



Indoor Residual Spraying:

Progress to date

27 March 2009

<http://www.pmi.gov/>



- IRS as part of Integrated Malaria Program
- IRS in Africa before PMI
- PMI scale up and impact
- Issues:
 - IRS Management cycle
 - Insecticide resistance
 - Pesticide management

PMI

IRS as part of a comprehensive program

Rationalization and Optimization of vector control, alone or in combination



IRS in Africa pre-PMI

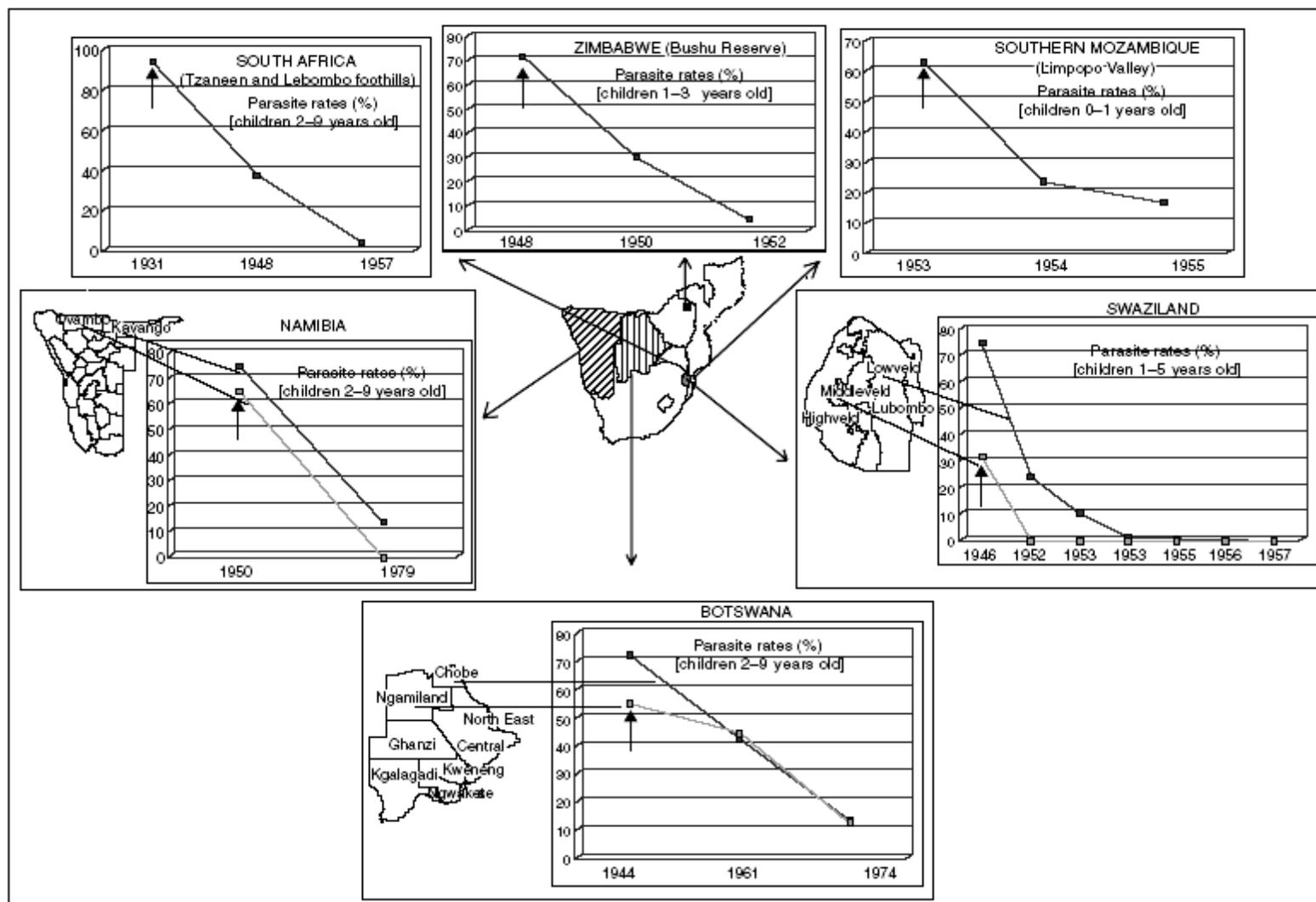


Figure 1 Parasite rates before and after the inception of malaria control by indoor residual spraying (IRS) (arrows show the start of IRS) in Swaziland, Botswana, Namibia, South Africa, Zimbabwe and southern Mozambique (for references on country data see main text).



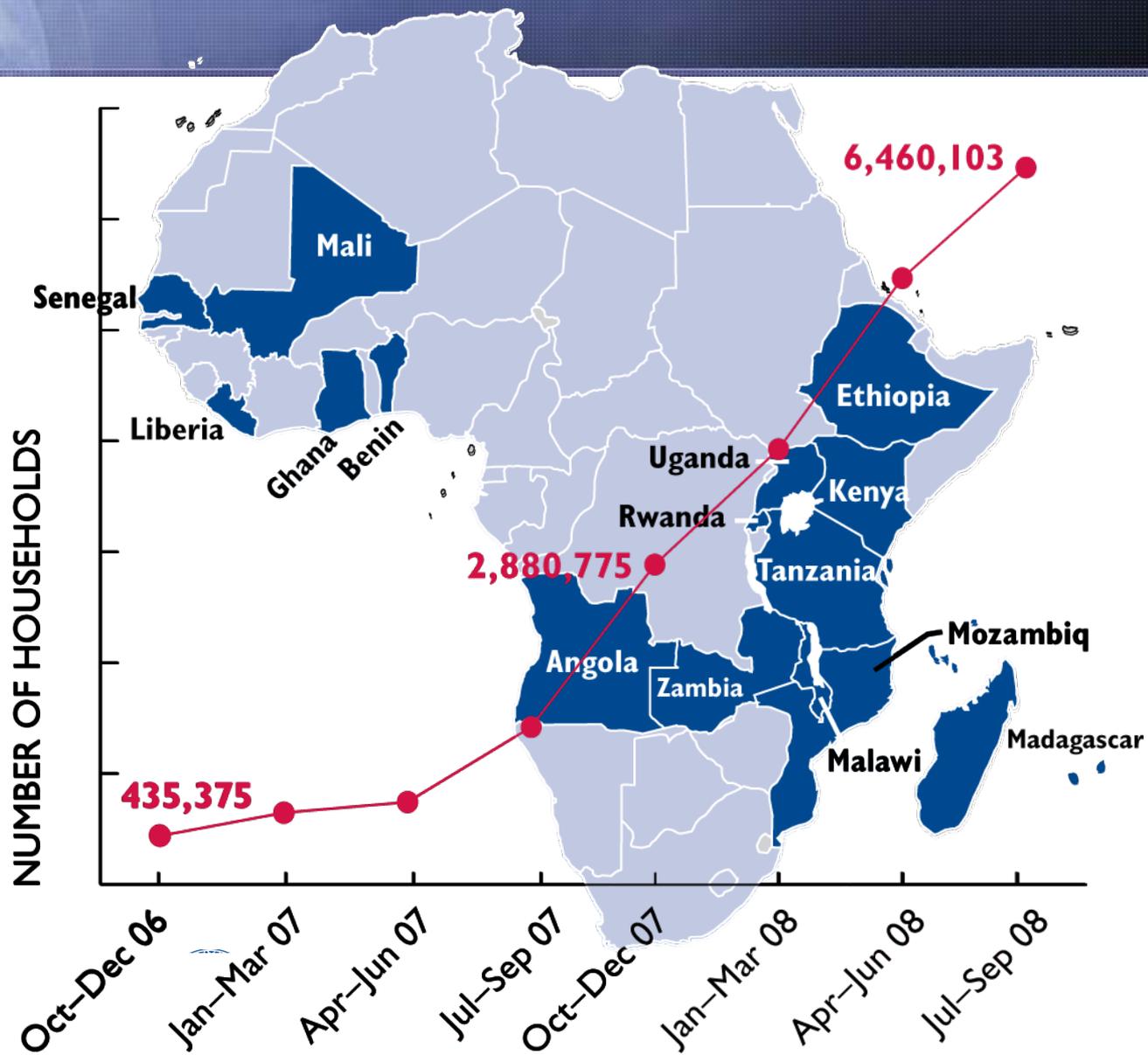
Existing IRS programs:

- Ethiopia
- Mozambique
- Madagascar
- Zambia
- Kenya
- Malawi*
- Ghana*

Starting *de novo*

- Liberia
- Benin
- Mali
- Uganda
- Tanzania
- Angola
- Rwanda
- Senegal

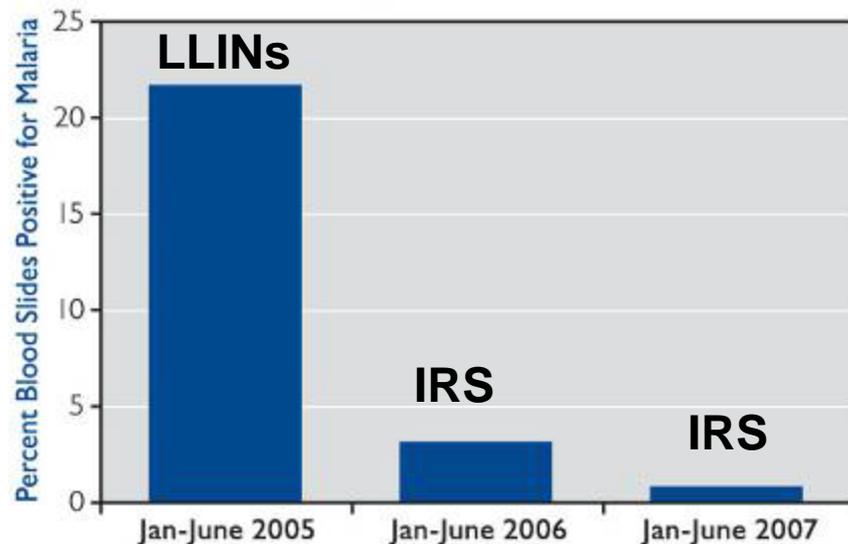
Households Sprayed by the IRS Program



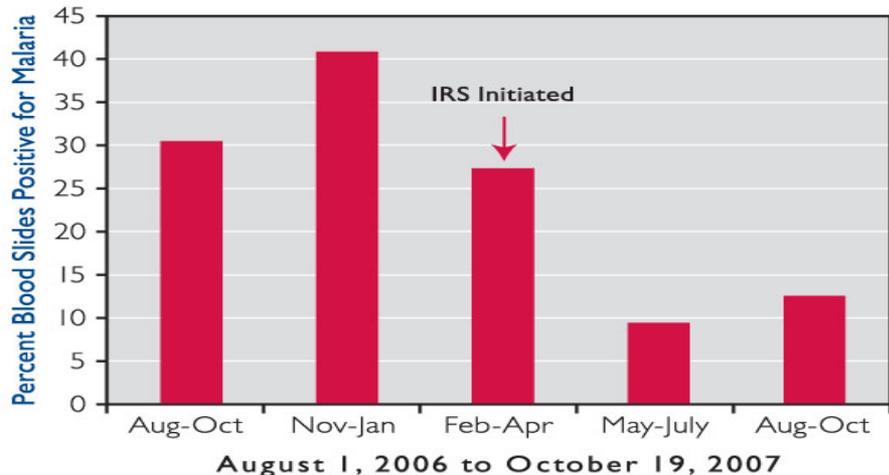
PMI Progress:

- Zanzibar
- Uganda
- N.W. Tanzania

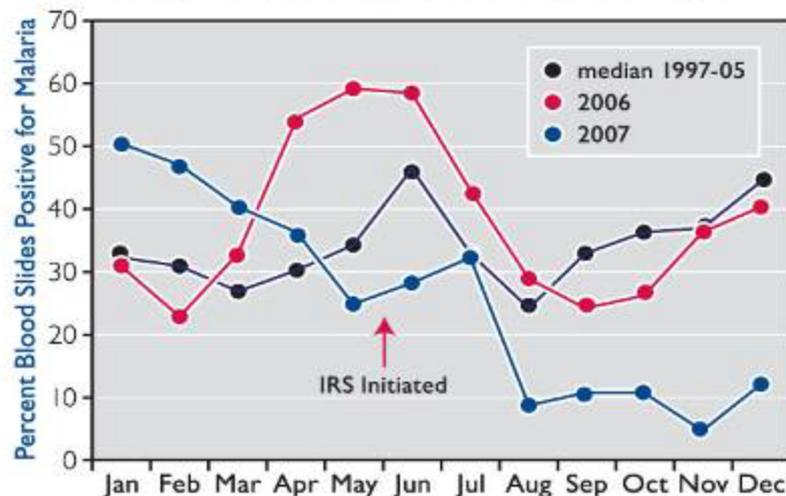
Percentage of Blood Slides Positive for Malaria in Children Under Age 2, Zanzibar, 2005-2007



Percentage of Blood Slides Positive for Malaria, Kihhi Health Center, Uganda, 2006-2007



Percentage of Blood Slides Positive for Malaria, Muleba District Hospital, Tanzania, 1997-2007





- IRS Management Cycle
- Insecticide Resistance
- Pesticide Management

Environmental Assessment



Mapping,
Targeting and
Quantification

GIS, GPS

Evaluation

*Epidemiological
Entomological
Environmental*

Action

*Supervision, information
management,
environmental compliance*

**Pesticide
Selection and
Procurement**

Micro-Planning

*Timing and Program of
spraying*

**Organization
logistics**

*Teams, transport,
supplies, systems*

Training

*Spray teams,
supervisors*

WHO recommended insecticides for indoor residual spraying against malaria vectors

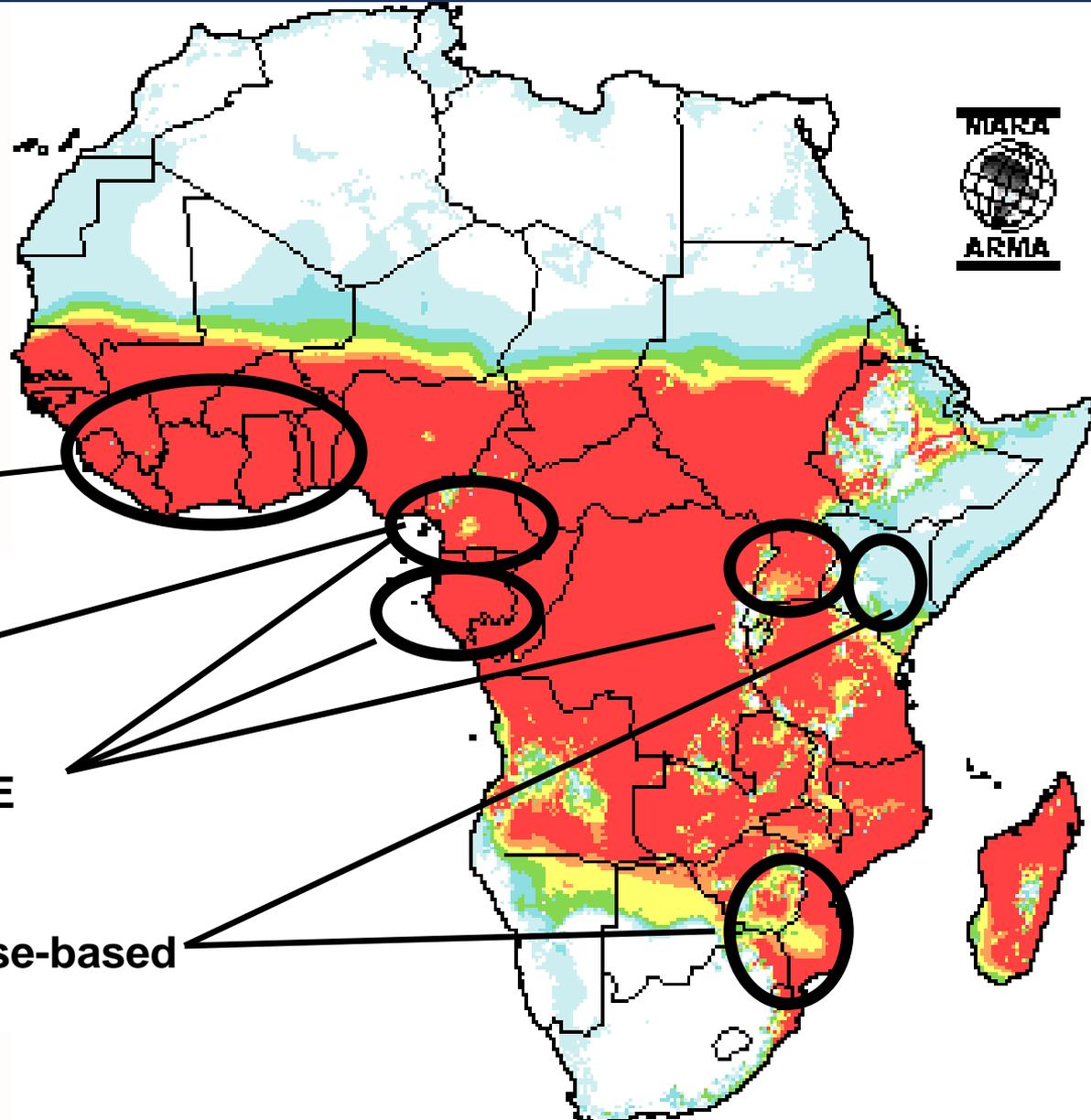
<i>Insecticide compounds and formulations (1)</i>	<i>Class group (2)</i>	<i>Dosage (g a.i./m²)</i>	<i>Mode of action</i>	<i>Duration of effective action (months)</i>
<i>DDT WP</i>	OC	1-2	contact	>6
<i>Malathion WP</i>	OP	2	contact	2-3
<i>Fenitrothion WP</i>	OP	2	contact & airborne	3-6
<i>Pirimiphos-methyl WP & EC</i>	OP	1-2	contact & airborne	2-3
<i>Bendiocarb WP</i>	C	0.1-0.4	contact & airborne	2-6
<i>Propoxur WP</i>	C	1-2	contact & airborne	3-6
<i>Alpha-cypermethrin WP & SC</i>	P	0.02-0.03	contact	4-6
<i>Bifenthrin</i>	P	0.025-0.05	contact	3-6
<i>Cyfluthrin WP</i>	P	0.02-0.05	contact	3-6
<i>Deltamethrin WP, WG</i>	P	0.02-0.025	contact	3-6
<i>Etofenprox WP</i>	P	0.1-0.3	contact	3-6
<i>Lambda-cyhalothrin WP, CS</i>	P	0.02-0.03	contact	3-6

(1) CS: capsule suspension; EC = emulsifiable concentrate; WP = wettable powder.

(2) OC= Organochlorines; OP= Organophosphates; C= Carbamates; P= Pyrethroids.

Note: WHO recommendations on the use of pesticides in public health are valid ONLY if linked to WHO specifications for their quality control. WHO specifications for public health pesticides are available on the WHO homepage on the Internet at <http://www.who.int/whopes/quality/en/>.

Insecticide Resistance



Multiple resistance
KDr W /Ace1

Esterase / Oxidase

KDr W&E

Oxidase-based

PMI

Environmental Regulations:



Integrated Vector Management Programs for Malaria Vector Control

Programmatic Environmental
Assessment

January 2007

This publication was produced for review by the United States Agency for International Development. It was prepared by RTI International with contributions from International Resources Group.



IVM PEA Supplemental Environmental Assessment: Indoor Residual Spraying Using Registered Carbamates, Pyrethroids and DDT in Mozambique

January 30, 2008

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IRS is not easy...



....but when it works, it works