

Dry Soil Planting Risks for Maize and Sorghum in Ethiopia

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Introduction

Farmers in semi-arid areas of Ethiopia dry soil plant sorghum and maize in response to late and variable onset of rainfall. Early crop establishment can reduce soil water deficits during grain fill, and disease and insect pest damage is more with later planting (Bekele, 2000). The risks associated with dry soil planting had not be evaluated.

Objectives: To (i) evaluate three types of risk associated with dry soil planting times and (ii) identify dry soil planting times with low risk of failed crop establishment but early enough to take full advantage of the season for Vertisols in Ethiopia.

Material and Methods

Three risks were evaluated using >30 years of daily rainfall data for seven locations: Risk I, seed lies in dry soil without imbibing water for >20 days; Risk II, rainfall causes germination but fails to support growth and many seedlings die; and Risk III when planting is delayed until well after onset of rains by not dry soil planting sorghum or maize and because the fields are too wet to prepare and plant. Risk indexes were determined (Table 1).

Results

Probability of onset of rainfall is presented for 4 locations in Fig. 1 for days of the year (DOY) for the potential timeframe for dry soil planting. Mean risks associated with dry soil planting were, respectively: $\geq 50\%$ and $\leq 30\%$ for Risk I in 25% and 56% of the timeframe; $\geq 50\%$ and $\leq 30\%$ for Risk II in 35% and 22% of the timeframe; and $\leq 30\%$ for Risk III in 90% of the timeframe (Fig. 2).

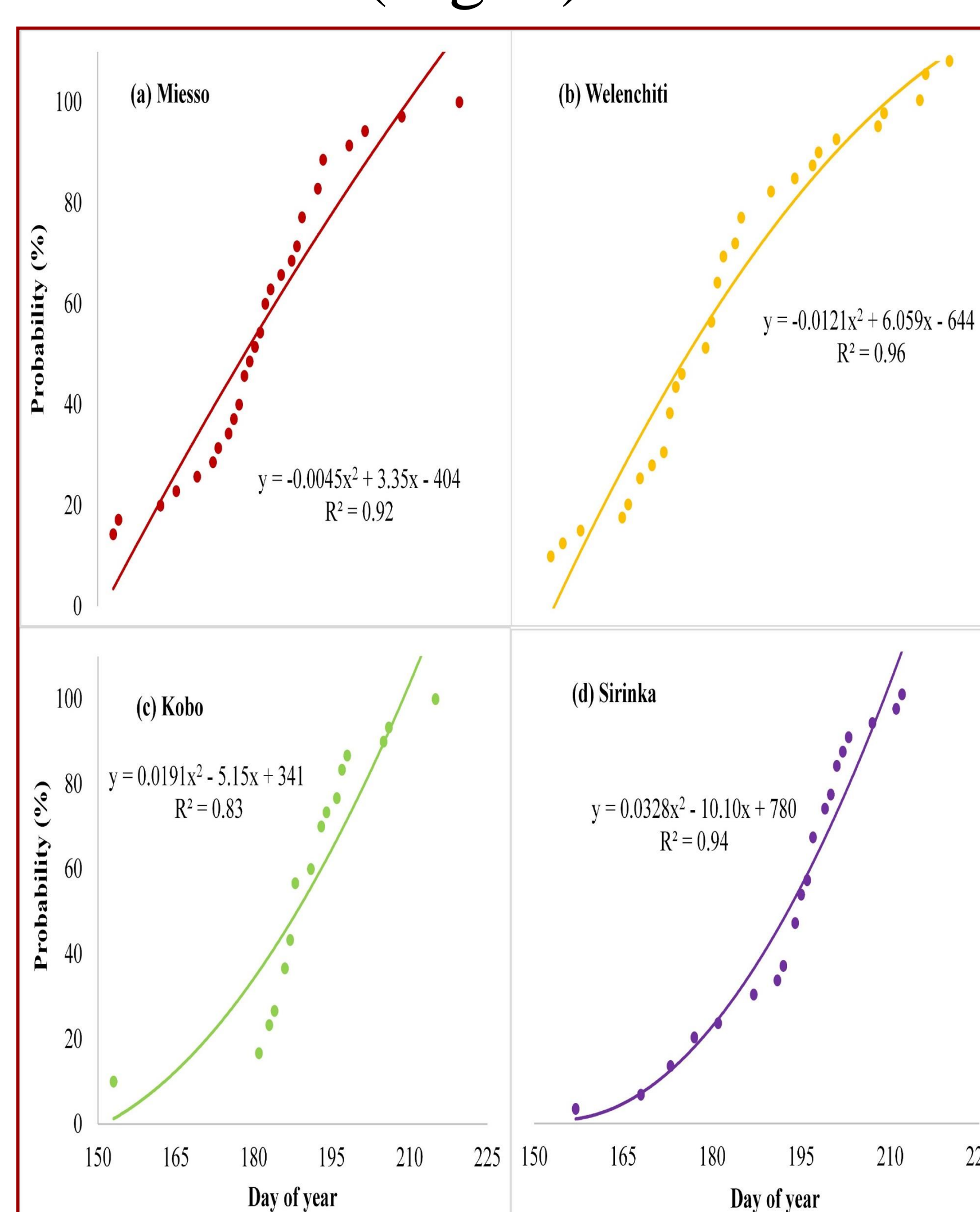


Fig.1. Cumulative probability of rainfall onset.

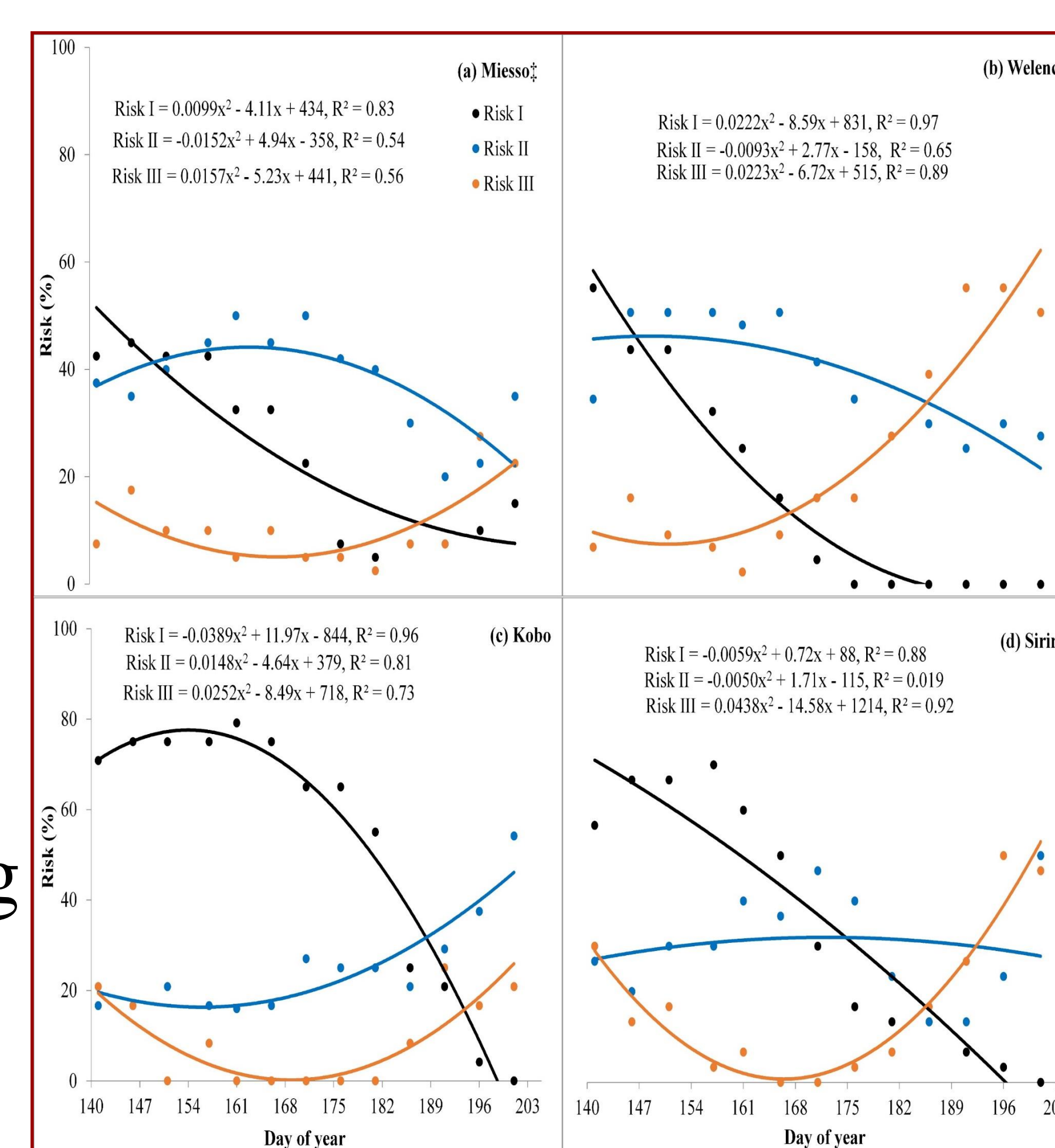
Table 1. Day of year (DOY) when risk index (RI) A and B are <30 and for 50% probability of onset of seasonal rains.

Location	RI-A [†]	RI-B [‡]	Onset (DOY)
Miesso	181	181	181
Welenchiti	173	168	181
Kobo			188
Sirinka	187	183	195
Dire Dawa	200	195	205
Jigjiga			217
Ya'abalo	89	89	89

[†]Risk A = Risk I + Risk II – Risk III ;

[‡]Risk B = Risk I + Risk II – (2* Risk III)

Fig. 2. Dry soil planting risks for different planting times at four locations.



Conclusion

Dry soil planting was found to have a high probability of success for most locations, often before the DOY of 50% for onset of the rains. However, risk is high both with dry and wet soil planting at Kobo and Jigjiga, but dry soil planting appears justified for the increased chance of having a longer growing season.

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