



# Resilience Against Future Threats

through vector control

A research programme consortium



[www.lshtm.ac.uk/raft](http://www.lshtm.ac.uk/raft)

# About RAFT

- Research consortium to address urgent and emerging challenges in mosquito-borne disease control
- Focus: malaria and arboviruses in sub-Saharan Africa and southeast Asia
- 6-year programme: 2020-2026
- Funded by the UK government



# RAFT Partners & Countries



LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE



Imperial College  
London



Mahidol University  
International College

malaria  
consortium  
disease control, better health



Addressing insecticide resistance and  
emerging mosquito-borne disease threats

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# Problem statement

## Insecticide resistance & malaria

- LLINs have been responsible for 2/3 reduction of malaria since 2000
- This is now under threat in Africa
- Future net-buying decisions will be more complicated
- Sub-national stratification needs to take account of differences in insecticide-resistance of local mosquitoes

## A rapidly changing world

- The effects of anthropogenic change on our environment are changing VBD risks
- To manage these risks, we need to document, monitor and plan for them (mitigation measures, action plans etc)
- This will require awareness-raising and engagement with sectors outside vector control

## Vectors that thrive in urban environments

- Aedes-borne arboviruses – limited data and technical capacity in Africa, historically overshadowed by malaria
- Anopheles stephensi – a newly invasive malaria vector in Africa (already found in Djibouti, Ethiopia, Sudan & Nigeria)

# Our goals

Obj.  
1

To manage insecticide resistance by ensuring the targeted deployment of most effective and cost-effective malaria vector control interventions in African countries

Obj.  
2

To enhance strategic preparedness for emerging and future mosquito-borne threats in SSA and SEA, through increased awareness, technical understanding and operational planning amongst vector control programmes and donors

# Some of RAFT's outputs – 1

- **Evidence for LLIN product choice:** To identify the “locally most effective and cost-effective LLIN”, taking into account the specific insecticide resistance mechanisms in the target locality [Background: new LLINs with new AIs and complex geographic variation in resistance, several species, each with diverse genes]
- **Environmental change on mosquito-borne diseases:**
  - Reviews: to improve knowledge on VBD threats amongst researchers, policymakers and implementers
  - Field research on land-use/land cover (LULC) and VBD
- **South-South networking:** Between African, Asian and Latin American country experts to strengthen national capacity in awareness and preparedness for arboviruses

# LLIN product choice



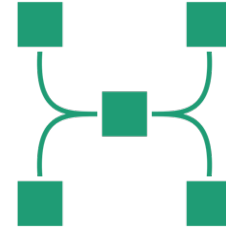
## Experimental huts

To compare how resistance affects vector bionomics



## Genetic analysis

To measure how each resistance gene affects vector (a) longevity and (b) feeding success



## Mathematical modelling

To predict the impact of each LLIN on malaria transmission, given local resistance



## Economic analysis

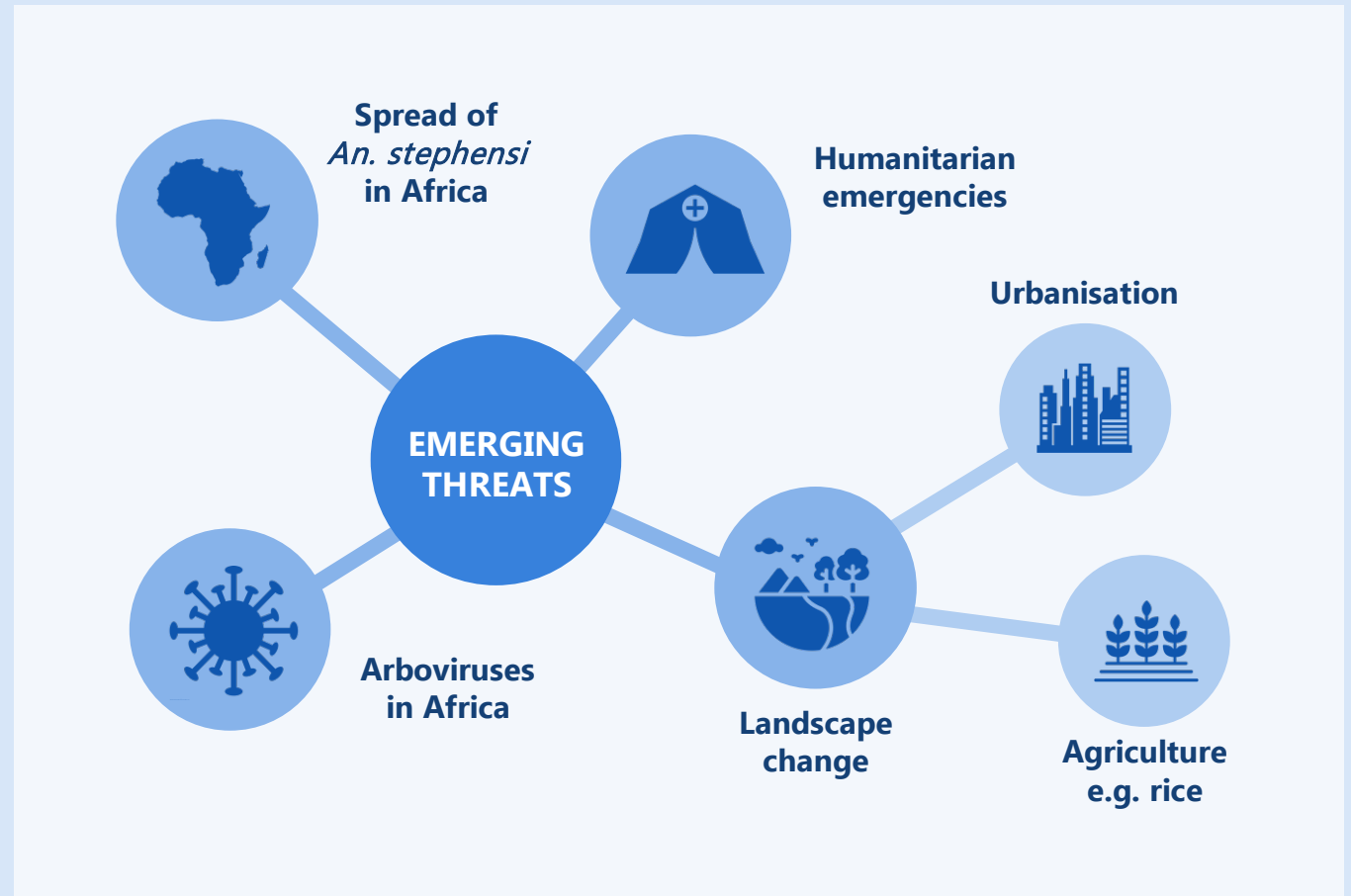
To identify the most cost-effective LLINs to counter insecticide resistance in a given target area

# Some of RAFT's outputs – 2

- **Evidence for LLIN product choice:** To identify the “locally most effective and cost-effective LLIN”, taking into account the specific insecticide resistance mechanisms in the target locality [Background: new LLINs with new AIs and complex geographic variation in resistance, several species, each with diverse genes]
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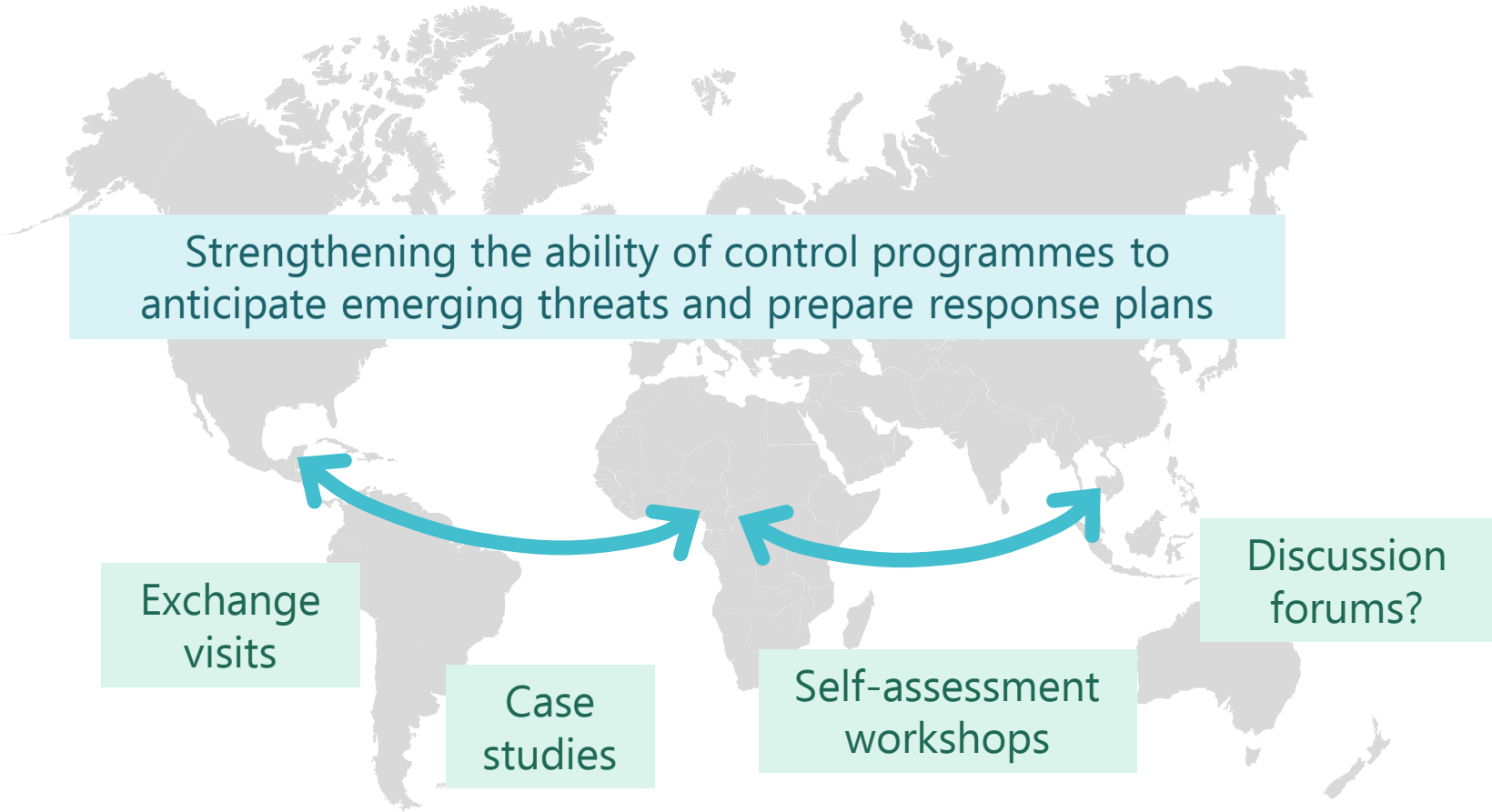
# Emerging mosquito-borne disease threats



# Some of RAFT's outputs – 3

- **Evidence for LLIN product choice:** To identify the “locally most effective and cost-effective LLIN”, taking into account the specific insecticide resistance mechanisms in the target locality [Background: new LLINs with new AIs and complex geographic variation in resistance, several species, each with diverse genes]
- **Environmental change on mosquito-borne diseases:**
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# South-south exchange



Strengthening the ability of control programmes to anticipate emerging threats and prepare response plans

Exchange visits

Case studies

Self-assessment workshops

Discussion forums?

## Cohort 1

Thailand, Nov 2022

- Burkina Faso
- Cote d'Ivoire
- Nigeria
- Tanzania
- Uganda



# New and emerging threats

- **Rice and malaria in Africa:** An avoidable trade-off
- **Urbanisation (etc) and malaria vector longevity**
- *An. stephensi* in Africa: What can RAFT contribute?

# How we will achieve this

<b>New research</b>	<ul style="list-style-type: none"><li>• Experimental hut trials to evaluate how different insecticidal nets perform according to local resistance (vector genomics)</li><li>• Field studies to characterize <i>Aedes</i> bionomics</li><li>• New eDNA surveillance tool for rapid assessment surveys of <i>An. stephensi</i></li></ul>
<b>Decision-making frameworks</b>	Co-designed with NMCPs (and global net-buying agencies) to identify the most cost-effective LLINs against mosquitoes with insecticide resistance
<b>Provide accessible state-of-knowledge evidence reviews</b>	To improve awareness and knowledge on changing mosquito-borne disease threats amongst researchers, policymakers and implementers
<b>South-south exchange</b>	Between African and Asian country experts to strengthen national capacity in preparedness and control of arboviruses
<b>Country case studies</b>	National action plans, self-assessment workshops



# RAFT

RESILIENCE AGAINST  
FUTURE THREATS

## Thank you

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