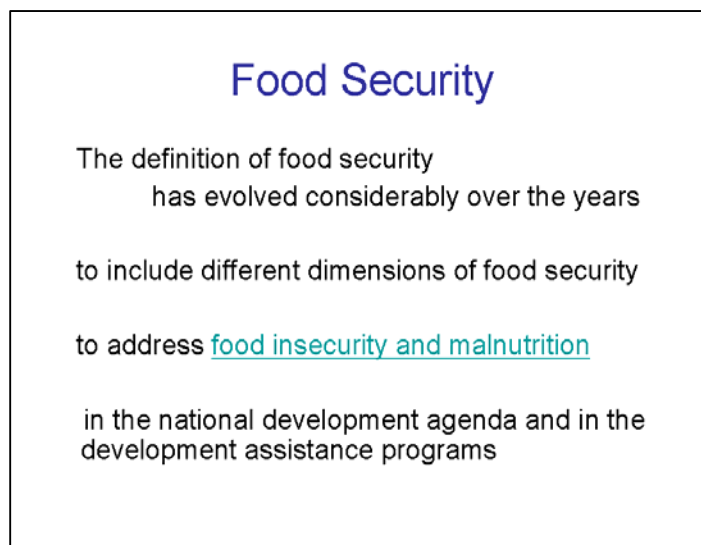
1 – Food Security and Land Availability

by Wasanthi Wickremasinghe

Slide 01



Slide 02



Slide 03

Food Security

- “Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”

State of Food Insecurity 2001

Slide 04

National Food Security

- Increasing Food Production
- Self sufficiency in paddy production has been the primary goal in view of increasing food security in the country
 - Hunger : Deficiencies of Calories and Protein

Slide 05

National Food Security Indicators

Food Availability	1990-2000	2001-2003	Latest	Source
Average per person dietary energy supply (kcal)	2,318.5 (2000)	2331.1 (2002)	2363.4 (2005)	CENSUS
Animal protein supply per person/ day (grams)	18.14 (2000)	18.11	15.48 (2005)	CENSUS
Food Production Index	101.7 (2001)	101.4 (2002)	102.8 (2005)	FAOSTAT
Rice self sufficiency ratio	100 (2001)	98 (2002)	98 (2005)	CENSUS
Per capita rice availability (Kg/Yr)	94.53 (2001)	98.09 (2002)	97.30 (2007)	CENSUS

Slide 06

Paddy Production

Paddy sector, the backbone of the food economy of Sri Lanka is the main focus of any development agenda of the country from its historical time.

A wide array of policies were implemented by the successive governments to increase paddy production in the country for food self sufficiency.

- Large scale irrigation investments,
- subsidised fertiliser,
- investment on research and development,
- investment on extension and education,
- paddy purchasing at a guaranteed price

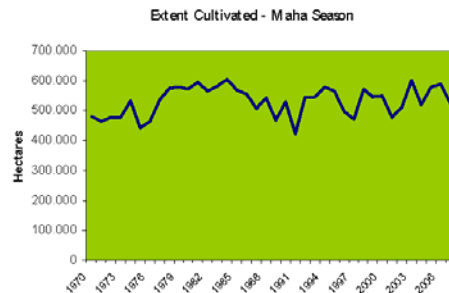
the main intervention programs implemented throughout at various degrees with huge budgetary allocations and donor assistance.

These policies were successful in achieving the goal of self sufficiency of rice in the country irrespective of its cost effectiveness.

Slide 07

Paddy Production

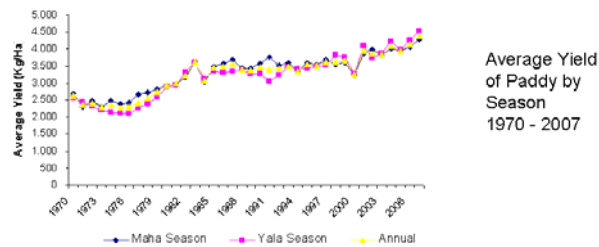
Land area available for paddy cultivation reached to its maximum towards mid 1980's



Slide 08

Paddy Production

Continuous growth of yield/productivity largely contributed to increased paddy production in the country.



Slide 09

Growth Factors of Paddy Production

- Irrigation
Cropping Intensity
Productivity
- Nitrogen Responsive Varieties
- Urea and other Fertilisers

Slide 10

Other Food Crops

- Net importer – Sugar, OFC
- Comparative Advantage ???
 - Productivity
 - Poor processing
 - Resource poor farmers
 - Marketing cost.....

Slide 11

New Challenges

- Rising energy prices

Energy prices always affected agricultural prices through inputs, i.e. [Price of fertilizer](#), pesticides, transport

Energy prices also affect agricultural output prices strongly via opportunity costs

resource competition for energy crops for ethanol and bio-diesel in the already limited land.

Food production an enormous challenge

Opportunity cost of Land

In favour of Food Crops or Energy Crops ??

Food Prices are increasing at the world market

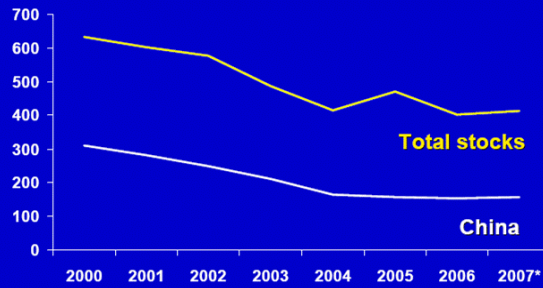
There is an increasing demand for domestic production

It has already been predicted that bio fuels from energy crops could hardly contribute to energy security that the share of bio-fuels in road transport would be only 3-4 % even in 2030 - IFPRI

Slide 12

The world eats more than it produces: cereal stocks decline

Million tons



Joachim von Braun, IFPRI, February 2008

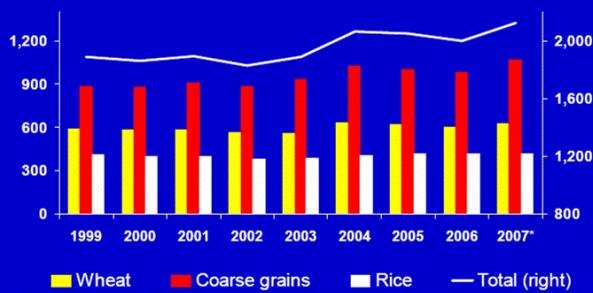
Source: Data from FAO 2003, 2005-07.
* Forecast.

Slide 13

World cereal production: not growing enough

Million tons

Total Million tons

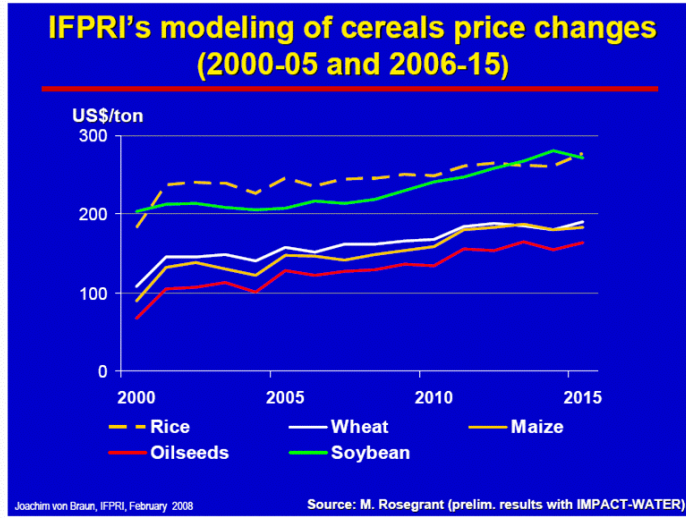


Joachim von Braun, IFPRI, February 2008

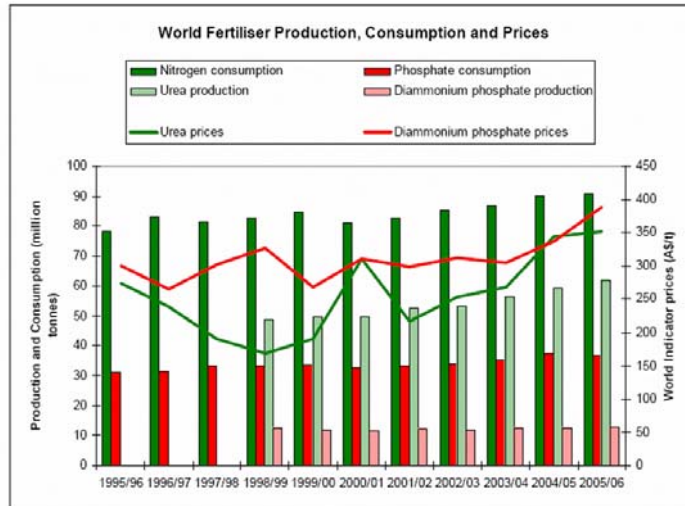
Source: Data from FAO 2003, 2005-07.
* Forecast.

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Slide 17


Food Insecurity and Malnutrition

Nutrition Status		2000	2001	2004	Source
Estimated number of undernourished people	of	26.0 (1997)	22 (2002)	22 (2004)	FAO
Low birth weight		16.7 (2000)	17.1 (2002)	16.6	MRI / DHS
Stunting (Pre School Children)		15.1 (2000)	13.9 (2001)	18.2 (2004)	MRI / UNICEF
Wasting (pre school Children)		15.5 (2000)	14.2 (2001)	16.0 (2004)	MRI / UNICEF
Underweight		30.5 (2000)	29.7 (2001)	34.9 (2004)	MRI / UNICEF

2 – Energy Alternatives: The Role of Bio-Fuels

By Parakrama Jayasinghe

Slide 01




Energy Alternatives The Role of Bio Fuels

Fuel, Fodder and Fertility

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Pepiliyana.
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bioenergy@sltnet.lk
www.bioenergysrilanka.org

Slide 02



The Needs of Humankind !!!

- In today's world, energy is as important as food in the day to day lives of man
- Some countries are ready to wage war to ensure their energy security
- Dependence on external sources for food nor energy is not a wise decision

Slide 03

Current Debate

- **Some countries have used food grains and sugar cane extensively as the base for fuel**
- **The rise in food prices is blamed on this usage**
- **Fear of agricultural lands being converted for fuel adding to the problem**

Slide 04

Alternative Points of View

- **Food grains are not the best option for bio fuel**
- **Other technologies for conversion of non food bio mass to energy/fuel already exist**
- **Other sources of energy too are available**

Slide 05


World is recognizing the potential of bio mass !

- **Abandoned Farmlands Are Key to Sustainable Bio Energy –
Chris Field , Director
Department of Global Ecology
Carnegie Institution**

Slide 06

Ethanol – has been around for a while

- Current Sources – Corn, Soya bean, Sugar cane,
- Blamed for driving food prices up
- Ford Model T and Original Diesel run on ethanol and peanut oil
- US target 7.5 Billion Gallons by 2012



Slide 07

Objections to Ethanol



- Food products diverted to energy
- Use of land suitable for food crops
- Environmental damage due to fertilizer use and burning of waste etc.



Slide 08

A better alternative

- Any biomass with cellulose can be converted to ethanol
- 1 ton of bio mass (SRC wood, stalks, leaves, sawdust) generates 70 gallons of ethanol
- Costs are still high with 45% conversion efficiency Vs 85% for petroleum refineries.
- GHG Emissions lbs/gal
- 20.4 : 1.9 - 91% less



Slide 09

The best alternative feed for bio ethanol – “Algae”



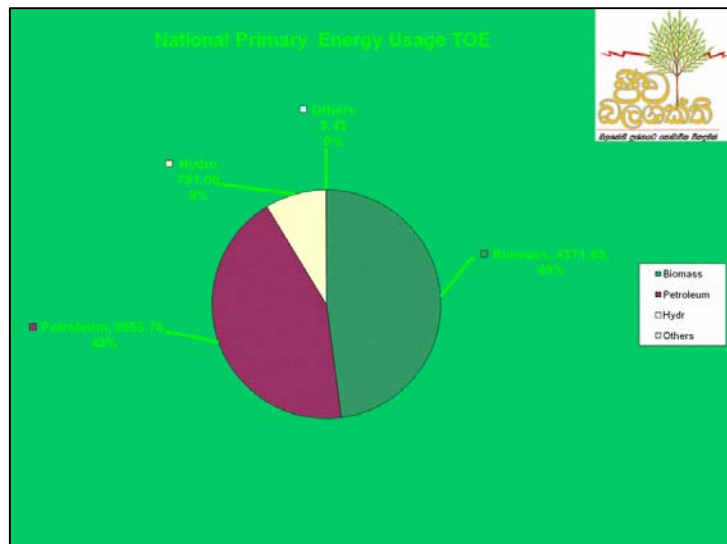
- Algae can be converted to ethanol via use of enzymes
- Can be grown in water bodies
- Additional benefit of CO2 sequestration
- Will help in cleaning up waste water streams
- No competition with agri. Lands

Slide 10

How is Sri Lanka Affected ?

- Over dependence on fossil fuels
- Large proportion of our food is still imported
- Drain on foreign exchange
- We have no proven fossil fuel reserves

Slide 11



Slide 12

The Solution must be indigenous !!!!



- Reduce dependence on imports
- Phase out Fossil Fuels as fast as possible
- Develop all indigenous resources for fuel fodder and fertility
- Target our natural advantages – Ample rain, sunshine and fertile soil
- Adopt alley cropping techniques
- Develop marginal lands for energy plantations!

Slide 13

Indigenous Sources Available

- Hydro - 360 KTOE /Year
- Bio Mass - 16,000 KTOE/Year
- Wind - 3440 KTOE/Year
- Solar - 8,600,000 KTOE/Year
- Solar Thermal/ PV
- Other – Wave Energy
Ocean thermal

Imports of Fossil Fuels –

4172 kTOE in 2005.

Source - SEA

Slide 14

Transport Needs – The difficult problem !!



- A Liquid or compressed gas fuel alternative is imperative to effectively replace the current gasoline and diesel usage
- Some bio fuel options are already available

Slide 15

Energy Alternatives for Sri Lanka – Priority Order

- **Hydro – remaining major and mini**
- **Dendro for electricity and industrial thermal and domestic energy**
- **Bio fuels for transport**
 - **Bio Diesel**
 - **Ethenol**
 - **Methenol**

Slide 16

Bio Fuels for Transport



- **Ethanol**
- **Bio Diesel**
- **Methanol**
- **Compressed Bio gas (Bio Methanol)**
- **Go electric !!!**

Slide 17


A Starting Point

- **Current plans target 65,000 Ha for sugar cane**
- **This will provide enough ethanol to mix with petrol within the CPC specifications within 10% mix**
- **Some lands already ear marked for Jetropha – could expand up to 10% mix of diesel**

Slide 18

Why Dendro ?

- **Low Cost Energy – Best alternative for electricity and Thermal Energy needs**
- **Poverty eradication**
- **Organic agriculture**
- **Energy security**
- **Self-sufficiency in milk**
- **Synergy with Food Production**
 - **Fodder for live stock**
 - **Fertilizer**
- **Source of Bio mass for Transport fuels as well**



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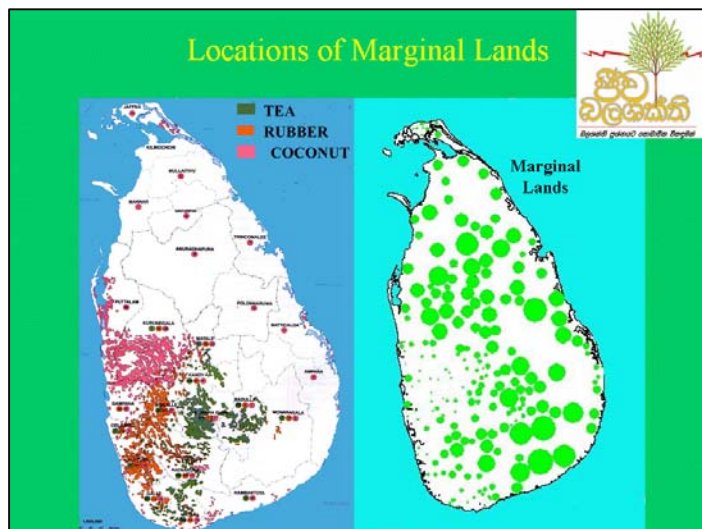
Land available in Sri Lanka

Source : Ministry of Lands

• Total Land Area	6,500,000 ha.	100%
Natural forest	1,678,000 ha.	26%
Forest plantation	81,000 ha.	1%
Industrial plantations	789,000 ha.	12%
Paddy lands	799,000 ha.	12%
Sparsely used crop lands	1,263,000 ha.	20%
Range scrub land	502,000 ha.	8%
Other	1,408,000 ha.	21%



Slide 20



Slide 21

Some Numbers to Note

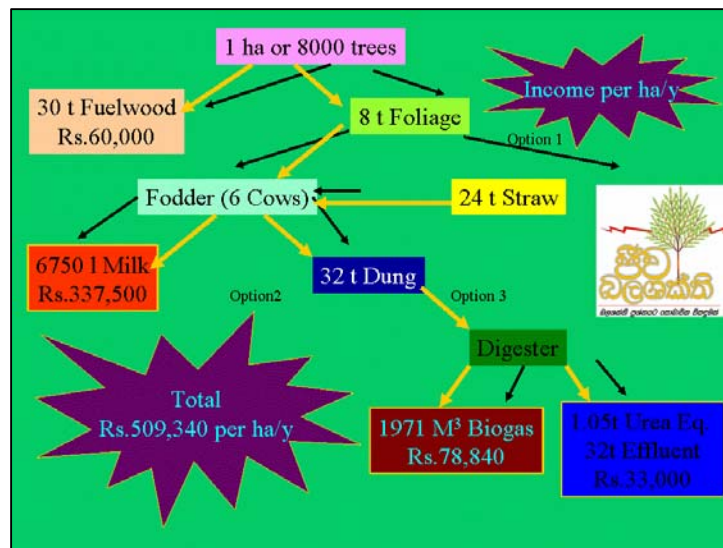


From even 100 MW of Dendro Power we can get

Rs 2,500 Million added to the rural economy annually

- Rs 8,100 Million from 2700 Million litres of milk –
- Rs 1.68 Billion from organic fertilizer eqt value of 70,000 kg of urea

Slide 22



Slide 23



Slide 24

Thermal Energy for Industries

- Annual Import of Fossil fuels **429,000 tons**
- Import Cost **\$ 300,000,000**
- Wood requirement for replacement **1,700,000 tons**
- Coconuts lands required for inter-cropping (out of 400,000 Ha) **100,000 Ha**
- Value of the wood – **Rs 6,000,000,000**
- Value of leaves as urea replacement - 30,000 tons @ Rs 110,000 per ton = **Rs 33 Billion**

Slide 25

The Time is Ripe!



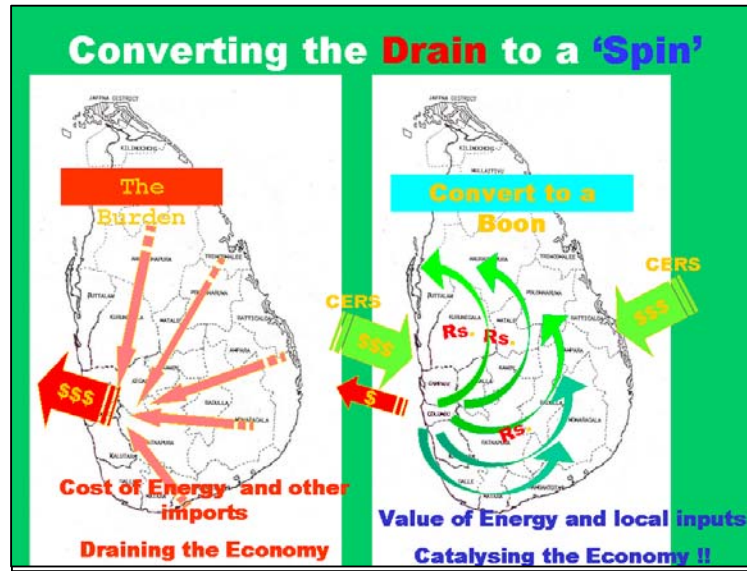
- An attractive tariff for Bio Mass Electricity
- Sustainable Energy Authority to iron out barriers and impediments
- Immediate financial benefits from switch over to Dendro for Industrial Heat Energy
- Increasing interest in energy plantations
- Many already reaping the benefits
- CPC amenable to purchase bio fuels at prices comparable to fossil fuels

Slide 26

Energy Alternatives for Sri Lanka – Priority Order

- Hydro – remaining major and mini
- Dendro for electricity and industrial thermal and domestic energy
- Bio fuels for transport
 - Bio Diesel
 - Ethenol
 - Methenol

Slide 27



Annex 02: List of Attendees

Name	Organisation
01. Wasanthi Wickremasinghe	Hector Kobbekaduwa Agrarian Research and Training Institute
02. Parakrema Jayasinghe	Bio energy Association of Sri Lanka
03. Lahiru Perera	Foundation for Co-Existence (FCE)
04. Bandula Idamegama	Jathika Sevaka Sangamaya (JSS)
06. Ruwanthi Elwalagedara	Institute of Health Policy
08. Damitha Samarakoon	Practical Action
09. Darini Rajasinghham Senanayake	Consultant
10. Ramani Gunathilleke	Consultant
11. Bandula Jayamanne	
12. Roshan Uyanwatte	
13. Thalavou Alilama	
14. Kamani Vitharana	
15. Karin Fernando	CEPA
16. Nilakshi De Silva	CEPA
17. Mansi Kumarasiri	CEPA
18. Arunika Meedeniya	CEPA
19. Neranjana Gunetilleke	CEPA
20. Azra Abdul Cader	CEPA
21. Juanita Wickremaratne	CEPA
22. Amila Balasooriya	CEPA
23. Sanjeewanie Hemamala	CEPA
24. Gayathri Lokuge	CEPA
25. Munas Mohommad	CEPA