Dengue control in urban environnement
ການຄວບຄຸມພະຍາດໄຂ້ເລືອດອອກໃນສະພາບແວດລ້ອມໃນຕົວເມືອງ

Olivier Telle

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ສະຖາບັນ ປັດສະເຕີ ລາວ
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Aims:
ເປົ້າໝາຍ

- 1) Understand how dengue spread in Vientiane:
- ເຂົ້າໃຈວ່າພະຍາດໄຂ້ເລືອດອອກແຜ່ຂະຫຍາຍໃນນະຄອນຫຼວງວຽງຈັນໄດ້ຄືແນວໃດ

- 2) Relation between environment (socioeconomical factors) and dengue incidence
- ການພົວພັນລະຫວ່າງສະພາບແວດລ້ອມ (ປັດໃຈດ້ານເສດຖະກິດສັງຄົມ) ແລະ ກໍລະນີການເກີດພະຍາດໄຂ້ເລືອດອອກ

- **Method:** Spatial epidemiology, GIS study
- ວິທີການ: ການລະບາດວິທະຍາໃນທ້ອງຖິ່ນ, ບົດສຶກສາລະບົບຂໍ້ມູນທາງພູມມີສາດ (GIS)
- **Data:** Surveillance system and fieldwork study (detection of antibodies in population)
- ຂໍ້ມູນ: ລະບົບການເຝົ້າລະວັງ ແລະ ບົດສຶກສາໃນພາສະໜາມ (ການກວດຫາ ແລະ ພູມຕ້ານທານຂອງຮ່າງກາຍໃນປະຊາກອນ)

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Conventional fumigation and larviciding are hard to implement in modern urban cities
ການພົ່ນຢາ ແລະ ຂ້າໜອນນ້ຳແມ່ນປະຕິບັດຍາກໃນຕົວເມືອງທັນສະໄໝ

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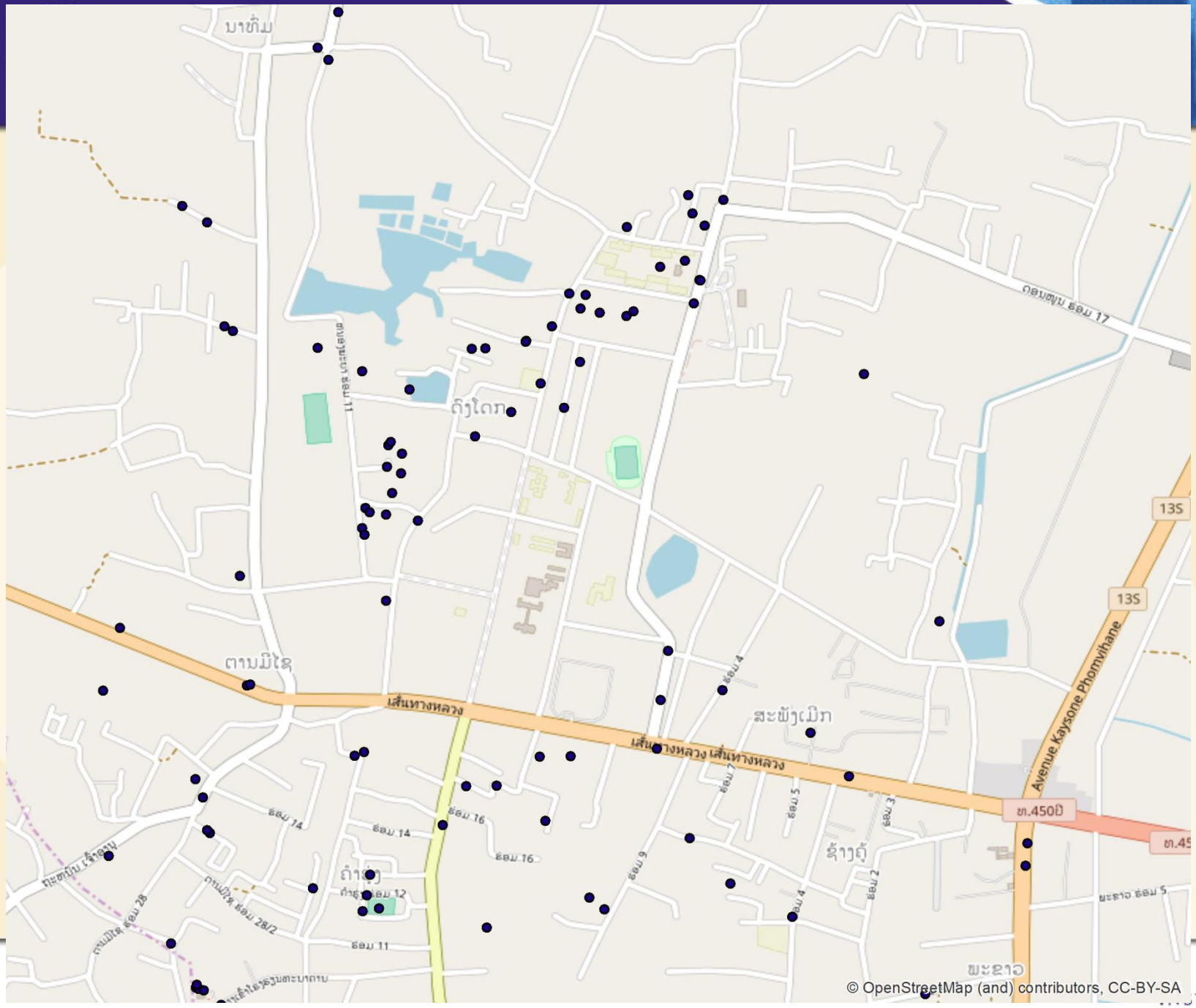

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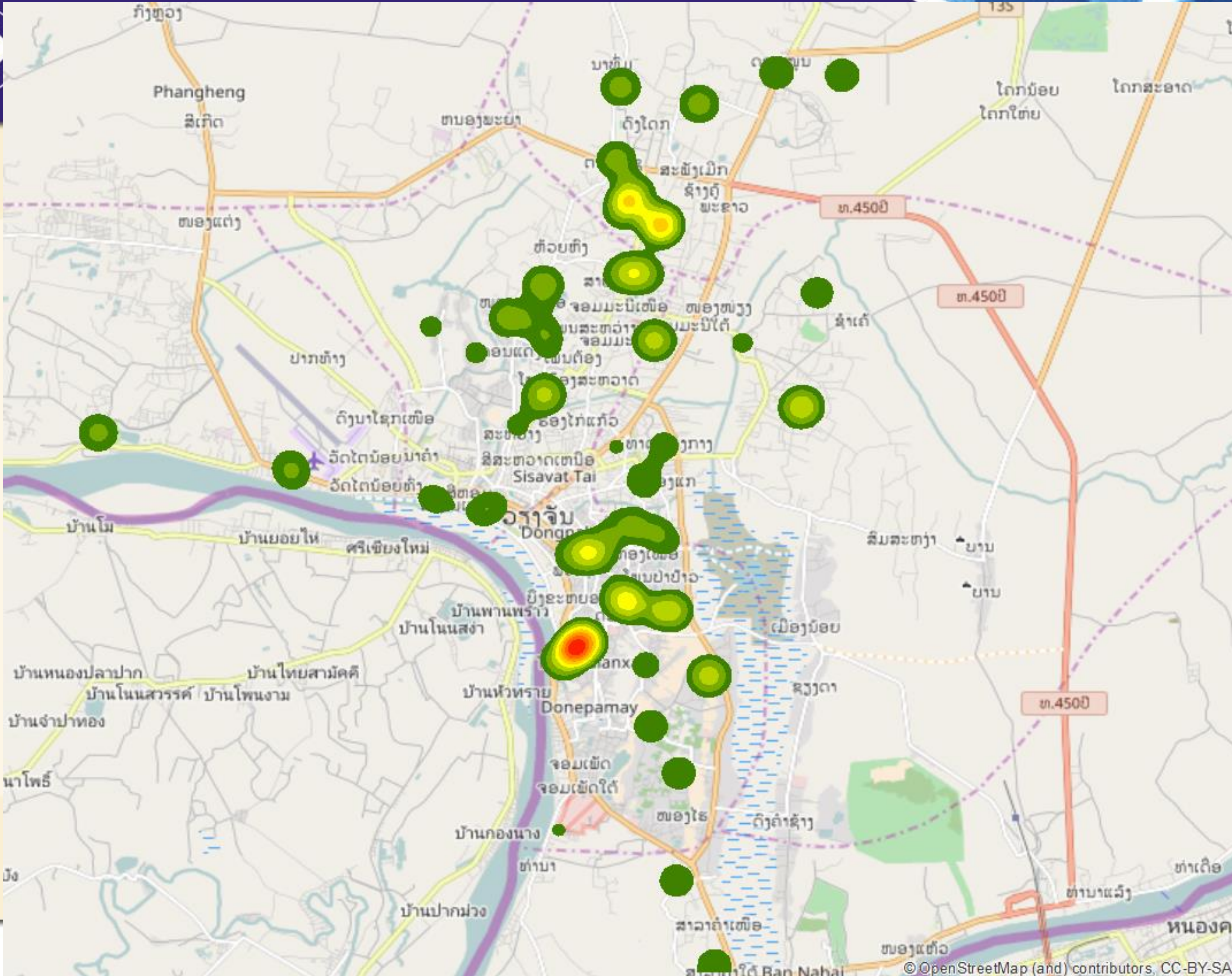
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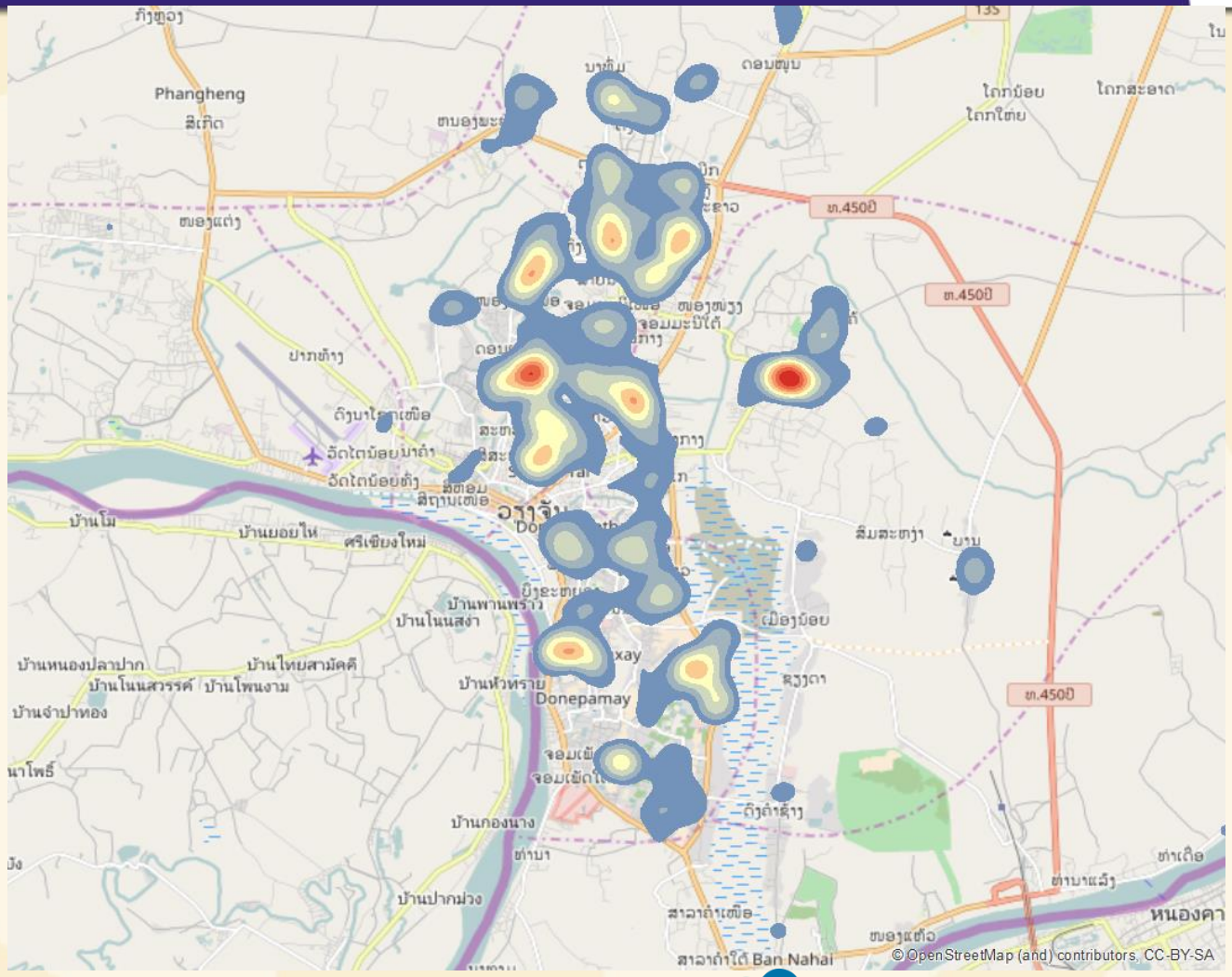
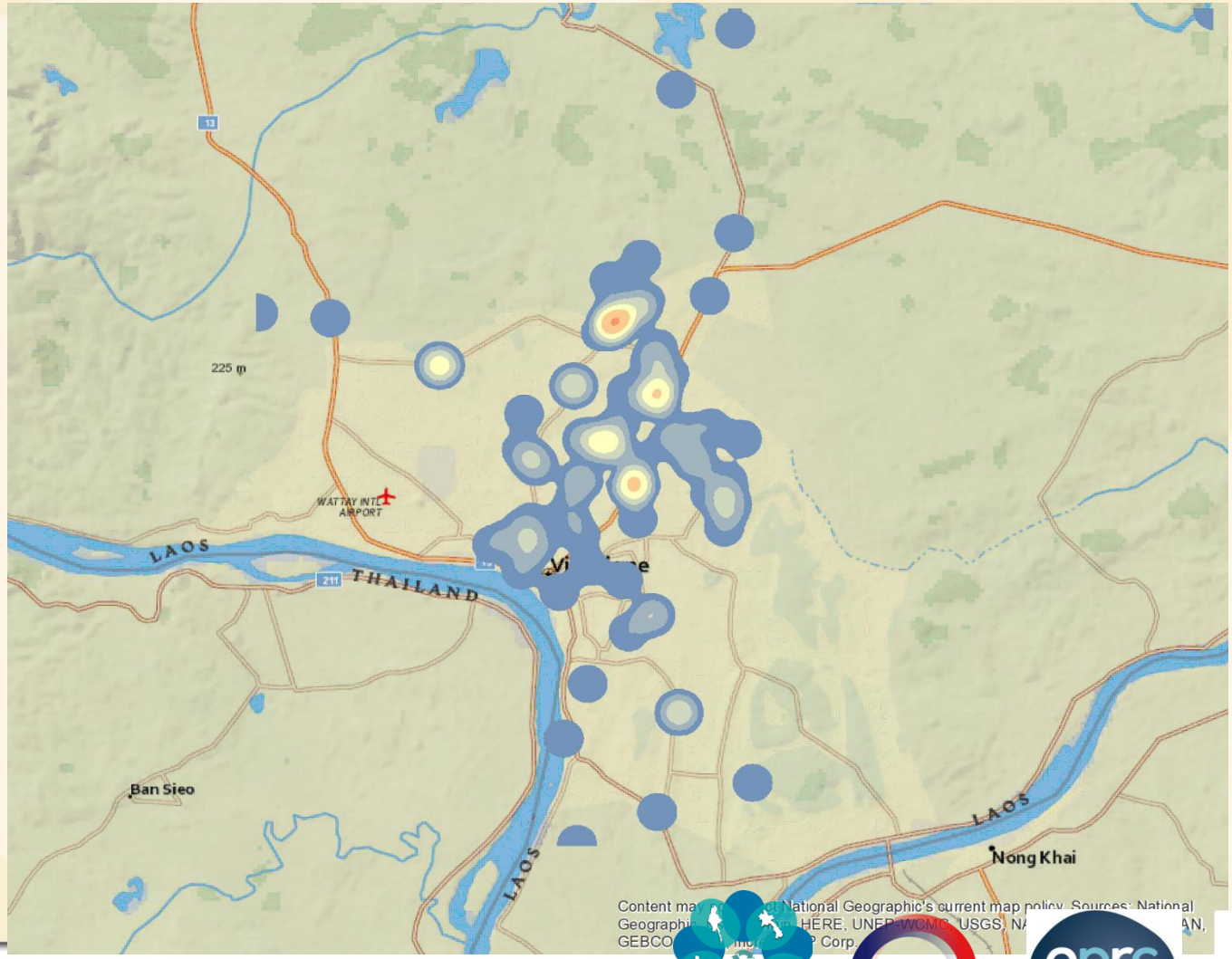
2013



2015



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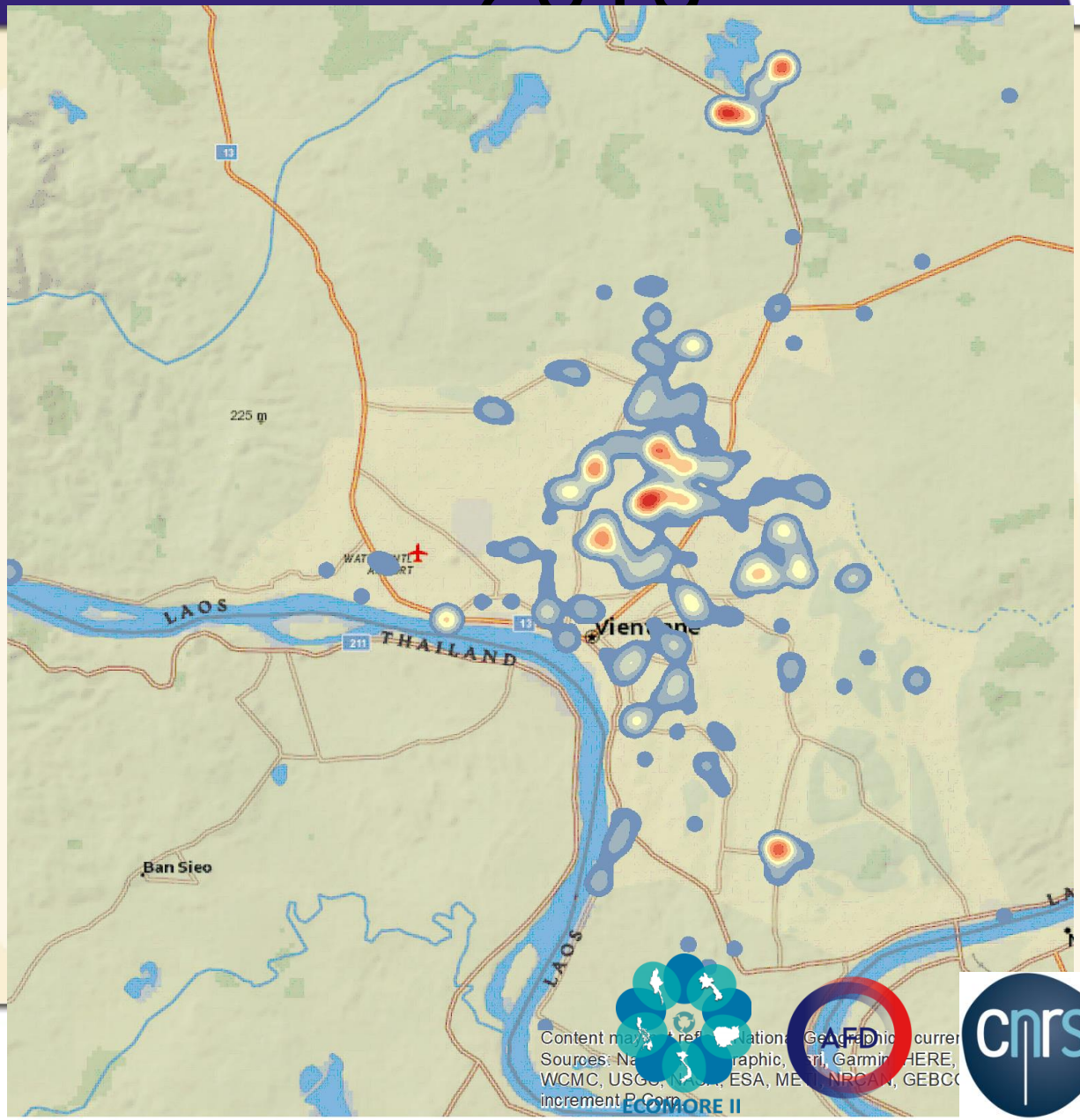
2016



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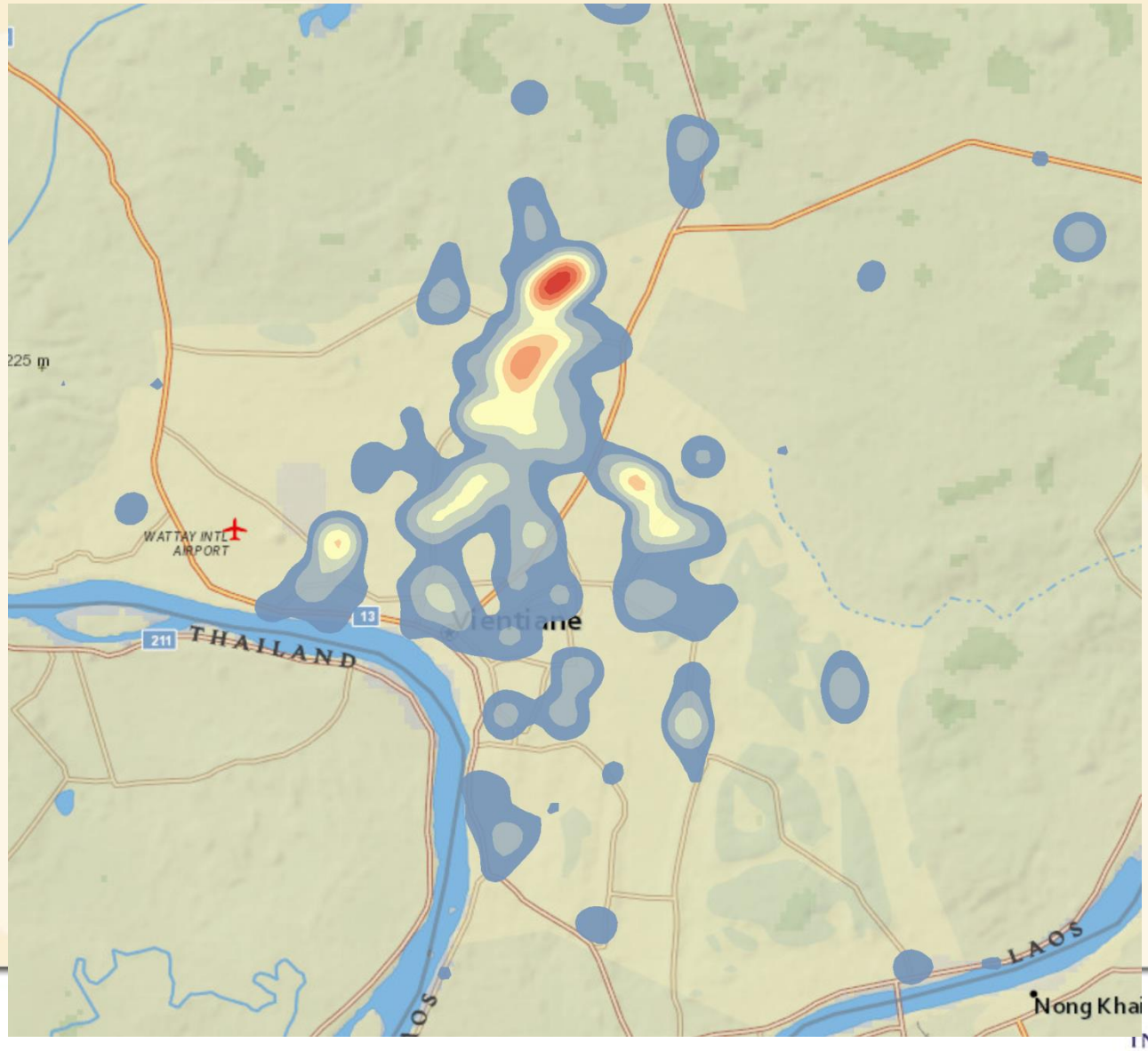
2017



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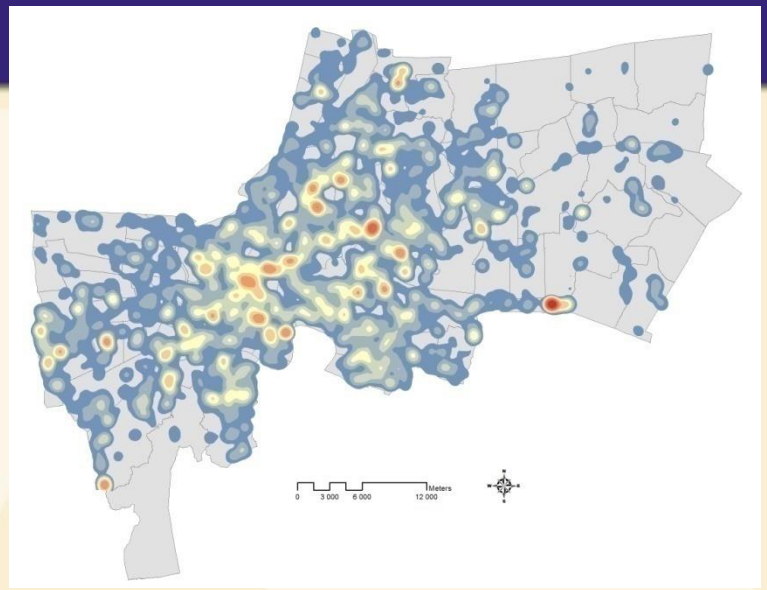

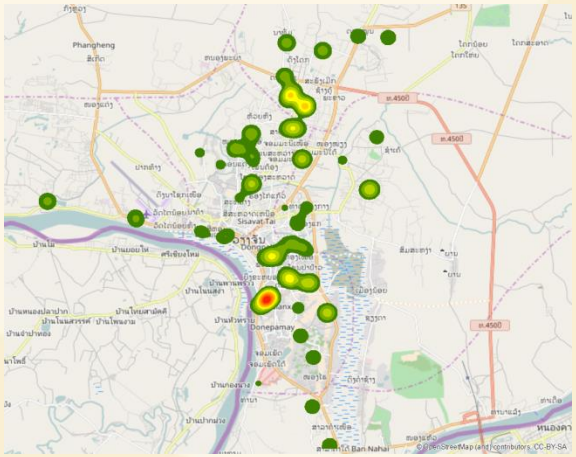

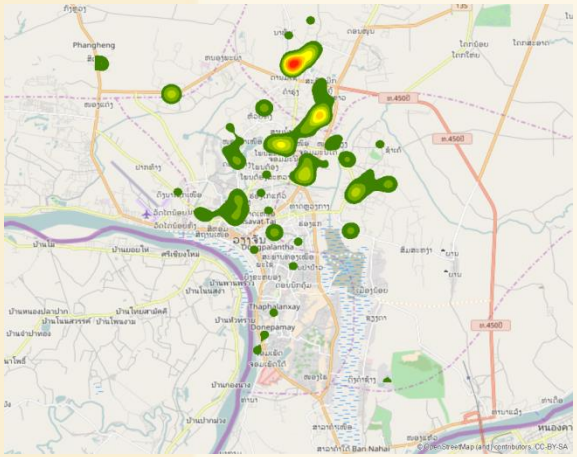

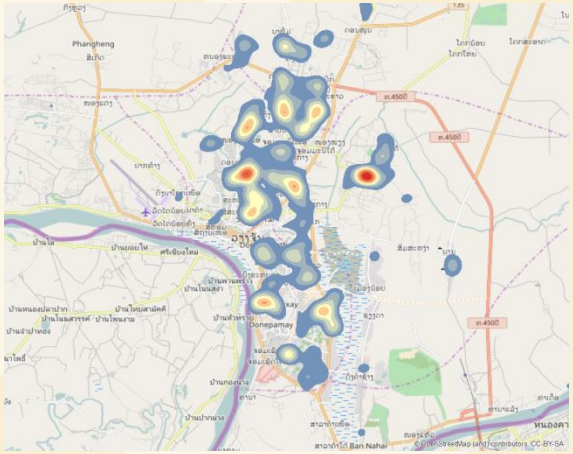

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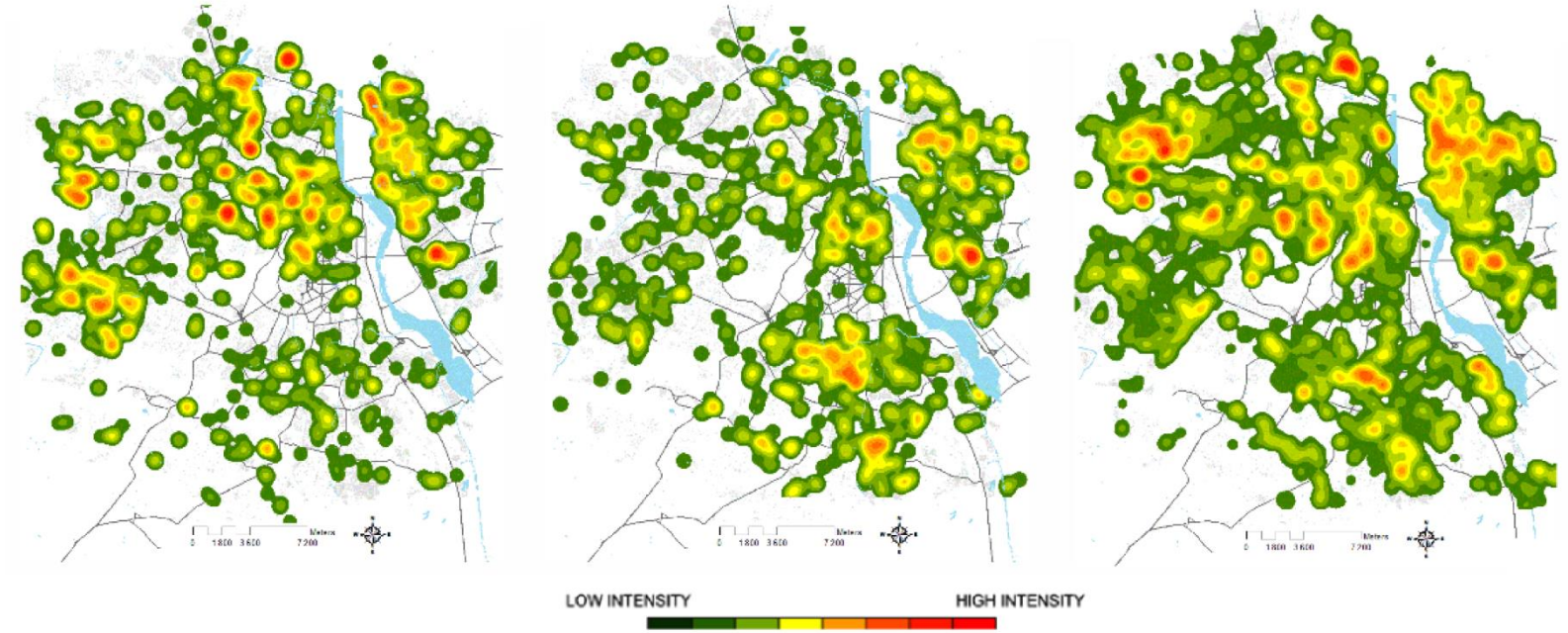
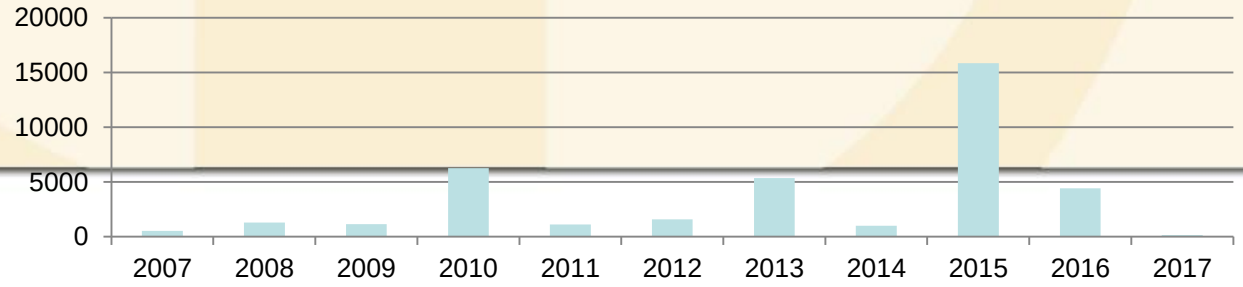
Surveillance system: Density of dengue cases in 2008; 2009 and 2010
ລະບົບການເຝົ້າລະວັງ: ຄວາມໜ້າແໜ້ນຂອງກໍລະນີພະຍາດໃນປີ 2008; 2009 ແລະ 2010
(ແຫຼ່ງຂໍ້ມູນ: Telle O. et al., Plos one, 2016).



ກໍລະນີໄຂເລືອດອອກໃນນະຄອນເດີລີ



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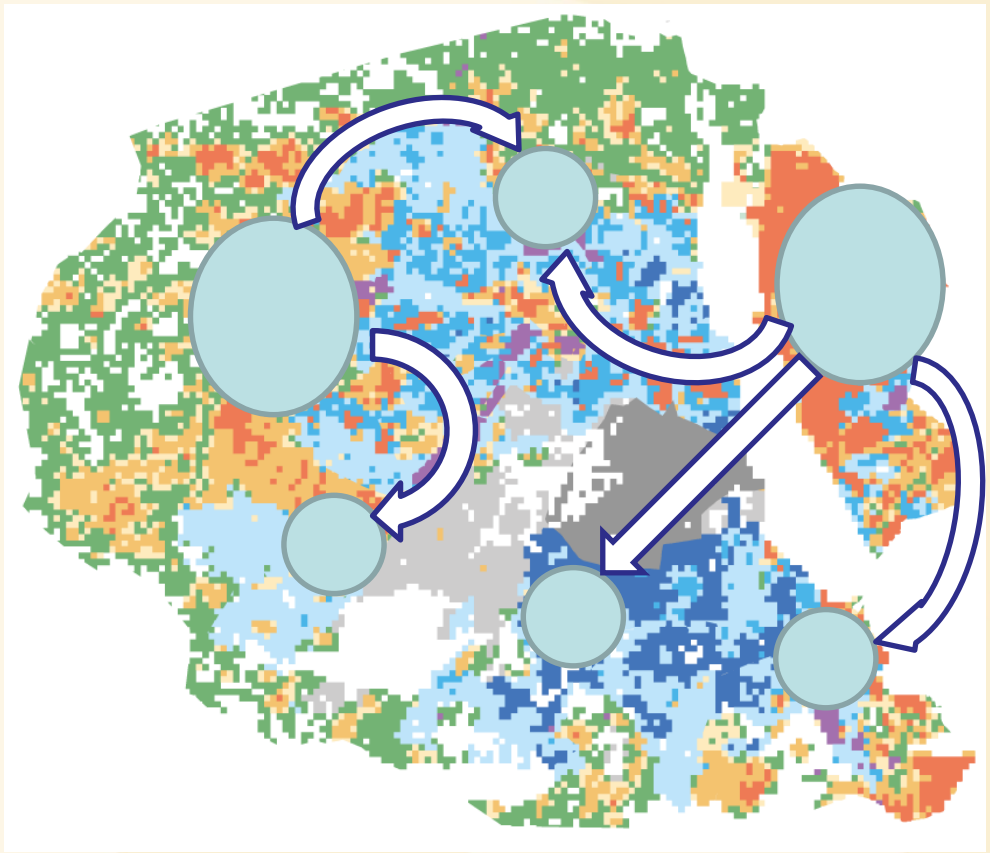
Are there identifiable migration patterns that go beyond physical distance?

Source-sink structure to Delhi ?



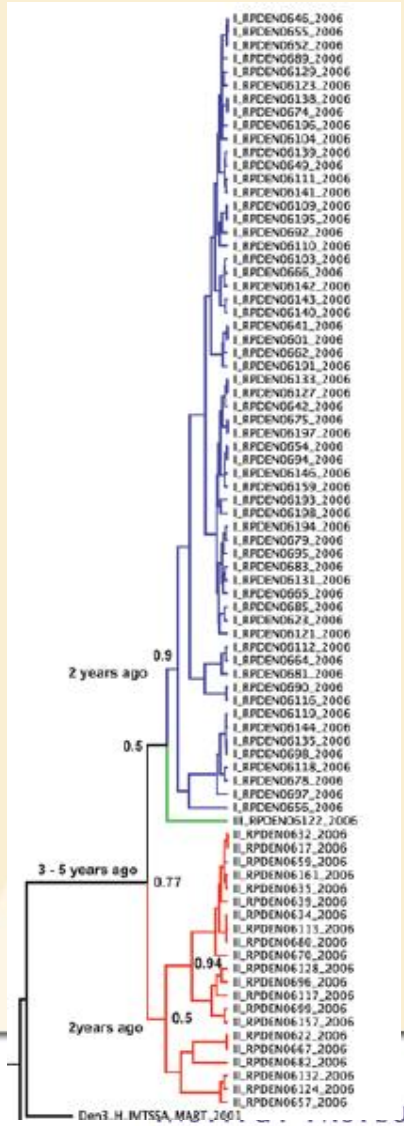
Viral genetics more informative than mobile phones/twitter etc

Genome 11000 bases and mutation rate 10^{-3} per generation (man mosquito man)

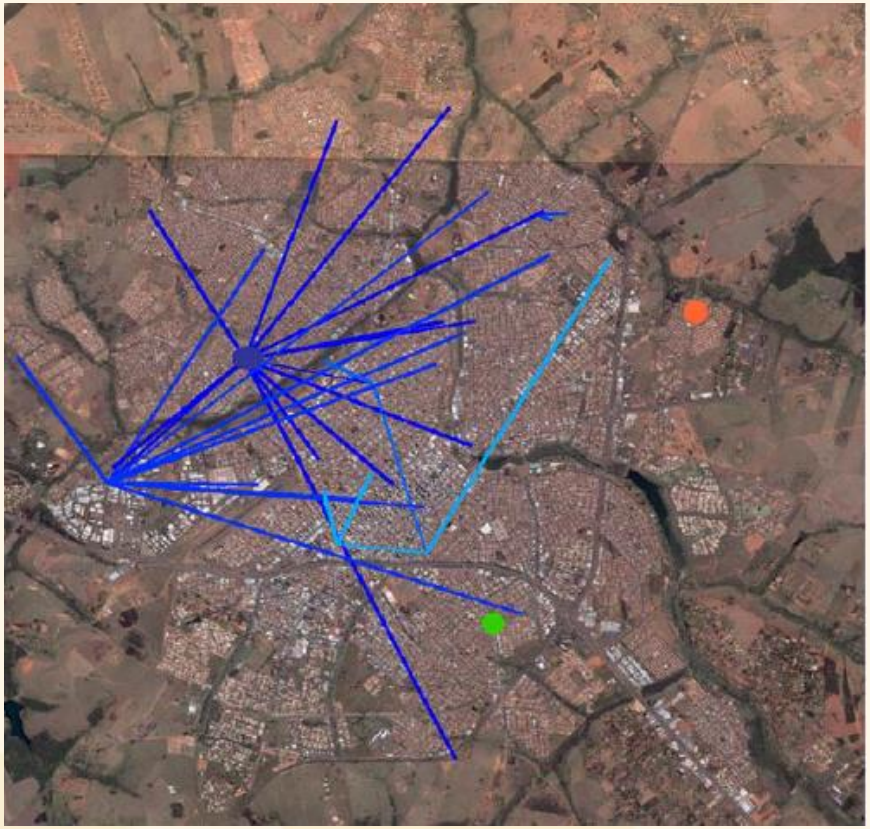
Thus 1-10 mutations per generation

Inferring micro-epidemiology through viral sequencing

Phylogenetic distance tree



Route of viral dispersal inferred through viral phylogenetics



San José de Rio Preto, Brazil. Mondini et al. 2009

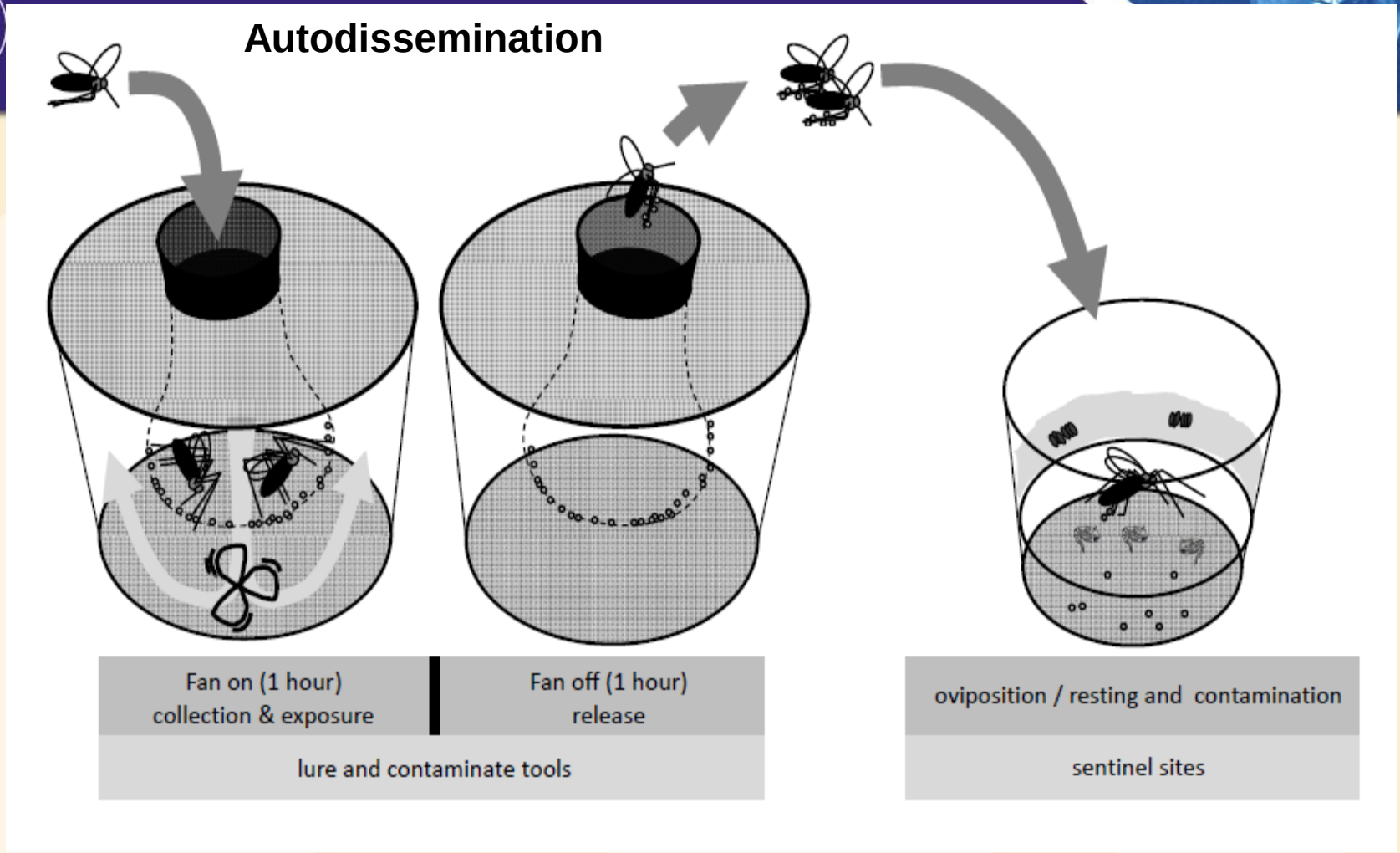


Figure 1. Adapted BG traps for pyriproxyfen dissemination. Trialled in Peru 2010 and Madeira 2014.

Mobility are important, but complex to understand

WHAT ABOUT URBAN NICHES?

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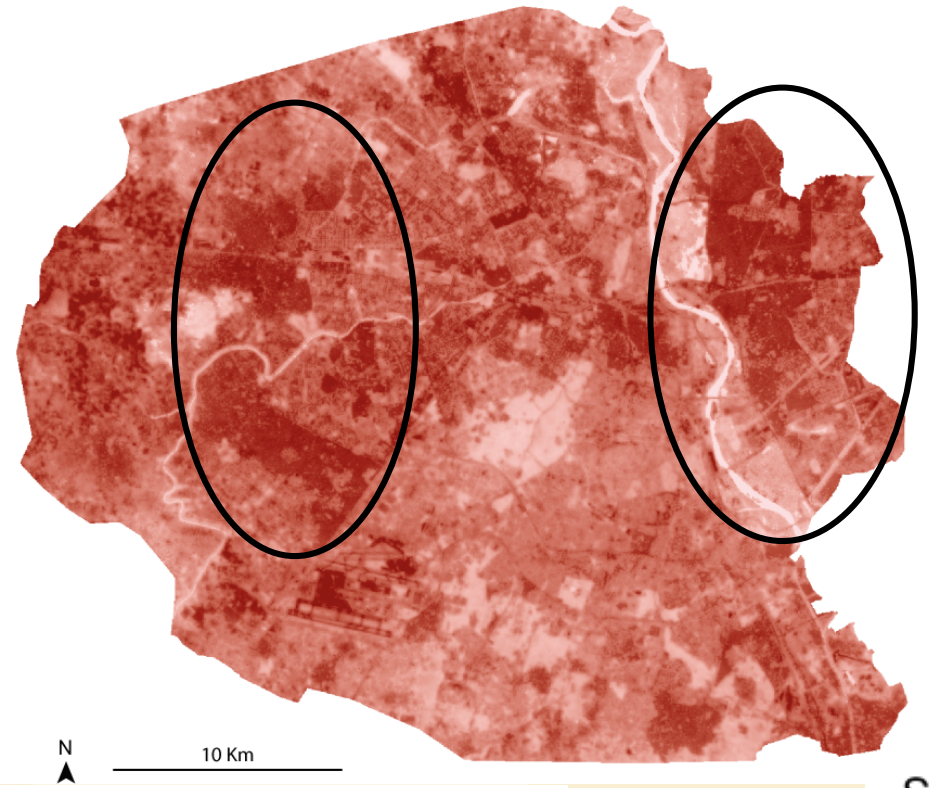
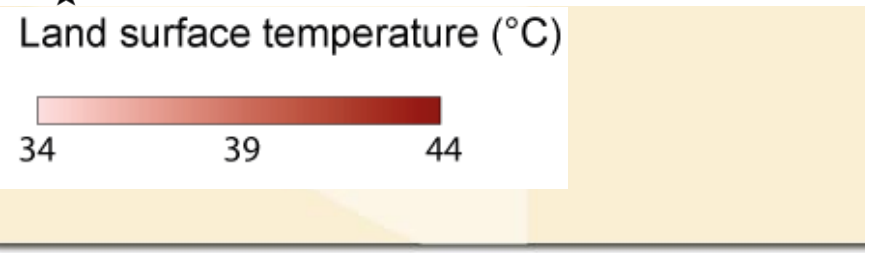
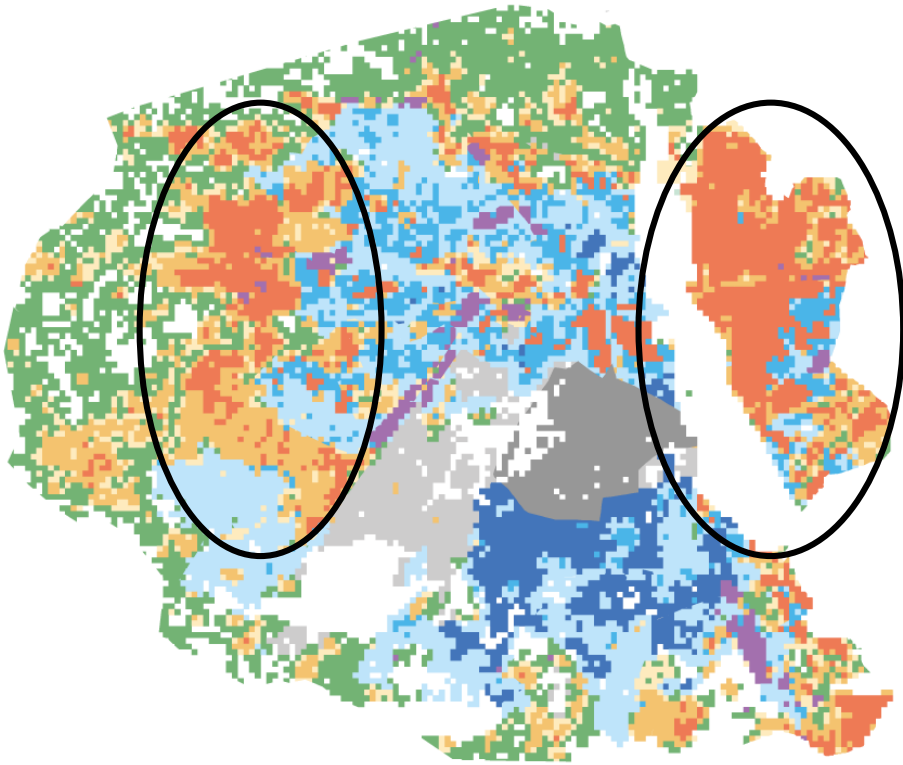
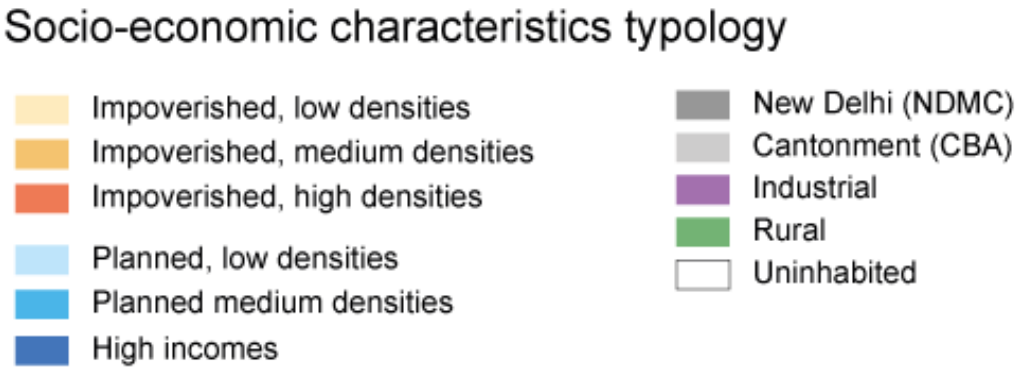
Winter Hotspots and Urban Heat Islands

Poor densely populated areas 5-10°C hotter in winter at night



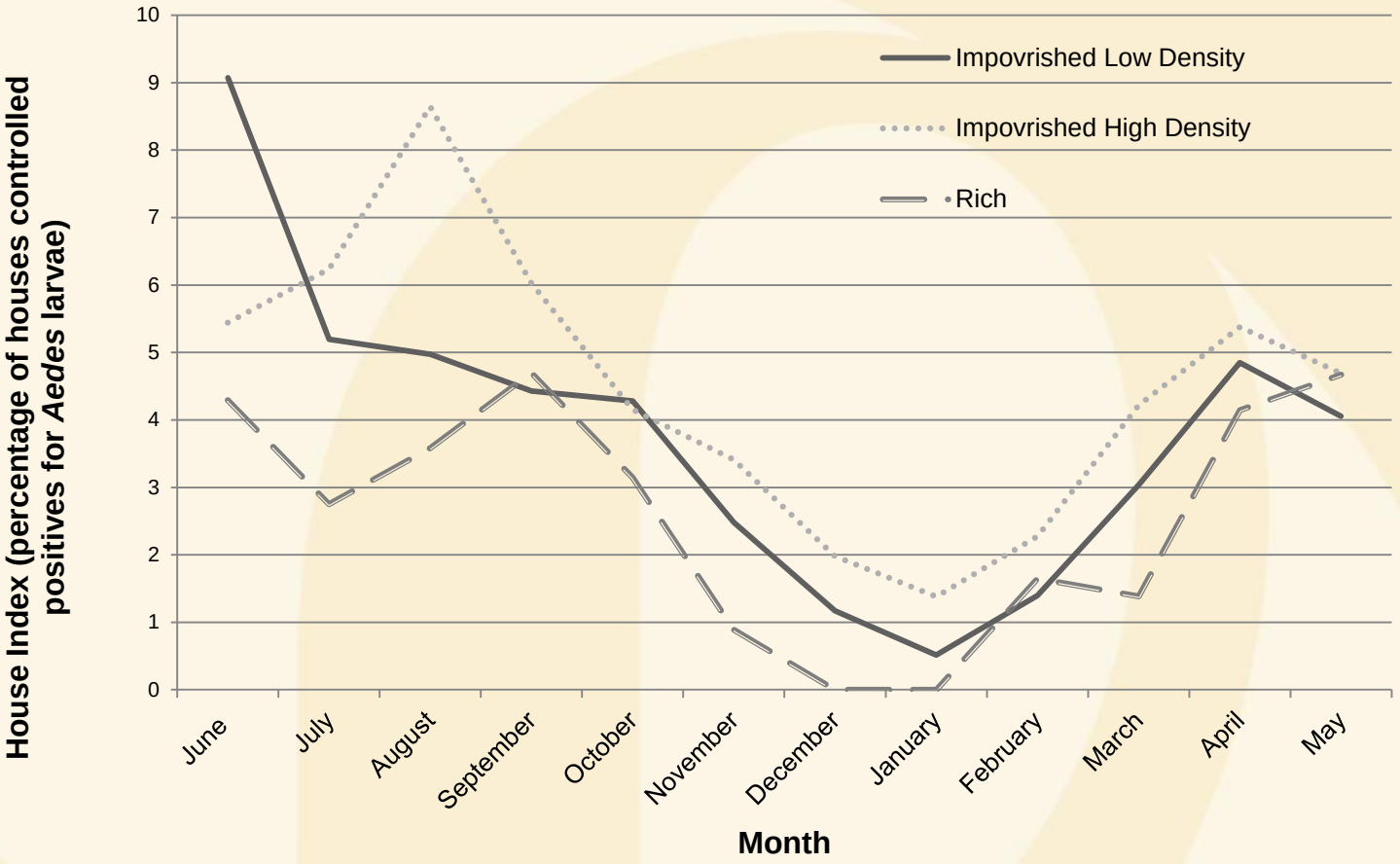






Virus found in mosquitoes in winter – urban hotspots

Presence of mosquito larvae vs socio-economic typology



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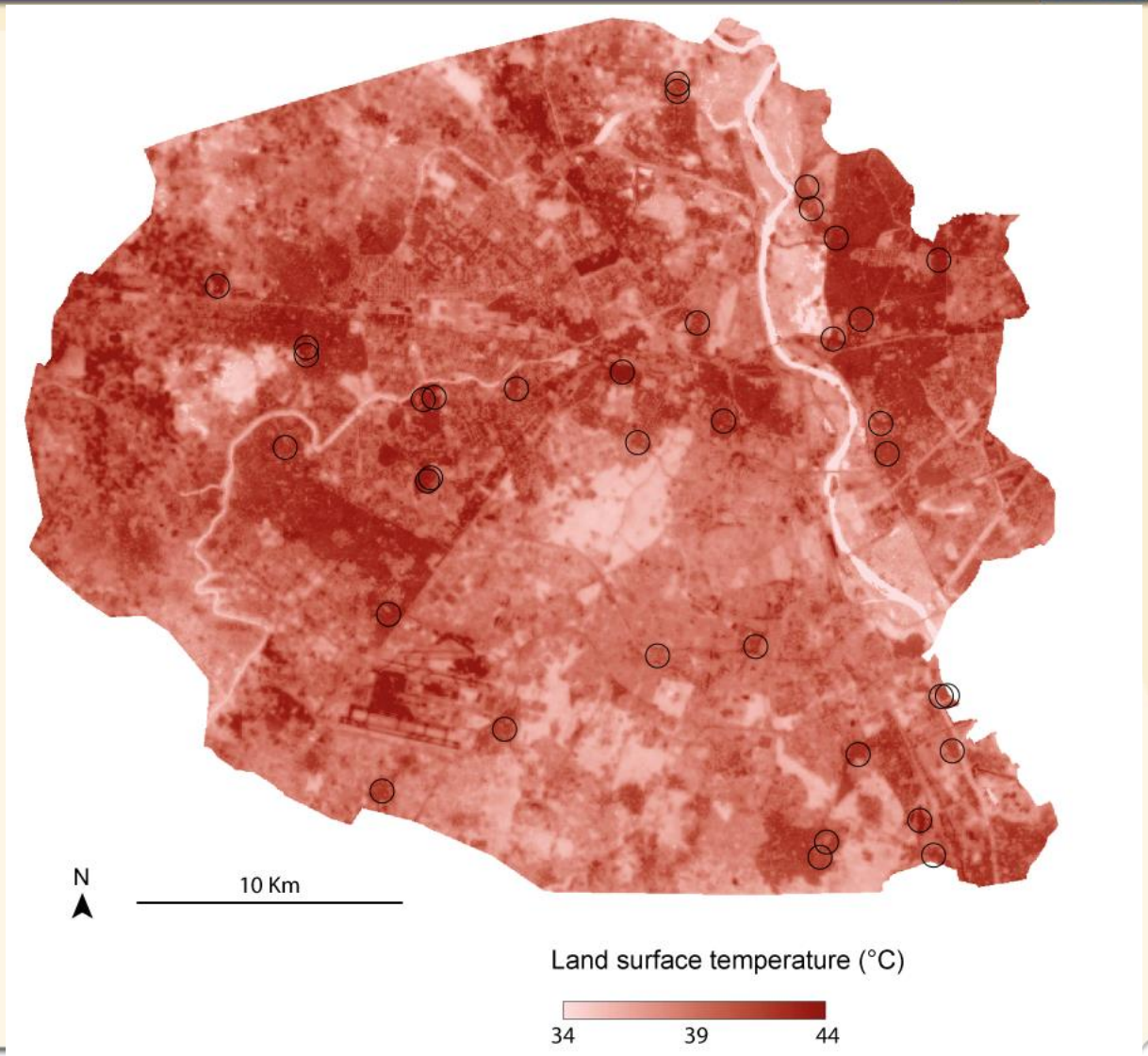

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Delhi strategy (cold season)

Map dengue clusters

Implement intervention vs. control (clusters/random)

Measure efficacy through Passive Case Detection (Public Health surveillance program)

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Very few succes in Aedes contr

- New strategies has to be found:
  - Avoid niches at any scale (between and within cities)
  - Short term strategies in phase with administration capacities (surveillance and control)
  - Strengthen intersectorial researches and lab capacities (sequencing, automatic mapping of dengue cases)
  - Think long term and relation between city and virus expansion
  - **Governance of diseases !!**

- Thank you

National Institute of Malaria Research (Delhi)

Municipality of Delhi (Health departement)