

# Application of maize mega-environments in seed systems in Southern African Development Community

P. S. Setimela<sup>1</sup>, M. Bänziger<sup>1</sup> M. Listman<sup>2</sup>

<sup>1</sup>Maize Program, International Maize and Wheat Improvement Center (CIMMYT), P.O. Box MP 163. Mount Pleasant, Harare Zimbabwe

<sup>2</sup>Maize Program, International Maize and Wheat Improvement Center (CIMMYT), Apdo. Postal 6-641, 06600 Mexico D.F. Mexico



**CIMMYT**

International Maize and Wheat Improvement Center  
Apartado Postal 6-641, Mexico DF, 06600 Mexico

## Introduction

New open-pollinated maize varieties that mature earlier are stress tolerant and higher yielding are now available. With the development of new varieties farmers and relief organizations still find it difficult to select an appropriate variety for their environment. Variety selections are usually based on availability of seed and price ignoring adaptation factors such as rainfall, minimum and maximum temperature and the length of growing season. Identification of maize mega environments offers farmers, relief organizations, an opportunity to select an appropriate variety for their environment. Based on maize regional yield trial data and Geographical information systems (GIS) parameters maize mega environments were identified.

## Methods

Using the revised mega-environments (Setimela et al 2002) a basis for choosing the **right open pollinated maize variety** for a given environment was developed. Similar areas across the SADC region where given the same color code based on the classification of the mega-environments. By determining on the map where one was, color of the area (yellow, orange, red and green) and the maturity group (early, intermediate, and late maturing variety) one selects an appropriate group. Once an appropriate group has been chosen varieties within the group are then assessed for their appropriateness in the given environment. A description of important characteristics for each variety is also given. Based on these combinations of factors the farmer is guided to choosing the right variety.

## Result

A clear and easy to follow system for choosing appropriate varieties has been developed. A booklet to guide farmers on choosing appropriate varieties for their environments has been published and is now available and widely distributed in the SADC region.

## Conclusions

The use of mega-environments in combination with descriptions of varieties has provided a quick and transparent basis of choosing maize varieties in the SADC region. When appropriate varieties are clearly identified their seed production and provision is facilitated.

## References

Setimela P.S et al. 2003. Book of Abstracts Arnel R. Halleuer International Symposium on plant breeding Mexico City, Mexico

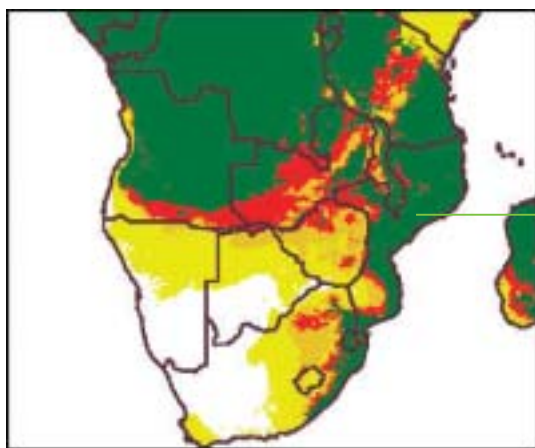
## Choosing the Right Open-pollinated Maize Variety

Maize is grown throughout the SADC region. However growing conditions differ for rainfall, temperature, growing season length and the occurrence of diseases and pests. As a consequence, different maize varieties are recommended for different parts of the region.

After testing available open-pollinated varieties (OPVs) in trials under diverse conditions, we developed a guide that should help you to find the right OPV for your area.

### Step 1

Determine on the map where you are and select the color of your area.



**Step 1**  
I am from Nampula so I am in the green area

### Step 2

Determine the maturity group you are interested in.

**Early maturing variety:** This variety does not need the entire rainy season to mature. If you plant it at the beginning of the rainy season, you can harvest it about one month before the rainy season ends. Alternatively, you can plant it late and still harvest it before the rainy season ends. In normal years, however, this variety may yield less than other varieties, because it grows for a shorter time.

**Intermediate maturity variety:** This variety also does not need the entire rainy season to mature. If you plant it at the beginning of the rainy season, you can harvest it about two weeks before the rainy season ends. Alternatively, you can plant it slightly late and harvest it at the end of the rainy season.

**Ideal variety:** This variety makes optimal use of the rainy season in your area to mature. Thus, you plant it at the beginning of the rainy season and harvest it at the end of the rainy season.

**Late variety:** You need to plant this variety very early with the first rains, so that it matures within the rainy season.

### Step 3

Based on the color of your area (Step 1) and the maturity group you chose in Step 2, decide which variety group is appropriate for you, A, B, C or D.

	Yellow area	Orange area	Red area	Green area
Early maturing			A	A & B
Intermediate maturing		A	B	C
Ideal variety	A	B	C	D
Late maturing	B	C	D	
Usually not suited	C & D	D		

The ideal variety for the green area is from group D

### Step 4

In the table below, choose the maturity group you are interested in. There are several varieties in this group. A color key is used to describe important characteristics of the varieties. Select the OPV that has the characteristics you like.

Variety	Origin	Group	Tolerance to			Disease resistance				Other traits			Grain texture	
			Grain yield	Drought	Fertility	Low soils	Maize streak virus	Gray leaf spot	Leaf blight	Rust	Ear rot	Husk cover		Lodging
KATUMANI ST	Tanzania	A	3	3	5	3	2	4	3	2	2	2	4	SF/SD
MMV400	Zambia	A	4	5	5	3	2	4	4	2	1	2	2	SFlint
POOL 15 OPM	CIMMYT	A	4	5	5	3	2	3	4	2	3	3	2	Flint
Pool 16 SR	Zambia	A	4	4	4	3	2	4	5	3	3	2	4	SD
ZM301	Botswana	A	3	3	3	2	1	5	5	4	3	3	4	SF/SD
ZM303	CIMMYT	A	2	3	2	5	2	4	2	4	3	3	3	SD
ZM305	CIMMYT	A	2	1	2	2	1	3	4	3	2	3	3	SF/SD
ZM423	CIMMYT	A	1	1	1	1	1	2	2	1	1	5	3	SF/SD
GRACE	Ecolink RSA	B	3	2	5	1	4	4	3	5	4	1	3	SF/SD
KAFULA	Malawi	B	3	3	3	2	4	4	4	3	5	2	3	SF/SD
KEP	Botswana	B	4	4	4	1	5	3	3	5	3	2	3	Dent
KITO ST	Tanzania	B	4	5	5	3	3	5	4	2	2	3	3	SF/SD
MATINDIRI	Malawi	B	4	4	3	4	2	3	2	4	4	4	3	Flint
MATUBA	SEMOC	B	4	5	3	4	1	5	3	2	2	2	3	SFlint
ZM421	CIMMYT	B	2	2	2	2	1	2	2	2	2	4	2	SF/SD
ZM521	CIMMYT	B	1	1	1	2	2	1	2	2	2	2	4	SF/SD
ZM523	CIMMYT	B	1	2	1	1	2	1	1	1	2	4	3	SD
CHITIBU	Malawi	C	3	4	3	3	4	3	3	5	2	5	2	SFlint
MASIKA	Malawi	C	2	2	3	5	2	4	3	2	3	3	3	SF/SD
Pop 10	Zambia	C	4	4	5	1	2	4	2	3	4	2	2	SFlint
SUNDWE	Malawi	C	4	5	5	2	3	2	3	5	2	4	4	SF/SD
TMW-1 SR	Tanzania	C	4	3	4	1	5	3	5	2	2	4	1	Flint
ZM611	CIMMYT	C	1	1	2	1	1	3	1	1	3	5	1	SF/SD
ZM621	CIMMYT	C	1	2	2	4	3	2	3	2	2	4	3	SF/SD
KAKHOMERA	Malawi	D	4	3	4	4	2	2	1	4	2	3	3	SF/SD
KILUMA SR	Tanzania	D	3	3	3	2	3	4	2	1	2	3	4	SFlint
OBATANPA OPM	Ghana	D	4	4	4	5	3	2	5	4	3	1	4	SD
Pop 25	Zambia	D	4	5	5	5	4	2	3	3	2	1	3	SF/SD
STAHA SR	Tanzania	D	4	5	4	4	1	3	5	3	5	3	3	SFlint
ZM623	CIMMYT	D	1	1	1	1	1	2	3	2	3	2	2	SD

Here are the OPVs in group D

What is the meaning of these groups?  
At any given site, Group A would be earlier maturing than Group B, Group B earlier maturing than Group C, and Group C earlier maturing than Group D.

These colors and numbers mean

1	Very good for this trait	F	Flint
2	Good for this trait	SF	Semi-flint
3	Average for this trait	SF/SD	Semi-flint/semi-dent
4	Poor for this trait	SD	Semi-dent
5	Very poor for this trait	D	Dent

Legend for grain texture

### Step 4

Enquire with the seed producers about the availability of seed.

Contact	Organization	Country	e-mail	Tel No	Fax No
<b>Seed Companies (Regional representatives)</b>					
Jerry Lambie	Seed-Co Int.	Botswana	lambie@botsnet.bw	267 3911658/906	267 9311830
Jose Carlos	SEMOC	Mozambique		258 1 460044/141	258 1 460186
Brian Lever	Advance Seed	South Africa	brian@popcorn.co.za	27 11 7625261	27 11 7624111
Andrew Taylor	Capstone Seed	South Africa	capstone.seeds@ntlworld.co.za	27 33 3303252	27 33 3303252
Grace Green	Ecolink	South Africa	eco.link@mweb.co.za	27 13 7512120	27 13 7513281
Pieter Herbst	Link Seed	South Africa	linkseed@linkseed.co.za	27 33 4171494	27 33 4131057
Trevor Hobbs	Monsanto	South Africa	trevor.hobbs@monsanto.com	27 11 7488304	27 11 7488353
Mike Barrow	PANNAR	South Africa	mike.barrow@pannar.co.za	27 33 4131131	27 33 4171208
Peter Pickering	Pioneer HiBred Int.	South Africa	peter.pickering@pioneer.com	27 12 6630810	27 12 6635964
Hans Gevers	Quality Seeds	South Africa	geversh@nu.ac.za	27 33 3865809	27 33 3865594
Gertie Coetzee	Seed & Grain Production	South Africa	gertie@popcorn.co.za	27 12 3455883	27 12 3454543
Vincent Volckaert	Syngenta	South Africa	vince.volckaert@syngenta.com	27 11 5414050	27 11 5414062
F. Swai	TanSeed	Tanzania		255 57 2239	255 57 8242/6630
B.N. Verma	ZamSeed	Zambia	svrverma@zamtel.zm	260 11 2243762	260 11 248028
John Makoni	Aggy	Zimbabwe	jmakoni@aggy.co.zw	263 4 660667	263 4 668770
Rob Kelly	Agricultural Seeds and Services	Zimbabwe	agryseed@zol.co.zw	263 4 701795	263 4 701833
Vincent Gwarazimba	Nimbebe Seeds	Zimbabwe	zsls@mweb.co.za	263 4 732403	263 4 701833
Lance Kennedy	NTS	Zimbabwe	lance-nts@kencor.co.zw	263 4 310284/5/6/7	263 4 310288
John MacRobert	Seed-Co	Zimbabwe	johnmac@seedco.co.zw	263 4 232968	263 91 552330
<b>National and International Agricultural Research Programs</b>					
Fernando Soto	IIA MINADER	Angola	lia@ebonet.com	244 2 399868	244 2 321943
Lekgari Lekgari	Department of Agricultural Research	Botswana	llekgari@gov.bw	267 328780	267 328965
Martin Ranthamane	Agriculture Research Division	Lesotho	agrics@lesoff.co.za	266 326042	266 310362
Vernon Kabambe	Ministry of Agriculture	Malawi	malzagr@mozambique.net	265 707222	265 707019
Pedro Fato	INIA	Mozambique	fato@iniaz.gov.mz	258 1 460190	258 1 460074
Dries Fourie	ARC Grain Crops Institute	South Africa	dries@agg2.agric.za	27 18 2996100	27 18 2947146
Jeffrey Mkhari	Limpopo Province Department of Agriculture	South Africa	mkharij2@agricho.norpro.gov.za	27 15 2957090/5	27 15 2913660
Mbuso Hlope	Ministry of Agriculture	Swaziland	spoller_s2@yahoo.com	268 52 83017	268 52 83490/83495
Zubeda Mkuruma	Ministry of Agriculture	Tanzania	sari@yako.habari.co.tz	255 27 2503883	255 27 2508242
Catherine Mangoma	Ministry of Agriculture	Zambia	maize@zamtel.zm	260 1 233832	260 1 233832
Xavier Mhike	Agricultural Research and Extension	Zimbabwe	drss@mango.zw	263 4 705321	263 4 728317
Team Leader	CIMMYT	Zimbabwe	cimmyt-zimbabwe@cgiar.org	263 4 3691200/1/3	263 4 301327/945

**Disclaimer:** The OPVs were rated based on collaborative trials conducted annually by national agricultural research programs, non-governmental organizations, private seed companies and CIMMYT across southern and eastern Africa over 1999-2002. Results are based on a minimum of two years' data. The information in this publication is based on results available at the time of publication. The varieties may perform differently if grown at other sites, or under different conditions, and certain varieties may be also produced by other seed producers.