

# Vector Control In Indonesia : Decentralization; Responsibility At Peripheric Level

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## **Abstrak:**

*Pemberantasan vektor di Indonesia, suatu kebijaksanaan nasional yang melaksanakan penyemprotan rumah dengan DDT dewasa ini, banyak kendalanya. Menghadapi kendala tersebut, suatu kebijaksanaan baru telah diajukan, yaitu pemacuan suatu sistem survailans sederhana, yang dimonitor pada tingkat desa (desa endemis malaria). Penyuluhan kesehatan ditingkatkan, dan masyarakat diberi penyuluhan tentang terjadinya penularan penyakit malaria dan cara-cara pencegahan vektornya.*

*Pengelolaan lingkungan yang sederhana dan cara pemberantasan tepat guna lain yang dapat dilaksanakan oleh masyarakat disarankan. Indikator sederhana tentang peningkatan kepadatan vektor dicari, agar masyarakat dapat mengawasi indikator tersebut. Indikator ini dapat dijadikan alat bagi ko-asisten entomolog untuk memonitor dan melaporkan peningkatan dalam kepadatan vektor untuk penanganan pemberantasan segera agar peningkatan vektor lebih lanjut dan penularan penyakit dapat dicegah.*

*Strategi pencegahan/pengendalian vektor malaria maupun DHF dibicarakan dalam makalah ini.*

## **I. Introduction**

The main Vector-borne diseases presently presenting problems in Indonesia are malaria and Dengue Hemorrhagic Fever (DHF).

Vector control progammes in Indonesia since the malaria eradication period have been conducted through routine DDT spraying in malaria endemic areas. Based on the firstly reported residual effectivity of DDT of 6 months, the routine spraying has been conducted twice a year. However, resistance to DDT has been reported by many workers (Soerono, 1965).

DDT has also been reported as a persistant chemical in the environment. It has been found

as a compound in various household products such as milk, and other diary products. Indonesia has presently attempted to increase its GNP through export of various commodities, which includes diary products. To prevent contamination of the environment, DDT has been banned for vector control. A new policy has been recommended through a Malaria surveillance project, conducted to obtain alternative vector control strategies. Various conventional as well as newly developed vector control methods are presently recommended, suited to specific habitats. Dengue Hemorrhagic Fever has mainly been fogging, distribution of ABATE and the campaign to clean the environment. Health for all by the year 2000 has been taken into consideration, and more efforts are exerted to

educate communities about disease transmission and self help to prevent the creation of excess waterbodies which could lead to larval habitats. This paper attempts to summarize activities conducted in Indonesia, in determining its new national policy for malaria and DHF vector control.

## II. Vector control for malaria and DHF

### a. Malaria

#### **Malaria surveillance project**

Facing the resistance of various vector against DDT, many alternate insecticides and application methods have been proposed and used. The alternate insecticide recommended are generally more toxic and more expensive, and are therefore costly for the national vector control policy. A study was therefore conducted to determine a more specific vector control strategy which is implemented according to existing situations.

Stratification of malaria endemic areas (Hunt, 1991).

Stratification of malaria endemic areas has been conducted based on two main criteria namely, (i) static and (ii) dynamic indicators. The static indicators, known as HCI (High Case Incidence), MCI (Medium Case Incidence) and LCI (Low Case Incidence), based on the number of malaria cases are mainly used for planning and development of yearly vector control budgets. Monthly case fluctuations are used for the dynamic indicators, which divides malaria endemic areas into focal zones, namely Potential Focal Zones, Low Focal Zones and High Focal Zones.

Considering the variety in ecosystems and breeding habitats which mostly determine the specific vectors, the following criteria have been determined based on ecosystems in Indonesia.

#### Criteria for Potential Focal Zone

a. Located in hilly areas with non-technical

irrigation system, padi planted all year round (Anopheles aconitus)

- b. Springs, small running streams throughout the year
- c. Remote areas with little or no surveillance visits by village malaria worker
- d. Historically once a High Focal Zone (HFI) with heavy migration to and from transmigration sites and original villages on Java
- e. Coastal areas with waterbodies becoming brackish certain parts of the year, usually after cutting of mangrove forest, or dirty unused fish ponds.

#### Criteria for Low Focal Zone

- a. Medium Case Incidence or Low Case Incidence areas with constant monthly indigenous cases
- b. High Case Incidence area with indigenous cases decreasing
- c. High Case Incidence areas with the following specifications:
  1. No migration from high density areas to and from malaria endemic areas on or outside Java
  2. No specific changes in the environment promoting larval breeding sites
  3. No ricefields in hilly areas, if available, technical irrigation system, synchronous planting and crop rotation
  4. No springs and mountain streams present
  5. No lagoons or deserted fish ponds in coastal area.

#### Criteria for High Focal Zone

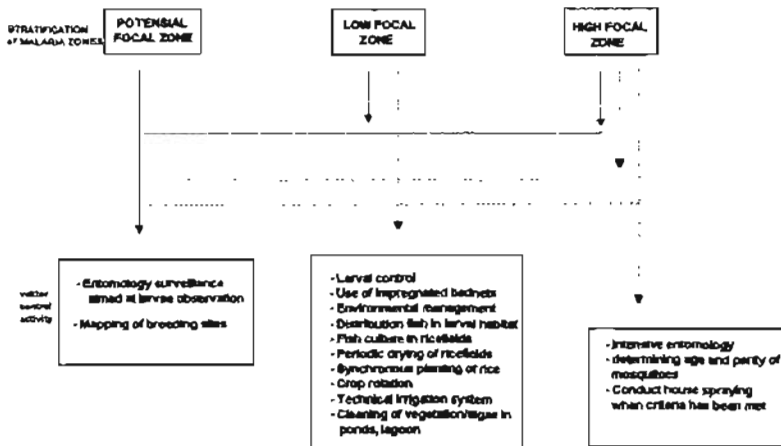
Villages vulnerable for epidemics meet the following criteria:

1. Potential village where indigenous cases are found
2. Village with constant indigenous cases for three months, or with cases increasing
3. Malaria endemic areas with increases in indigenous cases to 14 per mille compared to past month.

Vector Control Strategy (see figure 1)

High Focal Zone

Figure 1. Scheme for malaria vector control



- \* All activities conducted for the potential and low Focal zone
- \* During epidemics, conduct intensive entomological survey, including age and parity determination for female mosquitoes.
- \* When criteria is met (vector densities determined locally based on specific densities of larvae or adults), conduct residual house spraying or cattle shelter spraying (if vectorial behavior suggests).

Health education for environmental management/sanitation

One of the main factors for the success in environmental management, which is monthly conducted through community participation, is the education of groups in the community through the local infrastructure, both non Governmental and Governmental. Indonesia has used most local groups existing in the villages (Nalim, 1993).

Potential Focal Zone:

- \* Larval and adult survey for vector species
- \* Mapping of breeding sites
- \* No house spraying

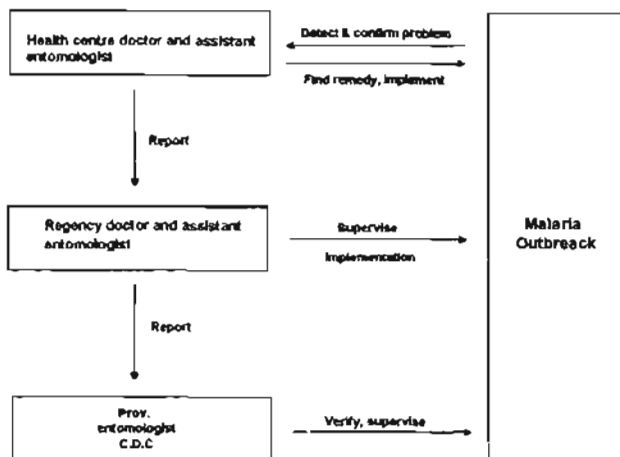
Low Focal Zone:

- \* All activities for the potential Focal Zone with the addition of the following activity :
- \* Larval control using IGR, Bti (Teknar) and other formulations
- \* Use of insecticides (Permethrin, etc.), impregnated bednets
- \* The following environmental management actions:
  - distribution of larvivorous fish in springs and streams
  - fish culture in ricefields (Nalim, 1985)
  - synchronous rice planting
  - technical irrigation systems
  - Cleaning of vegetation and algae from coastal fish ponds (Nalim, 1989)

- \* No spraying is conducted

Infrastructure for implementation of vector control methods during outbreaks (see figure 2).

Figure 2. Decision making process for vector control



Control strategies during outbreaks in the specific

stratified zones will be conducted based on reports from the assistant entomologist in endemic areas. These assistant entomologist will report to the regency entomologist who will report it further to the provincial entomologist. Actions can be conducted immediately by the local (village) health authorities.

**b. Dengue Hemorrhagic Fever**

**Center for Disease Control Strategy (PPM PLP, 1992)**

Stratification for DHF area

- a. Endemic village/subdistrict, DHF epidemic occurring every year during the last three years.
- b. Sporadic village/subdistrict, DHF epidemic occurring during the past three years, however not every year.
- c. Potential village/subdistrict, area where during the past three years no epidemic has occurred, however, this area is heavily populated with good transportation facilities with neighbouring areas, where the Breteau index is found > 5%
- d. "Free" village/subdistrict, DHF outbreak never occurred in this area, areas with altitude of 1000 m, or < 1000 m with Breteau index < 5%.

**Vector Control Strategy (see figure 3)**

Figure 3. Scheme for DHF Vector Control

Stratification zones (village)	Mass	Cleaning of larvae		Vector Control by community	Health education
		House	P.P		
1. Endemic	+	(+)	(+)	+	+
2. Sporadic	-	(+)	(+)	+	+
3. Potensial	-	-	(+)	+	+
4. "Clean"	-	-	(+)	+	+
5 Focal control	+			+	+

Note. (+) Cleaning of containers and distribution of ABATE  
 \* Cleaning of containers in houses if endemic and sporadic zones are in the same subdistrict  
 PP. Public places

1. Mass fogging
2. Periodical larval surveys/cleaning of larvae :
  - a. Larval survey conducted within at least every three months
  - b. Larval surveys followed by health education to clean larval breeding containers
  - c. Cleaning of larvae in houses by local infrastructure (cadre etc.)
  - d. Distribution of ABATE in larvae positive containers in Endemic and Sporadic areas.
  - e. Cleaning of larvae in public places by Health personnel
  - f. Monitoring cleaning of larvae: conducted every three months through Breteau index (percent of public places exempt from larvae).
3. Health education to the community

Health education conducted through community activities, individually during monitoring of larval densities in houses through specific groups established to combat DHF, and through the School Health System.

**III. Future research activities**

Criteria for the determination of specific research activities have been determined, however considering the variety in ecosystems and niches, specific criteria should be assigned to each locality. These should be determined through careful observation and research.

The following lists certain parameters yet to be determined for the various vectors :

1. Periodic confirmation of vector species (changes in the environment have changed vector species)
2. Specific densities for larvae and adult mosquitoes to implement vector control activities (specific threshold levels)
3. Vector Control methods, e.g. specific methods to be used in the various

ecosystems should be determined based on careful observation and research, before implementation in the vector program.

#### IV. Summary

- New vector control strategies have been determined for vector control in Indonesia
- Parameters and criteria for the implementation of vector control should be determined based on careful observation and research
- Health education to the community and school children is conducted routinely

#### V. References

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### Renungan diri .....

Andaikan anda tidak mungkin menjadi pucuk cemara di puncak bukit sana.  
Jadilah saja perdu dilembah perdu yang terbaik di sisi bukit.  
Biarlah jadi berlukar bila tak mungkin jadi pohon.

Andai tak mungkin jadi perdu, jadilah rumput hiasi jalan raya.  
Bila tak mungkin tumbuh tumbuh rambat sedap.  
Jadilah serat berguna.  
Tapi serat terkuat ditepi danau.

Tidak semua kita jadi nakoda, siapa lagi awak  
Setiap orang mempunyai peran.  
Ada tugas besar, ada tugas kecil.  
Tugas kita masing-masing adalah yang terdekat.

Bila tidak mungkin jalan tol, jadilah anda jalan setapak.  
Bila tidak mungkin mentari, jadilah anda bintang.  
Berhasil atau gagal bukan ukuran.  
Apapun dan dimanapun jua jadilah yang terbaik

**Douglas Malloch**