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POTENTIAL FOR IMPROVED PRODUCTION OF MAIZE AND CASSAVA IN AFRICA AND LATIN AMERICA

The International irrigation Center at Utah State university has publish the required climatic data for use with crop growth and development (yield) models for Africa, Latin America and selected Asian countries. Publication of this data base was financed by the Agency for International Development.

In February and March, 1989, the Irrigation Center taught a course on Potential Crop Production from Irrigated and Dryland Agriculture. Participants learned the use of crop yield models and the interactions of various factors on crop yield and production. In connection with this course, Fatin Karahaliloglu selected a location in El Salvador, obtained the crop genetic coefficients for 14 maize cultivars and compared yields estimated by the CERES-Maize, Nitrogen Version model for typical conditions of soils and management. The yield comparisons are presented as Table 1.

The availability of the climatic data table prepared by the Center and crop genetic coefficients make possible the computer evaluation of performance of various cultivars in the climate of a particular site or the performance of a new cultivar in the whole range of climates documented.

Dr. Luis Manrique of the IBSNAT Project, University of Hawaii, has been using a cassava model and has proposed the documentation and/or compilation of crop genetic coefficients for both cassava and maize and the preparation of published information on where which cultivar performs best under conditions of dryland agriculture. This would require significant effort in documenting the crop genetic coefficients and in calculating yields by means of the crop yield models. It seems obvious that this approach would provide a very powerful tool for increasing production of two important food crops in the developing countries

of Latin America and Africa. This same approach can also be expanded to include other food and fiber crops.

Table 1 indicates that cultivar selection can have a large influence on potential yields. The estimated yield of the best performing cultivar is indicated to be 2.7 times that of the cultivar with the poorest performance. It therefore seems obvious that a small investment in documenting these relationships can within a reasonably short time produce large benefit to the developing countries of Africa and Latin America.

Table 1: Cultivars and Calculated Yields.

Cultivar Name	Region	P1	P2	P5	G2	G3	Grain Yld (kg/Ha)	Biomass (kg/Ha)
B59 X OH 43	1	162	.80	685	784	6.90	3860	11184
B60 X R 71	1	172	.80	685	710	7.70	4242	11186
B59 X C103	1	172	.80	685	825	10.15	5453	11645
PIO 3382	2	200	.70	800	650	8.50	5364	11827
PIO 3901	2	215	.76	600	560	9.00	3473	11171
PIO 3780	2	200	.76	685	600	9.60	5062	11687
W 64A X W117	3	245	.00	685	825	8.00	4097	12136
B 14 X OH43	3	265	.80	665	780	6.90	3116	11903
B 8 X 153R	3	218	.30	760	595	8.80	5059	11808
PIO 3147	4	225	.76	685	834	10.00	4712	11951
PV 82S	4	260	.50	750	600	8.50	4658	11939
B 73 X MO17	4	220	.52	880	730	10.00	5265	12190
H 610	5	340	.52	900	520	6.50	4163	11703
PIO X 304C	5	360	.52	900	550	5.6	1995	10753

Regions:
1 Northern United States
2 Northern Nebraska, Iowa, Illinois, Indiana
3 Southern Nebraska, S. Iowa, S. Illinois, S. Indiana
4 Central Missouri, Kansas to North Carolina southward
5 Tropical

Genetic Coefficients:
P1 Growing Degree Days (base 8 degrees C) from seedling emergence to the end of the juvenile phase.(d °C)
P2 Photoperiod sensitivity coefficient (1/hr)
P5 Growing Degree Days (base 8 degrees C) from silking to physiological maturity (d °C)
G2 Potential kernel number (kernels/plant)
G3 Potential kernel growth rate (mg/kernel-day)