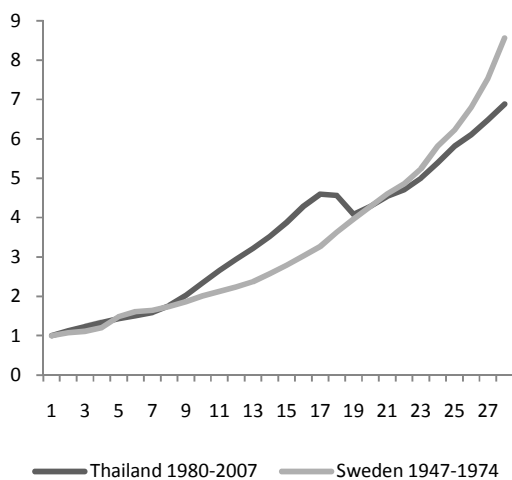


Singapore, 8th of May, 2010
 by Per Dahlen

25Hp Tractors and USD 25bn Fuel-subsidies

With this story we continue to explore the tremendous potential for 2nd generation biofuels in Southeast Asia by reviewing 25 horsepower tractors and the USD 25bn fuel-subsidies. Both will play a tremendous role in the deployment of second generation biofuels, both in this part of the world, and maybe also on a global scale.

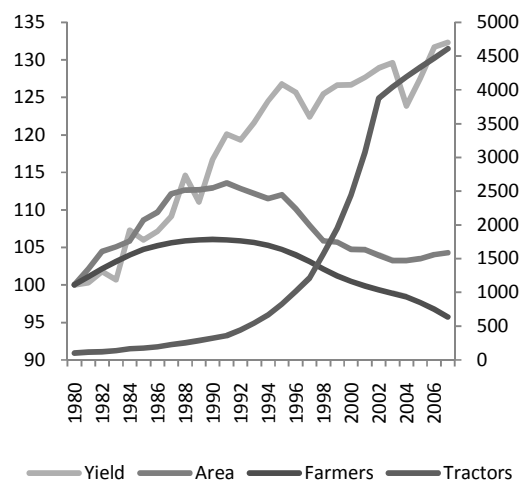
This small piece of research was made in preparation for the World Bioenergy 2010 conference in Sweden and started out with comparing the GDP growth of Sweden, 1947-1974 and Thailand 1980-2007. As we can see from the graph below both countries increased GDP it's 7-9 times over a 28 year period.



Now what is interesting to note here is that in 1947, Massey Ferguson started selling the TE-20A in Sweden, normally known as the 'Grålle', and over the next 28 years 500,000 of these 20-25Hp tractors were sold in total.

The best selling tractor in Thailand over the past 28 years is probably the 28Hp Kuboka L2202, and sales of this tractor really took off in 1990, with sales growth of 25% each year for 10 consecutive years. In 1980 Thailand only had 18,000 tractors but by 2007 there were over 800,000 tractors plowing the fields.

This tractor sales explosion had some interesting effects as shown below. As we can see both the number of farmers and the land used for farming decreased. And we also notice that the total food yield just continued to increase.



This pattern is visible in all other countries that move towards industrialized agriculture, as an example, agricultural land in the US has decreased by 25% over the past 60 years.

Shifts like this will of course have tremendous implications on rural migration, increased GDP, to not mention tractor spare parts, but we are

interested in the implications for 2nd generation biofuels.

Thailand has about 17% of the total agricultural land in Southeast Asia, Philippines and Vietnam makes together another 19% and Indonesia 41%, together these four countries constitutes 77% of the agricultural land in Southeast Asia, in total some 104M hectares.

Contrary to Thailand with a GDP per capita of USD 8,700, the three others were just shy of USD 4,500 per capita in 2009, and this is the important point. Tractor sales took off in Thailand when GDP crossed USD 4,500. This would imply that for the next decade tractor sales will soar in Indonesia, Philippines and in Vietnam.

It will also imply that food production is to increase 25-30% and that 10-15% of the land will be available for other purposes, for example energy crops.

Tremendous implications.

Let us assume that over the next 10 years some 10M Hectares will be available for energy crops and that we can realize an average yield of 100 ton dry biomass per hectare (see my precious article in Biofuels Digest) and that second generation biofuels technologies can yield 200Kg of fuel per each ton of biomass – Southeast Asia will produce 4.0 million barrels of renewable fuels per day!

Southeast Asia only requires 2.7Mbdp (to be oil independent) which would make us a net renewable fuel exporter of 1.3Mbdp, almost the 1.73Mbd name-plate production capacity of the Gulf of Mexico, or 23% of the total oil production in the US, not bad.

So where is the catch?

From the Advanced Biofuels Leadership Conference organized in Washington DC last month and attended by 65% of all the leading 2nd generation biofuels companies the message was pretty clear – We are ready today.

After USD 1.2bn in venture capital funded research and development over the past three years and with USD 800M in Recovery Act Funding for scaling these technologies, it now seems the time has come for large scale deployment with at least 67 companies ready to go within the next three years.

Land will be available, food will be plentiful, technology is available and commercially viable without subsidies – but, and here comes the real problem, the money required to fund the projects is not available.

A second generation biofuels project will cost USD 10-100M which makes these projects too capital intensive for venture capitalists and with the technology still not proven enough to attract private equity financing. Traditional project financing is also hard to attract due to the higher technical risk, but equally due to the lack of an execution track record.

This is where the fossil fuel-subsidies in Southeast Asia come into the picture.

It is estimated that Indonesia, Malaysia, the Philippines and Vietnam spend roughly USD 20-25bn in fuel-subsidies each year, about 10% of the world's fuel subsidies.

On average this is 10-15% of all government expenditures spent on subsidizing polluting fossil fuels instead of building infrastructure, healthcare and education.

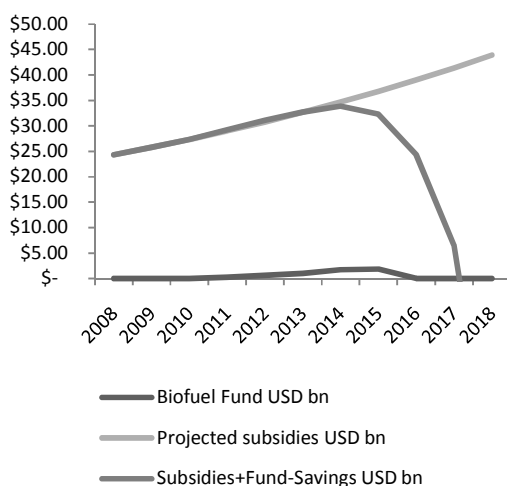
So let us assume that we use 1% of the subsidies in 2011 to co-fund 2nd generation

biofuel plants, which is USD 250-300M, a good start. Let us then go to 2% in 2012, 3% in 2013 up to 5% in 2015, this would give us a total of USD 5.4bn over the next 5 years to kick-start the domino effect of biofuels deployment.

The secret in the biofuels domino effect lies in the economics of 2nd generation biofuels. It all comes down to the price of oil, but with prices over USD70/bbl (the average price over the past 5 years), 2nd generation biofuels is a very lucrative business. Assuming a sales price of USD750 per ton fuel and agricultural biomass waste cost of USD 50 per ton, one 2nd generation biofuels plant will generate enough cash-flow to fund a second plant in year two, with 70% debt financing.

With two plants running we will have enough cash to set up two more in year three, and four more in year four, eight new ones in year five, you get the point.

As the 2nd generation biofuels does not have to be subsidized it should not take more than 7-10 years to fully eliminate fuel subsidies in Southeast Asia and to reach 4Mbd production.



Can this proposal really have any connection to reality?

Well let us consider the really big picture. It is estimated that Big Oil combined, will be spending USD 798bn in total CapEx in 2010. This is four times more than the required CapEx of USD 200bn, needed in project financing to reach 4.0Mbd.

There are two very interesting reflections to make here; the first is how much more production capacity is Bio Oil adding in 2010 with USD 798bn, more or less than 4Mbd?

The second and even more interesting reflection is of course that if 2nd generation biofuels even get remotely the traction as outlined in this proposal it is for certain that part of the USD 798bn will go to 2nd generation biofuels projects as all the major oil companies are already invested in some of the 67 technology companies now ready to go.

No matter how it plays out, the next decade will be fun. Are you ready to join the new green gold rush in Southeast Asia?

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