# MOSQUITO CONTROL EVALUATION IN LIPA CITY, BATANGAS

**Institut Pasteur**

**Research Institute for Tropical Medicine**

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# Dengue cases: Philippines and Lipa City

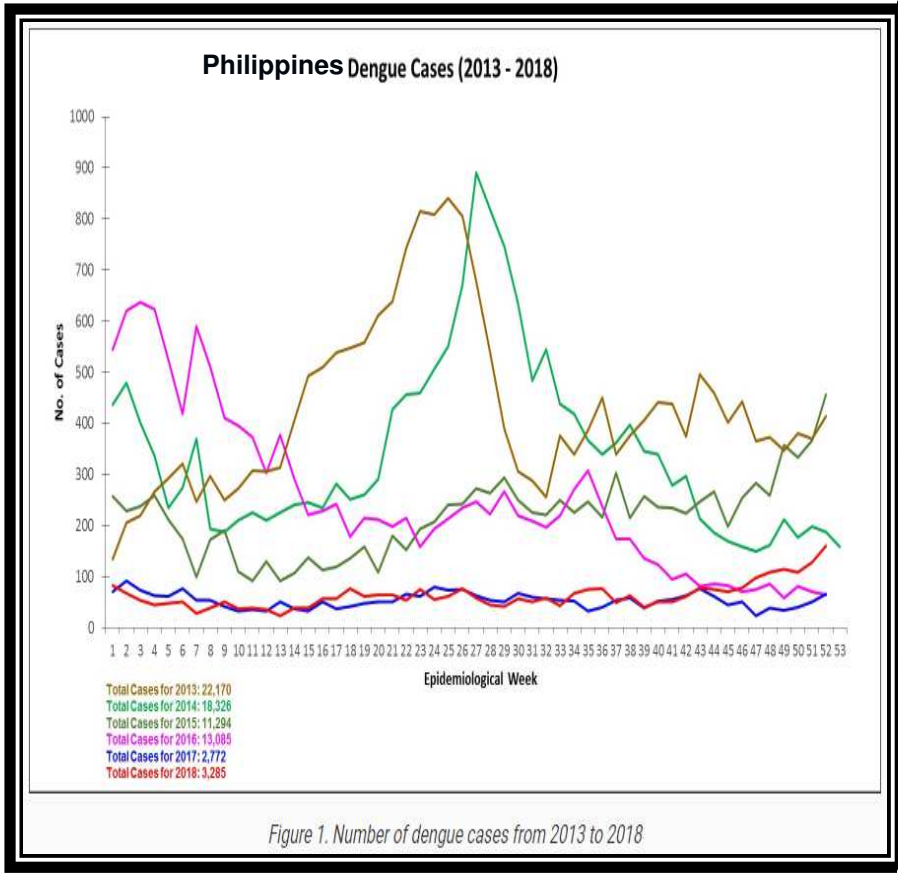
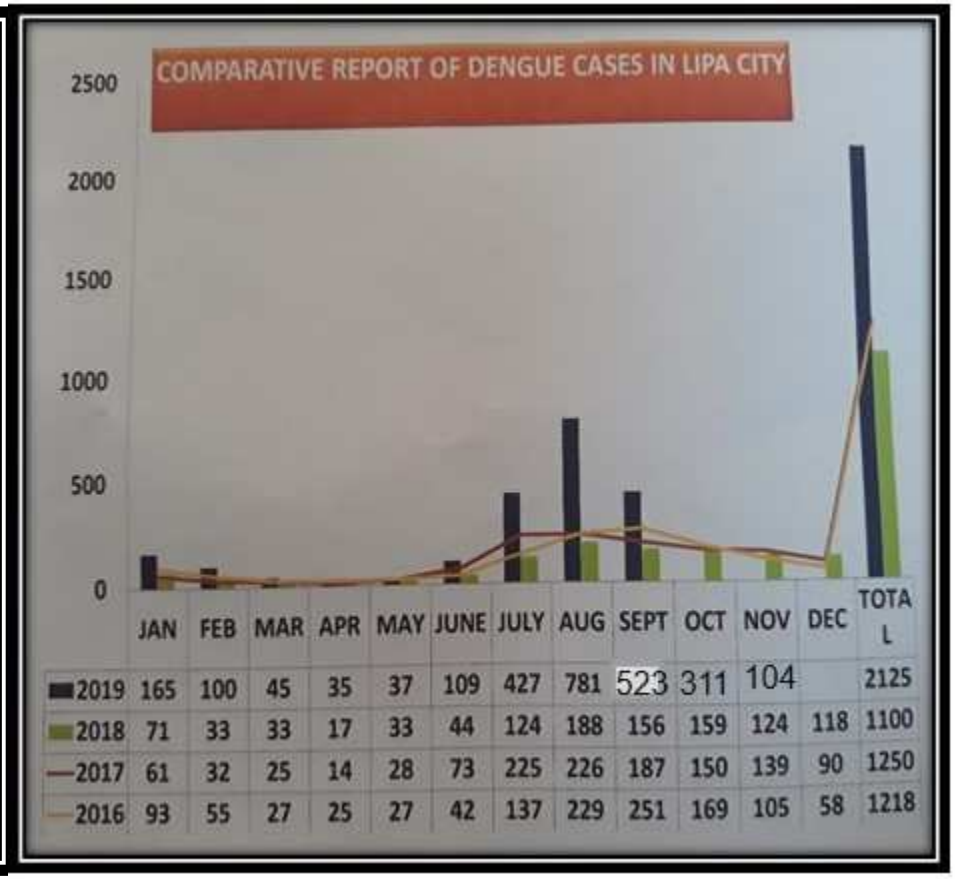



*Figure 1. Number of dengue cases from 2013 to 2018*




| | JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 165 | 100 | 45 | 35 | 37 | 109 | 427 | 781 | 523 | 311 | 104 | | 2125 |
| 2018 | 71 | 33 | 33 | 17 | 33 | 44 | 124 | 188 | 156 | 159 | 124 | 118 | 1100 |
| 2017 | 61 | 32 | 25 | 14 | 28 | 73 | 225 | 226 | 187 | 150 | 139 | 90 | 1250 |
| 2016 | 93 | 55 | 27 | 25 | 27 | 42 | 137 | 229 | 251 | 169 | 105 | 58 | 1218 |

- **January to November 9, 2019= 395,296 dengue cases nearly 12,000 deaths**
- **Lipa City as of Novemebr, 2019 has 2,638 dengue cases and 3 deaths (Aug data)**

# I. GENERAL OBJECTIVE

Assess a mosquito control on how it can reduce the extent of dengue transmission in children 6 to 16 years of age.

# II. SPECIFIC OBJECTIVES

- Describe current surveillance system in Lipa City, Batangas
- Implement Disease Data Management System (DDMS)
- Geolocalise dengue cases in Lipa City during the past 3 years
- **Implement a community-based mosquito vector control program in a vaccination site**

# Summary of 2019 Project Activities

| Activities | J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hiring of Staff | X | | | | | | | | | | | |
| National Stakeholders Meeting | | x | | | | | | | | | | |
| Meetings with Internal Partners (DEBS, Virology, RITM) | | x | x | | | | | | | | | |
| Preparation and signing of MOA (Lipa City & RITM) | | x | x | x | | | | | | | | |
| GPS Mapping (Recruitment of Cohort) | | | | x | x | x | x | x | | | | |
| Encoding of Coordinates | | | | | x | x | x | x | x | x | | |
| Training for/ Participant recruitment | | | | | x | x | | | | | | |
| Training for Saliva Collection | | | | | x | | | | | | | |
| Recruitment and encoding of participants information | | | | | | x | x | x | x | x | x | |
| Saliva Collection | | | | | | | x | x | x | x | x | x |
| Installation of GATs | | | | | | | | | | x | | |
| Installation of In2Care Traps | | | | | | | | | | x | | |
| Recording of data from GATs (Sticky Traps) | | | | | | | | | | | x | x |

# Upcoming Project Activities

| Activities | J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remapping of installed traps using Google Maps | | | | | | | | | | | X | X |
| Biweekly retrieval and replacement of sticky cards | | | | | | | | | | | X | X |
| Recording of data (mosquito surveillance from GATs (Sticky Traps) | | | | | | | | | | | X | X |
| In2Care trap monitoring (1 month after installation) | | | | | | | | | | | X | |
| In2Care trap refill (2 month after installation) | | | | | | | | | | | | X |

# National Stakeholders meeting (8 Feb 2019)

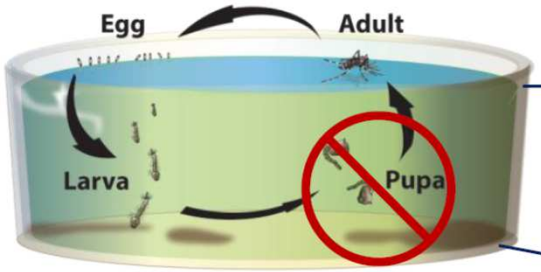
# II. METHODOLOGY (Mosquito Vector Control Evaluation)

## In2Care

- Pyriproxifen
  - Insect Growth Regulator (IGR)
  - Inhibits the life cycle of mosquitoes
  - Kills all mosquito larvae inside the trap
- *Beauveria bassiana*
  - A fungus that is safe for humans and mammals but toxic to mosquitoes
  - Kills adult mosquitoes 8-10 days after becoming infected inside the trap
  - Inhibits dengue virus development

# How does the trap work?

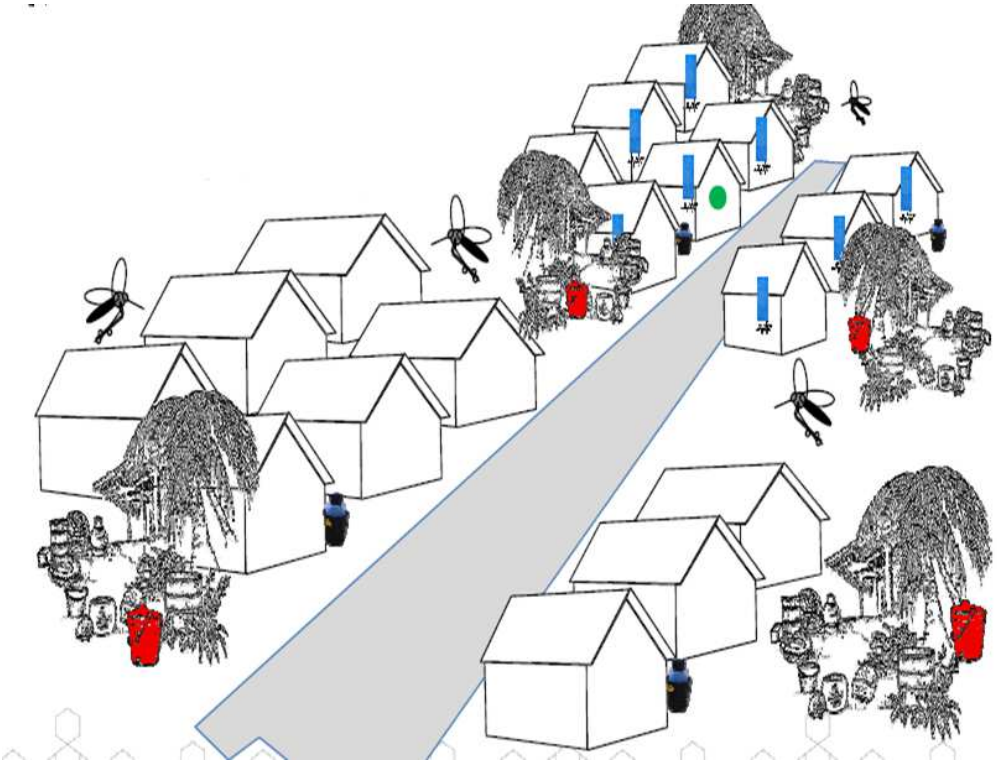
In2Care trap actives kill the pupal stage. Dead pupae sink to the bottom and get eaten by larvae. No adults will emerge from the trap water.




*Tip: explain this mode of action to your local vector control institution to avoid getting fined for having sites with live larvae.*

Mosquitoes are not trapped (or seen in the trap water) but are contaminated, so that they will spread larvicide to other small breeding sites; killing larvae also there. Contaminated females will die after a few days before they can transmit disease. Because of the slow-killing action of the trap larvicide **you will see live larvae present** in the traps but these will die before they pupate into adults.

# Where to install the traps?



# Gravid Aedes Trap (GAT)

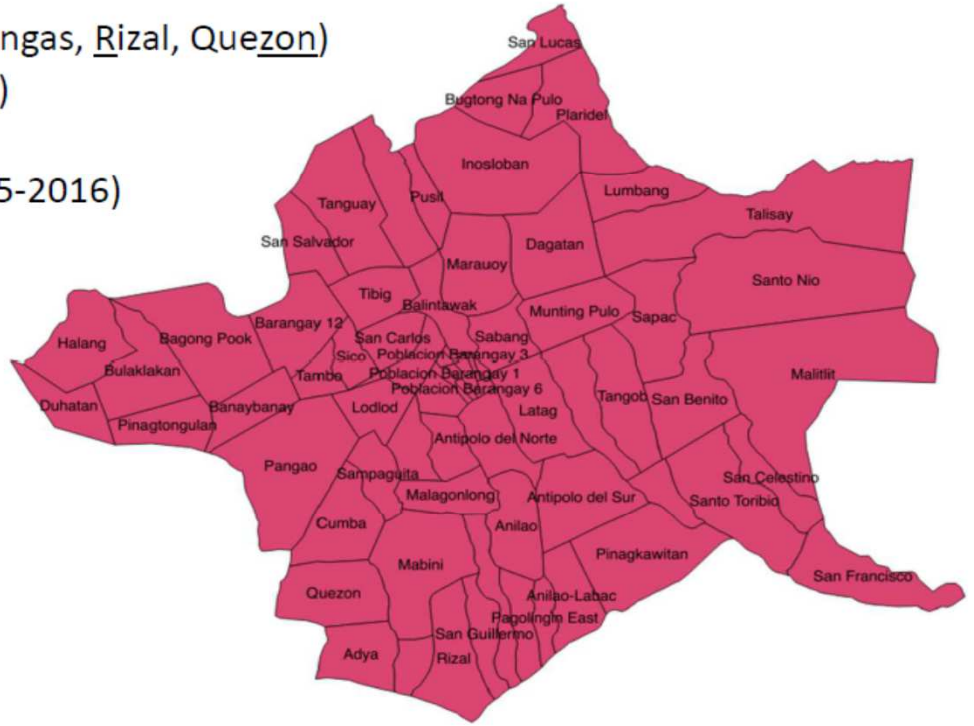
- Will be used to measure impact of auto-dissemination tool
- Mosquito trap for  determining mosquito density
- Will be checked biweekly

c/o Olivier Telle, CNRS, Delhi

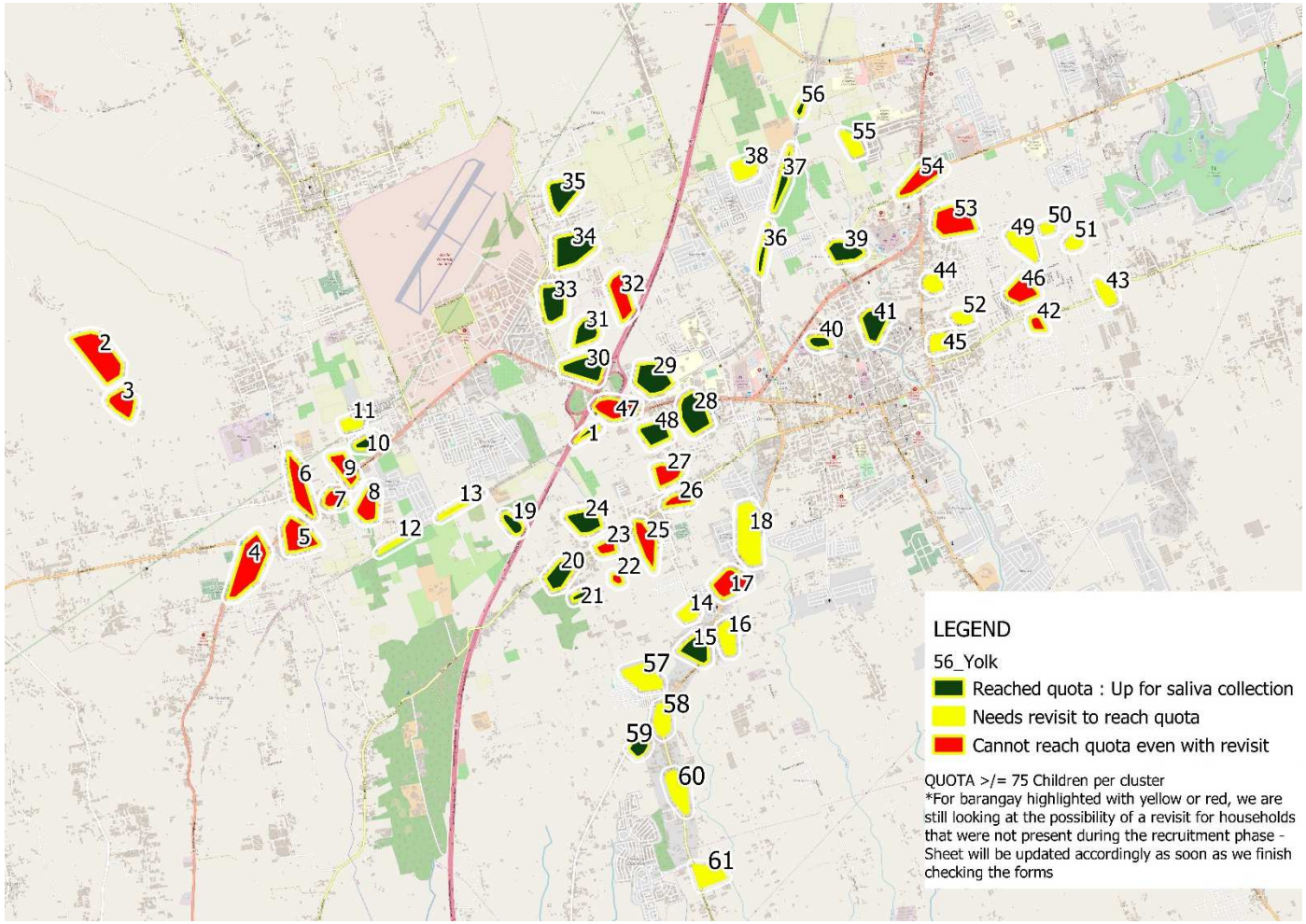
# Study Site: Lipa City

- Philippines
  - Region IV-A CALABARZON (Cavite, Laguna, Batangas, Rizal, Quezon)
    - Batangas Province (34 municipalities/cities)
      - Lipa City (72 barangays)
        - 67 Public Primary Schools (SY 2015-2016)

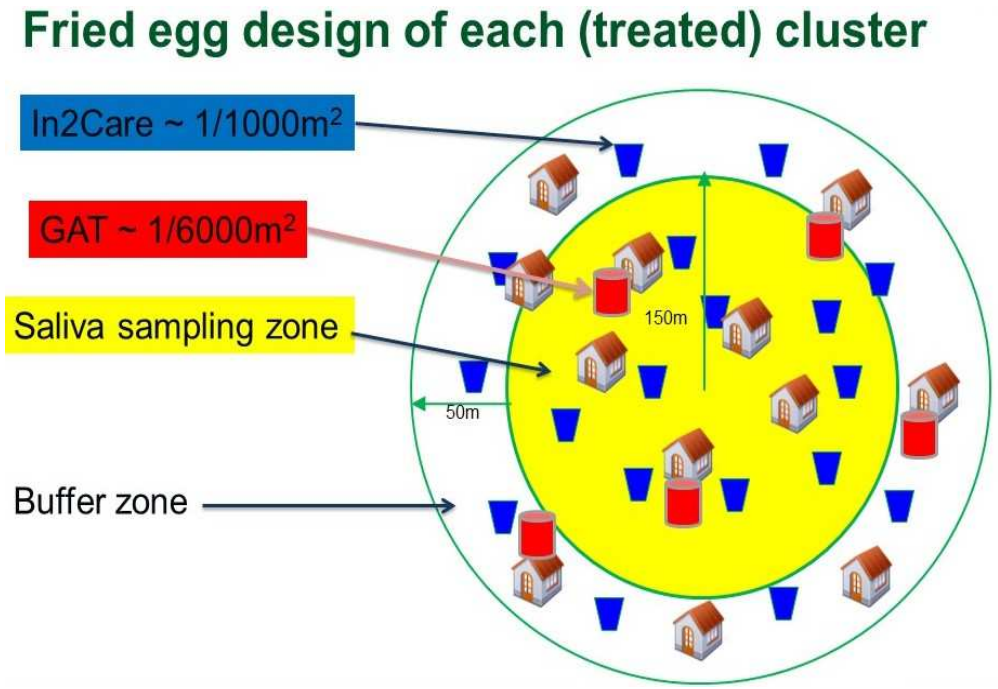
209.40 km$^2$ (80.85 sq mi)
312 m (1,024 ft)
332,386 (38th in country)
1st Class
It is located 78 kilometres (48 mi)
south of Manila

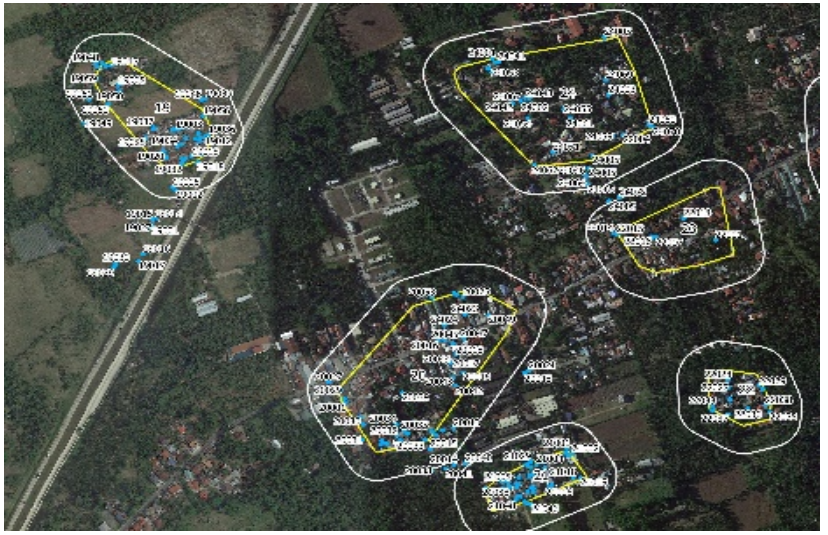


# Map of Clusters

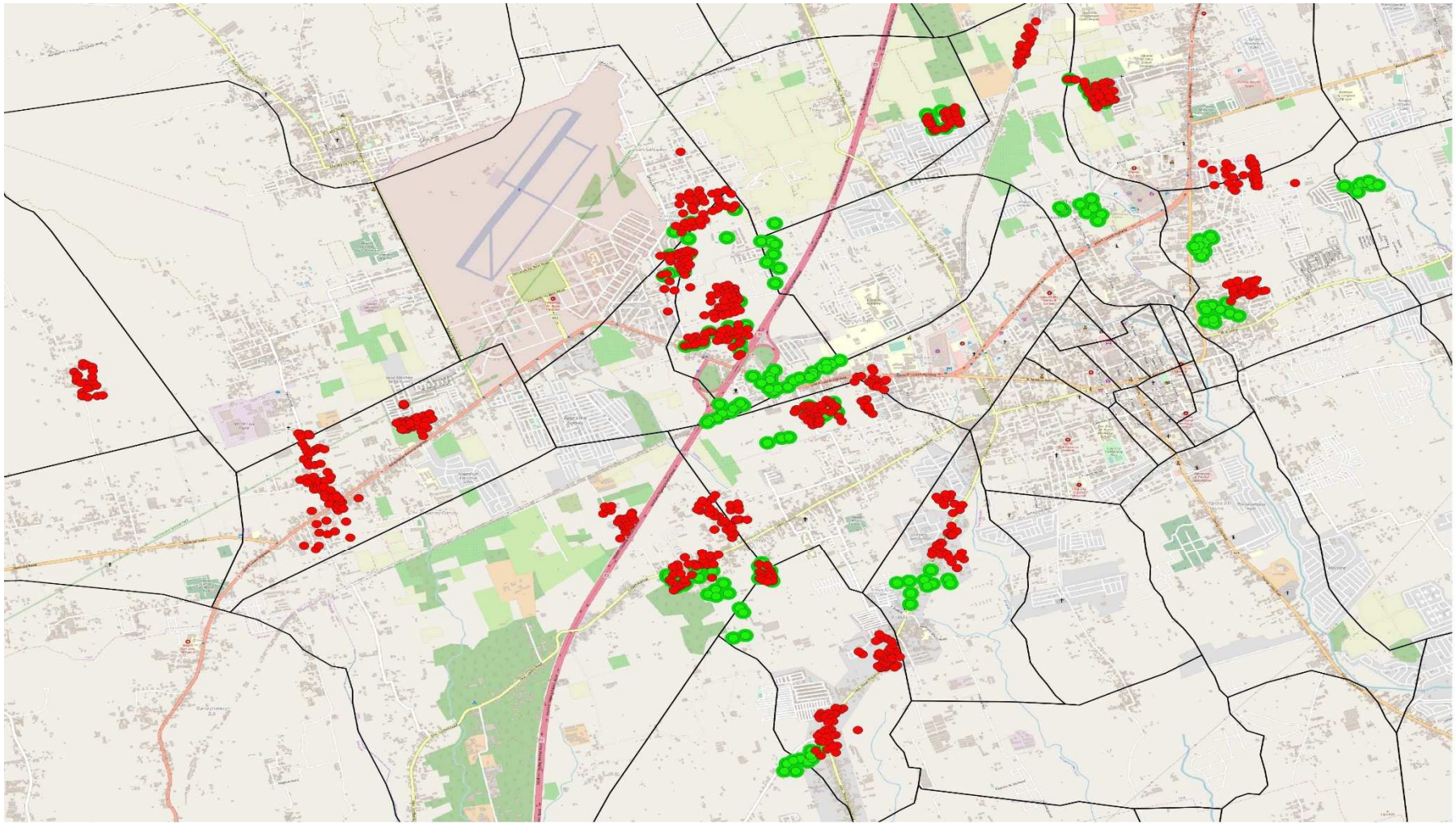


# Theoretical and Actual Trap Installation lay-out

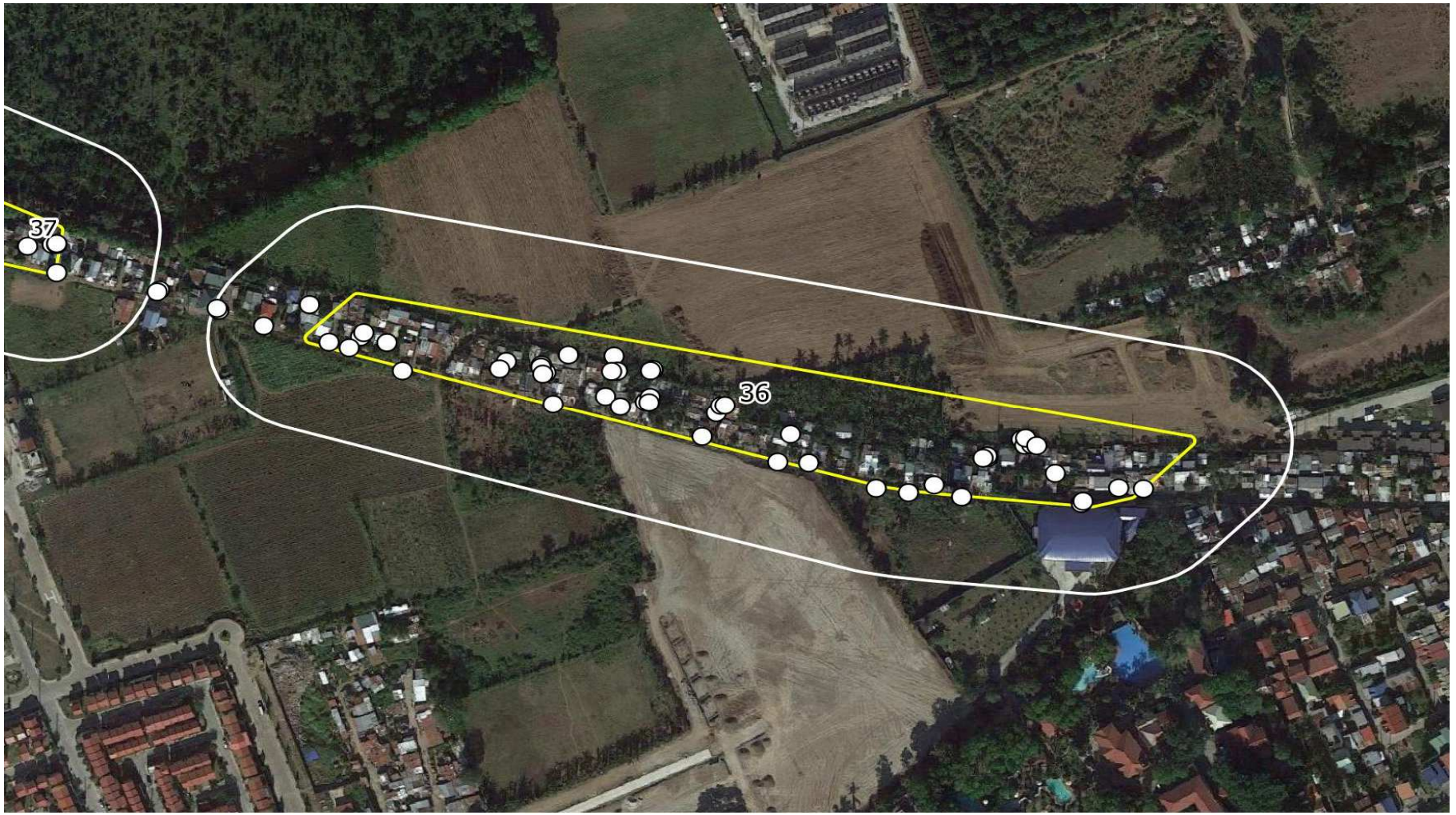


# Geolocalized positions of In2Care and GATs



# Positioned In2Care traps within cluster



## METHODOLOGY:
## *PREPARATION FOR TRAP INSTALLATION*

- Courtesy call with the Barangay
- Orientation of BHWs and Teams
- Division of labor (Clusters → Quadrants)

# METHODOLOGY: *TRAP INSTALLATION*

- Recording of GPS coordinates in the master list.
- Availability of the household owner for interview

# METHODOLOGY: *OBTAINING CONSENT*

- RESEARCHER introduction and the institution doing the study
- NOTING the NAME of the household owner – cross matched with the masterlist.
- STUDY INTRODUCTION – “Mosquito Control Evaluation in Lipa City, Batangas”.
- Approval, signing.

# METHODOLOGY: *GENERAL INSTRUCTIONS*

- **Gravid *Aedes* Trap** → 1/6000 $m^2$(assignment of households not to follow a strict spacing interval)

  *One inside, One outside – bimonthly retrieval and replacement of sticky cards

- **In2Care Mosquito Trap** → 1/1000 $m^2$ (one trap every 40 steps on the average)

  *1/400 meter squared – optimal distance between traps, monthly monitoring, refill every 2 months

# METHODOLOGY: *GENERAL INSTRUCTIONS*

- **Gravid *Aedes* Trap** → add fish flakes to the food to serve as attractant for the gravid mosquitoes
- **In2Care Mosquito Trap** → Avoid direct contact with sunlight (to avoid fast evaporation of water) and rain (to avoid overflowing)

## Difficulties experienced

1. Reading of maps for BHWs
2. Carrying of traps from one house to another
3. Availability of household owners and placement of traps
4. Lack of interest from household owners

## Solutions

1. Use of Google Maps and satellite view to place legends or landmarks for easier referencing of HH
2. Use of Ecobags, strollers and other containers
3. Adjustments on the distance between traps
4. Re-explaining the consent form to the household owners

# Difficulties experienced

- Trap revisits and maintenance
  1. Irresponsible household (not taking care of the traps)
  2. Households not available/ out of their houses (takes longer time to retrieve the sticky cards)
  3. Presence of larvae in GA Traps

# Solutions

- Trap revisits and maintenance
  1. Reminders for the household owners
  2. BHW to do the collection of the sticky cards
  3. Throwing of water with larvae and replacing of water

# Status of Trap Installation

| As of November 25, 2019 | Total | Average per Cluster |
|---|---|---|
| **Total number of In2care installed*** | **734** | **32** |
| **Total number of GATs installed**** | **400** | **20** |

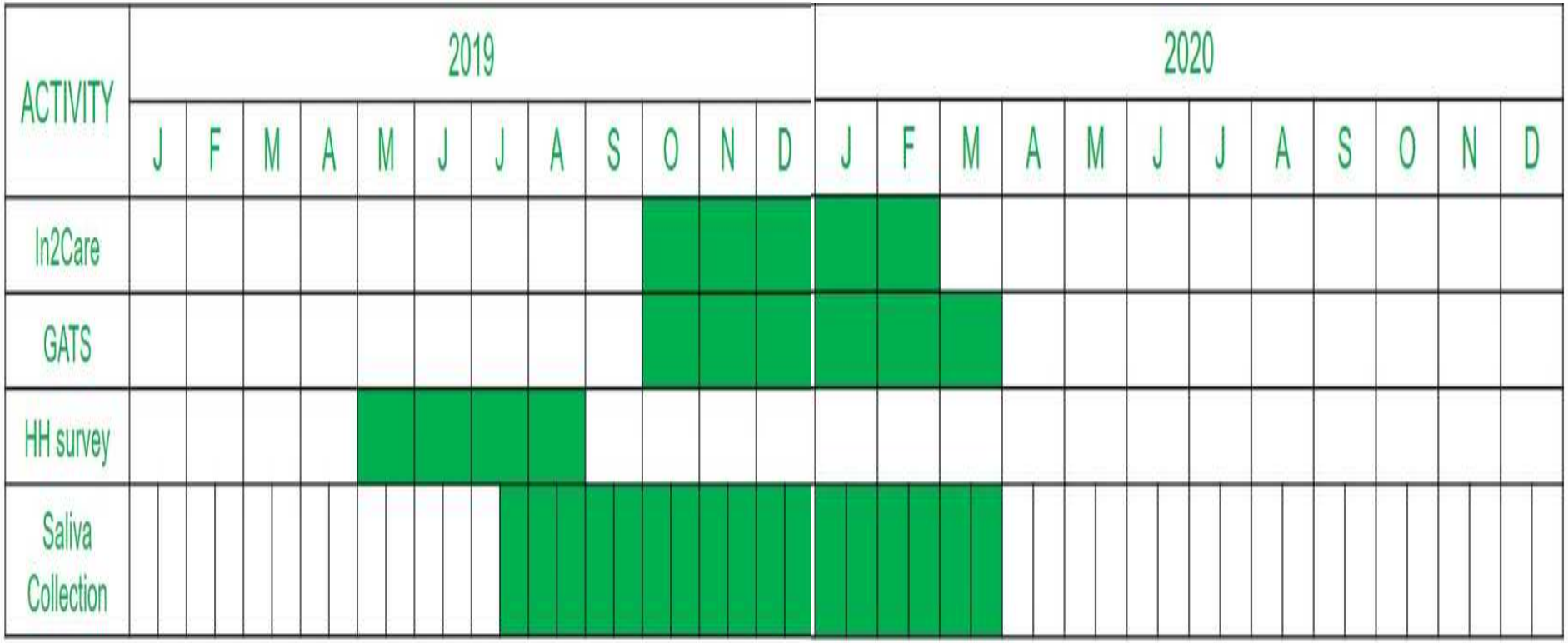
*23 treatment clusters

**10 households/cluster (1 indoor, 1 outdoor)
**10 treatment clusters, 10 control clusters
Cluster size range from 24, 500m$^2$ -77,841 m$^2$
In2Care Traps  from 16 to 59 traps/cluster

16 to 59

# Collection from GATs

# Activity Calendar 2019-2020



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# Thank you.