BEST TIMES FOR SOWING IN THE MARKHAM VALLEY

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Rain-grown cropping enterprises are an important feature of agriculture in the Markham and Ramu Valleys. On those soils which are well drained during the wet season, the sowing of crops can be timed to coincide with optimum soil moisture conditions during growth, and suitably dry weather at harvest time.

Climatically optimum sowing dates are suggested for dryland rice, grain sorghum, maize and peanuts at a number of locations in the valley.

When is the right time to sow crops in the Markham-Ramu Valley so that there is the best chance of getting the highest yield? Is there a "best" sowing period when good yields could be confidently expected over a run of seasons?

The Land Utilization Section of the Department of Primary Industry has been studying this question as part of its survey of the agricultural potential of the Markham Valley.

The timing of cropping could be affected by a number of factors, and these are described briefly as follows.

Location. Rainfall records from various places in the valley show that there are significant differences from one place to another. For example, areas close to the hills such as Kaiapit (94 inches per year) receive more rain on average than the valley centres (e.g. Mutsing, 63 inches per year). Also there are changes along the valley: Erap has an annual average of 48 inches but Gusap receives 75 inches on average. This suggests that if there is a "best" time for sowing crops, some differences might be expected from one location to another.

Soil conditions. The natural drainage condition of soils is one important factor which must be considered when deciding the time of planting. If the soils are free-draining, without surface water or subsoil water tables, then the best time of cropping depends chiefly on the rainfall. In poorly drained areas on the other hand it is not possible to plough during the wet season and hence ploughing must be delayed until the land dries out.

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For example, in the area between the Erap and Leron Rivers, well-drained soils occupy about 13 500 hectares but this represents only 27 per cent of the total area. A further 7 700 hectares are moderately well drained and can probably be ploughed during a break in the wet conditions, although some delays are likely. The rest of the land, 28 700 hectares, which makes up 57 per cent of the total, is poorly drained and most areas could only be used for cropping during the dry weather.

Type of crop. Different crops have different water requirements. For dryland rice, the growing period is about 19 weeks; for grain sorghum and maize, it is about 14 weeks. For cereals such as dryland rice, grain sorghum and maize, the plants need water most from just before flowering through flowering to early grain formation. In dryland rice this corresponds roughly to weeks 9 to 13 after sowing, and in grain sorghum and maize to weeks 6 to 9 after sowing. For peanuts the first 8 weeks after sowing is the time when water is needed most. Rainfall during the last 7 or 8 weeks of the growing season has little effect on yields.

Crop health. Most crops will grow faster in the wet season than in the dry season and unfortunately the same is true of weeds. It is also true of insect pests and of organisms causing disease. On the whole rates of insect and disease damage are much greater during the rainy season.

A farmer may decide to avoid cropping a particular section of land during the wet season if he knows it has a bad weed problem. Also he may choose to avoid certain types of crops during the wet season if he feels that the extra management costs in controlling weeds, insect pests or disease problems will not be worthwhile. This is a complex factor and is being examined by the agronomists.

Best sowing times

Taking the first three of the above points into consideration and ignoring the weeds, insect pests and disease risks, it is possible to match the water requirements of the crop with a period of high soil moisture levels and at the same time avoiding excessively wet conditions at harvest time. In this way it is possible to

decide what is the best time to plant a crop in a particular place in order to get the greatest chance of a good yield. This "best time for planting" is called "the climatically optimum sowing date".

Rainfall registrations have been recorded at seven stations in the Markham and Ramu Valleys for varying lengths of time—Erap 20 years, Sasiang 9, Leron 11, Mutsing 5, Kaiapit 20, Gusap 12 and Dumpu 10 years. The rainfall figures were processed by a computer to estimate the moisture content of soils over the whole period for which records are available. Allowances were made for losses by evaporation, transpiration (loss of water from leaves of plants) and water runoff.

After taking into account the general moisture requirements of different crops, and the risk of conditions being too wet at harvest time, the best times for sowing were determined. *Table* 1 gives these times for dryland rice, *Table* 2 for grain sorghum and maize and *Table* 3 for peanuts. Early and late limits for the growing season are suggested.

Sowing should not commence before the date given in the first column. In the case of Erap, this is because there is a risk that conditions will be too dry for good growth of the crop; for other stations the risk is that conditions at harvest time will be too wet. Likewise sowing should not be continued later than the date given in the third column.

Table 1. Dryland rice—climatically optimum sowing date on freely draining soils

Place	*Do not sow before*	*Optimum sowing period*	*Do not sow later than*
Erap (20 years)	Dec. 25	Jan. 1 - Jan. 10 May 28 - June 3*	Jan. 26
Sasiang (9 years)	Dec. 27	Jan. 1 - Feb. 1	Feb. 12
Leron (11 years)	Jan. 7	Jan. 20 - Feb. 10	Feb. 25
Mutsing (5 years)	Jan. 1	Jan. 14 - Feb. 1	Feb. 18
Kaiapit (20 years)	Jan. 10	Feb. 4 - Feb. 20	Mar. 18
Gusap (12 years)	Jan. 8	Jan. 20 - Feb. 14	Mar. 5
Dumpu (10 years)	Jan. 20	Feb. 10 - Feb. 22	Mar. 25

*A second rice crop is not recommended because soil moisture storage is too low in most seasons.

The length of time during which rainfall records have been kept is shown in brackets.

In this case the risk is that there will not be enough water available at the time when the crop needs water most.

As a general rule it is suggested that the freely draining coarser textured soils (sandy soils or shallow soils on gravel) should be the first ones sown, since these are least likely to have wetness problems at harvest time. Sandy loams and well-drained loamy soils should be sown at the beginning of the optimum sowing period (centre column in the tables) but not before this period. The finer textured soils (clayloams and clays) should also be sown as early as possible after the start of the optimum period, but in many cases it will be necessary to wait until the soils become drier before planting can begin.

Table 2. Grain sorghum and maize—climatically optimum sowing date on freely draining soils

Place	*Do not sow before*	*Optimum sowing period*	*Do not sow later than*
Erap (20 years)	Jan. 11 Jun. 20	Jan. 29 - Feb. 18 Jun. 25 - Jul. 3	Mar. 10 Jul. 26
Sasiang (9 years)	Feb. 1	Feb. 10 - Mar. 1	Mar. 15
Leron (11 years)	Feb. 15	Feb. 25 - Mar. 10	Mar. 25
Mutsing (5 years)	Feb. 11	Feb. 20 - Mar. 1	Mar. 10
Kaiapit (20 years)	Mar. 5	Mar. 12 - Mar. 25	Apr. 15
Gusap (12 years)	Feb. 20	Mar. 5 - Mar. 18	Apr. 5
Dumpu (10 years)	Feb. 25	Mar. 3 - Mar. 25	May. 1

Table 3. Peanuts—climatically optimum sowing date on freely draining soils

Place	*Do not sow before*	*Optimum sowing period*	*Do not sow later than*
Erap (20 years)	Jan. 28 Jun. 18	Feb. 15 - Feb. 25 Jul. 7 - Jul. 25	Mar. 12 Aug. 4
Sasiang (9 years)	Feb. 8	Feb. 18 - Mar. 10	Mar. 25
Leron (11 years)	Feb. 20	Mar. 1 - Mar. 18	Apr. 20
Mutsing (5 years)	Feb. 20	Feb. 26 - Mar. 12	Apr. 15
Kaiapit (20 years)	Mar. 5	Mar. 12 - Apr. 1	May. 14
Gusap (12 years)	Feb. 26	Mar. 5 - Apr. 9	Apr. 28
Dumpu (10 years)	Mar. 5	Mar. 18 - Apr. 9	May. 20

To get good yields from dryland rice and maize, it is particularly necessary to have the right amount of moisture in the soil during the growing season. If it is not possible to plant these crops at the times suggested in the tables, it would be better not to plant them at all, because at other times the risk is high that the soil will be too dry to get a good crop. Good soil moisture conditions are also important for grain sorghum and peanuts; however the risk of a poor crop because of dry weather is not as high as for rice and maize. Thus it is suggested that if for any reason cropping is delayed until after the optimum period, grain sorghum or peanuts should be sown in preference to rice or maize.

Unfortunately, the time when the crop grows best is also the time when weeds, insect pests and diseases are most likely to be a problem. Cropping programmes bases on these tables will mean more work for the farmer. In order to get a bigger yield he will have to give more attention to crop health factors, and especially to weed control. Generally speaking weed problems can be minimized by early ploughing, carefully timed cultivation prior to sowing, and also by the use of chemicals and crop rotations.

The sowing dates given in the tables are not meant to suggest that crops sown at other times of the year will yield poorly. There certainly is a risk of dry conditions especially on the freely draining soils, but this is offset to some extent by lower management costs. Again, some soils may still be too wet to plough during the "optimum sowing period". It is suggested however, that provided correct attention can be given to crop health factors, the most consistent crop yields on well-drained soils will be achieved if the schedules (*Tables* 1 to 3) are used as a guideline for sowing.

The recommendations given above are based on the highest chances of ideal soil moisture conditions occurring, and these in turn depend on rainfall records available at each station.

Normally a period of 30 years is considered to be the minimum period for reliability. Most rainfall records from the Markham Valley cover only short periods and there is a chance that the optimum dates may change somewhat as more records come to hand. Even for the stations with the longest records (Kaiapit and Erap) it is emphasized that the decision on sowing dates in any given year should be made in consideration of the particular weather, soil and weed conditions prevailing at the time.

An experimental irrigated rice crop in the Markham Valley. Photo: Office of Information.