

# Acceleration of Seed Distribution through Community-Based Seed Production in East Nusa Tenggara, Indonesia

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**Abstract.** Maize yields are relatively low in East Nusa Tenggara province of Indonesia. In 2003, the average yield here was 2.26 t ha<sup>-1</sup> while it was 3.20 t ha<sup>-1</sup> at the national level. In 2004, the average yield increased to 2.35 t ha<sup>-1</sup>, while the national average rose to 3.40 t ha<sup>-1</sup>. Planted area in the province increased from 246 599 ha in 2003 to 279 403 ha in 2004. The main reason for the low productivity is the predominant use of local varieties with nonlabelled seed (74%), with regenerated seed of open-pollinated high-yielding varieties accounting for a 26% share and hybrids only 0.3%. The variety Metro – introduced in 1950 – is still widely grown, as is Pukis, a variety that is preferred as a traditional staple food. Productivity is also limited by low and uncertain rainfall. To increase maize productivity in NTT there is a need to provide new seed of high-yielding varieties which are suitable to the environment and preferred by farmers. Community-based seed production should be introduced and implemented especially in remote areas in order to facilitate farmers' access to high-quality seed at an acceptable price. As part of such an initiative, seed multiplied in Nun Kurus village of Kupang district in 2006 and 2007 was subsequently adopted by farmers in the village and sold in other areas at an acceptable price. The seed growers' income was Rp. 15.4 million ha<sup>-1</sup>, with an R:C ratio of 3.20 and a break-even of Rp.1642 kg<sup>-1</sup> for stock seed production.

**Key words:** Acceleration, seed distribution, maize, high-yielding OPVs

## Introduction

In 1985–1986, local varieties accounted for 73% of the maize area in Indonesia. In 1992–1993, this fell to 56%, and to 43% in 2005. On the other hand, the share of improved varieties has increased with 35.36% accounted for by hybrids and 21.71% taken by new OPVs (Directorate of Food Crop Production 2006).

Maize is a staple food for farmers in East Nusa Tenggara province of Indonesia. The average yield is low. It was 2.26 t ha<sup>-1</sup> in 2003 and increased to 2.35 t ha<sup>-1</sup> in 2004 compared to the national average of 3.40 t ha<sup>-1</sup>. Maize planted area increased from 246 599 ha in 2003 to 279 403 ha in 2004. Productivity is low because of the predominant use of nonlabelled seed of local varieties (74.23%) with regenerated seed of open-pollinated high-yielding varieties accounting for 25.50% and hybrids only 0.27% (Extension Service 2003). In 2005, the share of local varieties fell to 51.04% with high-yielding OPVs going up to 48.87% but hybrids still only 0.09% (www.deptan.go.id 2005). Low and uncertain rainfall is a major cause of the predominance of local varieties with early crop duration in this province. Most of the maize crop, ie, 246 599 ha, is cultivated in drylands with short-duration local cultivars and under low rainfall conditions (www.deptan.go.id 2003), which leads to low productivity.

ICERI has conducted field presentations and other activities to disseminate seed of new high-yielding varieties. In the upland areas of East Nusa Tenggara, farmers produced only 1–2 t ha<sup>-1</sup> using local varieties while farmers who grew cv Lamuru (a new open-pollinated variety) produced 4–5 t ha<sup>-1</sup> using similar technology (Saenong *et al.* 2005).

Therefore, there is a need to establish a system of seed distribution of high-yielding varieties in the rural areas to provide an adequate quantity of quality seed at an acceptable price in a timely manner to farmers.

## Methodology

The first steps of this initiative included: (1) evaluate seed performance, identify problems of seed supply and assess farmers' perception of new varieties; (2) take an inventory of the available resources, ie, land, facilities and human resources; (3) note how the farmers solved their difficulties regarding access to the seed; (4) generate support from the community, seed growers and institutions; (5) prepare guidelines for seed production, processing, storage and distribution at the community level; (6) determine an appropriate technology for community-based seed production; (7) determine the demand for seed at the

community level; (8) create linkages among BPTPs, extension services, seed certification and quality control agencies (BPSB), ICERI and nonformal institutions to support the sustainability of seed distribution; and (9) record the progress and problems faced by farmers during the experiment.

The objectives of our study were: (1) to introduce community-based seed production of new OPVs that are suitable for to the agroecological zone, and sociological conditions and farmers’ preferences; and (2) to accelerate distribution of high quality seed of such varieties in adequate quantities and at affordable prices in the rural areas of East Nusa Tenggara.

Two series of experiments were conducted in Nun Kurus village in the district of Kupang in 2006 and 2007 in collaboration with the Tirosa Farmers Group at the village level, the Assessment Institute for Agriculture Technology (AIAT) and the Institute of Seed Certification and Quality Control at the provincial level, the Extension Service at the provincial and district level, private sector

**Table 1. Yield of graded and nongraded seed of Lamuru and Srikandi Putih-1 maize varieties in Nun Kurus village in East Kupang subdistrict in East Nusa Tenggara province of Indonesia, late dry season, 2007.**

Variety/site	Nongraded seed weight at 11% moisture content (t ha <sup>-1</sup> )	Graded seed (t ha <sup>-1</sup> )
Lamuru, Site 1	1.80	0.50
Lamuru, Site 2	4.00	2.00
Srikandi Putih-1, Site 3	0.65	1.5

companies and nongovernmental organizations (NGOs). Grain yield, return:cost ratio, income generation, rate of distribution and farmers’ response to the new varieties were recorded.

## Results and Discussion

Open-pollinated variety Lamuru was preferred by farmers since they believed that it is suitable for direct consumption. Soon after harvest, farmers dry the cobs outside their houses in the branches of trees or using a very simple drying rack (Fig. 1a). In several villages farmers store the nonhusked cobs in their kitchens for seed and food purposes. Seed remain viable with good germination for up to one year. The grain remain good enough for direct consumption for up to two years, free of maize weevil (Fig. 1b).

In the first year of our study (2006), seed growers obtained a yield of 4.25 t ha<sup>-1</sup> after followed the guidelines on seed production, processing and grading. About 55% (3050 kg) of the seed produced was distributed within the community and the rest was sent out to other villages. Farmers have a tradition of exchanging maize cobs with other farmers when they have a new variety. The seed produced as part of our initiative was distributed to several districts: Kupang (400 kg), Alor (50 kg), TTS (50 kg), the Extension Service (550 kg), and East Kupang subdistrict (150 kg).

In the second year (2007), the seed growers of Nun Kurus village produced seed of Lamuru and Srikandi Putih-1 varieties at three sites in the village. The amount of graded seed obtained was low due to late planting. There was high



**Figure 1a. Maize cobs being dried after harvest. (b) Traditional seed storage in the kitchen of a house in village in East Nusa Tenggara province of Indonesia.**

humidity during the grain drying process, as a consequence of which there was a loss of grain.

## Conclusions

The seed that was produced in 2006 and 2007 through Community-Based Seed Production in Nun Kurus village in East Kupang district of East Nusa Tenggara was well-adopted by farmers in the village and sold in other areas at an acceptable price.

The seed growers received a benefit of Rp.10 476 000 ha<sup>-1</sup> at a return:cost ratio (R:C) of 2.9, and a breakeven of Rp. 3065 kg<sup>-1</sup> of seed.

Farmers prefer to persist with their traditional method of seed storage in their kitchens.

Community-Based Seed Production in the rural areas can be extended to other village where farmers still find it difficult to access seed of high-yielding varieties suitable to their agroclimatic zone and meet their special preferences.

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