Management résumé sago starch project

Demand for starch is rising. In many places businesses are started up to produce renewable products. Plastics can be made of starch and sugar. Fuel for combustion engines can be made of sugar, starch and vegetable oils.
This growing need for renewable resources creates high demand on the existing area for agricultural production. New areas are created by deforesting nature. This creates another problem because the lungs of the earth are reduced; lungs making the necessary oxygen and reducing the load of carbon oxide.
Other tendencies are visible. Because of the production of ethanol out of corn prices in the VS have risen and export is falling. Ethanol can be made out of any starch. The need in the market for resources for glues, gasoline additives, methane, ethane, lactic acid, plastics, foods and other products will continue.

Sago starch
Sago is a big resource for starch production that is not yet used optimally. It is a potential in nature that is not used for advancing the wealth of all. Starch available in nature is not extracted even though there is a high demand for food. There still is hunger in this world and there is a high need for resources. There is potential for development of new markets without disturbing existing ones. Sago starch is the product that may help to solve problems.
Sago starch is much more cost effective than corn starch in land use and in cost of production. We have developed a pilot plan for the production sago starch. This pilot plan aims at producing 30.000 tons of sago starch. The pilot also aims at a production acceptable from the point of view of nature, sustainability, pollution and social economic influences.
If the results are good, production may grow. The business plan is a pilot project to make natural resources available for humanity in a sustainable way, improving life conditions locally and disturbing nature as little as possible. Meanwhile it creates a very nice profit.

Business plan
This business plan has the normal optimistic, realistic and pessimistic scenario. Added is an ideal scenario. It is not an idealised scenario but a scenario that is beyond the goals of the initial pilot. The aim of the pilot supports the goal of the project in this ideal scenario to produce natural en renewable resources at a larger scale.

Preliminary
There are a number of characteristics of sago plants that make them quite remarkable.

1. Sago is an extremely hardy plant, thriving in swampy, acidic peat soils, where few other crops survive. The palm is immune to floods, drought, fire and strong winds. Sago is the crop par excellence for sustainable agriculture.
2. Sago plants continually produce suckers which grow into adult plants. A sago holding can virtually produce plants in perpetuity. There is no necessity for replanting.
3. Starch accumulates in the trunk of the sago palm. This accumulation continues until the flowering stage. A farmer has a time frame of three years to harvest the sago. He is not forced to harvest when the price is low.
4. Sago starch may be used for many purposes. Sago is used to make sago pearls and to manufacture noodles. Other industries make extensive use of sago products. New uses for sago are in biodegradable plastics, alcohol, ethanol and citric acid.
5. Sago plants seem to have few pests or diseases. The sago beetle is one pest but this is considered a blessing too as the larvae is consumed as a delicacy. Monkeys and wild boars are the other pestilence of sago, digging up and eating the young palms during the sucker stage.

- Optimistic developments
    - The optimistic development considers a higher market price that follows demand for starch. It considers an optimal use of the production site.
- Realistic developments
    - The realistic development considers an average price development. It considers a normal productivity of the production site.

- Pessimistic developments
  - The pessimistic development considers a minimal average price development. It considers a diminished activity of the production site of 20% below normal.
- Ideal developments
  - The aim of this project is sustainable cultivation and production. The goal of the pilot project and beyond is a high economic result, when possible and within the UN set Millennium Development Goals.

Productivity of crops
The production of starch containing crops per hectare varies within a crop and between countries. For Indonesia it is: maize 2.0 t/ha, rice 2.8 t/ha, cassava 12.3 t/ha, and sago from 2.5 in natural conditions to 12.5 t/ha in modestly cultivated conditions. The max is 25-30 t/ha. For the suggested initial factory setup with a production of 30.000 ton of dry starch, 10.000 to 30.000 ha of sago plants are needed. Wheat grown elsewhere has an average production of 4.3 t/ha.
For starch and ethanol production the numbers are in order of magnitude:
Starch t/ha: maize 1.3, rice 1.8, wheat 2.8, cassava 3.5, and sago 12.5 t/ha as business aim;
Ethanol m^3/ha: maize 3.5, cassava 4.0, sugar cane 6.0, and sago from 12.5 m^3/ha as conservative guess.

Running start cultivation sago
The running start of cultivating let a sago forest grow considering the possibilities of sustainable forestry. It presupposes the optimal plants can be selected and processed. High potential plants will be guarded, not potential plants will be cut creating space for the high potentials.

Modern production
The optimal scales of production are determined by production techniques, and the final product. A modern starch factory is a continuous production process with few maintenance intervals. The social economic environment has to provide the natural produce, the logs of the sago plants.

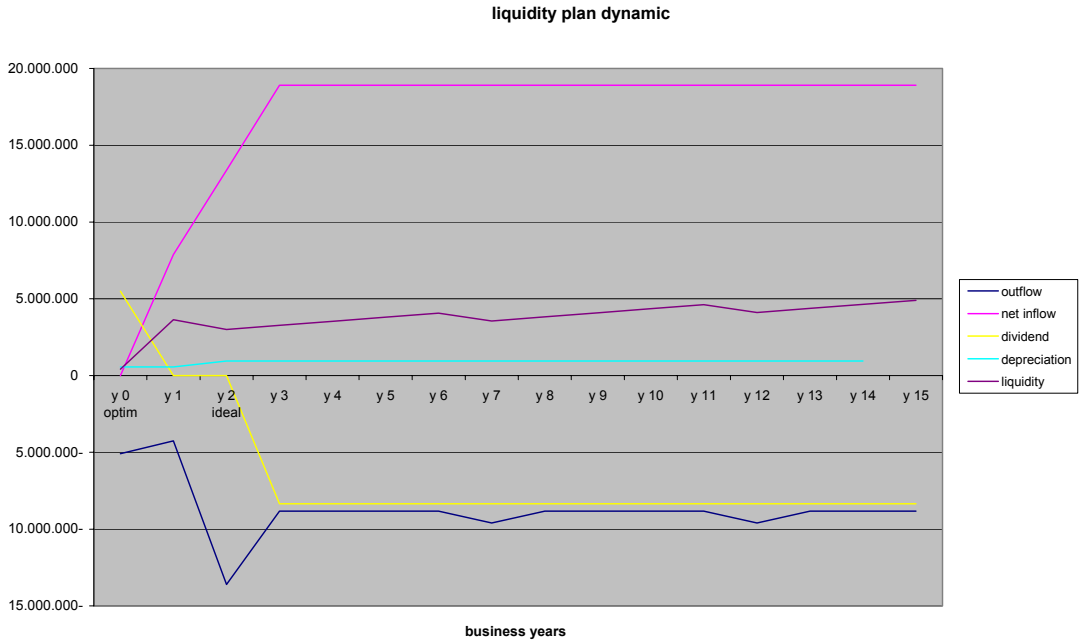
High tech factory
Waste of sago starch in traditional production systems is high. Logs consist of 26% bark, 34% water, 20% is sago starch and the rest to be wasted is also 20%. Modern facilities with an efficacy of 90 to 95% will extract between 200 and 275 kg per average sago plant. In Europe efficient facilities are manufactured to be set up anywhere in the world. The waste will be processed to gain reusable products as methane and compost.

Power generation
Of course the factory needs energy to run. A set of diesel generators will realize a 99% secure provision of electricity. At first this will be provided totally with diesel fuel. After some time it will be generated largely with energy from the waste of the production process.

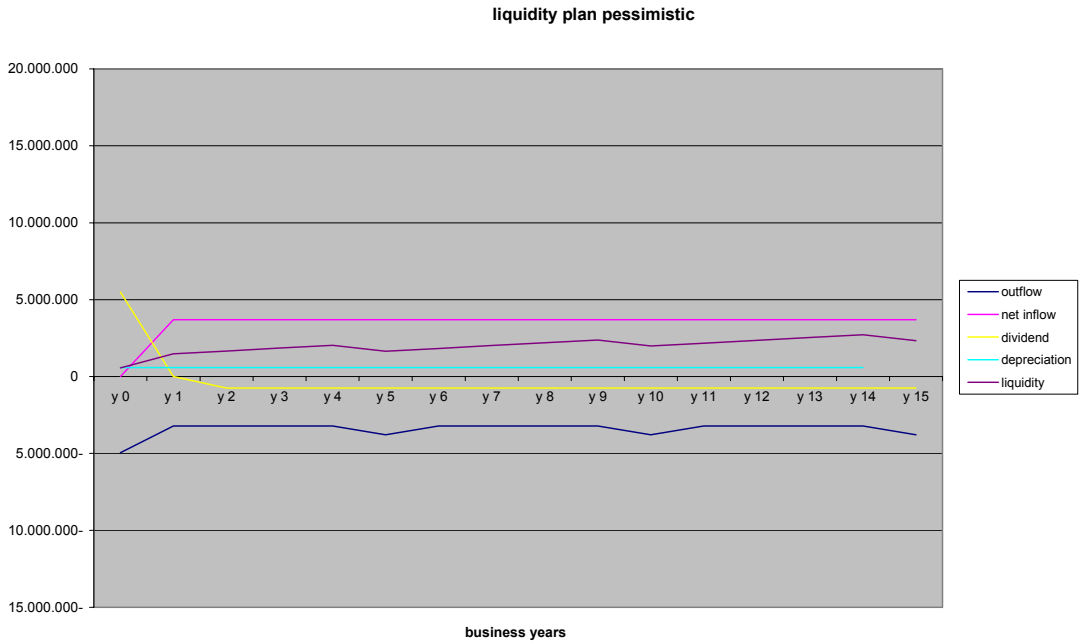
Drinking water
Drinking water for the food production process will be locally made by filtering. In case of energy break down the drinking water will be necessary to clean the starch extraction system. Therefore the water needs to be stored in a water tower or in a high placed water tank.
Waste water will be cleaned and given back to nature in creeks and rivers, and the residue as composted fertilizer for the sago plants where it came from.

Conclusion
The conclusion is that sago starch can be produced. The necessary output requires an adequate upload of trunks, continuous availability of electricity, and sufficient drinking water.
Investments start at 7 million Euros. The number of jobs created will be between 750 and 2600. The contribution to national income will be between 3 and 19 million yearly. The investment may be earned back in 3 years. Sago starch production is technology driven.
The mentioned approaches are financially presented in graphs. The ideal plan may be realised in different forms, a dynamic one, an organic one and one based on a long term loan. (IRR 60%, 32%, 31%)

The potency of the project according to the latest data shows an IRR of 60% on net profit. That is a NPV of 40 million euro, a yearly dividend of 8 million from year 3.

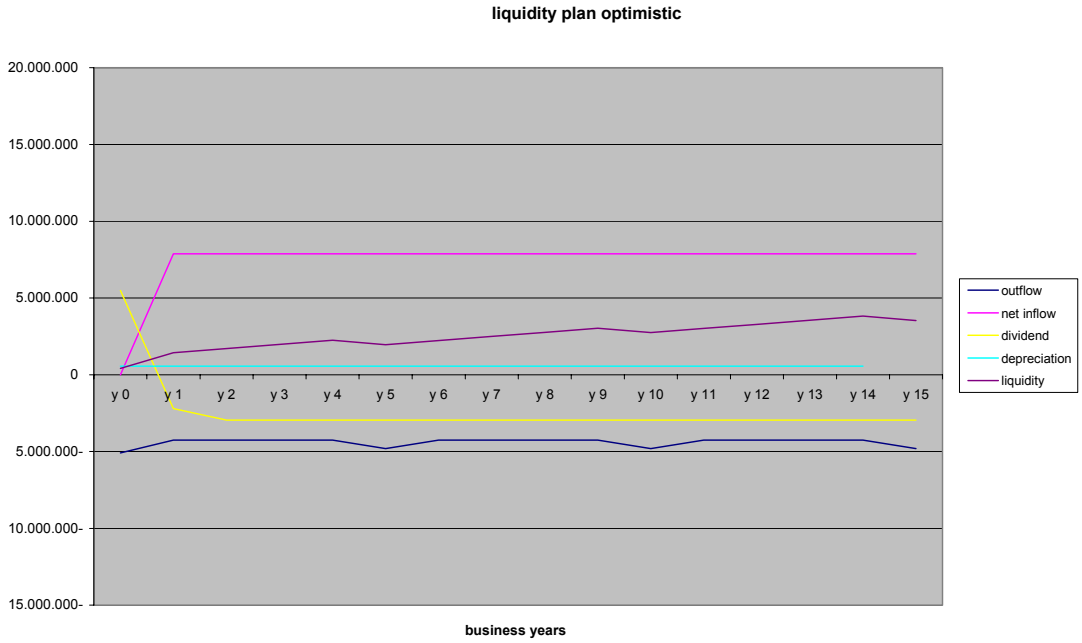


The pessimistic one has an IRR of 9%. That is a yearly dividend of ¾ Million from year 2.

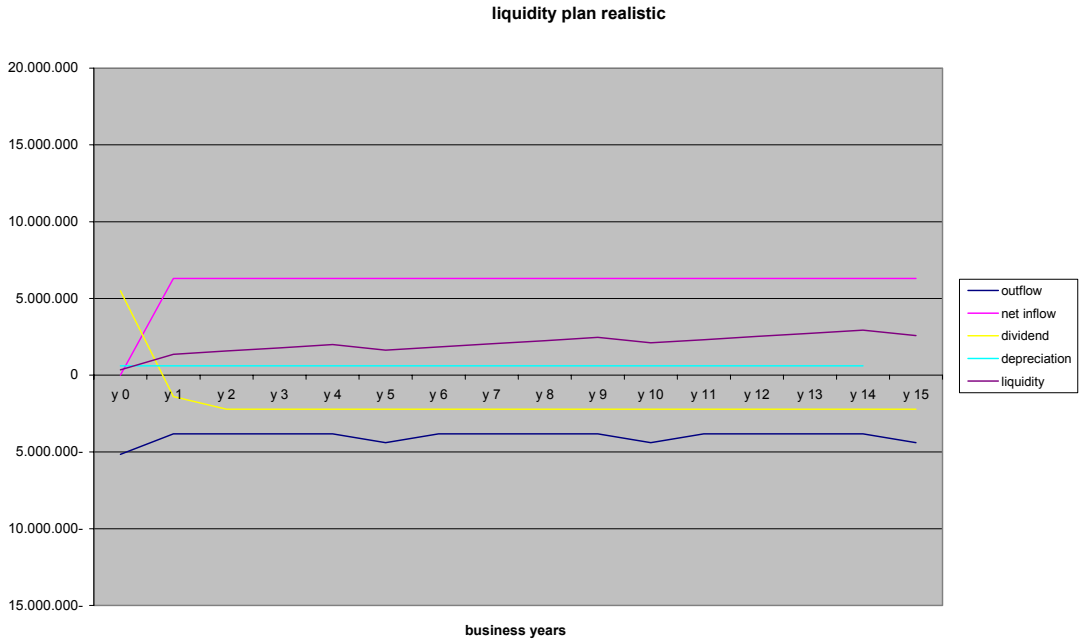


Pessimistic NPV: - 500.000
Optimistic NPV: 15.000.000
Realistic NPV: 10.000.000

The optimistic one has an IRR of 49%. That is a yearly dividend of 3 Million from year 2.



The realistic one has an IRR of 36%. That is a yearly dividend of 2¼ Million from year 2.



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