Cassava

Priority statement

Cassava is of **MEDIUM** research priority as it is part of a simple value chain that is developing towards industrial use of the product, offering limited opportunities for value-adding at the producer end.

Cassava production in Indonesia makes up about 30% of the production of Asia and the Pacific. Indonesia is the fourth largest cassava exporter in the world with 8% of the world market share. The total amount of production (23.5 million tonnes) is almost the same as Thailand's, the world largest cassava exporter.

East Java is the biggest producer of cassava and contributes about 13% of the total country output compared to NTB and NTT which contribute less than 1% and 4.7% respectively (see

Table 1). At 15.9 t/ha, yields are higher in East Java than in NTT or NTB, however are lower than the national yield of 19.5 t/ha. In terms of value, East Java's production generates US $13.2 million per year, which accounts for 16% of the national value of production.

Table 1. Cassava production statistics for selected provinces in Indonesia, 2011

Basic Statistics	East Java	West Nusa Tenggara (NTB)	East Nusa Tenggara (NTT)	Indonesia
Area of Production (ha) 2011	197,969	5,273	103,568	1,203,293
Volume of Production (tonnes)	3,154,295	74,912	1,093,885	23,464,322
Yield (t/ha)	15.93	14.21	10.56	19.50
Value of Production (US$)[1]	13,197,933	351,533	6,904,533	80,219,533
People Employed (hh)*	150,000	4,000	78,000	900,000

*Assume 1.32ha of cassava per household

[1] *Based on average price for 2009-2011 of Thai domestic root prices = 67USD/ton*

Poverty and sustainability

Is there potential to reach large numbers of poor households in production and post-production?

- There is no clear data on the number of people involved in cassava production and post-production, however for producers, out-grower schemes and geographical consolidation of production can help increase the number of people involved.
- In terms of post-production, processing for food can be further explored and potentially expanded.

What is the potential to increase income?

- New varieties for dry and wet starch content have potential in starch and bio-ethonol markets. Improved cassava varieties such as Manggu Darul Hidayah, can give yields of 100 t/ha, as opposed to 20 t/ha (Agro2, 2011).
- In Lumpang Province, Cassava income forms 43% of the total household income and 57% of the total agricultural income of the surveyed households.
- Income for producers can be increased mainly if they link into the estate crop production and switch from traditional to new varieties.
- Income for producers could be increased through improvement of post-harvest practices, access to optimum varieties for high quality cassava chips for bio-ethanol production, access to inputs and seasonal credit.
- Income for producers of traditional varieties can be marginally improved with further optimization of post-harvest basic processing for food.

What is the agro-ecological feasibility?

- Cassava is grown in all Indonesian provinces, which along with the high figures for national production demonstrate the crop's suitability to the environment.
- East Java has dedicated 197,969 ha to cassava, while NTT and NTB have 103,568 ha and 5,273 ha of cassava respectively.

Sustainability (economic and environmental)

Economic risk is moderate

- Indonesia is the third largest producer of cassava in the world behind Nigeria and Brazil.
- The economic sustainability of the industry is highly dependent on the international fuel markets and prices for raw material.
- On the whole, large producers with increasing processing capacity such as Indonesia are in a good position to ensure positive returns and support a large base of local producers.

Environmental risks are relatively high

- A major environmental risk for cassava is related to nutrient depletion and erosion, as it is often grown on degraded lands, low fertility soils and or sloping lands.

- Cassava is a resilient crop, with high water and nutrient use efficiency and is climate change ready. There are few examples of reductions in areas and productivity due to projected climate change, in fact mostly the opposite, with the possible exception of increases in the threat of cassava pests and diseases in some areas.
- Pollution from cassava processing facilities is another environmental concern. Deforestation as a result of clearing of large areas of land for commercial farming is one of the biggest factors affecting environmental sustainability of the sector.
- In addition, mono-cropping of large cassava plantations also leads to the loss of biodiversity and thus has negative long-term impacts on the environment.

Does the chain/commodity fit with the focus of Government programs and priorities?

Yes, cassava is a high priority at national and East Java provincial levels:

- The Government of Indonesia formulated a roadmap for biofuel development in 2006. The roadmap is targeting a 10% reduction in the country's consumption of petroleum-based fuel by 2010, by developing 5.25 million hectares of energy crop plantation including cassava, (Tim Nasional Pengembangan BBN, 2006).Government has prioritized the increase of bio-ethanol production for which cassava is a main commodity. Therefore the government development priorities for the cassava sector are focused on production of improved varieties for bio-ethanol.
- Cassava production has increased by 17% nationwide in the period 2007-2011 and Lumpung is the biggest producer with 9,017,137 tonnes in 2011 or 38% of all national production.
- While the production in East Java and NTB has gone down by 8% and 15% respectively, in NTT production has gone up by 38%, indicating both potential and prioritization of cassava production in this Province.

How project-crowded is the sector?

The development of the cassava sector is supported mainly by private sector. There aren't any current major donor funded projects targeting cassava growers.

External risk

There are two main risks associated with the cassava industry development:

- The first one is the substituting of traditional varieties more suited to human consumption with improved varieties for the bio-fuels industry, which cannot be consumed fresh and may impact negatively on local food security.
- The second one is related to land availability and the complex issues of resettlement of local populations potentially leading to social unrest.

Structure of the chain

What is the potential for improving market access?

- In East Java, the number of cassava processors is high and the size of each processor's production is relatively small. Therefore, the cassava market in East Java can be considered competitive, making marketing more efficient.
- Improving market access for export or industrial use requires direct links between the producer and large traders of processing businesses.
- These depend on the volume of local production, the available access infrastructure and transport links.

What is the scalability and transferability potential?

- There is potential for scalability with the increasing production of cassava for bio-ethanol.
- In terms of transferability, the value-chain analysis of this commodity will inform other sectors linked to the bio-fuels sector development.

Is there potential for post-harvest productivity / value-added?

- There is significant potential for post-harvest value adding at the farmer level prior to delivery to processors. Some very good village processing models exist.
- Relatively small amounts of Indonesia's cassava production are used for food consumption, majority being destined for the production of starch and ethanol.
- The only factor that influences the income from cassava is the quality of the produce which depends on the farmer's direct access to processors, minimizing deterioration and the effects of post-harvest physiological deterioration.
- In Indonesia two ethanol plants are currently operating, both using molasses as raw material. The industry is also looking at cassava as a feedstock. Since molasses is also used to produce monosodium glutamate, cassava may be an attractive alternative. At least two companies are currently making plans to use cassava as a feedstock. Indonesia's largest-listed energy firm, PT Medco Energi Internasional, plans to spend US$135-$144 million on three ethanol plants, each needing an investment of $45 million. One plant in Sumatra's Lampung will have a capacity of 60 million litres of cassava-based ethanol a year, which is going to be exported to India, Korea, Taiwan and China.

Is there sufficient infrastructure availability?

- No. There is evidence that farmers often incur post-harvest value losses due to bottlenecks along the chain, which suggest that infrastructure is not sufficiently available.
- The main infrastructure needed at producer level is the facility for storage and transportation that will ensure rapid movement of product prior to deterioration.