



ECOMORE II



AFD



ສະຖາບັນ ປັດສະເຕີ ລາວ
INSTITUT PASTEUR DU LAOS

ECOMORE2

New strategy for dengue vector control in insecticide resistant areas in Vientiane, Lao PDR

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ກະຊວງ ສາທາລະນະສຸກ
Ministry of Health

HANOI
15-16 JANUARY 2019

Mövenpick Hotel Hà Nội, Vietnam

ECOMORE2 project: Entomology Work Package, Vientiane, Laos

Objectives:

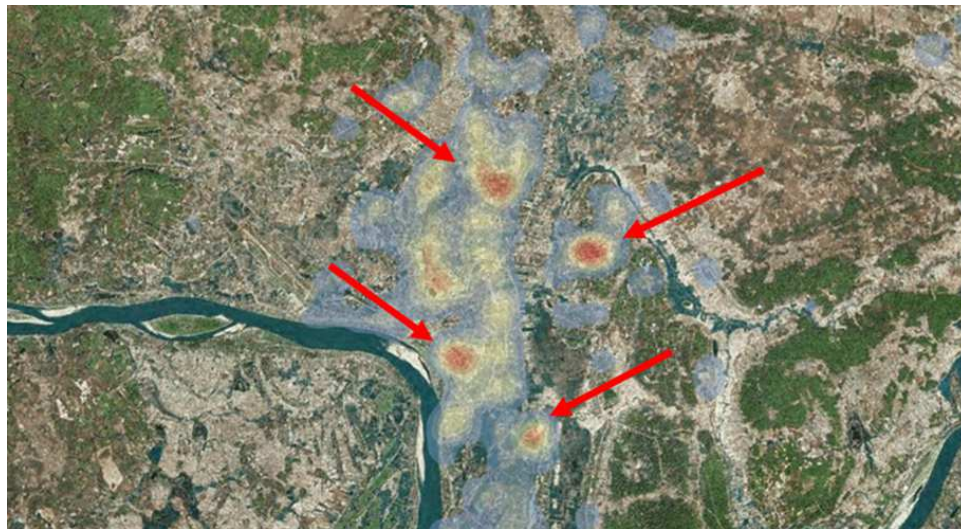
- Entomological surveillance to define dynamics of *Aedes* vectors in dengue hotspots in Vientiane Cap.
- Measure and Map insecticide resistance levels of the *Aedes* populations in Vientiane Cap.
- Evaluate innovative strategies of vector control (In2Care[®] traps, autodissemination of pyriproxyfen)

Dynamics of vectors and surveillance in Dengue hotspots

- 4 villages selected in Vientiane capital dengue hotspots (and IPL)
- 4 BG sentinel traps and 2 oviposition traps / village
- Mosquito abundance (every week since may 2016)
- Arbovirus infestation rates in vectors



Ovitrap



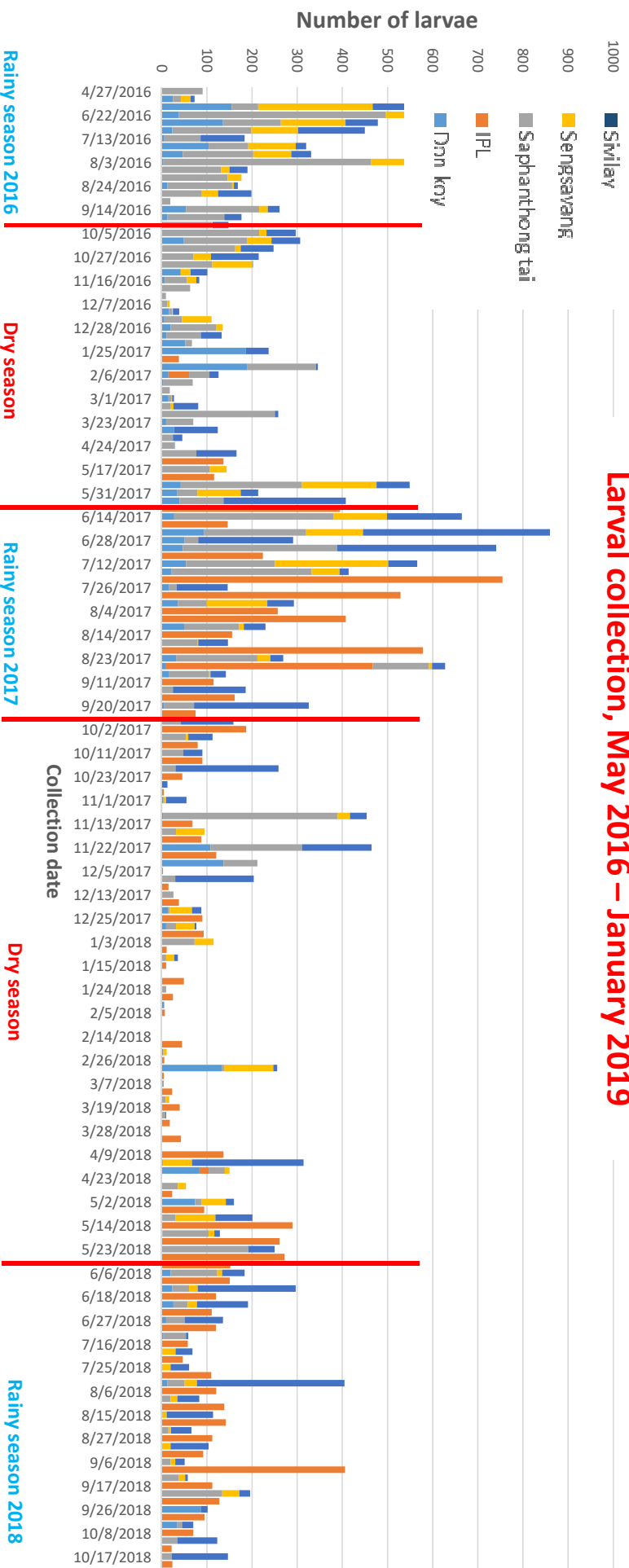
Density of dengue confirmed cases in Vientiane (2012/2016)
Virology Department IPL.



BG trap

Vectors surveillance

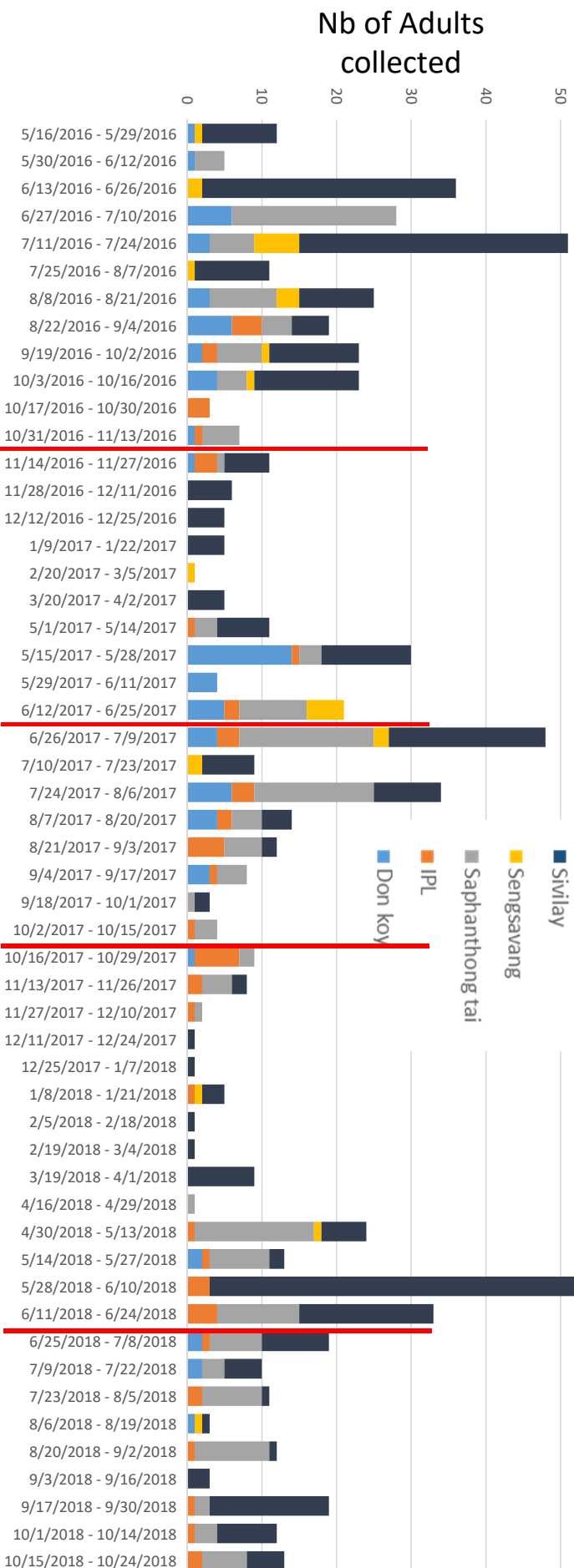
Larval collection, May 2016 – January 2019



Number of Larvae *Ae. aegypti* and *Ae. albopictus* collected every week between May 2016 and November 2018 in Vientiane

Vectors surveillance

Adult collection, May 2016 – January 2019



Number of Adult *Ae. aegypti* and *Ae. albopictus* collected every 2 weeks between May 2016 and November 2018 in Vientiane

Insecticide resistance

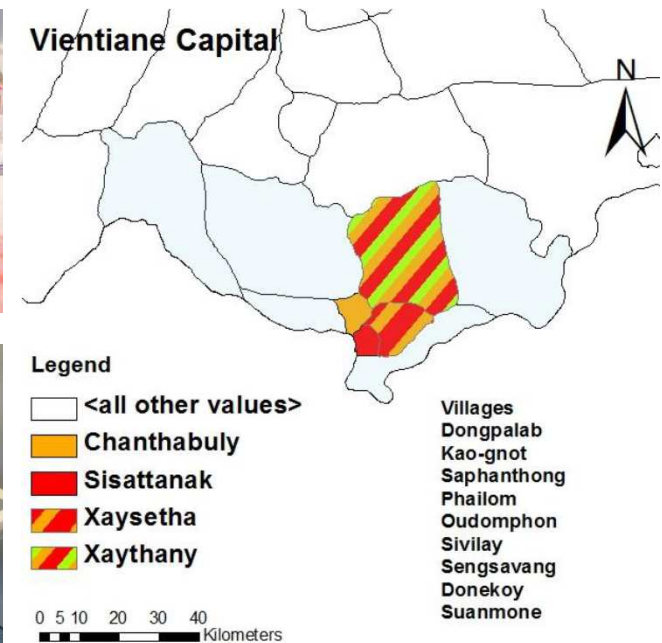
- Levels of insecticide resistance in ECOMORE2 sites against currently used insecticides of larvae and adults *Aedes aegypti* and *Ae. albopictus* populations using WHO standard bioassays



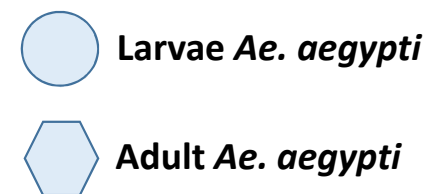
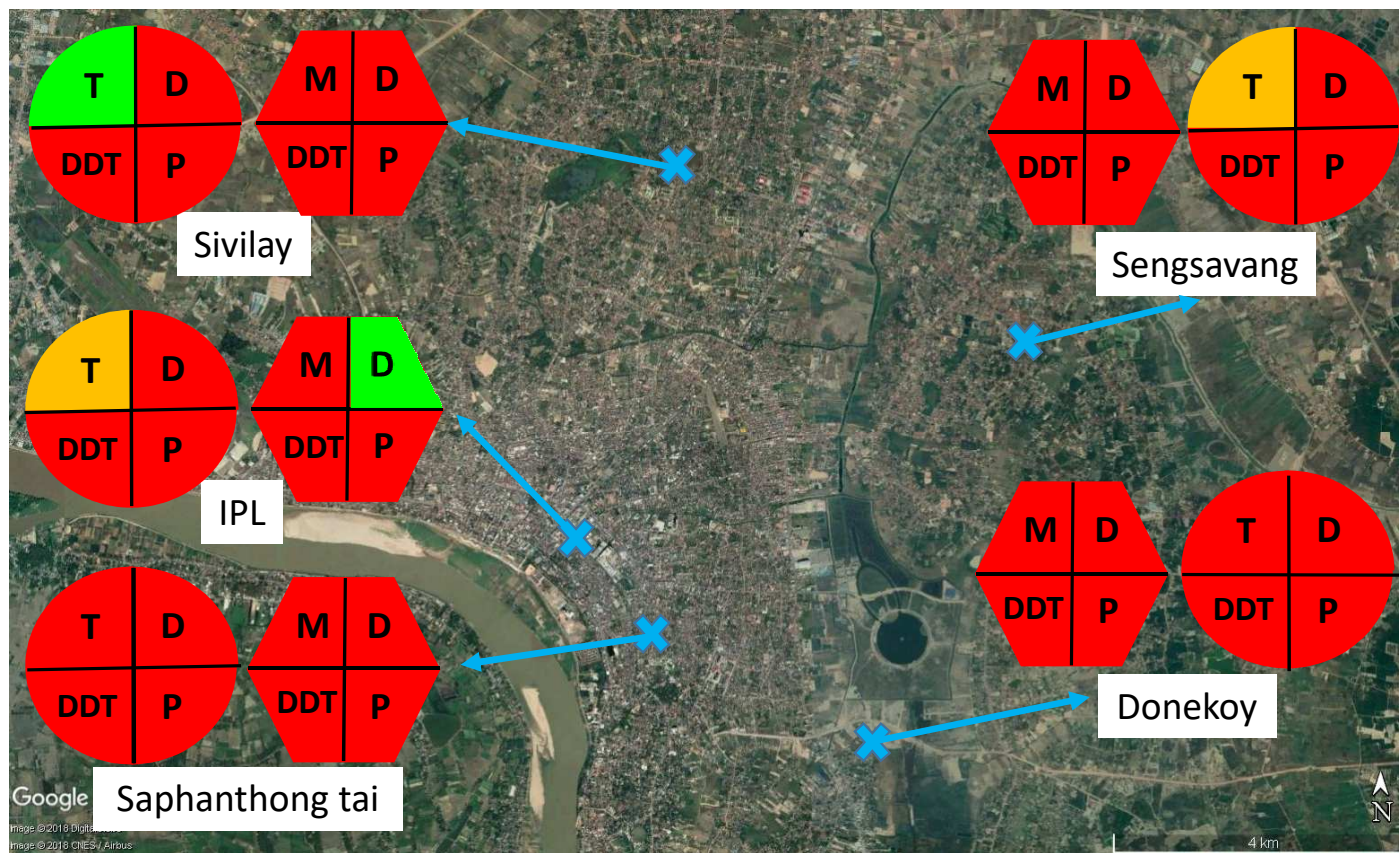
Temephos
Deltamethrin
Permethrin
Malathion
DDT

WHO criteria

- **Susceptible**
[98-100% mortality]
- **Suspected resistance**
[90-98% mortality]
- **Resistance**
[<90% mortality]



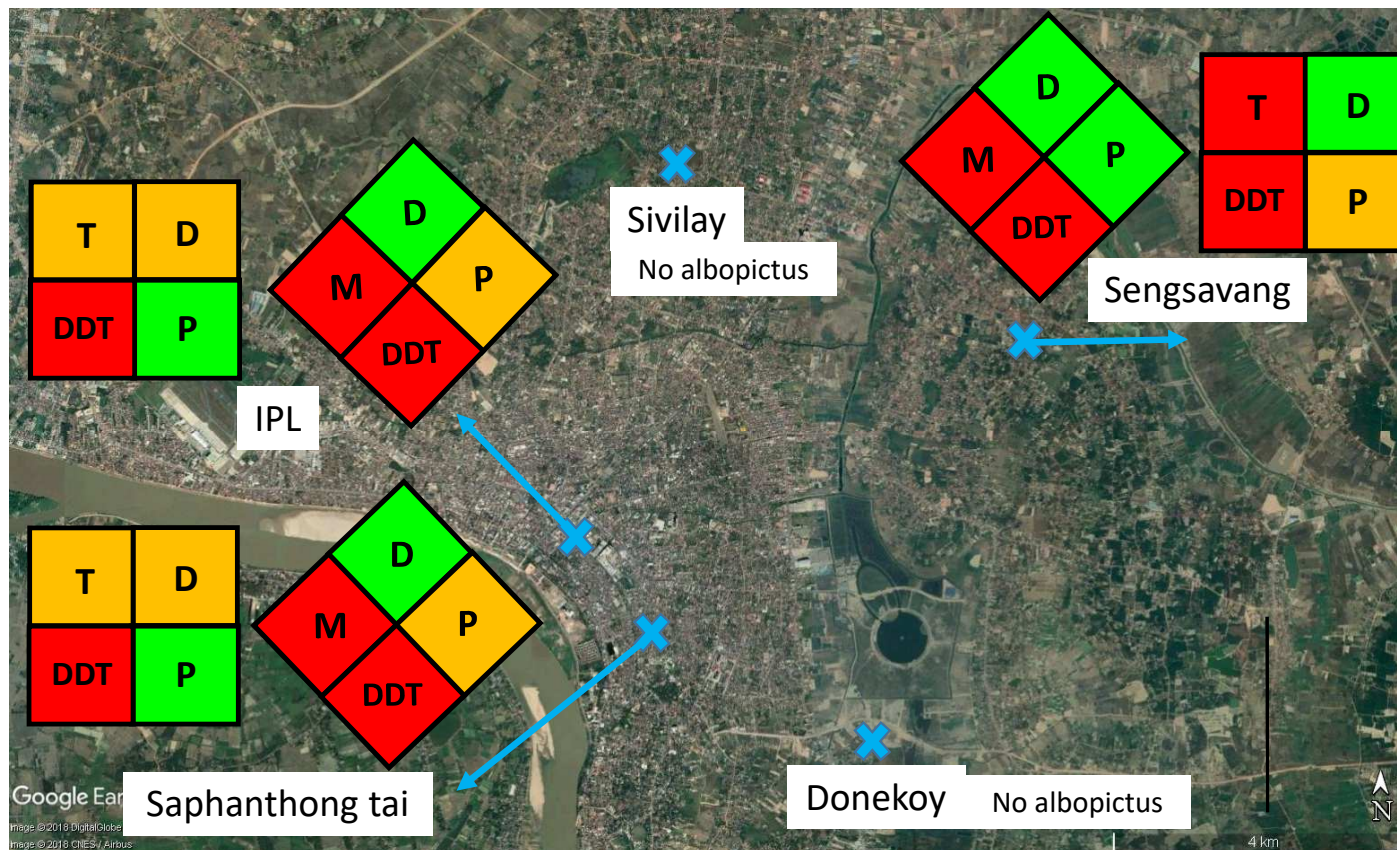
Insecticide resistance: *Aedes aegypti*



T = Temephos
 D = Deltamethrin
 P = Permethrin
 M = Malathion
 DDT

Resistant
Suspected
Susceptible
WHO tests

Insecticide resistance: *Aedes albopictus*



- Larvae *Ae. albopictus*
- Adult *Ae. albopictus*

- T = Temephos
- D = Deltamethrin
- P = Permethrin
- M = Malathion
- DDT

- Resistant**
- Suspected**
- Susceptible**
- WHO tests**

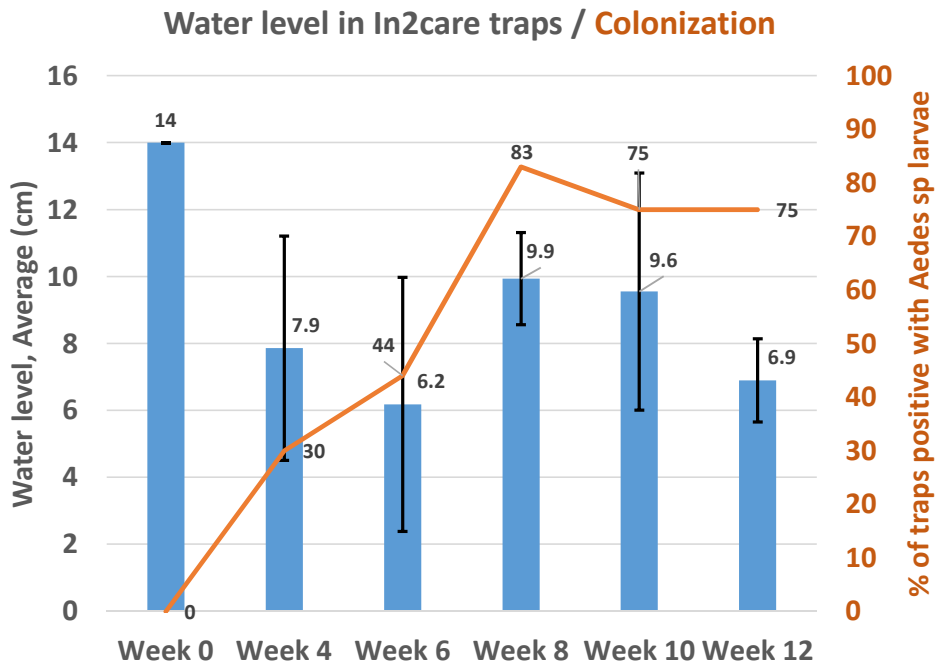
Innovative vector control strategy, In2Care traps

- Preliminary small scale study, IPL
 - Residual efficacy of the traps (water levels, insecticide efficacy)
 - Reduction of mosquito abundance in the area?

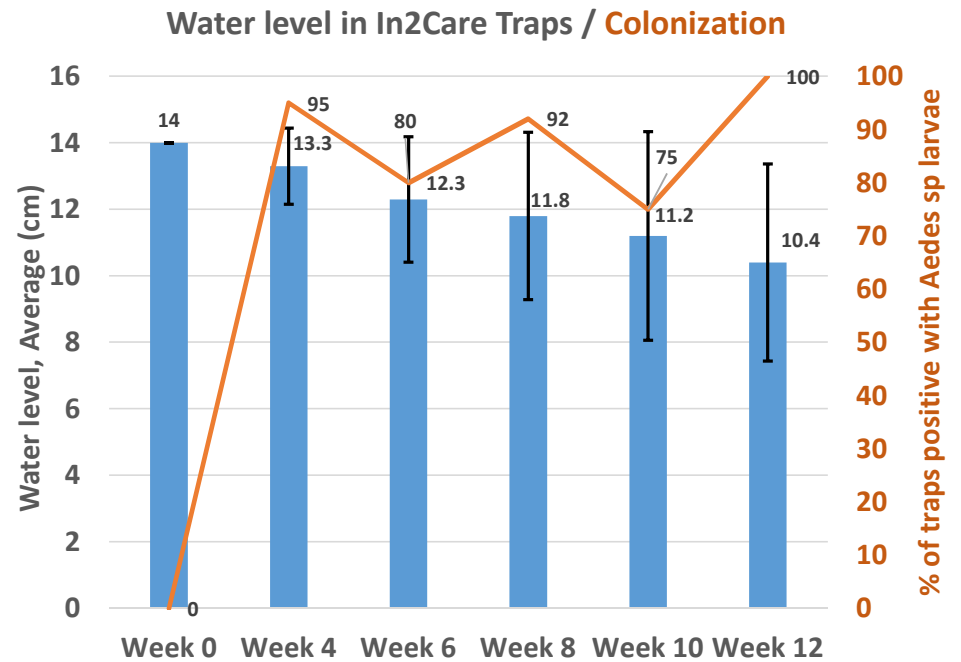


Innovative vector control strategy, In2Care traps

- Small scale study, IPL
- Residual efficacy of the traps (water levels, insecticide efficacy, 25 traps)



Dry season (Jan – April 2018)



Rainy season (July – Oct 2018)

Innovative vector control strategy, In2Care traps

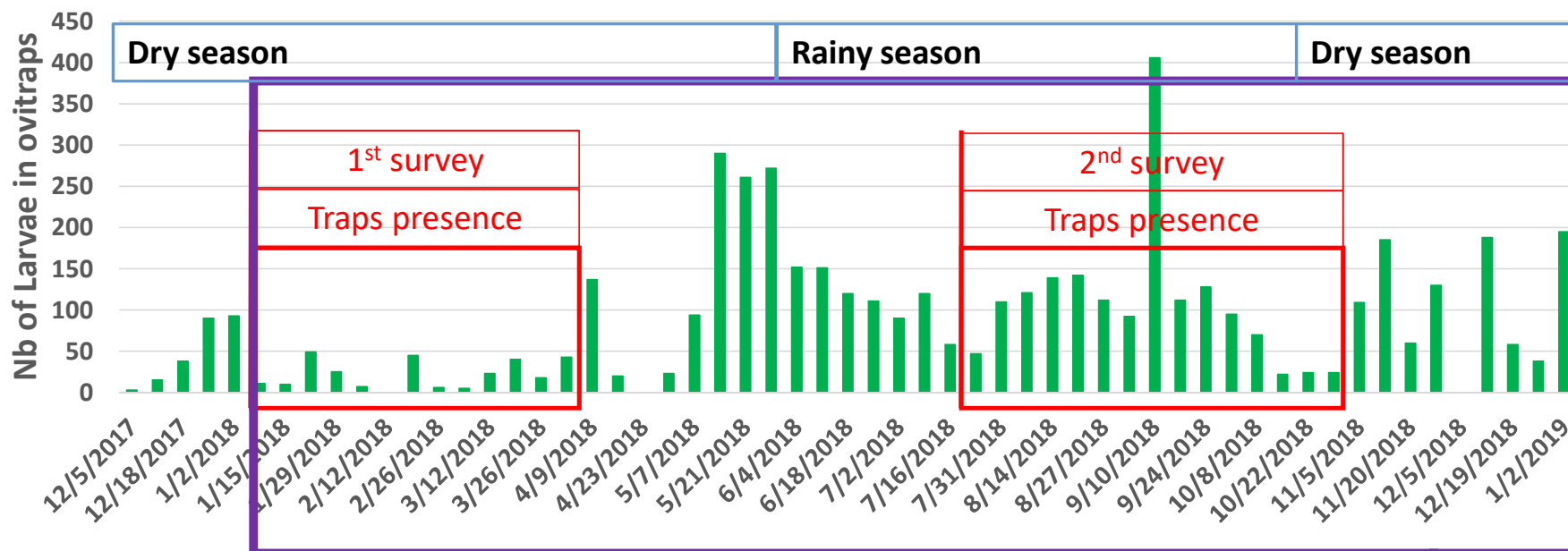
- Small scale study, IPL
 - Residual efficacy of the traps



Time	% emergence Trial 1	% emergence controls	% emergence Trial 2	% emergence controls
week 4	0	100	0	92
week 6	0	100	0	100
week 8	0	100	0	96
week 10	0.01	80	0	80
week 12	0	88	0	88

Table. Adult emergence in water sample collected in five traps every 2 weeks.

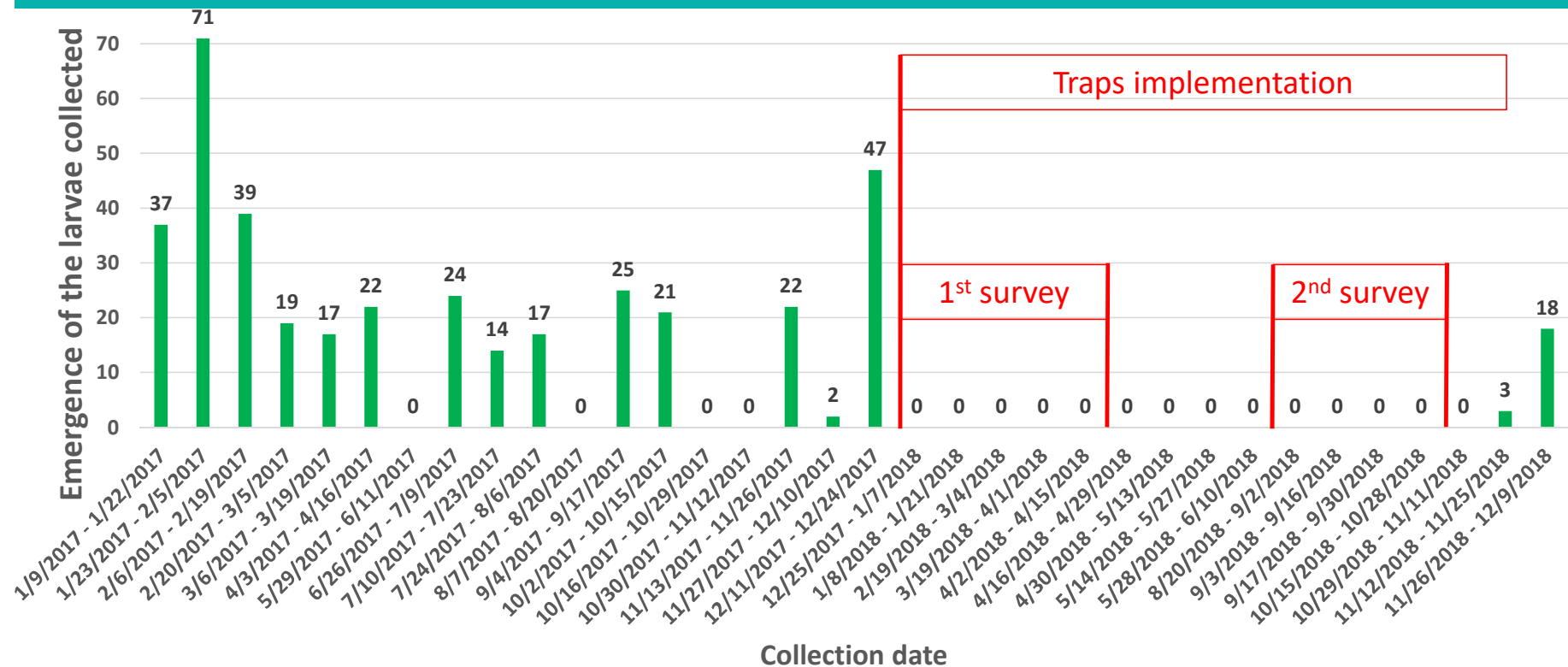
IPL small scale study: Larval survey, ovitraps



Number of Larvae (*Ae. aegypti* and *Ae. albopictus*) collected in ovitraps at IPL

No emergence of adults from the larvae collected from the ovitraps since the beginning of the first survey

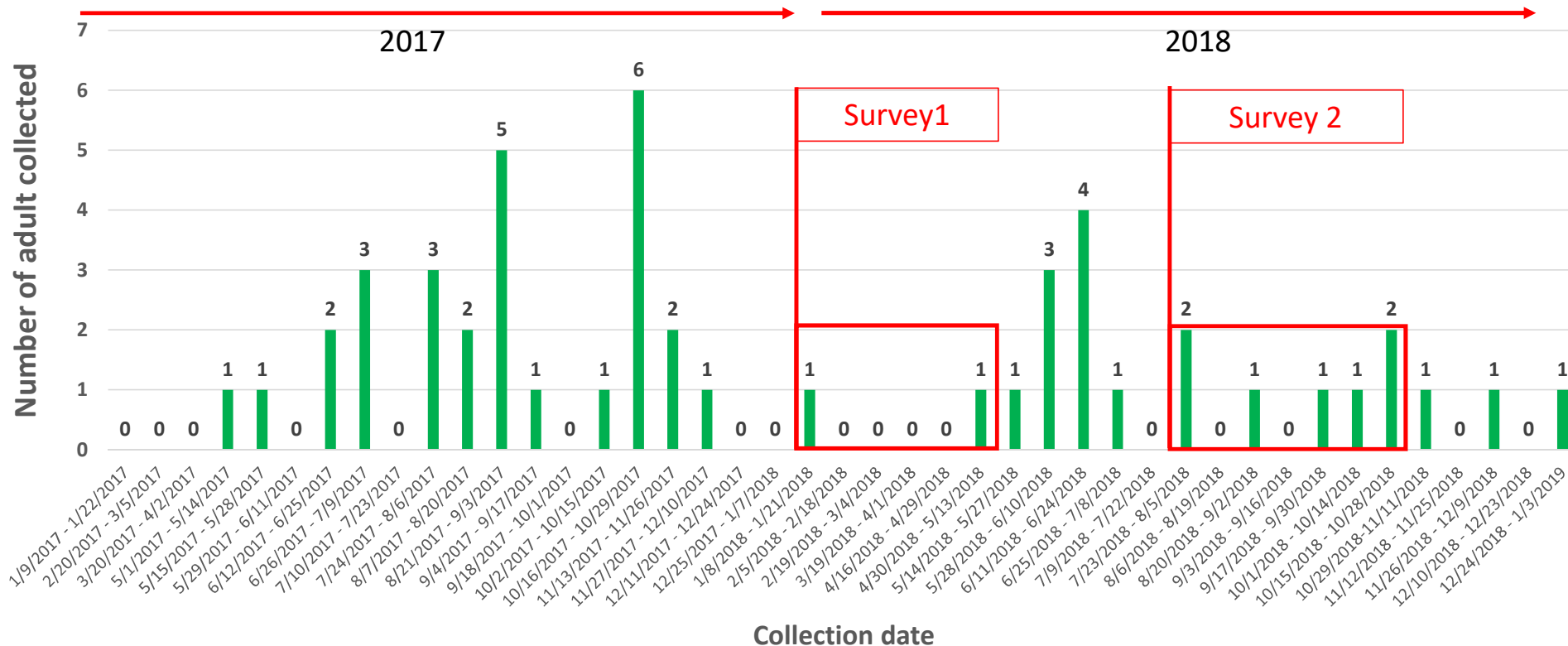
IPL small scale study: Larval survey, emergence



Number of Larvae *Ae. aegypti* and *Ae. albopictus* collected in ovitraps in IPL emergence

No emergence of adults from the larvae collected from the ovitraps

IPL small scale study: Adult survey

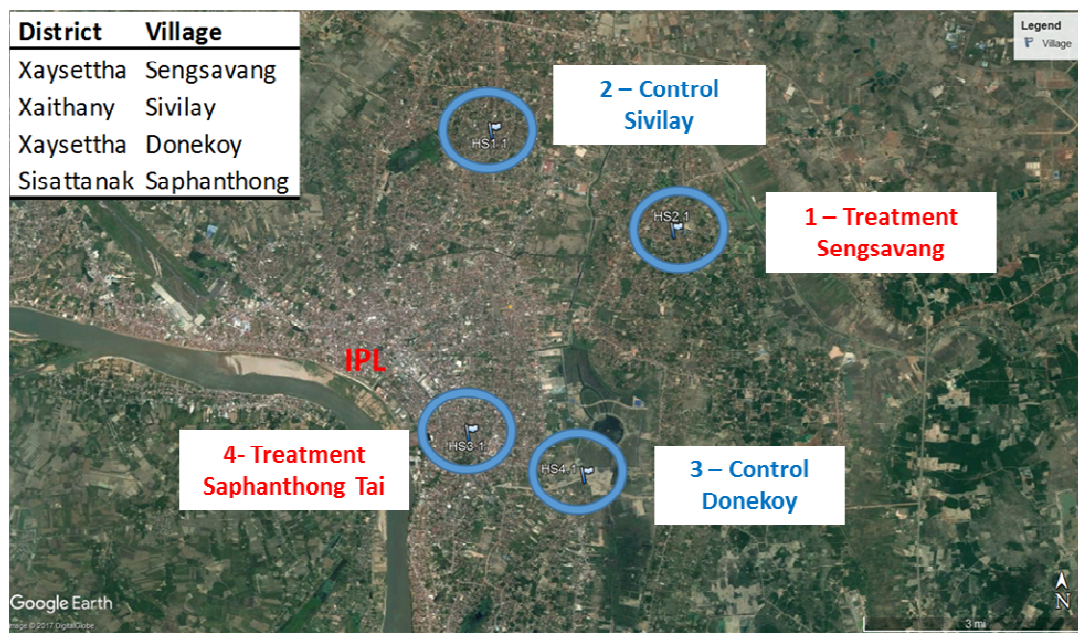


Number of Adult *Ae. aegypti* and *Ae. albopictus* collected with BG traps every 2 weeks at IPL

Innovative vector control strategy: In2Care[®] traps

Protocol:

- 2 Control sites vs 2 treatment sites
- July 2018 to October 2019
- Refill of the insecticides and water every 6 weeks



Localization of the selected sites for In2Care[®] traps implementation in Vientiane

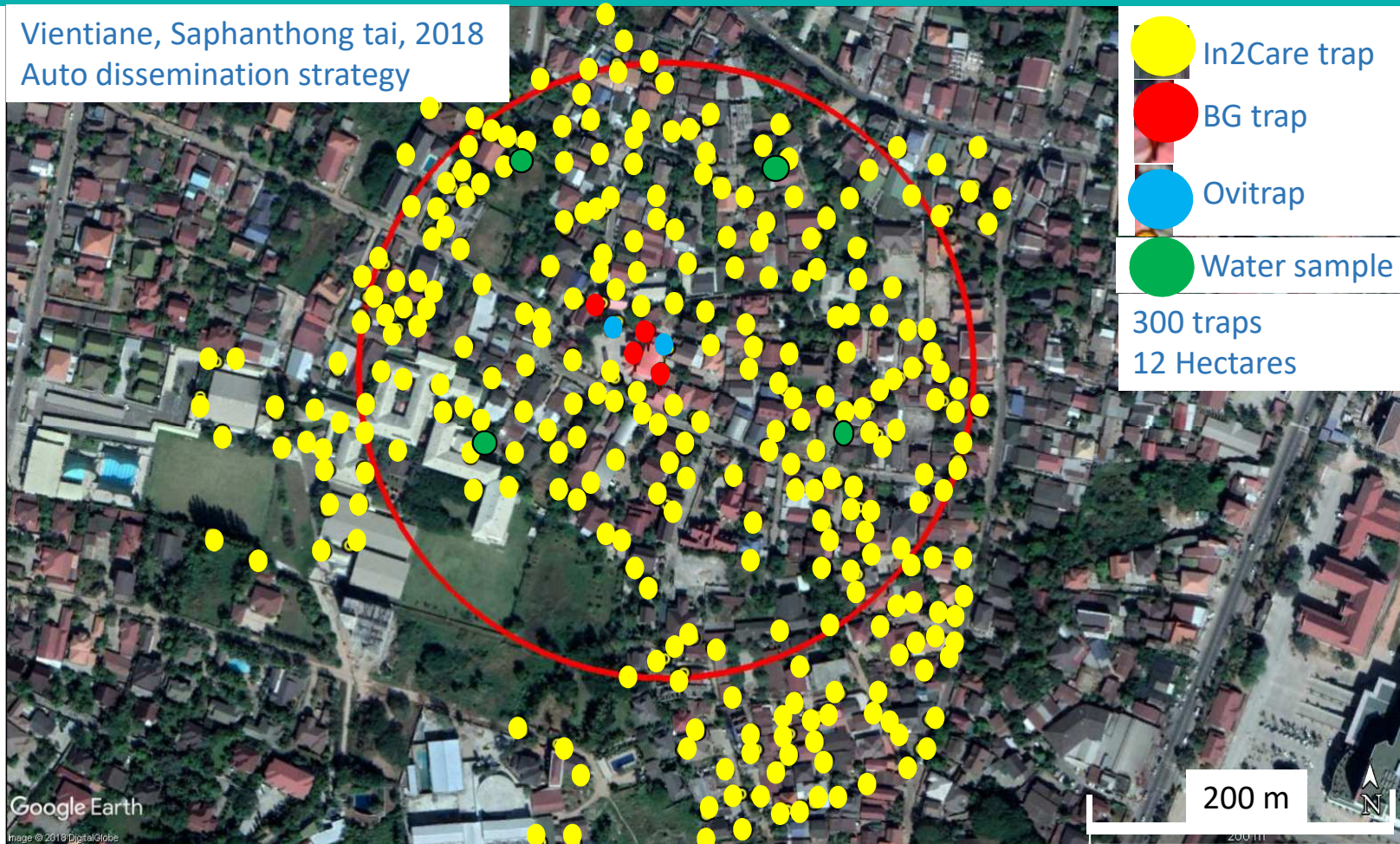


In2Care[®] trap

300 traps / village
 12 Hectares treated / village
 1 trap for 400m²

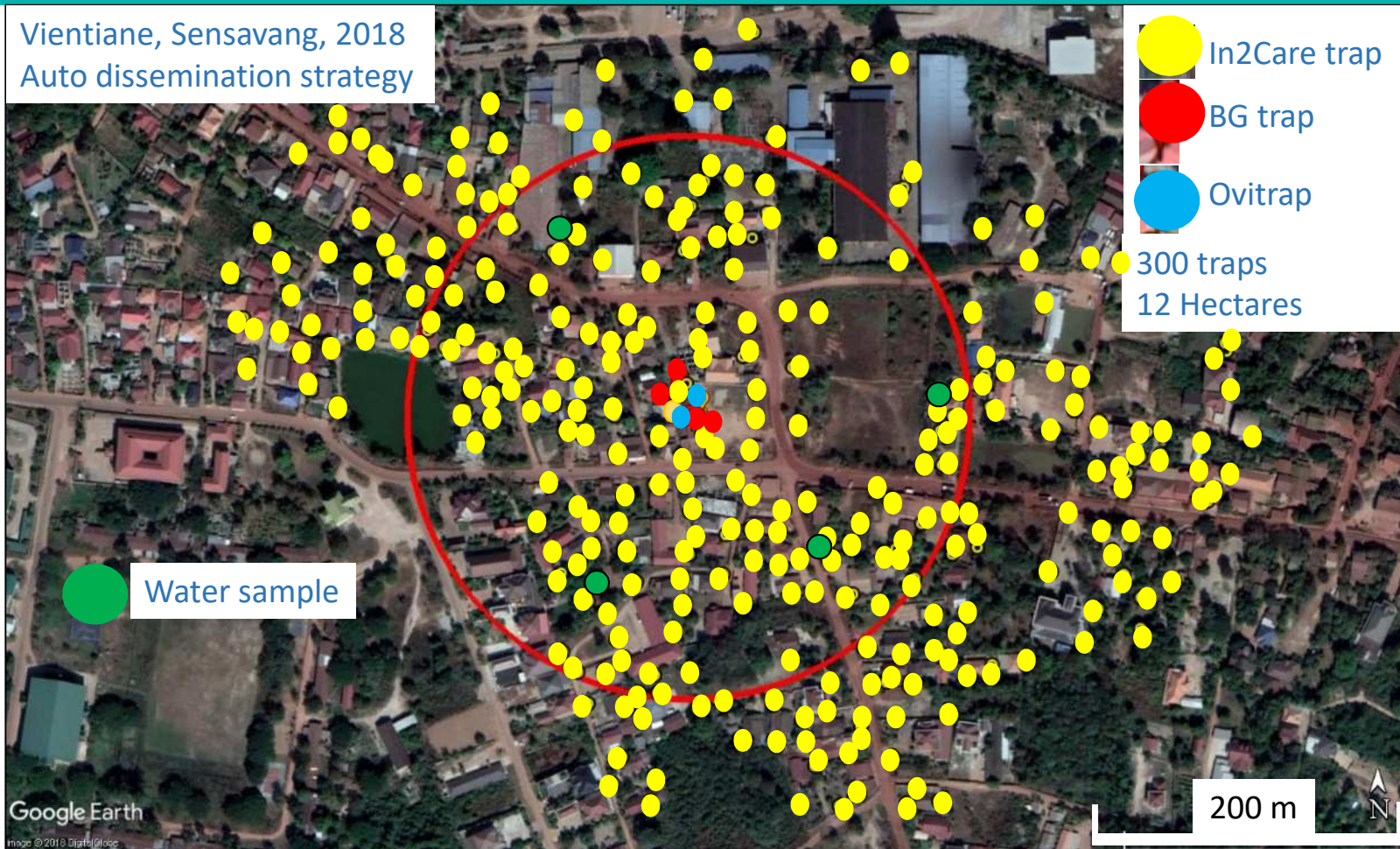
Traps location

Vientiane, Saphanthong tai, 2018
Auto dissemination strategy



Traps location

Vientiane, Sensavang, 2018
Auto dissemination strategy



New vector control sites

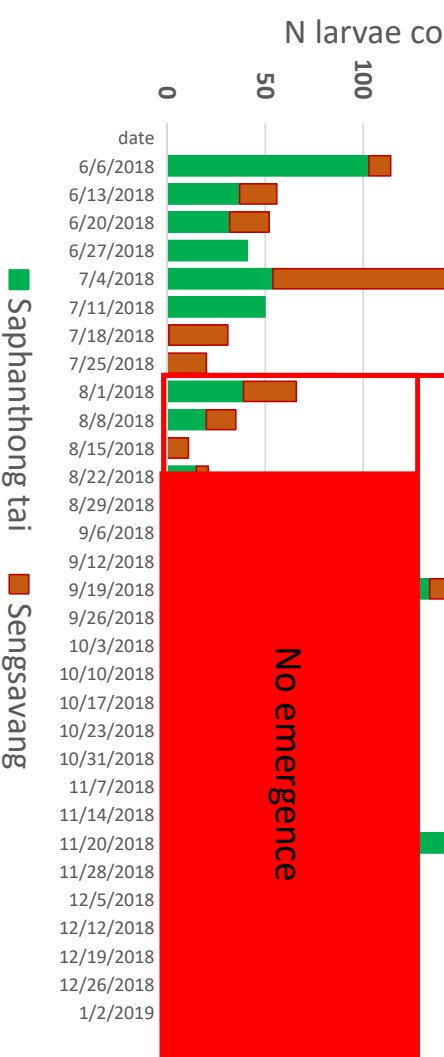
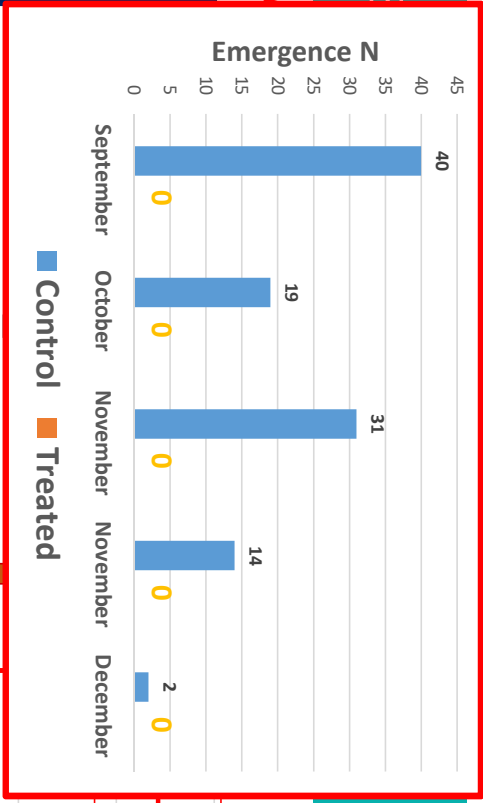
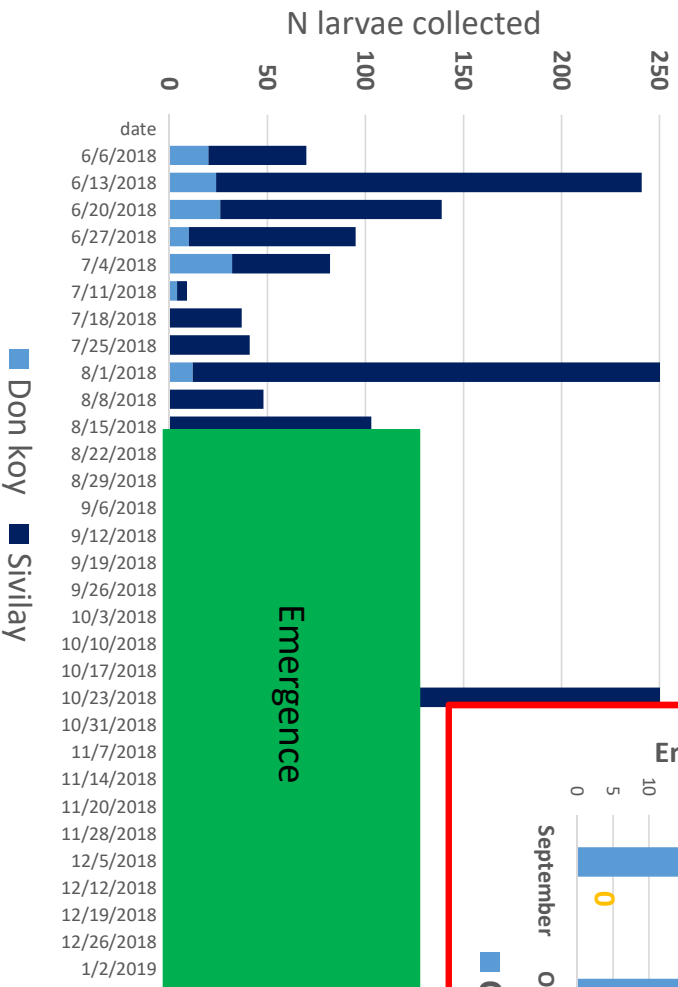
Control sites

Larvae

Insecticide sites

Traps implementation

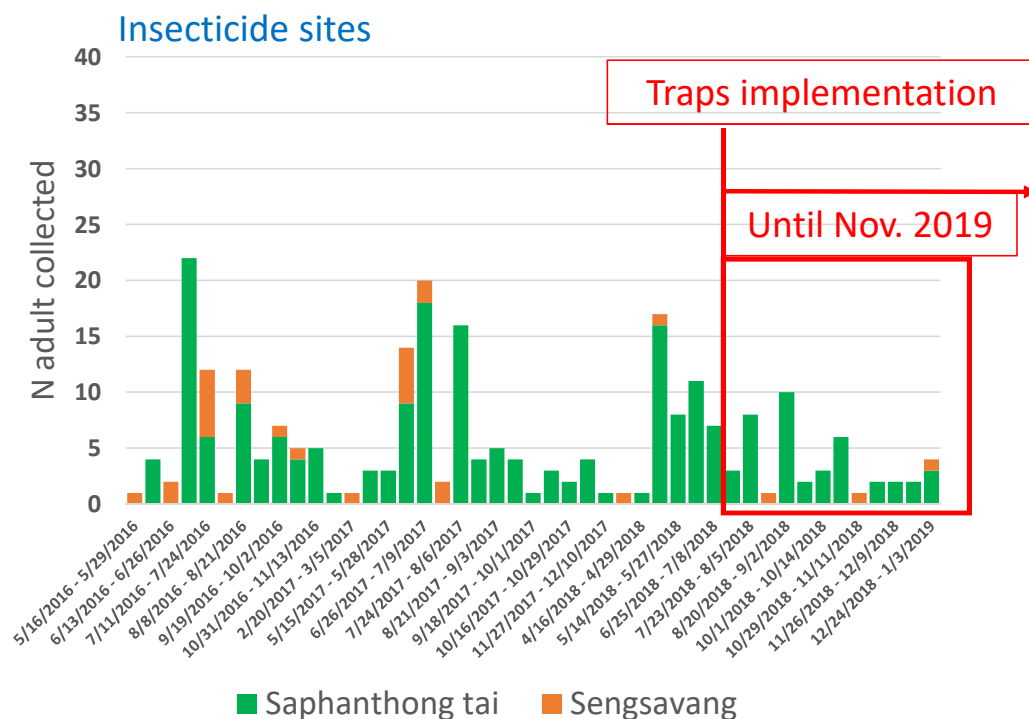
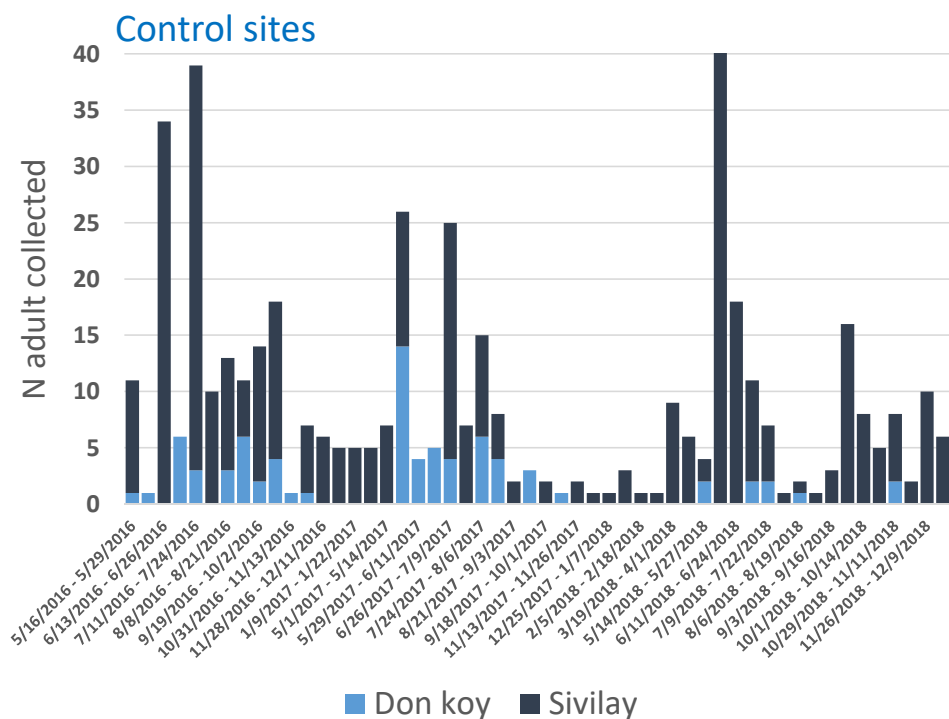
Until Nov. 2019



Number of Larvae *Ae. aegypti* and *Ae. albopictus* collected every week between May 2016 and November 2018 in Vientiane

Vectors surveillance and new control strategy

Adult collection, May 2016 – January 2019



Number of Adult *Ae. aegypti* and *Ae. albopictus* collected every 2 weeks between May 2016 and November 2018 in Vientiane Control sites VS Insecticide sites

Field implementation remarks:

- Technical organization



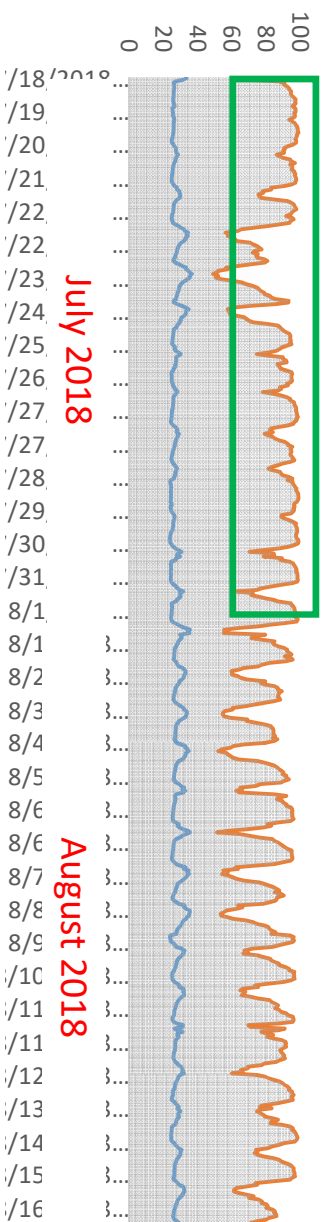
Field implementation remarks: Technical organization



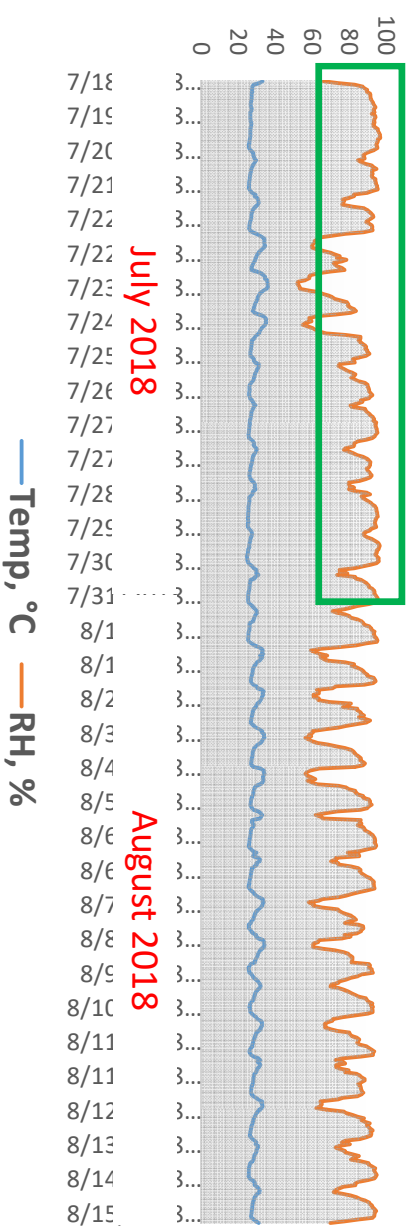
Field implementation remarks:

- Weather conditions

Saphanthongtai



Sengsavang



Field implementation remarks:

- Acceptance of the traps:
 - More than 200 houses visited per village
 - “No mosquito so no need of the traps”
 - “Not inside the house”
 - “More mosquitoes after implementation”
 - “Not interested”
 - Not understanding the use/principle of the traps
 - Larvae still present: IGR



Knowledge Transfer

Laos - Philippines



Cambodia - Laos



Laos - Cambodia



Acknowledgements

- IPL technicians, drivers and scientists
- Military staff
- Village volunteers
- Mayors
- District health officers

