



VECTOR-BORNE DISEASE CONTROL PROGRAMME

MINISTRY OF HEALTH MALAYSIA
PARCEL E, PRECINT 1
PUTRAJAYA



BRIEF INTRODUCTION TO MALAYSIA

Land Area: 330,252 sq.km.

Population: 27.7 millions

Population density: 84/sq.km

Annual pop. growth: 2.2%

Economy: Industrial
Agriculture



VBDC Section, MOH Malaysia

- The Malaria Eradication Programme was established in 1967, in order to eradicate malaria in Peninsular Malaysia by the year 1982.
- In 1986, the programme was reorganized to include other vector borne diseases namely dengue, filariasis, typhus, JE, yellow fever & Plaque and came to be known as Vector Borne Diseases Control Programme.

FUNCTIONS: MINISTRY LEVEL

- **Policy formulation**
- **Programme planning and development**
- **Protocols and guidelines developments**
- **Resource allocation**
- **Disease surveillance**
- **Monitoring and evaluation**
- **Training & research coordination**
- **Technical advisory service**

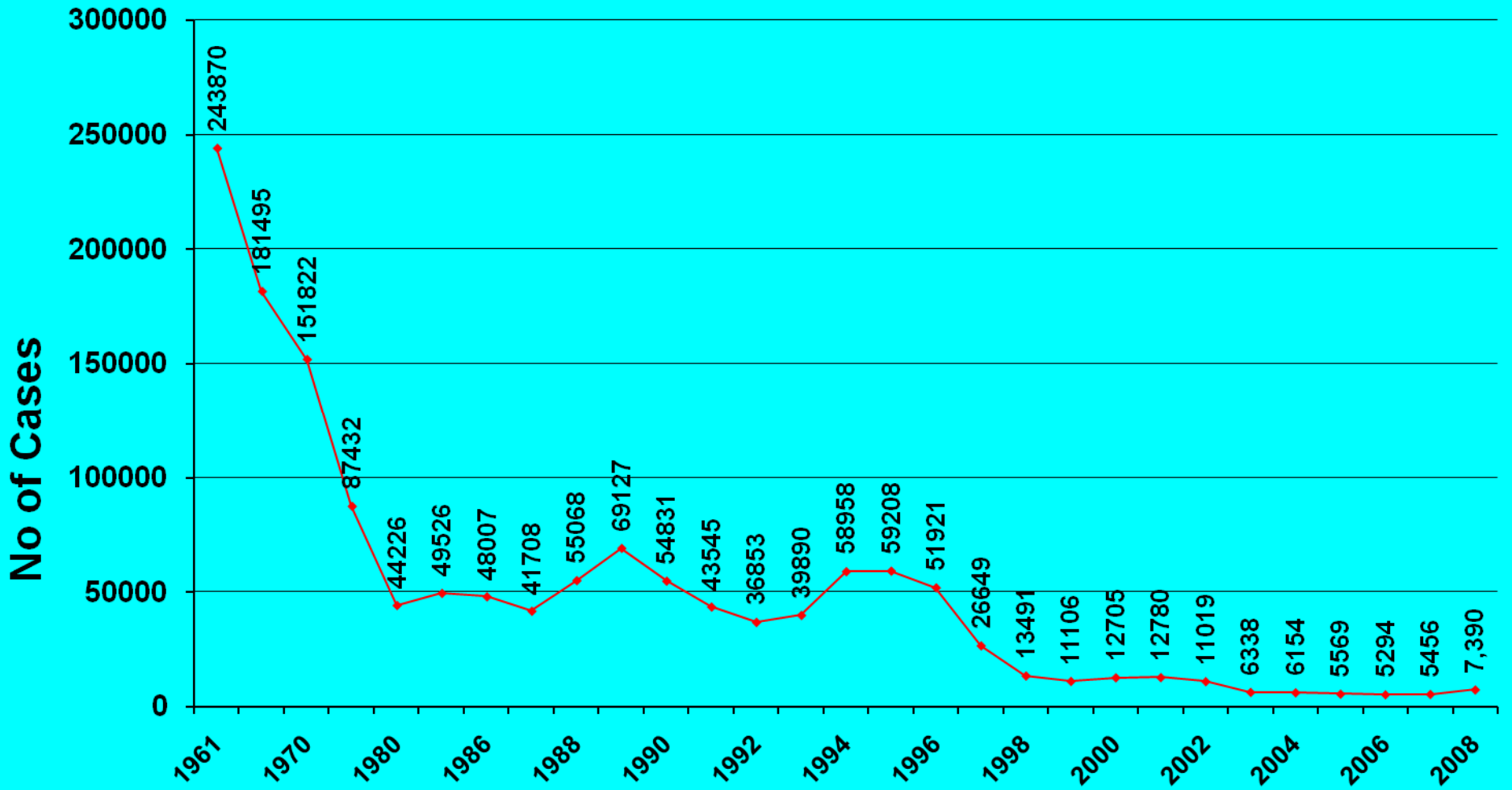
FUNCTIONS: STATE LEVEL

- **Programme planning**
- **Coordinating the implementation of the control programme**
- **Resource allocation within state**
- **Disease surveillance**
- **Monitoring and evaluation**
- **Training**
- **Research**
- **Technical advisory service**

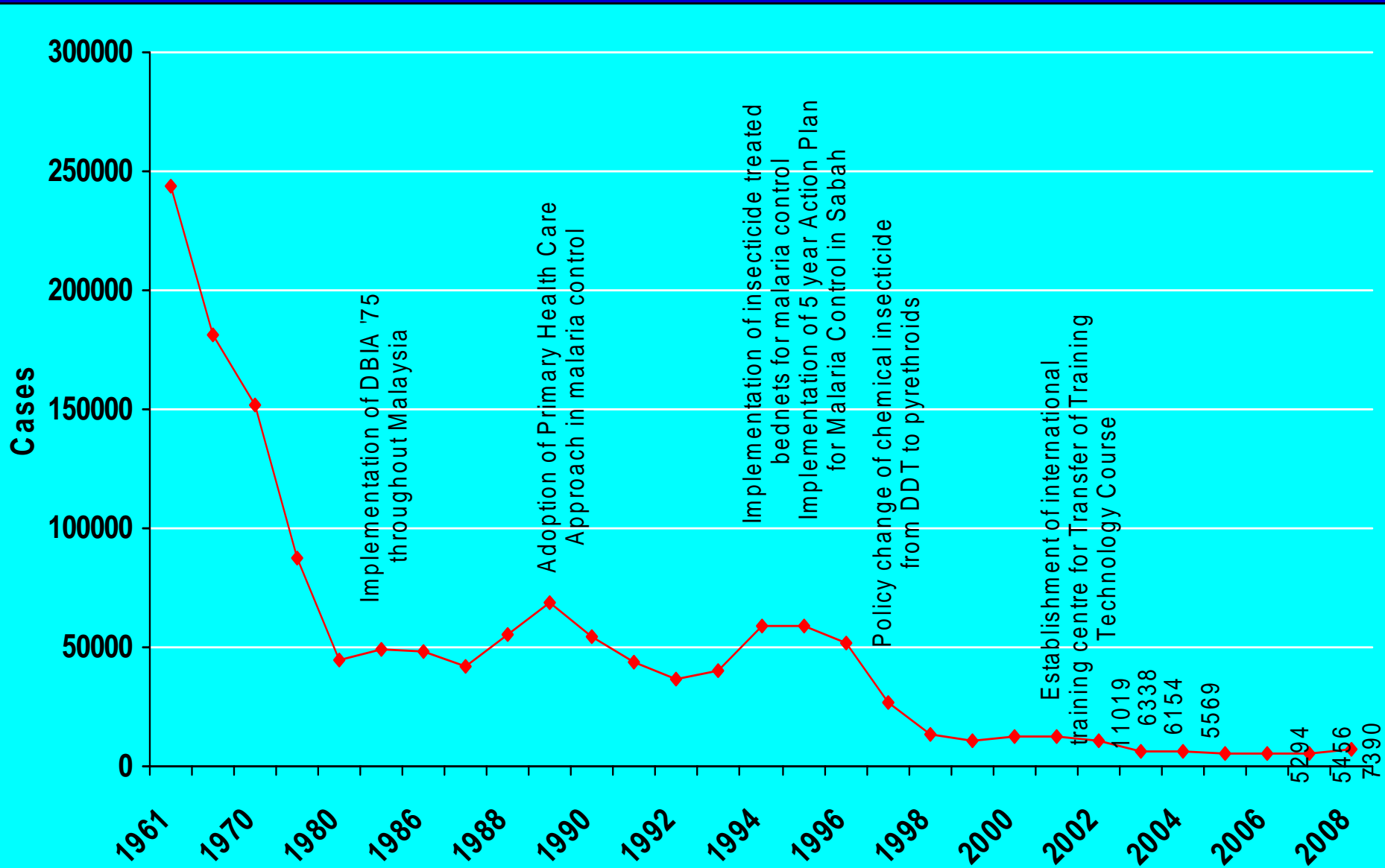
FUNCTIONS: DISTRICT LEVEL

- **Implementation of the preventive and control activities**
- **Disease surveillance**
- **Monitoring and evaluation**
- **In-service training**
- **Operational research**

MALARIA BURDEN IN MALAYSIA 1961-2008

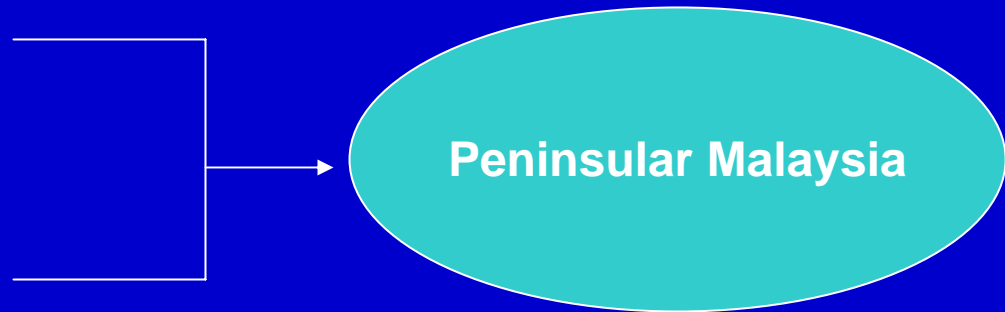


IMPACT OF INTERVENTIONS IN MALARIA CONTROL 1961 - 2005

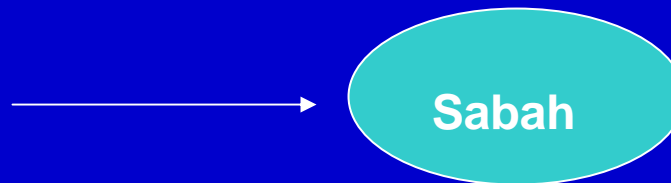


Malaria Vectors in Malaysia

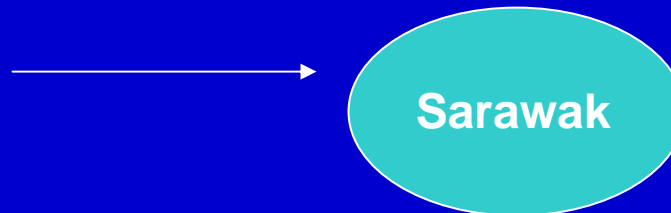
An. maculatus
An. epiroticus
An. campestris
An. letifer
An. dirus
An. crascens



An. balabacensis
An. sundaicus
An. flavirostris



An. latens
An. donaldi
An. letifer



BREEDING HABITATS

- An. maculatus* : Hilly mountainous areas, foothills, slow moving partly shaded streams, seepages and land clearings.
- An. balabacensis* : Forested areas and water pools, foot-print, wheel tracks, forest breeder.
- An. latens* : Forest breeder similar to
(*An. leucosphyrus*) *An. balabacensis*.

An. maculatus

Larvae found in slow moving rivers and exposed to sunlight

Larvae stick onto rock surface



An. maculatus

Water pockets / pools form after reforestation for agriculture



Water pockets



An. balabacensis

Larvae usually found in
✓ animal footprints,
pock-marks.
✓ Stagnant semi-
permanent water bodies
which fully or partially
shaded area



An. latens Breeding Places

- Breeds almost exclusively in clear spring water in tiny seepages at the source of streams or along a hillfoot in dense jungle
- Normally found in areas which are always under complete shade and likely to be distributed throughout jungle
- Not normally found in streams, swamps, paddy fields and irrigation channels

Characteristics of Breeding Places of *An. latens*

- Prefer slightly acidic water – pH 6.0 – 6.4
- Most commonly found in water which contain dead/decomposed leaves
- Do not prefer polluted and dirty water
- Not exposed to sunlight
- When collected *An. latens* larva remain submerged under water for long time (about 5 minutes)

An. latens

Larvae breeds in clear seepage pools or in swampy areas (inland) and usually fully shaded



An. latens – jungle habitat



Entomological Consideration in *P. knowlesi* transmission

- Studies in Sarawak showed that:

An. latens is generally a forest species, normally found in the jungle but can be present in farming zones located at forest fringe rather than in villages, and the density decreases in relation to distance away from the jungle

STRATEGIES IN MALARIA VECTOR CONTROL

1. Selective and effective use of chemical insecticides.
2. Encourage the use of personal protective measures.
3. Promote the use of environmental measures.
4. Promote community participation in vector control.

VECTOR CONTROL ACTIVITIES

1. Indoor residual spraying (IRS).
2. Insecticide treated bednets (ITN).
3. Larviciding.
4. Environmental management measures.
5. Personal Protection measures.

Vector control activities

- Traditional current methods:
 - Indoor residual spraying (IRS)
 - Insecticide treated nets (ITN)





INDOOR RESIDUAL SPRAY



INSECTICIDE TREATED NETS ARE GIVEN FREE TO THE COMMUNITY



Vector Control activities

- Community Approach:
 - Personal protection
 - Spraying of farm/garden huts



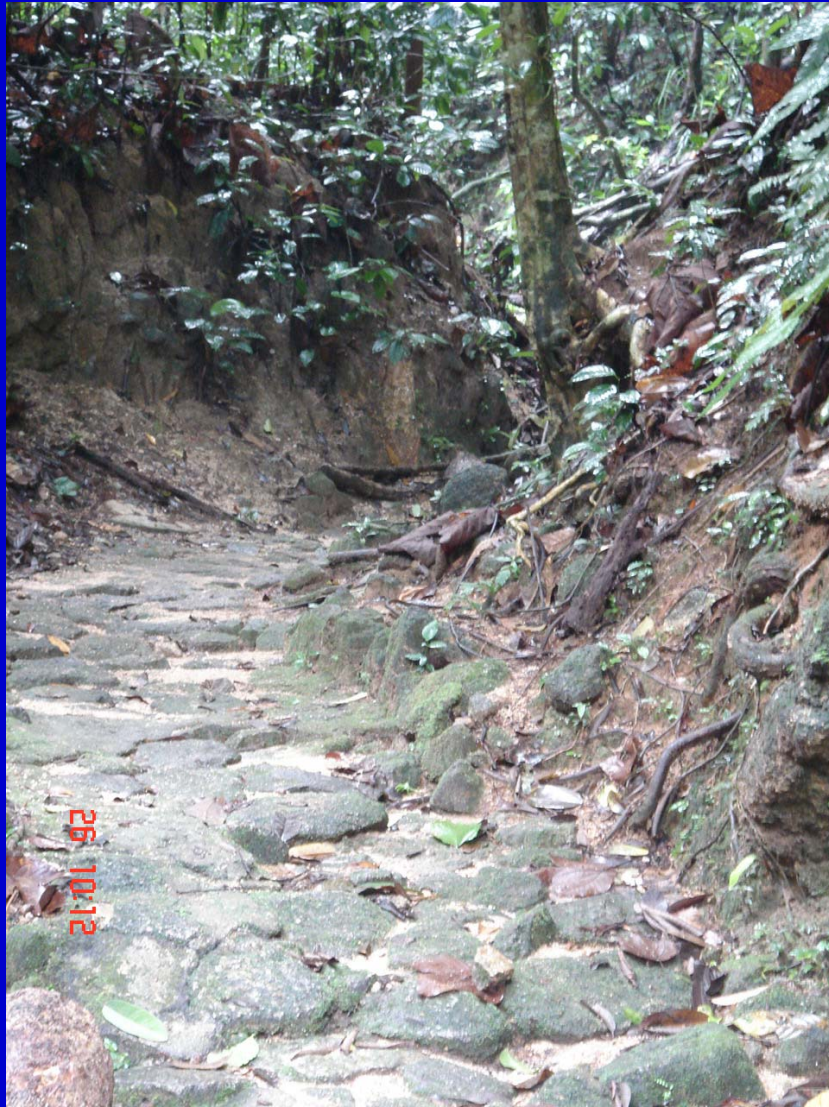
Vector Control activities

- Environmental Approach:
 - House screening
 - Clearings and sanitation
 - Webster (1941): extensive clearance of jungle in Miri in 1924 resulted in great reduction in malaria
 - McArthur (1945): Spleen rate in Sunsuran, Tambunan reduced from 80% in 1930 when still under jungle to 25% in 1940 when jungle cleared
 - Larval control??
 - Small scale trial in Tambunan (1941) by weekly dusting of paris green managed to reduce for some weeks, but not sustained due to flushing of insecticide after heavy rain.

ENVIRONMENTAL MANAGEMENT



AUTOMATIC SIPHON



STONE PACKING

**COCONUT HUSK
PACKED DRAINS**





AUTOMATIC DRUM SLUICE



TIDAL GATE



ENTOMOLOGICAL SURVEY



Larval Survey











Pesticides In Malaria Control

Indoor Residual Spray

- DDT 75%WDP:1961 - 1972
- DDT 25%EC : 1973 - 1999
- Deltamethrin : 1997 - recent
- Lambda-cyhalothrin (in Sabah) : 1997 - recent

Larviciding

- Abate 500E
- Bti

Insecticide Treated Nets

- Permethrin
- Lambda-cyhalothrin
- Deltamethrin

Fogging (during outbreak)

- Aqua resigen
- Resigen
- Malathion

Thank You

MANAGEMENT OF PESTICIDES IN MALAYSIA

SELECTION OF PESTICIDES

- FOLLOW WHO TECHNICAL SPECIFICATIONS
- WHO RECOMMENDED PESTICIDES FOR VECTOR CONTROL
- BASED ON LOCAL FIELD TRIALS STUDIES
- BASED ON WHOPEP STUDIES
- REGISTERED BY THE PESTICIDES BOARD
- APPROVED BY TECHNICAL SPECIFICATIONS COMMITTEE
- BASED ON TECHNICAL SELECTION CRITERIA
- OTHER CRITERIA ADMINISTRATIVE AND FINANCIAL FROM PROCUREMENT DIVISION

SELECTION CRITERIA

- EFFECTIVENESS IN CONTROLLING MALARIA AND DENGUE
- TOXICITY—MATERIAL SAFETY DATA SHEET
- RESIDUAL EFFICACY-KNOCKDOWN AND KILLING CAPACITY
- FREQUENCY OF SPRAY-NOS OF SPRAY CYCLES BASED ON DOSAGE/APPLICATION RATES
- SHELF LIFE/HALF LIFE
- PRESENCE OF RESISTANCE(AGRI VS PUBL.HLTH)
- DATA ON COMPARATIVE COST STUDIES-COST PER METRE SQUARE/COST PER HOUSE SPRAYED/COST PER CASE
- STAINING WALLS?
- HOUSE REFUSAL RATE
- CONTROLLING OTHER PESTS?
- ODOUR/SMELL
- LESSONS FROM OTHER END-USERS