

Maize

Priority statement

The maize sector has a **HIGH** potential for further development, particularly as it involves a significantly large number of poor households. Simple technology enhancements such as adoption of hybrids and management of irrigation can significantly address productivity issues.

Maize is the second most important cereal crop in Indonesia after rice. In eastern Indonesia maize is used for both human consumption and for animal feed. Total maize production in Indonesia is 17 million tonnes (Table 1). East Java is the largest producer of maize in Indonesia (close to 30%). East Java and NTB productivity achieve yields in excess of the national average of 4.5tonne/ha.

Table 1. Maize production statistics for selected provinces in Indonesia

Basic Statistics	East Java	West Nusa Tenggara (NTB)	East Nusa Tenggara (NTT)	Indonesia
Area harvested (ha) *	1,204,063 31%	89,406 2%	247,687 6%	3,896,855
Volume of Production (tonnes) *	5,010,626	442,426	522,970	17,230,172
Yield (MT/ha) *	4.5	5.1	2.1	4.5
People (farmers) employed	2,200,000	170,000	500,000	7,600,000
<i>Source: * Badan Pusat Statistik 2011 (preliminary figures)</i> <i>** People Employed: Assuming an average 0.5 Ha farm size per farmer</i>				

Poverty and sustainability

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

- Yes, a large number of smallholders grow maize in Indonesia. Estimates are in the range of 7 million farmers. They are mostly poor farmers with limited access to finance and agro-inputs. In EJ, NTT and NTB the total expected farmer coverage is around 2.9 million farmers.
- Demand for maize, especially from the livestock feed sector has been steadily increasing since the early 2000s. The expansions of feedmills in EJ (e.g. Malindo, Sierad Produce, Wonokoyo, etc), enhances market access opportunities for poor maize farmers. For NTT and NTB, the development of the poultry industry in the region presents another market opportunity.

What is the potential to increase income for producers?

Medium. There is significant potential to significantly increase maize yields, which are currently poor due to inadequate crop nutrition and crop husbandry, and variable climate.

- A recently conducted scoping study showed that yield of maize in Kupang (NTT) was 2.4 tonnes/ha and in Timor Tengah Selatan was 1.2 tonnes/ha, which was significantly lower than national average of 4.5tonnes/ha. Important productivity constraints faced by maize farmers include: low grain prices during harvest; high input prices, large distances between maize production areas and feed mills, an undeveloped seed supply sector, lack of promotion of local improved maize varieties (OPVs and hybrids) by government research centres, and lack of farmer capital.
- Increased adoption of hybrid varieties in production systems offers the potential for significant production increases. However, the high price of hybrid seeds has forced some farmers to use recycled hybrids, with lower yields than the pure hybrids. At present, the main factor causing high price of seeds is the distance between farmers and the seed supply industry, especially hybrids bred by private companies.
- Post-harvest storage may provide opportunities to manage market fluctuations. However, unless quality is managed effectively post-harvest losses can be high and negate any marketing benefits.
- Poor agronomic practice and the inability of farmers to afford inputs such as fertiliser often result in suboptimal yields of maize. For many farmers, maize is a supplementary income for other agricultural activities.

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

Yes, maize is a high priority at the national and provincial Government levels. Specifically:

- In the Strategic plan (Renstra) 2009-2014 the MoA stated that maize, along with beef, rice, soybean and sugar are the focus of development. On average the production of rain grown maize has increased approximately 10% annually during the period 2005 to 2009.
- The government of NTB has launched the PIJAR “SaPI, JAgung ,Rumput laut – cattle, maize and seaweed” program, which aims to make the province a key source of maize and to increase maize production from 290,000 tonnes in 2010 to 613,000 tonnes by 2013.
- In NTT, the provincial government has launched the “anggur merah” program to enhance economic growth and increase food security in which the maize sector is a focus of development.
- The MoA has set national targets to produce 26 million tonnes of maize by 2013. The provincial production targets for 2013 are: EJ: 7.4 million tonnes, NTT: 1 million tonnes and NTB: 0.6 million tonnes.

How project-crowded is the sector? (To what extent are sector needs addressed by the current donors?)

- There is a limited presence of funding bodies and projects in the maize sector. IFC, Worldbank and AusAID have provided intermittent input to the sector in the past.
- ACIAR has been involved in maize research for the past 2 decades. The sector has quite strong government support but limited donor support.

What is the agro-ecological feasibility?

- High. Given the importance of maize in the rural economy, the crop is grown across the whole country.
- Maize is grown mainly (>80%) in rain-fed areas, often in conditions of low soil fertility and erratic rainfall, and is often exposed to drought conditions. The agro ecology fits with some of NTT, NTB and EJ characteristics.
- Java provinces account for over 50% of national maize production with Lampung, South Sulawesi, North Sumatra, NTT and Gorontalo being other important production centres.

Sustainability (economic and environmental)

- The Economic sustainability is medium. The demand for maize as food and feed has been steadily increasing. However, for NTB and NTT, price instability at the farmer level can occur in areas where food and feed industries are not located. The farmers in those regions are faced with a lack of marketing infrastructure and post-harvest market opportunities.
- Maize production has also been increasing over this time, largely as a result of hybrid varieties which are more profitable than open pollinated and local varieties.
- With the increased adoption of hybrid varieties, the seed industry has become an attractive business proposition. This could encourage more participation of the private sector in maize agribusiness, resulting in a more rapid increase in production for farmers.
- Maize is often grown on steeply sloping uplands, where annual cropping and inappropriate cultivation methods increases potential for soil erosion and nutrient loss, leading to long-term soil fertility and yield decline
- Continuous cropping practices commonly used for maize-cassava, maize-rice, maize-maize systems can adversely impact soil fertility, particularly where farmers cannot afford inputs such as fertilizer.

External risk

- High. Several socio-economic constraints impact the returns from maize production. These include; the high price of inputs particularly hybrid seed and fertilizers, low maize prices immediately post-harvest, and a lack of access cash capital.
- Seasonal climate variability is also a significant risk to maize production. Indonesia's production is highly dependent upon rainfall. Only 17% of the country's cultivated area has access to irrigation infrastructure, and only 10% of this land is effectively irrigated. More than 80% of the agricultural activity depends on rainfall for irrigation.

Structure of the chain

What is the potential for improving market access?

- Yes definitely. Indonesia is a net importer of maize with minimal export flows. Maize imports fluctuate according to the needs of the internal market. There may be opportunities for this sector to supply to the bio-fuel industry.
- A promising market is the poultry feed mix processors which require a large amount of maize in their feed ration mix.
- Fresh corn for human consumption is also a market that warrants investigation as maize forms a large component of East Nusa Tenggara's staple food consumption.

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

- Yes. Maize is primarily used for animal feed. The by-products of maize based biofuels such as grain flour and solid residues may be used as a source of livestock feed. The fast growth of domestic livestock and feed industries presents opportunities for producers. However improvement is required to provide incentives for farmers to do so. Improved transparency in grading systems and better management of post-harvest quality is required to meet feed industry requirements.
- Price uncertainty is more common for the wet season harvest, when most farmers do not have appropriate shelling, drying, or storage facilities. In NTT, NTB and EJ improvement in post-harvest drying techniques is required along with development of good husk cove, development of weevil tolerant varieties, and the availability of improved storage. What is the scalability and transferability potential?
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Is there sufficient infrastructure availability?

- No. Irrigation infrastructure is lacking and drought is indeed the main and nearly exclusive risk for maize cultivation leading to potential crop failure.
- Poor roads and transportation systems in some provinces make it very difficult for farmers to sell their maize to the district or sub-district markets.
- Post-harvest machinery is normally not present at village level in NTT and NTB. Flat-bed drying facilities were found in some areas but are often not being used by farmers due to feasibility/human capacity issue.