

Cotton yield predictions for Lombok and Flores - Indonesia

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The Indonesian Nusa Tenggara Agricultural Support project has analysed climate and soils data with a view to defining areas with greatest cropping potential and to identifying high risk areas particularly for cotton. Cotton has been encouraged as an income generating crop for the poorer subsistence farmers on the islands of Lombok and Flores with distinct 'dry' and 'wet' season rain patterns.

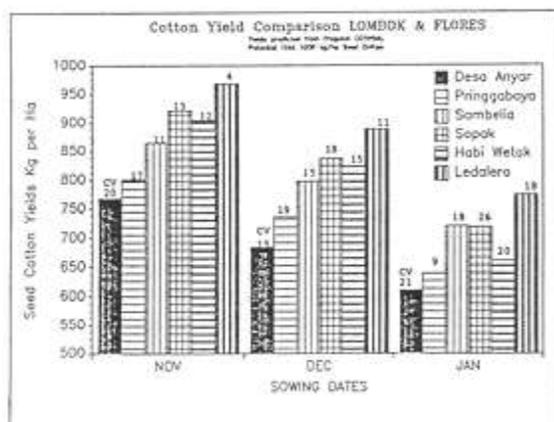
Methods

In the daily water balance and yield prediction program (COTWBAL), Penman estimates of potential evapotranspiration are modified by crop factors which change with cumulative mean temperatures above a base of 12°C. Crop factors are increased to allow for soil surface evaporation following rain and decreased to allow for reduced transpiration due to soil water stress in the root zone (1). COTWBAL sets a potential yield which is reduced by a cumulative seasonal stress index which takes into account daily temperature, radiation and water stress. The water stress index is weighted for crop susceptibility to stress at different phases of crop development. Over the past three seasons, average seed cotton yields have been 300 to 500 kg/ha on Flores and 450 to 800 kg/ha on Lombok.

Best farmer yields are 1200 - 2100 kg/ha and research and demonstration plot yields 600 - 2100 kg/ha (2). In these initial analyses the potential yield has been conservatively set at 1000 kg/ha of seed cotton.

Results and discussion

The figure shows predicted yields based on 14 to 16 years daily rain for four locations on Lombok and two locations on Flores.



At all locations, there is a striking decrease in yield with delayed sowing. The decrease from November to January sowings is 17 to 28% but the largest decreases occur between December and January sowings. For the yields presented, extractable soil water (ESW) was set at 100 mm. A 20 mm decrease in ESW can reduce yields by 6 to 17 percent in water stressed crops. Yields from Flores represented by Habi Wetak and Ledalero are very satisfactory compared with those from the higher yielding areas

on Lombok. Yield variability generally increases with delayed sowing. The locations of Desa Anyar and Pringgabaya represent high risk areas due to relatively low mean yields and high coefficients of variation (CV) even for the November sowing.

1. Wright, J.L. (1982). *J. Amer. Soc. Civil Engr.* IR1: 57-74.
2. Gerrish, W., Turner, J. and Gillham, F. (1988). ACIL/NTASP Report ACIL Melbourne.