Seasonal change of Anopheles population in teak plantation and slash and burn cultivation area in relation to population migration and receptivity

Masatoshi Nakamura
Vector Born Disease Control, DOPH, MOHS /JICA Malaria elimination project in Myanmar
4th Sep. 2018 APMEN, Bangkok
Malaria trend in Myanmar

No. of Malaria Confirmed Cases by Townships (2012-2016)

Project site
Situation was changed
(Sift from control to elimination)


Sporadic occurrence
Imported or Indigenous
(Residual transmission)?
<table>
<thead>
<tr>
<th>Forest related activities</th>
<th>Exam</th>
<th>Posi</th>
<th>% Posi</th>
<th>Manageability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Slash and Burn</td>
<td>11,562</td>
<td>5,579</td>
<td>48.3%</td>
<td>High</td>
</tr>
<tr>
<td>2 Bamboo Cutting</td>
<td>9,901</td>
<td>5,129</td>
<td>51.8%</td>
<td>Low</td>
</tr>
<tr>
<td>3 Logging (Irregal ??)</td>
<td>5,778</td>
<td>3,489</td>
<td>60.4%</td>
<td>Low</td>
</tr>
<tr>
<td>4 Charcoal Baking</td>
<td>3,677</td>
<td>2,363</td>
<td>64.3%</td>
<td>Low</td>
</tr>
<tr>
<td>5 Teak Plantation</td>
<td>1,695</td>
<td>840</td>
<td>49.6%</td>
<td>High</td>
</tr>
<tr>
<td>6 Return from Kayin state</td>
<td>1,387</td>
<td>724</td>
<td>52.2%</td>
<td>Low</td>
</tr>
<tr>
<td>Construction (Dam, Road)</td>
<td>759</td>
<td>424</td>
<td>55.9%</td>
<td>High</td>
</tr>
<tr>
<td>8 Pan for Gold</td>
<td>533</td>
<td>308</td>
<td>57.8%</td>
<td>Low</td>
</tr>
<tr>
<td>9 Fishing</td>
<td>458</td>
<td>254</td>
<td>55.5%</td>
<td>Low</td>
</tr>
<tr>
<td>10 Firewood Collection</td>
<td>168</td>
<td>91</td>
<td>54.2%</td>
<td>High</td>
</tr>
<tr>
<td>others</td>
<td>99</td>
<td>53</td>
<td>53.5%</td>
<td>??</td>
</tr>
<tr>
<td>Total</td>
<td>35,938</td>
<td>19,213</td>
<td>53.5%</td>
<td></td>
</tr>
</tbody>
</table>
Mobility within their Home Range

Slash and Burn/Plantation

Bamboo collection

Charcoal baking

Recorded as a epidemiological data

Actual transmission site
Landscape of traditional slash and burn cultivation
(3-5 Acers, managed by family)
Situation along Bago Yoma

- Many slash and burn cultivation and Teak plantation are conducting beyond village.
Distribution of village, CHWs and slash and burn cultivation area

Legend:
- Fire 2
- Village
- CHW Oaktwin

Village \ Slash and burn \ CHWs
Village people are moving in 4 miles radius
(Tanungya, Charcoal, Bamboo, Logging and gathering other forest products)
Teak Plantation Slash and Burn (agro-forestry system) >400 acers, >60 household, Managed by the Government

Taungya system has established during English period in Myanmar
Cycle of teak plantation
Result of mosquito collection by CDC light traps (20 traps X2nights)

Change of vector population in 2017 plantation
Changthongwa, PPK

2017 Plantation

An. minimus
An. dirus
An. maculatus

Dec 2017 Feb 2018 Apr 2018 Jun 2018
No./Trap/day

425 acer
40 household

Change of vector population in 2018 plantation
Changthongwa, PPK

2018 Plantation

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Transferring from Old to New Plantation
Correlation among morbidity of people, rainfall and vector density

- Rainfall Pattern
- Vector Density
- Plantation Started/
  Migrants introduced in new settlement

Jan | Mar | Jun | Sep | Dec
After logging ban in Bago Yoma

Skilled forest workers are moving to Sagain Region and return to highly receptive Bago mountains
Collaboration with Forest Dept.

- Approaching to the plantation
- Discussion with Forester
- Malaria survey
- Larval collection
- Adult I collection (CDC light trap)
- LLIN distribution
• Why collaboration is needed?

① Teak plantation area is providing favorite breeding place of vectors

② Teak plantation area was previously highly malarious and receptive.

③ Teak plantation area is beyond public health activities.

④ Forest department recognize malaria as a threat of their business

⑤ Government is promoting reforestation.

⑥ Implementation in plantation area is out of other partners (INGO/NGO) scope. Only VBDC is able to manage.
Detected fire point in two days in peak of dry season (2 to 3 Apr, 2018)
Conclusion

➢ Slash and burn cultivation is common livelihood in not only in Myanmar but also in entire SE Asia.
➢ Environment of slash and burn cultivation field provide favorite breeding place of vectors.
  • *An. minimus* density will be increases after development of the field.
  • *An. dirus* habitats are also maintain in the fringe of the field.
  • Highly receptive areas are creating and moving year by year.

• Action taking based on consideration of local ecological setting/context is essential for elimination of transmission and prevent re-introduction of malaria.