Community Engagement and Vector Control in the Caribbean

An introduction for governments to engage, empower, and activate citizens in the fight against mosquitoes that spread diseases.
Guidance Document

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This manual is intended to help Caribbean governments and communities strengthen their capacity to combat mosquitoes that transmit diseases. While its contents can easily be applied to other public health priorities, the focus of this document is on helping governments develop strong community engagement programmes to help combat the Aedes aegypti mosquito.

The importance of suppressing this disease vector cannot be understated. As evidenced by the high populations of Aedes aegypti mosquitoes and the increasing frequency and severity of diseases which they spread, it is clear, that we have yet to sufficiently control this mosquito throughout the Caribbean. Given the nature of this competent vector and the fact that it continues to exploit the hallmarks of human development in the 21st century, a regional strategy is a prerequisite to progress.

Rapid urbanisation, a changing climate, expanding international commerce and travel, rising insecticide resistance, competing healthcare challenges, inadequate public health resources, large-scale weather events, changes in public opinion, and in some instances diminishing public concern for the threat of vector-borne diseases, all make the prospect of a region free of vector-borne diseases difficult to imagine.

That is, until we transform our collective mindsets.

It should be noted that this manual does not include instructions or a specific model with prescriptive and programmatic recipes and instructions like COMBI. Instead, it shares the hard-fought lessons learned after engagement with governments, communities, businesses, nonprofits, foundations, the press, entrepreneurs, innovators, industry, multilateral organisations, donor governments, and others in more than a dozen countries as to how they might best be activated in a new and strengthened effort to transform how our countries plan, prepare for, and execute disease-fighting initiatives in this changing landscape.

This is not an academic exercise, nor does it subscribe to a set format designed to convince the reader. This is designed instead for those who are interested in transforming their work for the good of their beneficiaries, constituents, neighbors, family, friends, and fellow citizens - in taking action to eliminate vector-borne diseases from the Caribbean.
Vector control is viewed by many in narrow terms – as a set of specific activities relating to the monitoring and control of specific mosquito species. The typical toolsets remain limited and solutions have failed to keep up with the challenges that allow these vectors to persist and expand. Not much work has been done on what is viewed by a growing number of stakeholders as critical to the future of successful vector control outcomes – activating communities to play direct, meaningful, lasting, and successful roles in combating this and other vectors.

Engaging the public and inspiring individual and collective action against both the vector itself and the underlying conditions upon which this vector thrives, are now deemed by many as critical to a new generation of efforts to suppress *Aedes aegypti* and the diseases it transmits. However, the calls for large-scale public and community engagement are not supported by an equally enthusiastic level of effort to build both the conceptual understanding of what it takes to successfully drive behaviour change and citizen activation, and the necessary efforts to explore, experiment, test, calibrate, validate, and repeat –necessary steps in the formulation of any new and bold method of intervention.

Unlike a new insecticide formulation or new technology for mosquito control, community engagement, citizen activation, and behaviour change to date have been difficult to quantify, measure, or monitor with precision; particularly in disease-impacted settings that may lack basic infrastructure and access, or collaboration necessary to launch and sustain robust research methods.

Fortunately, this is changing. New survey methods, digital tools, and innovative evaluation methods are gaining traction in ways that can help non-academic practitioners apply learnings to programmes. So too is the acceptance that the broad umbrellas of behaviour change and community engagement - often two very separate areas of focus and activity - can come together efficiently for the benefit of both entomological and epidemiological outcomes.

We are entering a new era of progress in the fight against dengue, zika, chikungunya, yellow fever, malaria and other diseases spread by mosquitoes. This is due in part to the fact that governments and international organisations have begun recognizing that the single most potent, scalable, sustainable, and promising interventions we can deploy must be driven or powered by, and accepted by, the very constituents we seek to serve. It is pleasing to note that efforts aimed at empowering citizens and communities are no longer viewed as fanciful projects for graduate students in the social sciences. It is becoming clear that successful, thoughtful, and genuine engagement - indeed, partnerships - with communities will soon be the prerequisite for success in the fight against vector-borne diseases. Failure to incorporate, empower, and support communities will most likely result in the same results we see today – an increasing threat to health security yet to be contained.
The threat associated with Aedes aegypti warrants a full-scale effort to build capacity at both the regional and national levels to engage citizens and communities as partners and drivers of necessary public health outcomes. CARPHA’s approach – to begin sharing with its 26 member states the blueprints for successful community engagement in ways that will power a broader, interoperable ecosystem of public engagement efforts regionally - represents a first to institutionalise community engagement for reducing vector-borne diseases.

The hard work begins now as we try to build blueprints that will afford flexibility and scalability both - don’t often come together conveniently. No two Caribbean nations are the same and no one model will work for all. Add in multiple languages, diverse economies, unique geographies, ever-changing socio-economic challenges, a changing disease landscape, a smart and agile foe (Aedes aegypti) and a range of cultural, political, economic, and climate-related variances. One might argue that it’s an impossible task…it is not!

Transformation must start somewhere, and in the case of empowering communities to take up efforts to reduce the threat of vector-borne diseases, it will start in a manner similar to the great traditions found in many regions that play host to diverse cultures - sharing and listening. CARPHA, in this project, has begun the sharing. It is CARPHA’s hope that this document, comprised of lessons learned, will make listening easy and fruitful for the busiest of public health leaders, government officials, and communities themselves.

The outcome, at the very least, is the transformation of mindsets among government leaders and public health practitioners as to the role that community engagement can play in vector control efforts. At best, this manual will lay a strong foundation for further work in this area.
ACKNOWLEDGEMENTS

The Caribbean Public Health Agency (CARPHA), is grateful to Mr. Grey Frandsen for the conceptualisation and development of this guide for engaging Caribbean communities in vector control.

CARPHA expresses special appreciation to public health personnel in Guyana, St Lucia and St Maarten who participated in discussions and interviews with the consultant in the development of this guide.

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This publication has been created to help governments develop community-based policies, strategies and programmes designed specifically to meet the unique vector-related and disease-prevention challenges in the Caribbean region. It includes drawing from best practices implemented by successful control and prevention programmes found around the globe, including anecdotal and individuals’ suggestions for improving existing systems and programmes. In this way, it is the author’s hope that any reader will be able to both start community-engagement programmes from scratch and/or be able to augment existing programmes to increase effectiveness and sustainability.

This manual is not an A to Z set of instructions. Instead, it should be viewed as a set of modular and flexible blueprints for the implementation of new Caribbean based initiatives to develop the capabilities for activating communities in the fight against vector-borne diseases. Using a scalable, low-cost, and sustainable strategies and methods, CARPHA member countries and territories can deploy stronger community activation programmes that will ideally result in lower levels of vector-borne disease transmissions.

Recommendations for using this guide:

• View this as a set of recommendations for governments first and communities second; in most instances, governments will need to initiate conversations with communities to structure initial engagement efforts;
• The annexes provide concrete examples and templates that are designed to be transformed or customised; not to serve as exact tools
• Recognise that all countries and territories are different, and that certain recommendations may have no bearing on a reader’s reality.
SECTION 1

Introduction and Justification

Contents:
Chapter 1 – Introduction to Community Engagement and Vector Control
Chapter 2 – Why Now?
Chapter 3 – Validation of Approach
Chapter 1 - Introduction

Sub Chapters
1.1 The Basics
1.2 Key Themes
1.3 Purpose and Applications

1.1 The Basics

In the Caribbean, the primary vector responsible for disease transmission is the *Aedes Aegypti* mosquito. Because *Aedes aegypti* mosquitoes breed in and around humans and thrive in conditions largely controlled by the public, there is significant need for the development of community-based programmes and behaviour change measures to both expand and sustain current formal vector control services and operations. This community involvement will add a new layer of capacity to formal vector control programmes that today remain largely untapped in most Caribbean countries (and indeed around the world).

“Community engagement” is a broad term with few consistencies from one part of the public health community to the next. In the context of vector control, and for purposes of simplicity in this manual, the phrases “community engagement”, “mobilisation”, and “activation” describe efforts taken by governments to empower citizens and communities to lead, participate in, or support efforts focused specifically on reducing or controlling the threat posed by insects that transmit diseases. Further to this, “risk communications” are efforts undertaken by governments and other stakeholders to communicate critical public health-related risk or threat information to inspire specific efforts or actions among citizens or communities to mitigate those risks or threats.

The World Health Organization provides the following simple definitions: \(^{(135, 136)}\)

**Community Engagement** - Community empowerment refers to the process of enabling communities to increase control over their lives. “Communities” are groups of people that may or may not be spatially connected, but who share common interests, concerns or identities. These communities could be local, national or international, with specific or broad interests.

**Risk Communications** - Risk communication refers to the real-time exchange of information, advice and opinions between experts, officials and people who face a threat to their wellbeing, to enable informed decision-making and to adopt protective behaviours. It’s a core public health intervention in any disease outbreak and health emergency.

**Community Participation** - Involving the community in an activity such as the planning of projects or carrying out a Health Impact Assessment.

For many governments, activating the public in vector control efforts is the only significant way to advance capacity to achieve new gains, due in part to anemic vector control budgets or an expanded public health challenges driven by external factors (i.e. population growth, climate change, intra-regional transportation, etc.). Accordingly, a range of governments in the Caribbean are beginning to seek new methods to engage, empower, and activate communities. Ranging from small, barrio and village-led efforts to large-scale, multi-city campaigns, governments and the vector control community globally are beginning to accept that community-based mobilisation and participatory vector control initiatives may very well be the prerequisite for successful suppression of specific diseases, not just a luxurious set of tools favored by social scientists.
Fortunately, there are now more than four decades of literature that document how governments and communities have organised themselves and citizens for purposes of reducing both vector density and vector-borne disease transmission.

What is “Community Engagement” in the realm of vector control?

Vector control-focused community engagement is any activity pursued by government to inspire, encourage, empower, or incorporate the public, via communities, civil society organisations, institutions of faith, businesses, schools, and other groups, in specific activities to reduce or eliminate the presence of disease vectors. There are examples later in this manual.

There are distinctions between “community engagement” and “community-based vector control programmes” and governments will benefit from knowing this distinction; one includes establishing dialogue and sharing information while the other includes empowering communities to take on certain vector control efforts or responsibilities; investing in both types of activities represents opportunities for governments to simultaneously build stronger relations with those they serve and expand vector control efforts where formal capacity may be anemic.

For purposes of this manual, the following definitions will help readers appreciate the important distinctions between phrases or activity types. In general, this manual will use “community engagement” as a broad category of activity governments pursue to engage, activate, enlist, or otherwise inspire community participation in vector control-related activities.

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<thead>
<tr>
<th>Engagement Type</th>
<th>Description</th>
<th>Typical Leadership</th>
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<tbody>
<tr>
<td>Community Engagement</td>
<td>Government engages communities to take vector control-related actions, often by supporting, seeding, encouraging, incentivizing or otherwise enabling communities to organise around and take action on specific vector-related objectives.</td>
<td>Government</td>
</tr>
<tr>
<td>Community Partnerships</td>
<td>Government partners with communities - formally or informally - to pursue certain objectives; communities pursue the activities in direct partnership.</td>
<td>Both government and community</td>
</tr>
<tr>
<td>Community Alliances</td>
<td>Governments and communities come together to form an alliance based on equal inputs.</td>
<td>Both government and community</td>
</tr>
<tr>
<td>Risk communications</td>
<td>Governments distribute specific information about a public health threats to warn or otherwise prepare the public to defend or respond to the threat. Most often governments use multiple information channels - radio, TV, print, social media - to distribute this information. In some instances, governments partner with civil society, media, schools, large employers, etc. to distribute messages.</td>
<td>Government, often using private networks or “amplifiers” (influencers, thought leaders, popular social channels, etc.)</td>
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<tr>
<td>Community Mobilisation</td>
<td>Governments and/or communities “mobilise” groups of citizens or communities to pursue certain goals or objectives; once mobilised, communities operate with a certain degree of autonomy, but are often led by goals or objectives set by governments.</td>
<td>Either government or communities</td>
</tr>
<tr>
<td>Engagement Type</td>
<td>Description</td>
<td>Typical Leadership</td>
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<tr>
<td>Community-based Vector Control</td>
<td>Communities design, develop and implement community-focused vector control programmes without government, or with minimal support (technical expertise, etc.).</td>
<td>Communities</td>
</tr>
<tr>
<td>Public-private Partnerships</td>
<td>Governments partner with private institutions (for-profit or non-profit), often in a manner that distributes funding or costs via an agreement (i.e. a government gives a grant to a company to educate its employees, and in return the employer donates certain number of hours in which employees carry out community clean-ups).</td>
<td>Both government and private entities (for-profit or non-profit)</td>
</tr>
<tr>
<td>Community Activation</td>
<td>Communities take concrete organisational efforts to act and pursue goals and objectives as a unit.</td>
<td>Community or government</td>
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All of these types of activities can manifest themselves in an unlimited number of ways. There is no set formula for how governments should “activate” versus “mobilise”, and governments often employ many of these strategies or initiatives at once.

In general, though, vector control-focused community engagement strategy at its core emphasises a level of involvement from citizens affected by the program that traditional projects don’t. Such programmes are focused on building community ownership from day one, supporting creative potential and recognizing the impact inclusion and diversity have on successful implementation; and on enabling an action-oriented environment that is both sensitive to local dynamics and resources and organised enough to impact change.

These programmes are characterised by a certain degree of independence from government, their inclusion of socially and geographically excluded or isolated areas and their integration with existing community organisations and civil society networks, including both educational and faith-based organisations. While these ideas might appear foreign in the world of traditional top-down and heavy-handed vector control efforts, the impacts can be significant, and their applications are vast, as we’ll explore in future chapters.

It is important to note that community engagement programmes aren’t opportunities to abstain from traditional vector control responsibilities where they exist today. In fact, because of the highly amorphous nature of the problems they address, finding strong, driven individuals who can mobilise large groups of people towards common goals is all the more important for bolstering formal vector control programmes. These programmes represent an organic approach to problem solving and are focused on a more effective allocation of resources, allowing program directors to get more out of limited budgets and achieve more in a shorter period and with long-term impact.

**Who “Does” Community Engagement?**

While it certainly is not restricted, typically governments “do” community engagement, risk communications, education and other outreach or engagement efforts relating to vector control. The size, intensity, and outcomes differ widely, but most Caribbean public health ministries have some level of public engagement concerning vector control. However, much of these efforts are ad hoc or not sustained.
**Does it Work?**

Yes. While size, types, methods, and constructs differ, we are well beyond an era of skepticism as it relates to the impact that community engagement can have on vector-related indices or performance evaluations. Later in this manual there is an overview of a set of peer-reviewed studies assessing the performance of vector control-related community engagement programmes.

1.2 Key Themes

**How does my government get started in thinking about community engagement?**

Governments that choose to launch or expand their community engagement programmes will be assisted with this set of key themes identified in the review of 130+ case studies. In preparation for developing this manual, a wide-ranging study of both English and Spanish was conducted to capture key themes found throughout successful programmes.

- **Efficacy** - Vector control-focused community engagement and community-based mobilisation ("community engagement") have demonstrated, without a doubt, success in lowering vector density and vector-borne disease transmission in multiple settings.

- **Design** - inclusive project design is cited in dozens of articles as one of the primary requirements for a successful community-based program; including communities - broadly defined - in the process of designing and managing a project is a key lesson.

- **Surveys** - part of the program design process should be informed by early surveys relating to knowledge, attitudes and practices (KAP), thus enabling program planning around specific behaviour-related outputs (goals and/or objectives) and the development of specific program components that address KAP survey results; many cases reviewed included KAP surveys early in the process, allowing for evaluation of behaviour change-related efforts throughout the project’s life. (10)

- **Monitoring** - like any vector control program, community-based programmes need clear, easy methods for evaluating progress and overall outcomes; using either formal vector control-related metrics (vector density, for example, or certain indices) in conjunction with community-based metrics can help ensure community engagement is having an impact on real-world threats.

- **Difficulty & Horizon Planning** - successful community engagement does not come easily; most programmes evaluated took upwards of 12 to 18 months to form and organise and more time to begin generating results; difficulty in the ramp-up and sustainment of programmes was matched by difficulties in the monitoring or evaluating progress.

- **Policy** - absence of long-term government commitment to, and indeed support of, have an impact on the success of community-based programmes; there is little evidence that governments have adopted robust policy frameworks or commitments at the policy-level.

- **Sustainability** - virtually all studies suggest that sustainability of community-level interventions is a significant challenge to the long-term success and outcomes of any given project; various prescriptions are provided, but in general sustained government participation and the integration of existing social networks and community organisations remain top contributors to sustained efforts.
• **Inclusiveness** - most programmes highlight the benefits of building community-based programmes that are inclusive, open and welcoming to everyone. Studies on social inequalities have been able to tie areas of high poverty to higher degrees of dengue, even when broader city services are protecting other areas of higher income; community engagement models can make a difference.

• **Coordination** - a number of studies highlighted the need to closely coordinate community-based programmes with formal government-led vector control efforts; failure to do so can create confusion, duplication of effort, and resulting disincentives for participation; higher levels of coordination, on the other hand, can help both formal and informal efforts concentrate and specialise, affording better distribution of limited government resources.

• **Communications** - media and formal risk communications play a critical role in community mobilisation; a range of cases highlight effectiveness of sustained risk communications and messages that pertain to specific behaviours; coupled with ground-level mobilisation and sustained community engagement and empowerment initiatives, risk communications can add a layer of support to programmes.

• **Costs** - community engagement is not free; multiple sources suggest the nature of costs associated with mobilizing communities need to be planned and managed sufficiently; multi-year programmes need fiscal discipline, just as any operation would, for sustainability and effectiveness.

• **Diversity** - community-based programmes are dependent on just that - communities. Community composition, demographics, education levels, health levels, civic participation levels, etc. all vary greatly; efforts to mobilise communities against vector-related threats must be adaptable and reflective of local conditions and dynamics.

• **Trust** - trust between communities and government agencies and representatives is paramount; it is well documented that a lack of trust between government and communities can have a negative impact on the overall success or quality of a program; high levels of trust between them lays a solid foundation for success.

• **Adaptation** - adapting program design to local-level inputs, dynamics, and conditions is a high indicator, and potentially a prerequisite, for success; the earlier a community is involved in the design of programmes, the more successful they appear to be.

### 1.3 Purpose and Principles

Governments most often employ community engagement or mobilisation efforts for a number of reasons:

- Reduce disease transmissions;
- Improve health indices;
- Respond to disease outbreaks;
- Expand or supplement formal vector control capacity;
- Develop vector control capacity in an isolated or otherwise marginalised community or region;
- Compensate for technical challenges, including insecticide resistance;
- Supplement formal efforts when budget cuts or resource shortfalls (end of fiscal years, for example) force a reduction in typical vector control programmes;
- Respond to large-scale disasters wherein significant, if not all, vector control capacity has been destroyed;
Mosquito-focused community engagement and activation efforts traditionally include the following groups of activities - known to most in the field of environmental safety, public health and vector control but not often contextualised for strategic planning, resourcing, or decision-making:

- **Community Empowerment & Education Programmes** - Programmes designed to give a voice to the community in vector control strategy and priorities; to provide citizens inspiration or education about the importance of community-based efforts, personal contributions, and responsibilities; provide training, tools, and support to carry out personal efforts to combat vectors; to activate, incentivise, train, and equip citizens to reduce larval breeding sites and potential breeding sites routinely;

- **Organised Communications and Information Sharing Initiatives** - Programmes that engage large community and citizen-comprised activation networks throughout the city or region, create a short-circuit mechanism to get critical information about vector control to individuals at the community and individual levels when necessary; these efforts integrate lateral and vertical lines of communication to create nimble cross-community and actionable teams; distribute the benefits of new vector control technologies, knowledge, best practices, and other resources, as available, via interconnected networks; these include social media, informal social networks, “information trees”, etc.;

- **Crowd or Community-based Vector Monitoring and Surveillance Programmes** – These are programmes that utilise volunteers or volunteer stakeholder groups (i.e. churches or mosques, service clubs, Boy Scouts, etc.) as the ‘eyes’ and ‘ears’ relating to mosquito population levels or breeding source locations; mosquito species identification and/or managers of monitoring tools; activating technology-savvy supporters for citizen reporting, photo posting, and geolocation of larval breeding sites; developing a distributed, granular, multi-node monitoring and early-warning network among citizens; “roll-up” crowd-powered data from each community to create more accurate national and regional vector-related conditions in real-time;

- **Source Reduction Initiatives** - Utilizing volunteers and citizens to eliminate breeding sites in and around each parcel/homesite; utilizing volunteers to identify and geolocate public-area breeding sites; generate community expectations for businesses and homeowners to eliminate all breeding sites; coordinating with public works agencies, solidworks divisions, and/or other government agencies to remove physical breeding-prone debris (large tires, barrels, old cars); and other tasks associated with “cleaning up” and “keeping clean” each community;

- **Targeted, Safe Mosquito Control Efforts** - Programmes designed to organise local civil society or community leaders, including businesses and homeowners and volunteers to carry out targeted larval control efforts with non-toxic larvicides approved by national regulations, and most importantly, the national vector control authority; volunteers can apply, via permission from government agencies, certain types of larvicides in certain conditions;

These are traditional types of community engagement efforts in the vector control arena. There is an expanded range of activities, though, that governments should consider when developing vector control strategies, including:

- **Branded community engagement campaigns** - creating a separate brand outside of formal vector control efforts that inspires interest or action among certain influential or pertinent demographics (say, mothers in Zika-impacted regions);

- **Influencer campaigns** - leveraging respected personalities to share critical messages or calls to action;
• **Social media and digital community building** - engaging in direct, sustained dialogue with citizens and communities on topics pertinent to vector control and behaviour change;

• **Corporate sponsorship** - inspiring and empowering companies to “sponsor” or “host” clean-ups or “mosquito-free zones” or create incentivizing customer behaviour changes (“bring in your old tires for a 20% discount on your next purchase!”);

• **Public-private partnerships** - partnering with large employers, NGOs, or associations can yield excellent force multipliers and 3rd party validation for important public health priorities;

• **Crowdsourcing** - pulsing networks for information or other data inputs, including breeding sites;

• **Community Improvement Competitions** - holding competitions between communities; etc.

• **Grant-making opportunities** - providing communities opportunities to apply for or earn grant monies to further beautify, maintain, repair, or improve their communities with specific vector control outcomes in mind;

1.4 Guiding Principles for Successful Community Engagement

Generally speaking, governments “do” some form of community engagement, although most often in a very limited fashion. Even the humblest of vector control agencies engage with the public during breeding site inspections or on neighbourhood walk-arounds. Most agency personnel also have readily available a trifold brochure or colored checklist for homeowners to use to guide the removal of breeding sites in and around their homes.

Even further to this, many agencies maintain a Facebook page, or a WhatsApp number shared with the public. But these are tactical, one-way or service-specific efforts that rarely lead to sustained community action or ownership of vector control-related results.

Unfortunately, these do not constitute, in the eyes of this author, community engagement. A new generation of efforts are required to activate citizens and communities today, and what may have worked over the last four or five decades today may not work at all. Combined with the dull performance of aging insecticides and methodologies, and it is clear that new community engagement efforts are needed.

Guiding principles can help government planners think critically about how best to plan, prepare for, and implement new initiatives.

Accordingly, for governments seeking to design or develop new community engagement programmes, the following are helpful guiding principles that may help improve both the planning process and future outcomes:

1. **Be open, transparent, and collaborative** - if governments want to empower communities to play a direct role in controlling *Aedes aegypti*, they must make themselves open and accessible to citizens and community groups at all times; community leaders must also return the favor, demonstrating respect and appreciation for the heavy load government workers carry on their behalf;

2. **Adapt models appropriate for local conditions and cultural, social, and economic dynamics** - No two communities are the same and creating a one-model-fits-all system or methodology is virtually impossible. As such, program operators should strive to build a model that accounts for local dynamics and allows for local adaptations will be necessary for scale across the region;
3. **Behavioural outcomes are difficult to measure but try** - This is not new to the public health field broadly, but it is made more difficult in the vector control space for instance because of the unique nature of specific vectors. Determining whether or not individuals have taken specific action on their parcels of land and inside their homes is not always an easy task; measuring the impact of community-based programmes needs to take into account that humans are often unpredictable and/or unavailable in rigid fashion;

4. **Program and performance monitoring and evaluation is often the last priority** - Despite overwhelming evidence and logic of doing so, many governments and communities fail to adopt a set of measures to help determine whether or not a community engagement program is successful. This is often a constraining factor to long-term funding and program growth. Agreeing to, and then routinely monitoring, a set of metrics will be critical to any future endeavor;

5. **Education is not enough to inspire behaviour change** - Thoughtful, aggressive face-to-face action over a sustained period of time, along with strategic communications, constant messaging, and other efforts are needed to achieve or sustain impact; tight feedback loops also help, demonstrating to communities that their specific actions on day one led to a specific outcome on day X;

6. **Programmes imposed on communities most often do not work** - Community-driven models that fail to empower local citizens to take ownership from the beginning jeopardise - if not poison - the long-term success of program. Likewise, if authority centralised around management isn’t successfully transitioned to regional/locational citizen-authority organic program growth can stagnant; (115)

7. **Program value and legitimacy matters** - No matter the instigator of a new community engagement initiative, governments are encouraged to value and respect these efforts; if legitimacy isn’t well established, and if communities feel their efforts are not appreciated or “sanctioned”, they will dry up (118); one of the primary causes of failure is often a failure to integrate with existing community-based organisations, NGOs, and/or local/regional/national government. A failure to achieve long-term partnership usually indicates a shorter life-span for the project or program being implemented;

8. **A failure to budget and forecast appropriately is a common theme among mismanaged programmes** - Community engagement takes resources; scope, desired outcomes, and duration will all have an impact on just how much is necessary; however, in hindsight, most program managers or developers recommend preparing a “runway” of at least 8-12 months, and for longer program horizons suggest planning to solicit donor and grant funding to augment initial budgets. Program directors should be prepared to commit to at least this time period when applying any community-based approach;

9. **Develop a formal mechanism for dialogue** - in many governments, there is no specific forum for dialogue and information sharing between the public and vector control officials; this makes it difficult to build the trust, consistency, and transparency needed to build a successful community engagement program. (68)
Chapter 2 - Why Now?

Sub Chapters

2.1 Why Community Engagement is Important
2.2 Traditional Challenges to Community Engagement
2.3 The Unique Caribbean Context

2.1 Why Community Engagement is Important

If you’re reading this, chances are you already appreciate the importance of activating communities to play a meaningful role in the reduction of vectors that transmit diseases.

But if for some reason you need to convince others, or if you’re not fully convinced, there are a number of reasons why community engagement is critical today. Given that the efficacy of typical vector control solutions has fallen short of success in eliminating the threat of *Aedes aegypti* and given that Zika demonstrated how fragile our current control programmes are, community engagement efforts are becoming more attractive to governments.

Among those reasons, the following are clear drivers for evaluating and deploying new community engagement initiatives:

- **Proactively improve vector control strategy and programmes** - community engagement can have a positive impact on overall vector control outcomes;
- **Supplement ongoing vector control operations** - new engagement programmes can lighten the load for formal vector control programmes by reducing breeding sites, expanding mapping and breeding site location identification, etc.;
- **Encourage behaviour change** - in instances where behaviours are contributing to vector-related challenges, governments often turn to community engagement to inspire behaviours or discourage particular actions, reducing the burden on formal vector control;
- **Make up for insufficient resources** - many governments do not have, or choose not to allocate, sufficient resources to support formal vector control programmes necessary to meet the level of threat posed;
- **Respond to ground-up pressures** - many communities are becoming impatient with the continued burden of vector-borne disease or the perception of pervasive mosquito populations;
- **Protect vulnerable communities** - governments have often engaged community-based organisations or civil society groups to protect vulnerable populations (e.g. pregnant women, the elderly, those impacted by poverty, etc.) where formal government efforts may be insufficient or ineffective;
- **Extend into sensitive communities** - some governments must contend with community constructs that prevent government access to a geographic location (a favela, barrio or neighbourhood), often restricted by criminal entities, cultural restrictions or political challenges; community engagement - empowering local community groups to carry out certain vector control tasks or education efforts - may be the only way to extend vector control into certain communities;
- **Respond to large-scale natural disasters** - as we saw in the aftermath of the devastating hurricanes Irma and Maria, communities become the primary functioning societal unit that can be leveraged to pursue certain (although limited) vector control tasks; communities also can play a direct role in rebuilding vector control programmes.
For sure, the value of community engagement to both governments and communities varies greatly. In countries with well-funded and successful vector control programmes, community engagement for vector control-related purposes may seem to be excessive or unwarranted, given that formal vector control operations need no further supplementation. For countries with few resources, anemic vector control capacity, and/or high disease burdens not sufficiently mitigated by governments, community engagement may be one of the most attractive means by which new vector control objectives can be secured.

Fortunately, community-based efforts to combat *Aedes aegypti* mosquitoes have demonstrated success around the world. A growing body of evidence has allowed for the development of best practices and guides for governments to establish, support, engage, or expand community-based programmes.

For countries with few resources, anemic vector control capacity, and/or high disease burdens not sufficiently mitigated by formal vector control capacity, community engagement may be one of the most attractive means by which new vector control objectives can be secured. In fact, in many countries or regions impacted by vector-borne diseases, there is no formal, top-down vector control service and no formal infrastructure to supplement or bolster. In this case, community engagement is the single most important means by which communities can defend themselves from the threat posed by *Aedes aegypti*-transmitted vector-borne diseases.

### 2.2 Traditional Challenges to Community Engagement

**Common Barriers to Implementation**

Of course, despite numerous justifications in support of selecting community engagement, there are many reasons why community engagement efforts may not be prioritised within governments in the near term. As paradoxical as it may sound, governments aren’t always good at engaging and empowering communities and citizens in areas wherein governments have had sole domain (for right or wrong) and responsibility. Vector control is an area that is technical, intensive, detailed, and difficult. Communities aren’t seen as natural players in vector control, and few governments venture out of the comfortable arms-length relationship it has with those they serve.

Overcoming this organisational culture in some governments will not be hard; many governments have evolved their *Aedes aegypti* control strategy and programmes. But still others have not yet graduated into a more diversified control strategy that incorporates all assets and resources available - the largest being the very citizens the government serves.

To that end, there are a number of barriers that vector control agencies must overcome before getting to the good work of designing, preparing, launching, sustaining, evaluating and improving community engagement initiatives:

- Lack of political or policy-level support within governments;
- Lack of interest among vector control divisions;
- Lack of knowledge or appreciation for the benefits of community engagement;
- Lack of personnel (and/or resources);
- Lack of mechanisms to engage with communities formally;
- Absence of community engagement in annual strategic planning and resource allocations;
- Prohibitive rules and regulations;
- Lack of expertise, etc.

Surely there are other barriers. But these are common challenges.
Addressing Questions of Sustainability

Of all these challenges, sustainability is most likely one of the more challenging to overcome. While many governments have attempted to prioritise community engagement, it is not always the case that they have the resources - primarily personnel - readily available to start and then sustain engagement with communities, civil society organisations, and key stakeholders. This lack of sustainability, and despite earnest effort and interest on behalf of civil servants, creates fits and starts, often creating tension between communities and the government they perceive to be unreliable.

“But vector control offices don’t “do” community engagement. We outsource to the government’s communications office. They manage our Facebook page and send out video clips to media stations.”

It is rare for vector control agencies to have individuals on staff who specialise in community engagement, behaviour change, or other forms of public engagement. In most instances throughout the Caribbean (and there are exceptions, of course), vector control offices rely on other government entities to manage communications with the public, outreach efforts, social media engagement, relationships with the media, and other efforts intended to inform or engage the public. While this is not necessarily bad, it can have two negative consequences.

First, when vector control offices outsource their community engagement efforts, those efforts rarely will contain the expertise, authority, and genuine connection to the mission that vector control specialists have. Naturally, communications specialists in a government’s communications office is not tied to, nor responsible for, reduced *Aedes aegypti* populations in a given community, whereas vector control officers are tied directly to the outcome of their efforts.

Second, outsourced communications campaigns - say, a breeding site reduction media campaign during the rainy season - give the air of activity and productively but rarely are they connected to the substantive measurements and indices needed to determine success or drive changes in programmes or strategy. This leads to a vicious cycle - governments communicating to the public; no change in outcomes; frustration amongst government leadership, and a resulting deprioritisation of community engagement efforts.

While in decades past it may have been more difficult to convince vector control professionals of the value of community-based projects, both the vector and the conditions within which it thrives are proving difficult to address using standard vector control tools. As a result, community-based programmes are beginning to be viewed as a significant force multiplier of traditional vector control tools, but also as a new layer of additional intervention capability not possible with typical vector control tools, programmes and methodologies.

In many countries or regions impacted by vector-borne diseases, there is little formal, top-down vector control capacity and no formal infrastructure to supplement or bolster. In this case, community engagement may be the single most important means by which communities can defend themselves from the threat posed by *Aedes aegypti*-transmitted vector-borne diseases.
2.3 The Unique Caribbean Context

The Caribbean presents vector control professionals with a series of unique challenges and opportunities. No two countries are alike when it comes to dealing with vector-borne disease and vector control.

The diversity of geography, entomology, ecology, cultural and social pluralism, a range of economic conditions, increasing levels of transportation between islands, changing weather patterns, and a host of other characteristics make the development of a new community engagement model for vector control both difficult and exceptionally pertinent today.

That being said, Caribbean territories and countries share a set of characteristics that are unlike other regions of the world, which in turn makes the lessons learned from a number of Caribbean countries directly applicable to the others. Moreover, the relatively small populations - often not exceeding a fraction of what large municipal or county-level vector control agencies are responsible for serving - means that governments are smaller and have smaller capacities for technical vector control, and that it is more difficult to build out robust vector control operations that benefit from scale, larger budgets supported by broader tax revenue sources, and the corresponding benefits afforded to territories or nations with larger populations.

Fortunately, many Caribbean vector control programmes have become experts in *Aedes aegypti* control. When contemplating what a regional community engagement strategy or model would entail, a number of characteristics make the Caribbean an ideal candidate for strengthening community-based vector control efforts and new methods for combating *Aedes aegypti* that leverage the strengths of the islands.

In fact, Caribbean-specific characteristics have been identified by the Pan American Health Organization\(^{(84)}\) as important to the implementation of community engagement programmes in the region, including:

- There already exists a large amount of political support for dengue control; countries in this region have experience with dengue outbreaks;
- Human resources may require training or retraining to motivate and sharpen skills; rapid turnover a potential challenge and certification and training programmes can help reduce this risk but may not completely mitigate;
- There is a limited use of digital data collection currently, but infrastructure exists and data can be easily collected;
- Coordination with other sectors - private sector, NGOs, schools - is necessary, and many already have expertise or exposure to formal education on disease prevention efforts;
- Rapid communication and health information systems are available and ease communications between countries;
- There is a cultural reluctance of local authorities to report dengue cases due to international health advisories issued by tourism countries.
These Caribbean region-specific studies also help cast the value of these types of engagements over our project’s pertinent region, affording important lessons. The following studies/articles demonstrate the following results that also point to the efficacy of these approaches:

- In Nathan and Lloyd (2004)(79), the Caribbean Cooperation in Health (CCH), in collaboration with the government of Italy Integrated Vector Control Project, organised community behaviour-change and vector-control teams across 15 English-speaking islands. The approach was successful at dengue reduction and prevention, and the programmes were expanded beyond *Aedes aegypti* control;

- In Toledo, et al. (2007)(118), a community-based vector control program in Cuba reduced potential breeding locations near homes from nearly 50% to just over 2% over 2 years; key factor to success included the local community task forces working directly with government sponsored vector-control agents;

- In Stoler (2011)(111), a pilot evaluating the relationship between dengue and *Aedes aegypti* was conducted on a shoestring budget, demonstrating the ability to conduct local community-knowledge and breeding-level assessments, and showcasing the association between education and mosquito larval-sources occurrences;

- In Elder (2005)(27), a COMBI-based model is used to engage the communities of six countries, including an island-wide program in Barbados. The project experienced “exceptional commitment by the frontline staff and volunteers” and was proven effective, yielding additional secondary gains in both general sanitation and knowledge of other vectors and diseases.
Chapter 3 - Validation of Approach

Sub Chapters

3.1 Evidence, Efficacy and Examples of Implementation
3.2 Programme Types and Lessons Learned

3.1 Evidence, Efficacy and Examples of Implementation

This section on efficacy is addressed early in this manual because of the overwhelming misconception held among many vector control and public health experts that community engagement has not yet been proven as a successful method of achieving measurable vector control-related outcomes.

For practitioners from government or civil society reading this, we have attempted to make the following section accessible and usable in justifying your current or future community engagement, behaviour change, and mobilisation campaigns.

Summary of Literature on Community-Engagement Vector Control Programmes

A number of programmes have successfully implemented community engagement initiatives around the world in a range of settings. Among other highlights, these investigations of community-based vector control efforts showed that they achieved the successful results:

• Community engagement programmes in Latin America showed a reduction in households with mosquito larvae or pupae by as much as 44%\(^{(6)}\);
• A significant reduction in adult *Aedes aegypti* populations - in some places decreasing from 44% to low 9% over 2-3 years\(^{(40)}\);
• In Puerto Rico, a programme achieved as much as a 66% reduction in mosquito-infested breeding sites through school interventions and indicated that tracking *Aedes aegypti* behaviour among children rose by multiple standard deviations - in one programme from 27.5 to 110 at the programme’s height\(^{(139)}\);
• A review of multiple community-based vector control and surveillance programmes highlights the potential for preventing regional epidemics when executed properly.

Example of Implementation

The Camino Verde Green Way Project\(^{(6)}\) is one of the larger initiatives in this arena.

The programme’s primary results are (with a 95% confidence interval):

• Lowered risk of infection in children by nearly 30%;
• Reduced medically-reported incidence of dengue illness by 25%;
• Reduced number of homes with mosquito larvae/pupae by almost 45%;
• The Communication for Behavioural Impact Planning Methodology (COMBI) approach engendered strong commitment at multiple levels in country and have led to broad sharing of responsibility, work, and credit.
On a broader scale, a meta analysis consisting of a review of fifty-seven large community-based surveillance and control interventions \(^{(48)}\), primarily in Southeast Asia highlights a few additional, important findings:

- Successful implementation was highly correlated with strong educational components (90-95% significance);
- Disease-specific prevention programmes achieved a reduction by 50-80% in larval indices and were more likely to maintain these results if combined with community activation models;
- In one study, community-control methods reduced occurrence of households positive for *Aedes aegypti* from 60.4% to 13.3% after a single month;
- Some control interventions “appeared to enhance knowledge and awareness of dengue;” considered a natural byproduct of community stewardship and ownership across program elements;

**Example of Implementation**

The Community-Based *Aedes aegypti* control program in Merida and Yucatan, Mexico \(^{(32)}\) demonstrated that community engagement-only efforts can secure a reduction in vector-borne diseases. In this effort, community-based efforts were capable of achieving:

- More than a 6-fold increase in the number of people able to correctly identify *Aedes aegypti* as the responsible vector for disease transmission;
- Significant reductions in tyres (42%), number of containers (20%), and number of lots (50%) positive for larvae.

Please refer to the extensive annotated bibliography in this manual for a more thorough exploration of former and current community-based activation programmes. The bibliography includes a review of more than 100 documents with short summaries designed for the reader’s casual perusal or detailed, in-depth investigation of pertinent case studies.

### 3.2 Programme Types and Lessons Learned

With this growing body of work, we now have decades of contemporary lessons from which to pull helpful examples and best practices for developing new community-based vector control programmes.

**Planning Community Engagement Initiatives**

- Community-based planning is cited as being one of the most critical components of developing successful programmes;\(^{(129)}\)
- Programmes highlight the importance of creating a customised approach for various genders and social sub-groups to increase overall project efficacy and long-term adoption rates;
- Early evaluation of local hierarchy and social systems helped many projects accelerate initial development activities and linked the programme to a greater sense of community ownership;
- Most of the successful community-based programmes focused on bottom-up identification of needs rather than on a top-down identification of preferred outcomes \(^{(79)}\); crafting small-to-medium size objectives seems to be the most successful approach;
• Developing methods for regular two-way feedback and linking this with external resources is critical for local ownership, programme growth, and perceived legitimacy; it is often an eventual requirement of programme funding/support.

**Community Engagement and Mobilisation Programmes**

There is an unlimited number of programme types, models and structures which will never be sufficiently catalogued by any one project. However, by reviewing dozens of community engagement efforts around vector control, a number of themes emerged that will help the reader determine how best to build the right programme for his or her community:

- Community-based interventions benefit from having a sustaining partner in government, the nonprofit or the private sector if long-term programmatic success is to be achieved;
- Community programmes that focused on organizing communities into new organisational structures - rather than using existing structures - did not necessarily demonstrate a larger level of success;
- Successful engagements highlighted a need to build stewardship and ownership from the beginning and incorporated flexibility / creativity based on local citizen suggestions for site-specific interventions;
- All successful programmes focused on interpersonal and face-to-face communication as the main tools for engaging local citizenry; this often transitioned into finding strong, driven individuals including some who are well-involved in community/faith-based organisations;
- Mobilisation efforts that recognised the effects of diversity and equity within local communities tended to have a greater impact, partially because they accessed and activated pockets that had been socially- and geographically-excluded previously;
- Community-based interventions that coincided with local calendar events presented opportunities to increase programme support and increase visibility within the greater community;

**Behaviour Change and Behaviour Change Communications**

Studies of programmes in this category are difficult to place into one neatly-curated section, but in materials reviewed for this effort, behaviour change programmes have demonstrated success in the context of enlisting citizens and communities in new, vector control-specific activities.

The following findings elucidate some of the aspects that are making behaviour change less of a “nice to have” component to technical vector control operations and more a set of specific programmes that in themselves can be used to reduce vector density and the spread of vector-borne diseases.

- Behaviour change programmes in at least three long-term studies demonstrated definitive success in lowering either vector (Aedes aegypti) density or the transmission of vector-borne diseases; highlighted the importance of behaviour change as part of an overall strategy;
- At least five specific elements were identified across three or more of the studies and highlighted as key to their respective programmes successes:
  a. Small, dedicated teams that can plan and execute projects end up working as well, if not better, than larger committees / teams;
  b. Communities and households will readily get involved if behaviour targets set are reasonable and achievable;
c. Sustaining the interest of volunteers is fundamental and key to success;
d. Success depends highly on novel, local, and strategic deployment of media; media should incorporate two-way communication and both strategies and media elements should be developed by working with appropriate community audiences;
e. Behaviour change and awareness-building take long periods of time and therefore plans should be prepared in advance and supported appropriately.

Example of Implementation
One application of the COMBI model in six countries (Brazil, Guatemala, Nicaragua, Malaysia, Barbados, and Laos) identified particular markers seemingly indicative of the successful implementation of behaviour-changing programmes and communications, regardless of region\(^{(25)}\). They were:
1. Efforts are led by programme champions;
2. Programme leaders have autonomy and the opportunity for reinvention at the local level;
3. Plans must be developed to fade once progress is sufficient;
4. Communities must help organisers determine what benefits are most necessary.

Education
There is a wide range of activities relating to vector-related or vector-borne disease-related education in both the primary/secondary and community education fields, both of which can play a critical role in bolstering local vector control-related activities and behaviour change. A review of the literature suggests a series of key take-away messages and lessons that can be applied to model development in the Caribbean context:

- Successful education-focused interventions generally followed five stages: a) formative research; b) developing recommendations for behaviour change; c) development of educational messages; d) development and production of materials; e) distribution of materials;
- Information distributed generally focuses around: i) community participation; ii) biological control; iii) breeding source reduction; iv) transmission information from national medical health services, social networks, and directly from health educators;
- Materials produced should emphasise a need to be flexible and adapt to local setting because of ecologic, cultural, and social differences;
- Education was most effective for the first 18-24 months after the intervention but then impact subsequently declined without sustained efforts;\(^{(3)}\)
- Networking effects - both in terms of management with local NGOs/governments and the on-the-ground implementation with community agents - are generally considered strong indicators of education and communication success;

Community-Based Control Efforts
For decades, multiple forms of both formal and informal community-based mobilisation and education efforts have been implemented globally. A qualitative survey of articles on this subject identified a number of cross-cutting themes:
• Control programmes require a clear, integrated approach with strong community involvement - characteristics that are at the heart of social-mobilisation concepts; this encourages sustainable processes to maintain the best efforts over longer periods of time;

• Implementation of community-based activation models requires community buy-in, education, and continued diligence coupled with trust in a functioning and sufficiently resourced mosquito control district or local health department;

• Control programmes utilise a combination of eliminating as many breeding sites as possible and applying vector control interventions that target mosquitoes across all stages of their life cycle;

• Community leaders and community-based organisations can be effective conduits through which to disseminate information, educate communities, and catalyse behavioural change at the household level and in turn stimulating progress in the wider community;

• Surveillance should be conducted concurrently with vector control interventions: measurement of mosquito larvae and pupae; measurement of targeted adult mosquitoes; advocacy of personal protection measures (with special methods for pregnant women).

Risk Communications

There is a detailed risk communications module in the annex section of this manual.

“Risk communications” represents any and all communications intended to inform, empower, engage, mobilise, and/or organise the public to take specific actions in relation to controlling *Aedes aegypti* and preventing vector-borne diseases. This includes public relations, digital properties, social properties, TV, radio, events, printed materials, billboards, information booths, etc. - all of which distribute targeted information to specific groups to encourage or influence a particular change in attitudes/mindsets and behaviours over time. There are multiple components that make up risk communications, but those most successful include at least four key characteristics:

• Linking risk communication with national prevention and control plans. It is harder than it sounds, but it is critical when planning for necessary resources, how best to leverage which communication channels, and how best to target key demographics;

• Partnership with existing technical and professional groups/networks. This method adds credibility to risk communications efforts, generating validity, interest or familiarity among the target demographic and the specific action or behaviour the program is attempting to affect;

• Developing country typology using epidemiological and entomological criteria is valuable, although not always possible;

• Combining risk communications with communities of support, local/community influencers, academic research institutes, and monitoring and reporting partnerships. This combination can help amplify the original message into culturally relevant or demographic-crossing messaging that often resonates more so than the formal communications campaign.

By and large, risk communications are often an afterthought, or not a thought at all. Governments that use Facebook, billboards or flyers are definitely conducting types of risk communication. However, without a clear strategy, specific goals and objectives, dedicated resources and measures of success, any efforts designed to inspire community or citizen participation will be unsuccessful.
SECTION

2

Getting Organised

Contents:
Chapter 4 – Core Components of New Community Engagement Initiatives
Chapter 5 – Foundation and Organisation
Chapter 6 – Potential “Models” of Engagement
Chapter 4 - Core Components of Community-based Programmes

Sub Chapters

4.1 Advice for Starting

4.1 Advice for Starting

If you flipped directly to this page, it means you’re eager to begin designing community engagement programmes for the communities you serve or activating your own community to play a direct and meaningful role in vector control efforts. If you are seeking to build a program to help reduce Aedes aegypti mosquitoes outside of formal vector control efforts, this is the right place.

The good news is that this manual provides you with resources to help build or expand community engagement programmes. The not so good news is that this is not prescriptive, and it does not actually tell you what to do.

Why? Every island and community in the Caribbean are unique. As a result, each deserve carefully developed community engagement programmes and strategies that are tailored to meet their specific needs. This manual is intended to help inspire thinking around structural components necessary to design, launch and sustain community engagement programmes, but it is not an ‘out-of-the-box’ program that you can build automatically.

There are, however, some valuable lessons learned in the early stages of organizing communities, developing government programmes to engage or empower communities, and designing tactics to transform mindsets relating to vector control.

The value of this manual will depend on who you are in relation to vector control activities in your community, region, or country, and knowing how you relate to other parties. Key stakeholders in community-based vector control include:

- **Vector control professional within government** - you are evaluating either the merits of or the potential systems needed to engage a community or activate citizens to take specific actions against Aedes aegypti (or another vector);

- **Public health professional within government** - your government may or may not have a vector control unit, but you are seeking inspiration for how new communications and behaviour change tools might generate improvements in disease prevention efforts;

- **Community leader outside of government** - you are an active leader in your community seeking to organise your community around specific vector control tasks or objectives; this may include physical interventions throughout your community, or political advocacy to have certain infrastructure repairs made, or new resources allocated to vector control services;

- **Business owner wanting to improve health of employees** - you are evaluating methods of organizing your employees and their families to improve health in their communities; this is good for them and good for your business; government may not be responsive to your business needs, and your employees are scattered across multiple public health or political jurisdictions; you are seeking a way to organise them and empower them to combat Aedes aegypti at home and at work;
• **Tourism association representative** - you are seeking ways to demonstrate that your primary product - your island - is being proactive about controlling the mosquitoes that transmit diseases and the government has little capacity to meet your specific needs; accordingly, finding ways to engage communities is one of the few options you have;

• **Social justice advocate** - you are working to lift up or protect a vulnerable community, including advocating for improved vector control coverage; you are concerned that your beneficiaries are not being afforded an equal level of support from government, or you are seeking greater protection from vector-borne diseases, but in either case, organizing your community is a positive, constructive way to elevate the voice of the community, etc.

There are many other profiles that may fit your purpose or interest, but these profiles and their reasons provide justifications for engaging communities in vector control activities or in building new programmes.

The following are recommendations for early-stage planning and concept building for a government-led effort - wherein the government seeks to engage, partner with, or seed a community-based vector control initiative or a related behaviour change programme.

• **Define the who** - which community is being engaged?
  - If you are in government and you are seeking to engage a community, clearly identify who that community is, what its parameters are, and how the community defines itself;
  - Who are the community leaders? Who are the influencers?
  - Who will serve as an advocate for this programme?
  - What are the concerns of these community leaders?
  - How can you best demonstrate respect for their concerns and reservations?

• **Define the what** - what will “community engagement” for vector control entail? What are the goals of the programme, and what are the objectives of the programme?
  - Goals are what the programme intends to achieve (“a reduction in dengue transmission” or “reduced larval breeding sites);
  - Objectives are the accomplishments you will need to secure to obtain your goal (s);
  - What is it that you are trying to accomplish, and how can you communicate that clearly?

• **Define the where** - vector control is very physical; community engagement programmes must be linked to geography, and a clear articulation of the geographical lines is important;
  - It is often useful to use existing political or voting districts, health districts, or other easily-used organisational mechanisms;
  - Are there natural environmental barriers that make determining the “where” easier? Are there cultural or social barriers or challenges associated with treating a community as “one” community?
• **Define organisational structure** - determine what type of organisational structure is necessary;
  • Community-based organisations may utilise existing community-based civil society organisations, faith-based institutions, businesses, neighbourhoods, or other existing organisational structures;
  • Communities may also want to form a “new” organisation devoted to bringing community members together for purposes of advancing goals/objectives;
  • Governments may want to “seed” a new community initiative or community-based organisation, or it may want to empower an existing organisation to take on specific efforts relating to vector control (i.e. asking the Red Cross to manage Zika prevention programmes at the intersection of vector control and reproductive health);
  • Governments may also want to communicate with communities more clearly, or in more of a dialogue format, which may necessitate some form of community engagement strategy or partnership;

• **Define other organisational components and requirements:**
  • **Leadership** - who will lead this effort; is there a committee or board to provide oversight?
  • Does your government agency require any new or additional authorities to engage the public in this manner?
  • Form **partnerships or alliances** - which nonprofits, government agencies, schools, companies, or other organisations would lend support to this effort?
  • Determine **resources needed** - what resources are necessary to achieve your goals and objectives?
  • Establish a **strategy** - “this is how we will reduce larval breeding sites over the next three months in this village”;
  • Determine how to **measure success** - even community-based, volunteer-powered organisations or programmes need to be measured against what it is they are trying to do; establish clear parameters or measures of success early;

Additional recommendations in structuring the programme or initiative are also helpful in thinking about the broader strategic questions one will encounter when determining how best to structure or empower existing structures to take on a vector control-specific role.

**Place a Premium on Independence and Autonomy**

Emphasis should be placed on communities shaping, guiding, deploying, and owning the vector control efforts best suited for their community, characterised by a light-touch approach. For the model to be fully effective, communities must have the independence to organise and manage their own initiatives; by using the template and modules, each community will have a range of variables within which to customise, adapt, or calibrate for local conditions and dynamics.

**Strive for Openness and Transparency at all Times**

Community-driven initiatives should remain open and transparent to all; communities must have access to vector control information and data, and District-level volunteers should be given access to the same data held by government or community programme sponsor (if the government is not the one “engaging”). This contributes to self-ownership of the process and implementation by local communities.
Starting Small and Local is Best

Independent community-based mobilisation programmes should be maintained at the smallest possible viable level - the smaller the group, the more effective the vector control efforts. Each initiative must contain a standard governance model so that support centers can interface with each program without hassle; however, the management of each initiative should include a range of community leaders, including representatives from various government agencies (not just vector control).

Build an Identifiable Brand to Which People Can Relate

Branded community campaigns can work well, particularly if done correctly. A thoughtful, impactful, highly-attractive and inspiring brand can be used to inspire communities and citizens to take action. It is imperative that any brand or communications effort be done side-by-side with the community and take into consideration the core values of the communities involved, in a manner that is digestible, easily identifiable, iconic, icon-friendly, and highly visible.

Use of Technology - Fear Not

New technologies are allowing governments and communities to work closely together. Mobile technology can be a critical citizen-engagement tool and a vector control tool that enables everyone who wants to play a role in vector-prevention related efforts to indeed play a part. Inclusive of a range of features for connecting with other volunteers; mapping; reporting hotspots; uploading photos of larval breeding sites; posting questions; answering questions, etc. It is recommended that this include an initiative-specific application (or suite of applications) that are customised for the programmes and to empower citizens to become excited about combating mosquito-borne diseases.

Build with Growth in Mind

For governments seeking to engage communities in vector control activities, it is important that the government do so in a manner that can be replicated in other communities. Success in one programme area may mean expansion to the next, and early planning for “modular” or scaleable programme components, is prudent. Each initiative should be structured as “building blocks” that form part of a future and broader effort that may fit into “districts” and then national coordination programmes. This will be outlined below, but the premise is simple - local initiatives will use the same mapping and reporting structures that connect with neighboring ministries of health or other public-based health initiatives. These ministries and initiatives can ultimately roll-up and report to CARPHA’s support center so that every initiative throughout the Caribbean is using the same reporting tools, language, measurement, metrics, and key performance indicators.

Vector control is a relatively technical and often complicated field. Therefore, any model should place emphasis on developing standardisation of basic, safe, easy-to-use, and low-cost vector control tools and methodologies for the benefit of all community participants, as well as each community initiative.
Chapter 5 - Foundation and Organisation

Sub Chapters
5.1 Adopting a New Policy Framework
5.2 Aligning Program Policies and Resources
5.3 Operationalizing Community Engagement
5.4 Key Constituencies

5.1 Shaping a New Policy Framework

Many governments seeking to empower communities to play a role in vector control do not currently have the resources or personnel to do so. In many cases, securing new funding to support new efforts will not come from requests sent to the Minister of Health or Environmental Health alone.

In anticipation of this, the following recommendations are intended to provide Ministry leadership and management with tools to help integrate community engagement into both the strategic planning process which governments undertake annually to determine policies, priorities and resources; and into a prominent place on an already long list of priorities.

The ideal scenario includes the alignment of the following components:

- **Authority:** vector control units need the authority and flexibility to engage communities, enter into partnerships, enlist citizen volunteers, provide materials and training, and execute other efforts to educate, equip and empower communities to play a direct role in vector control \(^{22}\); many units can already do so, but others are still not afforded such flexibilities in their mandate or authority;

- **Responsibility:** vector control units should be held responsible for the authority vested in them to empower and engage the public in their work; being held responsible means being given the requirements to pursue specific outcomes or processes associated with engaging communities; without this responsibility, government agencies rarely act;

- **Resources:** there cannot be authority and responsibility without the resources to support them \(^{70}\); governments will need to match the authorities and responsibilities of community engagement with resources necessary to do so appropriately.

**Do governments not already have the authority to “engage” communities?**

Yes and no. Governments are often not equipped to allocate resources for, say, assigning a person to help engage community groups with vector control-related education programmes. Without those resources, communities may not play a role in vector control, and this can translate to the removal of fewer breeding sites, which is seen as a responsibility of a ministry and vector control unit. Vector control units may very well see the benefit of enlisting the public in these programmes, but if the corresponding responsibility were not backed by the authority to take specific actions to help affect that responsibility, no action would be taken.

In more simple terms, governments need to imbue vector control units with the authorities, responsibilities, and resources to engage and empower communities to play a significant role in suppressing *Aedes aegypti* (or other public health threats).
To prepare governments to better do so, a strategic-level discussion is needed at senior levels of government to help define if, when, and how it will prioritise new community engagement efforts. One manner of establishing the appropriate authorities, responsibilities and resources is by establishing a new policy framework within the appropriate ministries. Without changes in prioritisation and accountability, community engagement will continue to be relegated to once-annually volunteer clean-up days - hardly the 21st century community engagement and activation programme we should hold up as ideal!

Establishing a new policy framework for community engagement in support of vector outcomes should not be an impossible task. The following components would appear to be pertinent in most governments in CARPHA’s member states:

- Establish vector control-focused community engagement as a priority in the national vector control strategy and resource plan; identify community engagement as a strategic priority, equal to the weight given to traditional vector control programmes;
- Institutionalise community inputs and participation in the vector control-related strategic planning process, enabling community leaders and citizens to play a direct role in shaping the government’s annual vector control efforts before the year begins;
- Establish community engagement as a strategic pillar or pathway in the annual strategic plan;
- Establish a requirement for vector control management to incorporate community engagement in their annual operational plan, encouraging operational-level programmes to incorporate or empower communities in vector control operations; Charter a quarterly review of community engagement efforts and measure performance based on broad but measurable metrics;
- Deputise a manager to serve as the responsible party for ensuring alignment between the annual strategic plan and operational plans throughout the year; evaluate that manager on an annual basis in part based on performance relating to community engagement priorities.

These efforts would help enshrine community engagement at the national or ministerial level, laying the groundwork for the necessary resources for institutionalizing community engagement efforts.

5.2 Aligning Priorities and Resources

With a new policy framework in place, or at the very least community engagement built into a strategic plan, a vector control unit can start to speak about resource requirements. Resource levels need not be significant to begin engaging communities in earnest around key priorities or vector-related challenges.

Consider the following:

- One full-time staff in a vector control unit can manage relationships with a dozen community groups;
- One dozen community groups, when educated and empowered to host community clean-ups, house-to-house neighbourly source reduction efforts, larval breeding source reporting via free Apps, or volunteering to teach in local schools, can touch thousands of lives in multiple communities;
- These activities have a ripple effect, generating awareness, concern, and ownership among the local population, which may contribute to the overall reduction in mosquito breeding sites;
The reduction in breeding sites at individual homes will begin to diminish the burden on the vector control unit, allowing vector control personnel time to focus on high risk areas, as well as monitoring and evaluation of control activities, resulting in better targeted use of resources.

That single FTE could have a significant impact on the overall effectiveness of the vector control operation.

Additional financial resources, if made available, could easily be a catalyst for community-based organisations to take on responsibilities for certain vector control functions. Grants or micro-contracts with nonprofit organisations to manage source reduction, reporting or vector control education in primary/secondary schools would also have ripple effects, allowing a small vector control unit to amplify its impact.

5.3 Operationalising Community Engagement

The following are some of the first steps to building a community engagement programme with, or within, a community from the government perspective:

- Establishing initial contact with key community leaders for consultations;
- Recruiting a select handful of community leaders to form a “Community Advisory Group” (CAG);
- Sharing data or information relating to vector threats;
- Establishing joint priorities (e.g. “source reduction in district two is a priority” or “our community would like to focus on educating children”);
- Hold initial community meetings, co-hosted and chaired by the CAG (community leaders should, when possible, lead community engagement meetings);
- Identify a broader “action group” comprised of community leaders, business owners, faith leaders, educators, local politicians, and others who can tap into or mobilise communities throughout the area;
- Develop partnerships with one or two existing community-based organisations;
- Establish a schedule of meetings for the CAG;
- Provide a training for CAG members relating to community-led vector control activities, basic mosquito biology, etc.;
- At the first CAG meeting, sanction a specific set of near-term activities (say, a first community clean-up, information booth in front of the supermarket, visits to schools, or community training, etc.);
- Begin to shape a simple, short-term strategy (often best done after the group comes together around a specific event designed to generate visibility and momentum);
- Identify a managerial role or secretariat within the community to keep efforts moving forward (often individuals who are retired, unemployed, etc.);
- Establish a cadence of meetings and activities around which new member recruitment or efforts can take place;
- Develop a branded identity established by the community, creating pride and visibility to the broader community;
- Secure resources from local stakeholders, including businesses;
- Implement programmes chosen or developed by the community itself;
• Report back routinely and often to the community broadly, and utilise all available information sharing channels to continue to share information about programmes, progress, and other important material;

There are plenty of other steps that could be taken but these represent some very basic steps to establishing a community-based vector control initiative.

5.4 Key Constituencies

So who are we talking about when we say community?

What groups or associations actually make up a community? For purposes of building vector control-focused community engagement programmes, the following are amongst those groups we would call communities in their own right, and those communities that are joined together with others to form a new, larger community.

The more targeted a campaign is for engaging a specific community, the greater likelihood that specific goals or objectives are met. In addition, programmes that rely on community engagement around geographic areas - 800 Vela, Barrio, et cetera - should be mindful as to how best to inspire or engage individuals that may meet various distinctions within a community.

• Citizens - as individuals or grouped by demographic, geography, income;

• Communities - geographical groupings of individuals and families, or more broadly defined groups into which individuals place themselves (i.e. “I live in Ward 5, but I identify more with my church group across town”);

• Civil society groups - groups most often organised around meeting needs within a community, city, or country;

• Institutions of Faith - churches, mosques, temples, and faith-based communities;

• Small businesses and industry - for-profit entities or associations;

• Education networks - educators, families and students;

• Social networks - cross-cutting networks into which individuals place themselves, often transcending geography or other areas of identity or affiliation;

• Media - individuals, organisations or companies can be effective partners or force multipliers;

• Government agencies - agencies outside of vector control offices with a stake or role to play;

• Public safety - police, fire and emergency management networks;

• Military - often an ignored stakeholder group that can add capacity, expertise, or support;

There are many other groups, but for any vector control office seeking to engage communities, it is best to be precise about which communities are intended to be engaged, and which communities can be leverage for the benefit of other communities in need.
Chapter 6 - Potential Modes of Engagement

Sub Chapters

6.1 Selecting the Right Engagement Structure
6.2 The District and Neighbourhood System

6.1 Selecting the Right Engagement Structure

When preparing to develop a new engagement initiative designed to engage a community geographically (e.g., a neighbourhood of 5,000 people on an island), it is critical to evaluate options for how best to structure such an engagement. It will vary widely and should be decided by the communities themselves, where appropriate.

The following are sample structures designed to inspire thinking about how best to mix the appropriate levels of community-level ownership and initiative with guided structure and with support from governments. There is no perfect format or structure, but decisions made early in the process as to how best to situate government services or support can often prevent hassle and confusion later in the process.

How governments position themselves to engage, empower, encourage, incentivise, and/or align with community’s matters. While there is no set method that would work for every effort throughout the Caribbean, it is suggested that governments think carefully about how best to ensure communities play the primary role in determining or shaping the programmes they will pursue in efforts to suppress *Aedes aegypti* populations.
6.2 The District and Neighbourhood System

Many community engagement initiatives across the public health spectrum use geographical organisational units to break activities into management components. This is smart. For vector control-related engagement efforts, smaller community units are better, as *Aedes aegypti* control efforts require trusted relationships among community members and volunteers in the programme. People from outside a neighbourhood knocking on doors and asking to help remove standing water or mosquito-breeding containers is not an ideal arrangement.

Neighbourhoods – the smallest possible geographical grouping of citizens, parcels/homes/businesses, and environmental features (including parks, open spaces, beaches, rivers, roads, etc.) that are managed by the initiative’s governance body, and that are managed by neighbourhood “captains” – are helpful. Each neighbourhood can be host to a set of tasks, responsibilities, monitoring tools, and teams that ensure the neighbourhood is carrying out the maximum level of vector control effort possible. This allows for scaleability as well.

Multiple neighbourhoods can be grouped together to form larger organisation groupings, or districts that represent a broader effort with maximum impact.

As programmes, Neighbourhoods and Districts get bigger, it is important to monitor the size of particular regions and their densities. In the case of overly populated regions, it is important that Districts be subdivided further to keep each Neighbourhood within a “warm and fuzzy” feeling, not overly bloated; therefore, operating effectively so that within each community, members know one another and can work well together and grow together.

Core Organisational Elements:

For larger community engagement initiatives that will stretch beyond small communities or targeted neighbourhoods experiencing outbreaks of vector-borne diseases or high mosquito densities, scale needs to be seriously considered. Governments preparing to engage communities would be well-served by envisioning, if not establishing a plan for, how best to establish a community-led central coordinating element, comprised of multiple Community Action Group (CAG) leaders; then multiple small geographic CAGs; and so on.

One sketch of a structured hierarchy includes the following:

- **Headquarters / Regional Core:** A partnership between the government and a coalition of multiple representatives from multiple CAGs from various communities - this is the source and curator of the initiative’s core mandate, central planning efforts, the development of programme components, modules, resources, tools, standards, and support for each CAG; this body hosts a small volunteer or part-time staff to manage “dashboard” and coordination, collaboration, administration, operations and support efforts;

- **Community Action Groups (CAGs):** the community coalition assembled and organised to implement or guide community-based vector control programmes;

- **Community Action Districts (“Districts” or CADs):** this is the second-most valuable organizing unit in the model, as it supports a handful of neighbourhoods and serves as the center of gravity for a number of neighbourhoods within the District; the District is the center for distributing training, materials, and resources to each neighbourhood; Districts help each neighbourhood move along, report on neighbourhood-level activation; and identify and fill any particular gaps; each District is empowered by an internal organisational structure comprised of individuals from government agencies, civil society, the community at large, businesses, etc.;
• **Community Neighbourhoods (“Neighbourhoods”):** Neighbourhoods are the single most important element in the model. Neighbourhoods can be comprised of up to 1,000 individuals or more (typically 200-400 homes), businesses, and other community components within a contiguous geographic territory; Neighbourhoods are designed by Neighbourhood volunteers supporting local communities which are seeking to stand up as a Neighbourhood. Neighbourhoods are managed by Neighbourhood Captains - volunteers who serve as the lead coordinator and who carry out specific routine tasks, and who inspire and encourage other volunteers to fill important Neighbourhood-level roles; Neighbourhood Captains provide reporting on the Neighbourhood; host Neighbourhood-level social events; host trainings; and serve as the “heart” of the programme. Neighbourhood Captains are “all-stars” and represent a true commitment to community and to the safety of its members; These Captains will be bolstered and supported by the Country-level and District-level program, and also be highlighted as the heroes of the Caribbean in various region-wide marketing programmes.

Suggestions that there is one template that can be used to engage communities in critical vector control tasks would suggest that every community is homogenous and similar. This is simply not the case. Thinking early and often about how best to structure community engagement programmes will lead to less confusion and fewer ad hoc arrangements. It will also inspire greater confidence among community members and key stakeholders who will be key to the success of any programme attempting to inspire community or citizen participation in reducing the threat of *Aedes aegypti*. 
SECTION 3

Building Community Engagement Programmes

Contents:
Chapter 7 – Community Engagement Programme Concepts
Chapter 8 – Building and Operating New Community Engagement Programmes
Chapter 9 – Resource Requirements
Chapter 10 – Enabling Technologies
Chapter 7 - Community Engagement Programme Concepts

Sub Chapters
7.1 Sample Programme Components

7.1 Sample Programme Components

governments and communities around the world have employed a range of “programmes” for engaging communities and citizens in activities relating specifically to *Aedes aegypti* control.

In the Caribbean context, here is one sample programme construct. A more programme-oriented version is available in the annexes. This sample programme would be the result of government and community collaboration and the result of work by a Community Activation Group.

Vector Control Priorities:
1.  **Preventive** - empower communities to eliminate breeding sites;
2.  **Community-Led** - activate communities to lead vector control efforts and to hold neighbours and businesses accountable for participation;
3.  **Safe and Effective** - use mosquito control methods that are approved by leading regulatory bodies and that are safe for use by volunteers;
4.  **Comprehensive** - pursue island-wide vector control, including on every property, home, business, and public space in a given district;
5.  **Integrated** - use a variety of methods to control larval and adult mosquito populations;

Prevention Programme:
1.  **Education at schools and with civil society groups** - engage with local schools in an attempt to secure behaviour change from an early age;
2.  **“Zero Tolerance” Breeding Site Elimination** - ensure all properties are free from breeding sites; work at each property until all breeding sites have been eliminated;
3.  **Ongoing Larval Control** - utilise safe, effective methods for eliminating mosquito larvae in permanent or semi-permanent structures;
4.  **Physical Infrastructure Improvements** - work with government and communities to remove, change, or eliminate permanent or semi-permanent physical structures or features that pose threat/harbour breeding sites;

Ongoing Community-based Vector Control Efforts:
1.  **District and Neighbourhood Operations** - develop strong neighbourhoods and districts led by trained volunteers to distribute knowledge, know-how, resources, and alerts on an ongoing basis, and to provide the programme with a granular, ongoing view of conditions and dynamics;
2.  **Annual House-to-House Baseline Surveys** - conduct annual baseline surveys with trained volunteers of every premise in the targeted community; this survey will score each property based on larval breeding sites or potential breeding sites; the baseline survey will be mapped and will guide subsequent control efforts. Premises will be visited once per week until each one is at “zero” on breeding site presence;
3. **Ongoing Surveillance and Monitoring** - pursue ongoing surveillance methods including house-to-house inspections using randomised and systematic methods and continue to eliminate breeding sites;

4. **Targeted Suppression** - conduct surge efforts at various times in the year to address ongoing or recurring problem areas.

**Community-based Emergency Response:**

1. **Zika Transmission Case** - respond to reported and suspected transmission cases with larvicide, adulticide, and source reduction efforts within 1/8th of a mile of transmission case using trained volunteers;

2. **Pregnancy Support Kits** - provide pregnant women with bed nets, insect repellent, conduct special inspections, and larval site reduction/elimination at their homes and within a certain radius.

**Community Vector Control Tools:**

1. **Mosquito Traps:** use certain traps to serve as monitoring and control tools;

2. **Chemicals:** use chemicals when necessary, but only as approved by the Steering Committee and guided by official vector control officer;

3. **Biological Control Methods** - evaluate biological control methods once the applicability of the method can be determined as being useful in the respective setting;

4. **Behaviour Change Programmes** - develop and implement locally-led communications programmes to inspire behaviour change;
   a. **Develop a branded community campaign to draw attention to positive community momentum and importance of collective action;**
   b. **Leverage media** to share information about program events and certain behaviour change recommendations;
   c. **Develop “incentives-by-association” programmes** - schemes that allow individuals, families, businesses, faith-based organisations, etc. to earn some form of positive identification or affiliation with the programme or its specific recommended actions;
   d. **Develop and maintain an active social media presence; Build and maintain a website for the programme with important information and resources;**
   e. **Build and integrate school curriculum to develop an appreciation of the importance of the role to be played by each household and society member in reducing mosquito populations.**

There are many other programme elements that a community effort could include but these suggestions should give the reader enough elements to consider when designing his or her own strategy and effort.
Chapter 8 - Building and Operating New Community Engagement Programmes

Sub Chapters
8.1 Planning
8.2 Initial Governance
8.3 Training and Team-building
8.4 Sustaining
8.5 Data collection and sharing
8.6 Evaluating Performance

8.1 Planning

With the scarce resources that many community organisations and governments have, it is imperative to bear in mind that new community engagement efforts must have specific goals and know the limitations. As organizers and directors begin the process of bringing relevant parties to the table and mobilizing resources it is important to lay out the various components of the program from a high-level to ensure that there is community-level appetite and commitment to pursue those goals. Below are a few elements to consider when planning for implementation of community-based vector control programmes:

a. Start with data if possible: Community engagement programmes that start with data for mosquito densities, breeding sites, or other data can from the very start begin to determine priorities; leveraging government data, where available, this can help kick-start a community-based campaign;

b. Surveillance Networks: An accurate, ongoing, well-managed vector surveillance programme will help establish a baseline of data from which decision makers can monitor the overall progress of the program, including mosquito species distribution;

c. Community-based / Crowd Sourced Breeding Site Reporting: Inspiring the participation of residents in identifying and reporting current or potential challenges can be effective in providing both useful data and engaging the community. Larval breeding sites can be recorded via available applications, social or web. Residents may utilise an easy-to-use application to help report current or potential breeding sites. This information will help a VCO team target problem areas, thus maximizing their efforts;

d. Emergency Response: Consideration should be given to handling emergency response. Vector teams should respond to a suspected or confirmed reporting of a Zika, dengue or other VBD outbreak within 24 hours with targeted source reduction and other mitigation efforts (bed-nets; repellents; “pregnancy kits”). A quick response can help organizers mitigate further spreading of disease. Efforts should include source reduction, larviciding, and house-to-house notifications within a set radius around a confirmed or suspected transmission site;

e. Strategic Solutions: Evaluate the potential utility of deploying a “strategic” solution – a new control tool, for example - and engaging the community with options for pursuits relating to elimination. The development of a number of new technologies that can have potentially significant impacts on local Aedes aegypti populations require the engagement of communities in conducting pilot trials. Working together as a community to determine how best to pursue these options, can help align public, community, and private incentives and create momentum for change.
8.2 Initial Governance

Once the plan has been put into place, it is important to support its implementation with the right amount of expertise, political will, and consistent follow through. This generates much of the authority necessary to be consistently relied upon as a trustworthy source of information and support within the community and, when done right, further enables individuals and organisations to participate in an organised way.

The following are a list of suggestions for maintaining successful governance:

- Establish, manage, monitor, and evaluate the programme in accordance with the mission, mandate and goals, as established by the Steering Committee and to ensure that the programme is implemented in the most professional and efficient manner possible.
- Programmes are governed by a Community Advisory Group (CAG) or Steering Committee, as authorised by the primary founders of the programme. The CAG or Steering Committee is responsible for the overall successful implementation of the programme and is the body responsible for the deployment of financial resources in a manner consistent with the programme’s charter and strategic plan. The Steering Committee should meet at least monthly, and request that all contracting organisations report routinely and consistently.
- Maintain a community-based leadership team and coalition comprised of a diverse range of community leaders and stakeholders.
- Community leadership is the cornerstone of these types of programmes. Social license to operate comes from a well-rounded community organisation driven by a variety of stakeholders who can speak for multiple constituencies, thereby making the programme rooted in the specific needs of the community.

8.3 Training and Team-building

When building teams for these community-based initiatives, managers should strive to develop a high degree of interconnective and synergistic characteristics between the team members, the larger community, local government and key stakeholders.

Here is an example of a team setup that supports a robust, well-funded community engagement effort:

- **Community Vector Control Officers (CVCOs):** This is a hybrid position that may or may not be paid: responsibilities include administering control technologies; monitoring and collecting data on risk areas; interfacing with the general public; participating in educational capacities at local schools and community organisations. CVCOs are the backbone of any program and should be selected for both their work ethic and interpersonal skills. Very often, these team members will be out in the field, alone or in small teams of 2-3, and will need to be able to problem solve quickly and effectively, keeping the greater programme objectives in mind. Control is only part of the job description: as the CVCOs will be interfacing with members of the community, they need to be able to communicate clearly and with authority on behalf of the programme.

**Daily Task List:**

1. **Conduct Baseline Surveys (of new regions):** segment and map new areas as they are incorporated into the programme; advise decision makers on areas most at-risk and specific challenges that might be expected;
2. **Administer Control:** apply appropriate control methods to individual residences, businesses and organisations, religious institutions, educational and community facilities;

3. **Collect Data:** ideally integrated with any control methods is a digital data-collection method which allows for easy decision making based on available data; includes risk and control data, KAP and survey information, etc.; utilised by the team and programme managers for tactical and strategic purposes.

- **Community Engagement Officer:** Responsible for communicating the greater impact of the programme to the community, including to businesses, religious organisations, and governments; managing outward communications on behalf of the programme; developing and monitoring implementation of “Adopt-a-Spot” or similar programmes that involve the community in control and prevention efforts. This key role should be filled by a highly charismatic and high-energy individual and someone who is eager to learn and grow in the position.

- **Team Manager and General Administrator:** Responsible for assigning weekly and daily goals, including the areas where control measures should be implemented; oversees team, manages supply levels, scheduling, and general operational duties; produces weekly reports which are used by Steering and Management Committees for long-term planning;

- **Technology Support Lead:** Responsible for managing the ongoing maintenance of any applications utilised by the team, including for determining areas of high risk and for collecting decision-driving data; ability to analyze data and produce detailed reports would be an asset.

**Other key components for training or sensitizing communities to these types of programmes include:**

- **Activity Normalisation:** Inspire neighbourhood-level participation and action via a robust “neighbourhood watch” programme for source reduction and social normalisation relating to environmental cleanliness and programme participation. Inspire participation in each district, including the appointment of at least one district captain in all districts, and at least one event per district per month;

- **Inspiration Through Education and Transparency:** Educate and inspire residents to take concrete steps to reduce mosquito breeding sites and hold their neighbours, communities, and employers accountable. Sharing factual, specific and targeted information about what individuals and families can do to help prevent the spread of vector-borne diseases can help inspire and inform and foster change in attitudes about the roles that individuals can or should play;

- **Demonstrating Momentum:** Recruit and activate residents, businesses, clubs, and other groups to play a direct role in source reduction and generalised behaviour modifications relating to environmental maintenance and social expectations related to mosquito breeding sites. Sustained, high-profile and positive community events can inspire participation and foster changes in knowledge and attitudes relating to the roles of individuals and communities in the prevention and control of vector-borne diseases. Events should be open to everyone and be implemented routinely to serve as a means to engage with and listen to communities/residents, and to demonstrate positive action.
8.4 Sustaining

Once the programme has been implemented, it is important to immediately begin supporting and planning for its long-term health. This will require successful buy-in from the community, political parties and government organisations. The following are a few avenues worth exploring for this purpose:

- **Resource Mobilisation for the Long-Term**: Secure new funding for out-year (typically 2-3 years in advance) programming from local and international stakeholders. In order to have long-lasting impact, organisations need to plan beyond the initial objectives of the programme. This will require new resources and new commitments for support and collaboration - that work needs to begin now;

- **Expanding Education**: Energy spent towards educating future generations is similarly recommended for long-term success. Inspiring school-aged children to play a direct role in behaviour change can have direct impacts at home and throughout the community. Educating students is a key component to achieving large-scale behaviour change region-wide. Working with schools directly allows students with hands-on educational experiences to improve knowledge and attitudes relating to their roles in the prevention of vector-borne diseases;

- **Encouraging Self-Policing Environments**: Improving knowledge among residents of key vector-related threat areas island-wide can create social pressure and positive attitudinal changes. Showing residents, the results of surveys and inspections and offering honest explanations can help add to their knowledge base and help inspire attitudinal changes relating to source reduction.

8.5 Data Collection and Sharing

Data-driven decision-making is a hallmark of successful programmes. It is critically important to plan methods for collecting and sharing key metrics, not only for internal decision-making but for greater organisational transparency. Data collection is also nearly always a prerequisite for many funding sources. Here are a few tips for planning data collection and sharing:

- **Demonstrate Success**: Demonstrate effective, safe, sustainable measures in areas of responsibility, while sharing knowledge, tools, and experiences with local vector control agencies. Demonstrating the effectiveness of a vector control programme that does not use toxic or damaging chemicals and that places emphasis on changing mindsets of communities, can go a long way to obtaining political sponsorship and support;

- **Regular Data Collection Intervals**: volunteer teams to inspect every property for active or potential breeding sites - on a cyclical basis (300-400 homes each quarter potentially, depending on volunteer load). Results ideally recorded and reported via an App. A thorough and complete survey of all premises on the island will lead to both an accurate view of container-breeding habitats - active and potential - and then lead to effective source reduction efforts;
8.6 Evaluating Performance

Feedback is a critical part of community-engagement and setting up successful and useful two-way dialogue can often suffice as a feedback and evaluation process. However, when planning for formal programme growth and improvement, consider the following:

- **Monitoring and Evaluation is Important but Not Imperative:** Community-based vector control efforts should be monitored and evaluated when possible, but the absence of such capacity should not be a barrier to communities organizing and taking action; in some instances, communities have little to no capacity to conduct thorough or ongoing evaluation of performance, but in others, communities may be able to develop a set of basic benchmarks or objectives that can be measured on their own;

- **Leverage Government Vector Surveillance Methods:** Governments can often use existing surveillance methods (ovitraps, container indices, etc.) in an area to help demonstrate their progress.

**Example of Implementation**

**Measuring Overall Success of the BugOut Initiative and Management**

The BugOut Program is a community-based vector control program operating in the British Virgin Islands BugOut’s Strategic Plan - and all BugOut activities - are evaluated by the following measurements, along with other indicators, including efficient and effective management, sound financial stewardship, and growth in numbers and quality of stakeholders and supporters:

- The level of vector density, as determined by BugOut’s network of surveillance traps measured weekly all year round;

- The number of breeding container counts per property, as measured by conduct of two surveys annually and spot checks;

- The % of properties rated as “High Risk” or higher during each survey, and the % reduction between surveys;

- The change in knowledge and attitudes (via a KAP survey) of Virgin Gorda residents relating to their specific role in preventing or eliminating breeding sites;

- The change in knowledge and attitudes (via a KAP survey) of Virgin Gorda students relating to their specific role in preventing or eliminating breeding sites;

- The number of districts that are activated as part of the BugOut initiative;

- The number and % of businesses involved in the BugOut Hero programme (this programme recruits and engages organisations to participate as partners of BugOut). All BugOut efforts will be focused on securing progress in each of these areas, and a technical team will ensure that each programme area is meeting expectations. Alterations to the strategic plan or specific efforts are expected, to some degree, and will be guided by BugOut Directors and Steering Committee.
Chapter 9 - Resource Requirements

Sub Chapters

9.1 Budgeting for Community Engagement
9.2 Community-based Resources

9.1 Budgeting for Community Engagement

No two countries or territories will implement the same programme, but certain budget items will be common throughout most government-driven community engagement efforts. Further, for purposes of sustainability of program efforts, budgeting is best done as part of the annual strategic plan for the vector control unit and its broader ministry-driven resource strategy.

- Personnel - one of the largest costs for governments pursuing community-based vector control programmes is the personnel it takes to plan, prepare for, and implement these programmes;
- Indirect Costs - government efforts to seed community engagement programmes often will incur indirect costs, including transportation, hosting coffees or meals for community leaders, printing costs and lost productivity on mainline vector control responsibilities but these should be minimal; communities rarely need much prodding if the appropriate construct for collaboration is presented early and frequently;
- Support to Community Programmes - expenses can range from US$100 to US$10,000 to seed community-based programmes; supplies, meeting materials, printed materials, basic tools and chemicals, support for training, support for building a website, etc., are low-cost requirements that most vector control offices can support initially;
- Risk Communications - typically requiring cash or a direct in-kind contribution from media companies, marketing campaigns can vary in cost; it is suggested that expensive marketing campaigns that utilise broad communication channels be scrutinised and that more targeted efforts be prioritised;
- Digital Communications - costs associated with developing digital tools - website, social media accounts, etc. - should also be minimal. Low-cost website building tools are available, allowing for the development of websites for less than $20 per month; social media accounts are free to establish; proposals from vendors or consultants within or outside of communities should be critically viewed in an effort to be clear that certain requirements for the programme are identified;
- Special Events - certain costs associated with hosting community clean-ups, or information booths, are minimal, but can run the range of the cost of latex gloves and trash bags to hosted BBQs, transportation for volunteers, t-shirts, hats, and even digital tools like App-loaded phones for use by community leaders.

Whatever the size or scope of the project, it is recommended that costs be kept to a minimum until a strategic plan, developed in large part by the communities themselves, can clearly articulate desired goals and objectives. From there, resources can be allocated or requested in direct relation to outcomes.
9.2 Community-based Resources

The single-largest resource base for community-based programmes exists within the communities themselves. The following are examples of resources that can be generated from within the community:

- Private donations from members of the community;
- Corporate donations from businesses within or near the programme area;
- In-kind contributions of supplies, food/water, equipment;
- Donated space for meetings, storage of equipment or hosting of special events;
- Donated copies/printing;
- Foundation grant funding;
- Donations from government;
Chapter 10 - Enabling Technologies

Sub Chapters

10.1 Basic Tools
10.2 Leveraging Mobile Technologies
10.3 Social Media

10.1 Basic Tools

Few tools are needed to engage communities and activate them in vector control-related tasks. However, the following are helpful tools to consider when planning to engage communities, or when communities plan to organise themselves:

- Volunteers;
- Website with calendar, announcements, and communication tools (submit forms, email newsletters);
- Social media accounts;
- Mobile phones (community members will have their own in most cases);
- App for larval source mapping;
- Breeding site inspection tools - gloves, dippers, etc.;
- Community clean-up tools - gloves, garbage bags, etc.;
- Clip-boards, pencils/pens, paper, etc.;
- Handouts - flyers, surveys, single-page print-outs, etc. (a range of templates exist online); etc.

Additional tools may be helpful but are not necessary. The simpler the community engagement programme, the better.

Example of Implementation - KAP In Fiji

Dengue is an emerging threat to Fiji due to increasing urbanisation, the adaptability of the principal vector, and the inconsistent mosquito control programmes. Until recently, the National Vector Control unit of the Ministry of Health ran a vertical dengue prevention and control programme consisting of expensive, intermittent, and largely ineffective insecticide spraying. Dissatisfied with the results, the Fiji Ministry of Health commissioned an innovation and prevention control project. The project consisted of two parts: a baseline KAP survey, and the implementation of a new social mobilisation and communication campaign.

The survey identified important issues that have been previously overlooked. People surveyed took little action in reducing the most productive mosquito breeding sites, even those that required little effort. Subsequently, working parties were formed with to develop education materials and mobilisation activities for their respective constituents. As a result, behaviour change communication was approached with only a few and small incremental changes as campaign objectives and focused largely on simple modifications to existing behaviours. This approach is now utilised by subsequent prevention and control initiatives in Fiji.
10.2 Leveraging Mobile Technologies

New, low- or no-cost mobile technologies are making community-based vector control efforts surprisingly effective. Details are provided in Module 2 relating to the use of one community-developed App for mapping larval breeding sites and presenting information back to communities.

There are a range of new Apps that enable these types of activities. These are used to synthesise a variety of robust data collection relating to seasonality, weather, historic, locational and community-provided data to create a predictive and reactive model. This data can be converted into interactive tools that are used to help educate, inform, and protect the communities from which the data was collected. These tools fall into three distinct categories:

- **Interactive Digital Elements.** Application and web-based tools are designed to allow individuals to view potential areas of risk, projected forecasting for future risk factors and stay up-to-date on how their region, community, neighbourhood, and household is doing compared to others;

- **Mobile Notifications.** It is relatively simple to push SMS text messages to citizens, warning them of current risk factors and advising them to take action based on current events or upcoming weather and seasonal factors. By advising citizens on best practices before high periods of mosquito breeding, initiatives can effectively prevent outbreaks before they occur;

- **Community Education.** With up-to-the-minute alerts, technology-interfaces helpfully remind communities about best practices on staying healthy and well; includes local events that communities themselves or local health organisations have organised to help promote safe and healthy environments. This education component is key to creating long-lasting impact within communities.

**Community Education – Zap-A-Quito**

A good example of community education in a digital format is CARPHA’s “Zap-A-Quito” application, which makes it fun and easy to reinforces educational concepts shared with the public. These types of games are especially effective for educational efforts aimed at children. By making these applications easy to download, directors can reach a large number of citizens inexpensively and continually emphasise prevention and control methods.

Child (left) playing the Zap-A-Quito game. When participants die, they can answer mosquito-based questions to continue playing. These questions include information found in other community educational materials, including how to keep your home free from mosquitoes (right).
**Mapping Tools - DiSARM and Malaria**

DiSARM is a surveillance and decision support platform, allowing malaria control programmes to perform complex analyses while still interacting with data in an intuitive manner. Combining satellite derived environmental and climatological variables, users can produce risk maps and make recommendations based on informed decisions. By automating this real-time process, teams can produce risk maps that allow interventions to target specific areas of high risk, allowing for a greater utilizing resources and a more effective approach to intervention.

Map (above) shows groupings of potential at-risk locations, which can be assigned unique identification numbers and can either be manually selected or generated automatically.

The forecasting features of DiSARM allow citizens to receive alerts as the risk levels of locations for potential outbreaks change and allow decision makers and relevant authorities (such as health facilities, community health workers) to prepare adequately beforehand.

To learn more about DiSARM visit [http://www.disarm.io](http://www.disarm.io)
10.3 Social media

Social media networks are essential tools for engaging communities today. As soon as possible, a community volunteer and the CAG should establish the community’s own social media account to begin generating energy and attention around forthcoming community-based vector control programmes.

There is a significant body of knowledge relating to the use of social media, but the following principles are helpful to remember:

- Social media “strategy” must support the goals and objectives of the programme;
- Before starting, the purpose and target demographics of the social media effort should be 100% clear;
- Opening a Facebook or Twitter account does not constitute a social strategy or campaign;
- A branded effort tied to the community programme will help drive interest and affiliation;
- Daily engagement via social media is critical;
- Funding is not required to establish a social presence; avoid attractive sales packages offering low-cost conversions or a growth in users; organic social media efforts, if done correctly, will be far more helpful to the programme than “buying” friends.

The goal of impacting behaviour change through social media for improving health related education and engagement is therefore not significantly different from social media marketing utilised in a corporate environment. Thus, it is appropriate to consider using strategies of commercial marketing on social media channels to help promote health behaviour change.

The advantages of this approach are numerous. Arguably social media channels offer a unique advantage of visibility, publicity and aggregating evidence of people’s choices. Proof of options made by a network of friends/followers on social media platforms can significantly influence the choice of other users thereby creating a cascade effect and accelerating the spread of information.

Moreover, interactivity, cost-effectiveness and adaptability are some of the advantages social media has over traditional media. Social media sites are some of the most visited sites on the internet with the vast majority of adults with access to the internet utilizing at least one platform \(^2\). This makes social media a key tool in achieving large-scale behaviour-change objectives.
ANNEXES

Module 1
- Community Engagement Toolkit

This module acts as a quick-start resource to help guide the development of initial community engagement programmes. This brand featured below was developed specifically for this exercise to help demonstrate how a branded community engagement campaign would look.

In this module, you will find the following:

1. Community Group Introduction Letter
2. Press Release
3. Program Overview Information for Website & Handouts
4. Adopt-A-Spot Information
5. Adopt-A-Spot Application
6. Town Hall Presentation
7. Job Description - Director of Community Engagement
8. Introductory Blog Post

1. Community Group Introduction Letter

4 September 2017

Dear Sir/ Madam,

We have recently launched a community effort to significantly reduce mosquito populations, especially *Aedes aegypti* using environmentally-sensitive methods and community empowerment. This initiative comes exactly at a critical moment when our tourism economy and our family health are being threatened by the spread of Zika virus. It is called Project MosquitoShield.

MosquitoShield provides the organisation and resources for successful mosquito control but it relies on the empowerment and participation of everyone in the community for its success. We have engaged some of the best scientists and vector control experts in the world as our advisors to help us understand effective methods of mosquito control.

Our first initiative is an information and education campaign to reduce the number of mosquito breeding sites in our neighbourhoods. To do this we are reaching out to meet with community, social, business and neighbourhood groups as well as hosting town hall meetings.
We are asking for leaders from church groups, businesses and schools to participate in community education effort by sharing a brief presentation about what each community member can do to reduce mosquitoes. You can then share this information with your group, with the full support of the MosquitoShield project team, and have a meaningful impact in the fight against mosquitoes. We would like to invite you to join a MosquitoShield workshop to equip you with the knowledge and tools begin this process right away. Your support is not only greatly appreciated, it is also vital to the reduction of mosquitoes in our community.

Thank You in Advance,

2. Press Release

**Community Coalition Continues Campaign to Fight Mosquitoes and Mosquito-Borne Diseases**

*Non-profit Initiative Targets Zika and Dengue-spreading Aedes aegypti Species*

**Appleville, Saint Roberts** - Last month, a coalition of business leaders, residents, government representatives, and international experts launched a new mosquito-fighting programme called “MosquitoShield”, a non-profit initiative intended to strengthen Saint Roberts’s capacity to control Zika- and dengue-causing mosquitoes.

Following the first wave of MosquitoShield community interaction last month in Appleville, MosquitoShield is keeping up momentum, with town meetings scheduled for the 26th and 27th April and a Mosquito breeding site reduction effort on Saturday the 30th April.

“It’s up to each of us”, said the project’s steering committee chair. “We need to see this as taking care of our neighbourhoods, health and families.” Robert Weastley, Sister-City Coordinator, emphasises the Government’s support of MosquitoShield. “This is a war against the mosquito, and we’re fortunate that the government and the people are united in this cause.”

MosquitoShield’s purpose and approach, highlights the five major components the initiative will pursue - community education and empowerment; breeding site reduction and community clean-up; surveillance and monitoring; mosquito reduction; and evaluation and iteration.

International mosquito expert Alan Lawrence, the architect of multiple international efforts to fight mosquito-borne diseases, will be a special guest of the Town Hall meetings this month. Lawrence, part of MosquitoShield’s leadership team, emphasised the importance of a coordinated strategy across Saint Roberts that doesn’t get sidetracked by one-off solutions or unproven methodology before MosquitoShield can roll out a coordinated effort.

MosquitoShield’s second round of town hall meetings start next week. The first on Tuesday 26th at 7pm at the Chapultepac Heights American S.C. School and the second at 7pm on Wednesday 27th at Colegio Columbia. We will also be leading a community wide ‘Mosquito Breeding Site Removal’ effort on Saturday the 30th April. Starting points for this effort are City Center Parking Lot, the Valley and Captain Owen Harrigan Visitors Center.

We invite you to come along and support your community! Check out our Facebook page for more updates and info!
MosquitoShield’s Integrated Vector Control Programme for Saint Roberts’ Mosquito Problem

A Comprehensive, Integrated Vector Management Campaign Designed With, By, and For the Appleville Community.

About: MosquitoShield is a community-driven, privately-funded nonprofit initiative for conducting integrated vector control efforts in Appleville. MosquitoShield is managed by a steering committee comprised of government, citizens, business leaders, community organisations, and international experts. MosquitoShield relies on community activation, education, and a new district system to distribute, share, implement, monitor, and advance vector control efforts against the Aedes aegypti mosquito (vector for Zika, dengue, and other diseases).

Vector Control Priorities:
1. **Preventive** - we will first and always empower communities to eliminate breeding sites;
2. **Community-Led** - we will activate communities to lead vector control efforts and to hold neighbours and businesses accountable for participation;
3. **Safe and Effective** - we will use mosquito control methods that are deemed reduced risk by leading regulatory bodies;
4. **Comprehensive** - we will pursue island-wide vector control, including every parcel of land, home, business, and public space;
5. **Integrated** - we will use a variety of methods to control larval and adult mosquito populations, and to reduce mosquito populations to near-eradication status;

Prevention Programme:
“Zero Tolerance” Breeding Site Elimination - we will work to ensure that all properties in Appleville are free from mosquito breeding sites; we will work at each property until all breeding sites have been eliminated;

1. **Ongoing Larval Control** - we will utilise safe, effective methods for eliminating mosquito larvae in permanent or semi-permanent structures and natural features (drums/barrels, tyres, etc.);
2. **Physical Infrastructure Improvements** - we will work with government and communities to remove, change, or eliminate permanent or semi-permanent physical structures or features;
Ongoing Community-based Vector Control Efforts:

1. **District and Neighbourhood Operations** - we will develop strong neighbourhoods and districts led by trained volunteers who will share knowledge, know-how, resources, and alerts on an ongoing basis, and to provide MosquitoShield with a granular, ongoing view of conditions and dynamics;

2. **Annual House-to-House Baseline Survey** - we will conduct annual baseline surveys on each premises in Appleville; these surveys will score each property based on larval breeding sites or potential breeding sites; the baseline survey will be mapped and will guide subsequent control efforts. Premises will be visited once per week until each parcel is at “zero” on breeding site presence;

3. **Ongoing Surveillance and Monitoring** - we will pursue ongoing surveillance methods, house-to-house efforts using randomised and systematic methods so that we continue to suppress hotspots, inspect premises, and continue to eliminate breeding sites;

4. **Targeted Suppression** - we will conduct “surge efforts” (periods of high-intensity preventative work) at various times in the year to address ongoing or recurring problem areas;

MosquitoShield Emergency Response:

1. **Zika Transmission Case** - we will respond to reported and suspected transmission cases with source reduction efforts within a one-mile radius of transmission case;

2. **Pregnancy Support Kits** - we will provide pregnant women with bed nets, insect repellent, special inspections and larval site reduction/elimination at their homes and within a certain radius of that premises;

MosquitoShield Control Tools:

1. **Traps**: we will use certain traps, upon evaluation, to serve as both monitoring tools and as lethal control tools;

2. **Chemicals**: we will use chemicals when necessary, but only as approved by the Steering Committee;
   a. **Larvicide** - we will use larvicide in standing water. We will use Natular, Aquatain, and BTI, with BTI as our primary tool in most all natural and semi-natural environments, and around human habitation;
   b. **Adulticide** - we will use an adulticide if and when necessary, and will determine this specific chemical based on particular criteria for safety and effectiveness based on testing for effectiveness;
   c. **Drinking Water Exception**: MosquitoShield will utilise certain larvicide applications in drinking water only upon approval by land parcel owners and/or government.

3. **Biological Control Methods** - we will employ biological control methods once we’ve determined particular applications can be helpful in controlled scenarios;

4. **Others** - we may employ additional chemicals, as needed, and as approved by Steering Committee.
4. Adopt-A-Spot Information

CRITICAL CLEANUP PROGRAMME
June 2016

A new program for Appleville’s most committed companies, nonprofits, churches, schools, student groups, and service organisations seeking to improve health and livelihoods on our island.

OVERVIEW

MosquitoShield is Appleville’s own community-based vector control initiative that is fully powered by us! We’re working hard to reduce the Aedes Aegypti population -- the mosquito that transmits Zika, dengue and other diseases -- with a community-driven approach. This new program empowers our island’s great organisations to connect directly with communities to help wipe out the Aedes mosquito!

EarthWise is Appleville’s primary recycling organisation. Through a partnership model that includes Government, local recyclers, EarthWise and the broader Appleville community, we aim to:

- eliminate open burning at dumpsites
- demonstrate that Saint Roberts can be a world leader in materials management where ‘waste’ is used as a resource.

What is the Critical Cleanup Program? The Critical Cleanup Program is a low-cost, high-reward program based on the “Adopt-A-Spot” model, which allows individuals and organisations to take ownership of a particular region. This unifies all efforts around lifting up communities and residents and empowering them to:

- Work with each other in specific neighbourhoods to clean-up mosquito breeding sites, improve knowledge of mosquitoes, and help develop excitement around eliminating Aedes mosquitoes.
- Raise awareness of mosquito threat among residents/employees/congregation/members/etc.
- Coordinate green events within the community.
- Adopt green practices in a local school, church, business, home, community location etc.
- Fundraise and develop plans for beautification projects.
- Be part of future Appleville education, awareness and empowerment initiatives.

WHY ADOPT A SPOT?

The aim of Adopting-A-Spot is to create genuine partnerships with Saint Robert’s communities to help reduce the population of mosquitoes that transmit diseases and reduce smoke emissions from the dumpsite via community clean-ups, recycling, door-to-door engagement, communication and education.
The Critical Cleanup Program is designed to encourage and support members of the community who want to be hands-on in keeping Appleville clean, safe and attractive for investment. We offer opportunities for people to get more involved in their community in a way that promotes civic pride and appreciation, self-responsibility, education and awareness.

Who can Adopt a Spot? Appleville has been organised into 15 “neighbourhoods” by the Environmental Health Department. Each neighbourhood is comprised of 100-300 homes each. Any volunteer group/ business/ educational organisation/ religious organisation or community organisation which shall be identified and defined as an adopter, may Adopt-a-Spot, or a portion (spot) thereof, for the purpose of maintaining, preserving, developing and improving it.

Benefit to the Adopters:
- A litter-free environment that will reduce breeding grounds for Aedes aegypti mosquitos and the promotion of responsible waste management options to reduce open burning at the dumpsite.
- Potential to develop proposals for beautification projects that can be included in EarthWise’s Fund Development Plan.
- Marketing and other partnership opportunities.
- EarthWise and MosquitoShield will acknowledge you as an Adopter by
  - Adopt-a-Spot sign with your name/logo, on our respective websites,
  - present a green rating to your group
  - facilitate an annual celebratory neighborhood event as a token of appreciation for your commitment towards keeping your neighborhood clean, green and healthy.

How can you Adopt-a-Spot? It’s Easy!
- Fill out an Adopt-a-Spot application form obtainable from EarthWise and MosquitoShield.
- Your application will be reviewed as well as the neighborhood area and scope of the program.
- Review the appropriate safety guidelines and sign a short legal release.

SUPPORTING YOUR COMMUNITY

Spots to be adopted:
- Include maps of districts, neighbourhoods, and / or spots

Responsibilities of EarthWise and MosquitoShield
- MosquitoShield and EarthWise will provide the Adopter with everything needed to engage their chosen communities. Adopters will be assisted every step of the way - from organizing their volunteers and special events, to focusing on special community programmes and improvements.
• EarthWise and MosquitoShield will process application forms for adopt-a-spot within thirty days from date of receipt of application form.
• EarthWise and MosquitoShield shall render technical support to the adopter where possible and develop the neighbourhood and district.
• EarthWise and MosquitoShield shall make clean-up guidelines and clean-up tools available to the adopter.
• EarthWise will assist with fundraising for neighbourhood beautification projects.

Responsibilities of the Adopter:
• Accept responsibility for litter control within the neighbourhood and develop a functional plan for that area that will influence the community to keep the neighbourhood litter free.
• Organise general clean-ups using adults and supervised children for their adopted neighbourhood at least four times a year.
• Complete Liability Release forms for all group members. Template will be provided to be signed by clean-up participants.
• Notify EarthWise and MosquitoShield 7 days before the clean-up is scheduled to receive vests, gloves, trash grabbers, blue recycle bags, and black trash bags.
• Utilise EarthWise and MosquitoShields Adopt-a-Spot Clean-up Guidelines.
• Download the Adopt-a-Spot app and report number of bags filled (recyclables and trash), number of participating volunteers and number of hours spent on the clean-up. Submit via app after clean-up.
• Submit photos to EarthWise showing your team in action.
• Assist in Keeping Appleville clean, green and healthy and promote the Critical Cleanup Program.
• Provide all necessary information as required by the adoptee.
• Report any hazards and unsafe situations to the adoptee

Period of Adoption:
• The adoptee shall Adopt-a-Spot for the minimum of two years.
• Renewal of the agreement period shall be based upon the performance of the adopter on the allocated spot.
• The adoptee may terminate an agreement for any reason including, but not limited to safety considerations, failure of the Adopter to perform according to the terms of the agreement, failure to report a health hazard on the adopted space or failure keep the neighbourhood clean. Termination of the agreement shall be issued in writing.
• The adopter may terminate the agreement by given thirty (30) days written notice to EarthWise or MosquitoShield.

Monitoring and Evaluation:
• Monitoring and maintenance of the neighbourhood should be done on a weekly basis. Some sites may require additional time commitments.
• The adopter may be required quarterly to submit a report to EarthWise and MosquitoShield as part of monitoring and evaluation purposes. A template will be provided.
**Recognition to the adopters:**

- Signage boards will be erected on the adopted neighbourhood to formally announce a partnership with EarthWise and MosquitoShield. In return, the Adopter will keep the adopted area clean and in a hygienic condition.
- EarthWise and MosquitoShield will design, furnish and erect a signature board on the adopted neighbourhood with the adopter's name/ acronym or logo displayed.
- The board will include the frog rating system for your group.
- The Adopter will be highlighted as committed partners and will be featured on EarthWise and MosquitoShield marketing materials, website, social media, signage and in various public service announcements via TV, radio, and print media.
- The board will remain the property of EarthWise and MosquitoShield and will be removed by EarthWise and MosquitoShield upon expiration or termination of this agreement.
- The acknowledgement sign is not intended as advertising or as a memorial. Items such as an internet address, website, or telephone number will not be allowed.
- A formal Certificate of Adoption and contribution towards the program shall be issued to every adopter as a token of appreciation.
5. Adopt-A-Spot Application

MosquitoShield and EarthWise are proud to present:

Appleville Critical Cleanup Volunteer Program
MOSQUITO PREVENTION - GREEN RECYCLING - AWARENESS

How Saint Roberts’s most committed companies, organisations and individuals can have improved health and wellness on our beautiful island.

Want to learn more about how you can have a positive impact on your community?

For more information contact us at:

P: ### ### ##### | M: sample@infor.com | W: crticalcleanup.org mosquitoshield.org

AGREEMENT and APPLICATION FORM

In order to enhance the environment and the appearance of our community, and to help reduce the threat of vector-borne diseases, the applicant(s) undersigned, request permission to participate in an Adopt-A-Spot at the following location (address or boundary description):

Neighbourhood Number (1-15): ________________

Specific Spot Location (if applicable, describe)

If you don’t know or aren’t sure about the neighbourhood scoring system, please visit our webpage here.
**Adopt-A-Spot Information**

Any volunteer group/ business/ educational organisation/ religious organisation or community organisation which shall be identified and defined as an adopter, may Adopt-a-Spot, or a portion (spot) thereof, for the purpose of maintaining, preserving, developing and improving it.

SIGNATURE

Name of Adoptee

School, Club, or other Affiliation

Home & Emergency Phone Number

Address

City Zip

**Location & Cleanup Information**

1. Please describe approximately how often you plan to clean the site:
   - Weekly
   - Bimonthly
   - Monthly
   - Other

2. What services will you provide at this location:
   - Litter pickup
   - Weeding
   - Planting
   - Watering
   - Pruning Shrubs
   - Other

3. Approximately how many volunteers will be cleaning the area?

4. Generally, what day(s) of the week will you clean?
   - Mon
   - Tue
   - Wed
   - Thu
   - Fri
   - Sat
   - Sun

5. List the nearest address of your adopted spot:

**Legal Disclaimer**

Work will be performed under and in accordance with EarthWise and MosquitoShield terms attached hereto and incorporated herein by reference. Applicants with whom agreements are signed shall at all times indemnify and hold harmless the EarthWise and MosquitoShield, their officials or agents, from responsibility, damage or liability arising from the exercise of the privileges granted under this agreement.
This agreement may be terminated by the EarthWise and MosquitoShield at any time the applicant(s) do not comply with this agreement or at any time the applicant’s work effort is considered unsafe. The Organisation reserves the right to revise or discontinue this program at any time.

Applicant(s) hereby assume all risk of damage or injury resulting from the activities performed hereunder and recognise that certain risks are inherent in litter pick up, especially in areas open to the public.

It is understood that the applicant is not an employee or volunteer of the local or federal Government or EarthWise or MosquitoShield while participating in the Critical Cleanup Program. As such, the Critical Cleanup Program is not providing any worker’s compensation insurance, general liability or automobile insurance or uninsured/underinsured insurance motorist coverage, for the acts or omissions of applicant while engaged in any activities arising out of or related to this agreement and program. It is further understood that neither EarthWise or MosquitoShield will defend, hold harmless, or indemnify the applicant for any claims of loss, injury, death, or damage arising out of or related to this Adopt-a-Spot agreement and the Critical Cleanup Program.

SIGNATURE ____________________________________________________________________

Name of Adoptee ___________________________ Date ________________

School, Club, or other Affiliation _________________________________________________

ADOPT-A-SPOT SUPPLIES REQUEST FORM

Use this form to request supplies for a scheduled cleanup. Please give at least 7 days advance notice. Supplies will need to be picked up from the main entrance reception area at _____________ between Monday and Friday, 9 AM to 5 PM.

We will contact you to let you know we have received your request. Please kindly call us if you end up cancelling your cleanup _____________.

Thank you for your efforts to help keep Appleville clean and beautiful!

Date of Request ______________________________________________________________

Spot Number (1-15): ____________________________________________________________

Name of Volunteer ____________________________________________________________

School, Club, or other Affiliation ________________________________________________

Home & Emergency Phone Number ______________________________________________

Address________________________________________________________________________

City Zip
VOLUNTEER WAIVER AND RELEASE AGREEMENT

I______________________, hereby volunteer to participate in the EarthWise and MosquitoShield Critical Cleanup Program scheduled for Fiscal Year 201__ through 201__. As a volunteer, over 18 years of age, performing activities for the Critical Cleanup Program, I recognise and acknowledge that there are certain risks of serious injury. I understand that the creeks, parks, streets, plazas, drains, and trails may contain broken and discarded items such as glass bottles, sharp metal objects, and other potentially serious hazards. I understand that by participating in this volunteer activity that I expose myself to injury.

This Waiver and Release Agreement is intended to discharge in advance both EarthWise and MosquitoShield (its officers, employees, and agents) and person(s) owning land in Appleville or designated volunteer area from any and all liability arising out of or connected in any way with my participation in said activity, even though that liability may arise out of negligence or carelessness on the part of the persons or entities mentioned above. It is further agreed that this Waiver and Release is binding on my heirs and assigns. I agree to assume the full risk of any injuries, damage or loss which I may sustain as a result of participating in any and all activities connected with or associated with these volunteer activities.

I do hereby fully release and discharge EarthWise and MosquitoShield its officers, agents and employees from any and all claims from injuries, damage or loss which I may have or which may accrue to myself arising out of, connected with, or in any way associated with the volunteer activities.

In the event of an emergency, I authorise both EarthWise and MosquitoShield officers to secure from any licensed hospital, physician, and/or medical personnel any treatment deemed necessary for my immediate care and agree that I will be responsible for payment of any and all medical services rendered. If I am injured while participating in the event, I agree to report it to my crew chief or to the first aid staff immediately.

I have read and fully understand the above Waiver and Release Agreement and Permission to Secure Treatment. I agree to abide by all instructions set forth by EarthWise and MosquitoShield staff during my volunteer activities.

I understand that I am required to wear and /or use all safety equipment and follow safe work practices as designated by staff.

SIGNATURE (Volunteer) _______________________________________________________

Name of Volunteer ____________________________________________________________

School, Club, or other Affiliation _______________________________________________

Home & Emergency Phone Number _____________________________________________

Address_______________________________________________________________________

City   Zip
ADOPT-A-SPOT SAFETY GUIDELINES

Below is a list of suggestions from EarthWise and MosquitoShield to help make your project experience a safe one! Have a safety meeting with your Team prior to your project event to review these safety do’s and don’ts.

Safety DO’s

- Wear gloves and thick-soled, closed-toe shoes.
- Wear long pants and long-sleeved shirts.
- Wear sunscreen and bug repellant. Wear a hat when appropriate.
- Dress appropriately for the weather.
- Drink plenty of fluids in extreme temperatures.
- Be aware of your surroundings and the potential hazards associated with them (e.g. passing cars, hazardous tree branches, etc.)
- Always sweep, rake or shovel glass. Never pick up sharp objects with your hands.
- When possible, stay on or work from the sidewalk. Never walk in the street.
- Request and use reflective vests when working in high traffic areas.
- Cross streets at signals or crosswalks.
- Use the “buddy system” - work in teams of two or three to maximise safety.
- Watch your footing on slopes and shorelines and never allow children to work on steep slopes or near shorelines without adult supervision.
- Keep pre-moistened towelettes on hand.
- Wash hands with antibacterial soap after the project, especially when dealing with trash pickup.
- Know emergency procedures, such as the location of the nearest emergency facility and how to quickly summon an ambulance or the police.

Safety DON’TS:

- NEVER TOUCH NEEDLES!!! Contact a staff person to dispose of needles. Bring a flag marker with you to identify the location of any needle(s) that may be found.
- NEVER TOUCH HAZARDOUS WASTE!!! Hazardous waste includes toxins (like auto fluids, chemicals or paints) or medical waste. Contact your Team Leader or staff EarthWise / MosquitoShield staff to report hazardous waste.
- Do NOT overstuff trash bags, these can rip tear or cause injuries.
- If an item is too large to move, report this information to your EarthWise and MosquitoShield contact for pickup.
- Do not conduct projects during extremely inclement weather.
- Do not conduct projects near or around construction sites.
6. Town Hall Presentation

THANK YOU!

Kingston Town Hall Meeting
Fighting Mosquitoes Together | The Saint Robert’s Community

Contact: P: #### #### | info@info.com

Our Community’s Response - Project BugOut!

“No Mosquitoes, No Bites, No Disease”

Our Target Together: Aedes Aegypti

Two Videos by the Saint Robert’s Government
Introduction of Participants

Government Representatives
Moderator - Mr. Arnold Habasher - Kingston Coordinator
Chief Environmental Safety Officer - Mrs. Pol Arganda
Chief, Saint Roberts Health Services - Dr. Reginald Vincent
Deputy Director, Saint Roberts Tourist Board - Jennifer Princely

MosquitoShield Team
Rachel Adams - Saint Roberts
Jonathan Hancock - Saint Roberts
Lauren Keever - Kingston
Delores Sanchez - EarthWise
Robert Abinith - EarthWise
Vladimir Pur - Rotary Club, Kingston
Alan Kingston - Advisor
Roberto Rodriguez - Advisor

Why We’re Here

To Combat Mosquitoes and Mosquito-Borne Diseases Together in Saint Roberts!
Our Community’s Response - Project MosquitoShield

A Community-Driven Program to Fight Mosquitoes and Mosquito-Borne Diseases in Kingston

Community Leadership
Non-Profit Initiative
Privately Funded
Rapidly Organizing to Prepare for Zika
Global Advisory Board and Experts

In Coordination with Saint Robert’s Government

MosquitoShield’s Integrated Saint Robert’s Campaign

Community Engagement, Education and Empowerment

Community Source Reduction & Clean-up

Surveillance and Monitoring

Targeted, Safe Mosquito Control

Continuous Community Feedback, Improvement
How MosquitoShield is Organized

Advisory Board (Scientific, Industry, and Public Health)

Private Stakeholders (Funding, in-kind Contributions, Insights)

Government (Program Guidance and Resource Coordination)

Steering Committee (Approvals and Evaluation)

Community Leaders (Community Action, Education and Support)

Working Group (Daily Management, Operations & Field Workers)

THANK YOU!

Kingston Town Hall Meeting

Fighting Mosquitoes Together | The Saint Robert’s Community

Contact: P: ### ### ### | info@info.com
7. Job Description - Director of Community Engagement

1. Introduction:
EarthWise and MosquitoShield are building a community engagement program that will seek to empower the Community of Saint Roberts to take ownership and play an active role in recycling and efforts to control Zika, dengue, and other mosquito borne diseases.

2. Our Goals:
A greener, cleaner and healthier Saint Roberts through empowering the Saint Robert’s community to dramatically reduce:
- Waste being burned at the dumpsite.
- The population of the mosquito that transmits diseases.

3. Our Objectives:
Educate: We seek to:
- Raise awareness about waste management issues in Saint Roberts and increase participation in solutions thereof.
- Increase knowledge among residents of the conditions which Zika- and dengue-carrying mosquitoes most thrive, and how to reduce the vector population to negligible levels.

Activate: Activate the Saint Roberts Community and inspire responsible behaviours and actions within that include:
- Reduce, reuse and recycle
- Clean up, cover up and communicate
- Neighbourhood adoption.

Sustain: Inspire ownership and ongoing community participation.

4. Management of Community Engagement Program:
The community engagement program is going to be managed by the Director of Community Engagement. This individual will be responsible for the program areas listed below:
<table>
<thead>
<tr>
<th>Community Initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Develop, Create and Sustain Adopt a Spot Program</strong></td>
</tr>
<tr>
<td>• With support from EarthWise and MosquitoShield, develop an Adopt a Spot plan.</td>
</tr>
<tr>
<td>• Create a database of schools, churches, businesses and community groups</td>
</tr>
<tr>
<td>• Identify, recruit neighbourhood sponsors (a school, church or business) for each neighbourhood.</td>
</tr>
<tr>
<td>• Train, assist and support neighbourhood sponsors.</td>
</tr>
<tr>
<td>• Equip each neighbourhood with a program to promote recycling, mosquito awareness and larval source reduction programmes.</td>
</tr>
<tr>
<td>• Foster ownership and pride within neighbourhood residents and encourage creative, positive efforts.</td>
</tr>
<tr>
<td>• Host celebratory neighbourhood events once per year in each neighbourhood sponsored by MosquitoShield and EarthWise.</td>
</tr>
<tr>
<td>Facilitate a working group for sponsors to:</td>
</tr>
<tr>
<td>• Distribute educational materials.</td>
</tr>
<tr>
<td>• Share experiences.</td>
</tr>
<tr>
<td>• Provide support.</td>
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<tr>
<td>• Disseminate information and progress.</td>
</tr>
<tr>
<td><strong>Continually Educate the Community!</strong></td>
</tr>
<tr>
<td>• Host, and attend, events with community organisations, schools, businesses and churches.</td>
</tr>
<tr>
<td>• Implement EarthWise’s education and communication strategy that includes the following:</td>
</tr>
<tr>
<td>• Co-Ordinate the door to door programme.</td>
</tr>
<tr>
<td>• Delivery of waste lesson-plans.</td>
</tr>
<tr>
<td>• Facilitate field trips.</td>
</tr>
<tr>
<td>• Facilitate Trash to Treasure workshops.</td>
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<tr>
<td>• Facilitate the CHAIR-ity event.</td>
</tr>
<tr>
<td>• Facilitate composting and garden projects</td>
</tr>
<tr>
<td>• Collaborate with other environmental programmes</td>
</tr>
<tr>
<td>• Deliver presentations.</td>
</tr>
<tr>
<td>• Oversee screening of Events</td>
</tr>
<tr>
<td>• Foster ownership and creative approaches.</td>
</tr>
<tr>
<td><strong>Clean-up Saint Roberts!</strong></td>
</tr>
<tr>
<td>• With the Vector Control Officers (VCO’s), host and manage community clean-ups throughout the island each month, touching each neighbourhood at least once per year.</td>
</tr>
<tr>
<td><strong>Change Hearts and Minds!</strong></td>
</tr>
<tr>
<td>• Host listening events to hear concerns of the neighbourhoods/community.</td>
</tr>
<tr>
<td>• Promote approved EarthWise and MosquitoShield messaging and behaviour change efforts via marketing and media campaigns.</td>
</tr>
<tr>
<td>• With the EarthWise and MosquitoShield teams, monitor progress.</td>
</tr>
<tr>
<td>• Share successes.</td>
</tr>
</tbody>
</table>
### 5. Deliverables:

<table>
<thead>
<tr>
<th>COMMUNITY ENGAGEMENT</th>
<th>3 month</th>
<th>6 month</th>
<th>9 month</th>
<th>12 month</th>
</tr>
</thead>
</table>
| Director of Community Engagement (DCE) | • Develop Adopt a Spot Plan  
• Set up database of community groups/businesses, school/churches for each neighbourhood  
• Set up model neighbourhood  
• Recruit 1 new neighbourhood sponsor and launch neighbourhood operations  
• Implement EarthWise and MosquitoShield strategic community outreach and communication plans  
• Develop standardised education programmes to ensure successful and sustained implementation at schools  
• Visit all VG schools at least once every three months  
• Facilitate KAP (knowledge, attitude and perception) for schools; prepare, plan, implement  
• Assist with one clean up per month  
• Secure monthly speaking opportunities at churches, businesses, civil society groups  
• Recruit new businesses, churches, and organisations  
• Organise one open, free MosquitoShield-hosted community event in each neighbourhood by month six in collaboration with neighbourhood captains; | • Implement 4 new adopt a neighbourhood programmes  
• Setup neighbourhood working group  
• Engage new sponsors  
• Implement EarthWise and MosquitoShield strategic community outreach and communication plans  
• Visit all VG schools at least once every three months  
• Assist with one clean up per month  
• Host one celebratory community event  
• Monthly speaking opportunities at churches, businesses, civil society groups  
• Implement KAP for schools | • Implement 5 new adopt a neighbourhood programmes  
• Facilitate neighbourhood working group  
• Engage new sponsors  
• Implement EarthWise and MosquitoShield strategic community outreach and communication plans  
• Visit all VG schools at least once every three months  
• Assist with one clean up per month  
• Host one celebratory community event  
• Monthly speaking opportunities at churches, businesses, civil society groups  
• Implement KAP for schools | • Implement 5 new adopt a neighbourhood programmes  
• Facilitate neighbourhood working group  
• Implement EarthWise and MosquitoShield strategic community outreach and communication plans  
• Visit all VG schools at least once every three months  
• Assist with one clean up per month  
• Host one celebratory community event  
• Monthly speaking opportunities at churches, businesses, civil society groups  
• Implement KAP for schools |
6. **Expectations:**
   - Work closely with the EarthWise and MosquitoShield teams on all programmes.
   - Ensure the community engagement program is continuously active and that ownership of recycling and reduction of mosquito breeding sites is adopted by each neighbourhood.
   - Ensure that the community engagement team, led by the director, is professional, positive, and available to the community.
   - Ensure that the EarthWise and MosquitoShield program models, values, and purposes are followed.
   - Ensure that no personal or individual recommendations are given outside of approved EarthWise or MosquitoShield endorsements or recommendations.

7. **Reporting:**
   You will report to EarthWise’s Appleville Manager and will prepare weekly and monthly written reports. Templates will be provided.

8. **Introductory Blog Post**

   **MosquitoShield Summary:**
   The MosquitoShield approach to mosquito control is a community-based, community led effort to control the mosquitoes that spread diseases (*Aedes aegypti*). We’re developing an integrated, building-block approach.

   We start with large impact, low-tech and build from there until we reach our goal of eradication. Empowering the community, educating kids in schools and spreading our message in the churches and community organisations, MosquitoShield empowers the individuals of the community to do their part. Everyone can eliminate the sources of mosquitoes in and around their property. Our message that ‘you are only as good as your neighbor’ - engages the entire community to get 100% participation. Community cleanups engage and empower community groups, where individuals can also take pictures and alert the MosquitoShield program of the bigger problems found and work with the government to solve them. We are exploring all technologies, sharing our experiences not only with the local community, but with the wider community concerning mosquitoes.

   Our effort is a private- public partnership. We recognise that government does not always have the resources to do everything for everyone. In this case we are supplementing the governmental agencies with strategy, prioritisation, knowledge and advisory inputs, and specific funding. By supporting our government with these resources we can assure the community that the most effective strategy for mosquito control is in effect around our homes.

   **On Mosquitoes**
   There are many types of mosquitoes, but the primary target of this campaign are *Aedes Aegypti* and *Culex* mosquitoes. These are the most common among human populations and are the ones that spread diseases such as dengue and Zika. Others, for example the salt marsh mosquito, are particular to specific environments and while a nuisance they do not pose a particular health hazard. We aim to eliminate all mosquitoes but will do so on a prioritised basis.
First Stage Strategy
MosquitoShield control strategy focuses on the source of the mosquitoes: the breeding sites where the female mosquitoes lay their eggs to hatch. Breeding sites are identified by standing water fresh water. We are educating the community, with widespread clean ups to remove these breeding sites, which include; bottles, cans, tarps, old tires, derelict cars and boats etc. We ask that the community address cisterns, water tanks, septic systems, clogged drains and gutters, potted plant water trays, pet water bowls, in and around houses and other common household occurrences. The cisterns and septic tanks get sealed using mesh screen and zip ties or silicone or grout. Experts have found that by eliminating all these breeding sites we could reduce the mosquito populations by 50-60 per cent.

Second Active Stage: Safe Mosquito Control
For sites that cannot be eliminated we recommend using larvicide treatment to prevent the hatched eggs from becoming adult mosquitoes. We searched for a product that has no collateral damage to other insects or animals. This is very important. We found an active ingredient is called BTI that is easy to buy on Amazon as a product called “Mosquito Dunks” or “Mosquito Bits.” These can be flushed into a septic system or tossed in a marshy pond and last for about 30 days.

We also like the “X” mosquito trap, which creates a larvicide-contaminated false breeding site to attract females to lay their eggs. The eggs hatch into larvae but never mature into adults. There is also an adulticide which poisons the female after a few days. The doses are very very low so if another animal such as a dog was to drink from the trap it would not be harmed in any way.

There are certainly many other control methods, but the combination of source reduction, BTI larvicide and passive larval traps have been highly successful for us. We have seen 90+% reductions over the past 2 years.

Standard vs Emergency Control
We get lots of questions about fogging. Fogging is a method to deliver adulticides into the air but it is inherently inefficient and also has side effects and collateral damage. Once the adults are killed new ones will hatch from the breeding sites within days. You would have to fog every few days to be effective and the collateral damage to other insects, birds and possibly human health would likely be significant. We would recommend fogging as part of an emergency response protocol to be activated if there is a disease- such as Zika- present in the community. At that time, it is prudent to try to kill the adults that are flying around potentially spreading the disease and fogging may be the most immediate way to do that.

Our strategy has evolved to define the measures above as emergency control and we like to keep that differentiated from our standard control methods. We hope to rarely or never use emergency control measures, but we also recognise that we need to be prepared to react to a mosquito-borne disease outbreak. On the other hand, if we can effectively administer a safe and sustainable standard control strategy then the likelihood of an emergency is greatly reduced.
Module 2 -
Using Mobile Technology in Community-based
Vector Control Initiatives

Mobile technology is making data collection easy. Communities now have at their disposal a range of Apps that enable the collection, tracking and mapping of vector control-related data. Using this new technology will add a great deal of value to community-based projects. While not all initiatives will be robust enough to deploy the use of these capabilities, it does not take much in terms of volunteer time, donated expertise, or minimal costs associated with the configuration and deployment of an App.

Key considerations:
• Keep it simple - it is imperative that community-based initiatives do not take on too much; bulky or complicated Apps can frustrate volunteers;
• Tie it to objectives - use an App to pursue specific objectives, such as identifying breeding sites in common areas;
• Share information rapidly - as information is collected, every effort should be made to share that information with the public and key stakeholders; this improves trust and value in the efforts to collect said information;

Developing an App and Data Collection Platform

For more advanced community engagement efforts, mobile technology can enable a community-driven effort to transform how communities and the government respond to vector-related challenges.

After determining how technology can fit into the strategy (including goals and objectives of the program), efforts should be made to build one (1) online ad app-powered platform that will help facilitate collaboration across a number of key stakeholder groups.

This may require the development of multiple components that allow team members, community members, and decision makers to all have the relevant information at their fingertips within user environments suited to their needs (volunteers do not need lengthy or detailed technical information; only simple click-and-enter formats).

When beginning from scratch, it is important to plan with the functionality in mind first, - then build the appropriate technical systems and support to enable the end goal. By planning ahead, program directors can appropriately scale-up operations without having to constantly redesign their digital toolkit.

When designing data-collection systems, the author suggests creating a single database and allowing individual applications to access specific sections of it (based on the application’s specific tasks and goals). This allows for easy, on-the-fly application modification later, should additional functionality be needed to be added to specific users and/or when pursuing partnerships with other organisations interested in collecting different data.

With that in mind, it is important to point out the architecture that follows emphasises mobile technologies; this is because they are naturally aligned with supporting the core ideas of community engagement programmes. Moreover, with current technology, it is fairly easy to modify any data collected or applications designed to work on other platforms, including desktop and/or web. For those reasons, the following sections will be discussed with mobile technologies in mind.
Selecting an Approach to Development

There are several ways to approach adding application support to an existing program or building one from scratch and they generally exist on a scale between purchasing off-the-shelf solutions or developing applications from scratch. There are various degrees of each of these: for instance, there are several drag-and-drop application builders that require only little technical experience to develop and can be a great solution for resource-strapped programmes.

Off-the-shelf solutions are usually robust but may require additional customisation and are generally quite expensive. Developing from scratch allows for the greatest level of customisation and pertinent functionality but will require more time (and often dedicated staff to manage the development process). Depending on the objectives, timetables, and resource restrictions of the program, any or all of these may be applicable.

For those not yet entirely sure what information they wish to gather, the author suggests utilizing drag-and-drop application builders which allow for relatively intuitive solutions and high degrees of on-the-fly customisation. These solutions usually also have sliding-cost structures based on the number of users and/or features which also make them relatively cost-effective solutions.

Sample Architecture

The following is a sample process flow for an advanced community engagement effort. Information is gathered from individuals entering information via one of several forms and specific to the type of application the user has permissions for. Once a form has been submitted it is stored on the phone, which can either be uploaded manually later or uploaded immediately to an online server (if connectivity is strong enough).

External programmes, such as heat-mapping and risk-assessment algorithms, can be applied to the data which then powers other areas of the application suite, such as visit logs, priority parcel lists, and mapping tools.

If the program utilises a remotely-synchronised Vector Toolkit (including traps, sensor equipment, etc.) and connectivity is strong enough, this information can also be incorporated into any modeling or decision-making feature of the application suite.
**Management**

During the development process, it is important also to plan for how management processes will function - this will save time and headaches later when the application is deployed in the field. For example, it is highly suggested that the application keep track of user (both VCO and volunteer) IDs which is critical for effective resource allocation. See the section below, of 'Recommended Features' for a list of additional suggested functionality. Additionally, it is worth considering adding a manager-specific application and/or filtered view; this can prove incredibly helpful for organisational and resource-tracking systems. These systems can help build accountability within teams and provide a level technical automation that can aid decision makers in simplifying information before sharing with the general public.

**Recommended Features**

The following is a list of some of the common functionality found within implemented vector control and community applications:

1. **KAP Surveying**
   a. How serious is the threat of Zika, dengue, Chikungunya?
   b. What type of mosquito transmits Zika, dengue and chikungunya?
   c. Do you currently have mosquito breeding sites on your property/home (indoors and/or outdoors)?
   d. Can a mosquito that transmits dengue and Zika fly from one home to another?
   e. What can you do to protect yourself from a mosquito-transmitted disease like dengue or Zika?
   f. Who is primarily responsible for controlling mosquitoes that transmit diseases?

2. **Reporting Mosquitoes** - after initial KAP surveying has been completed, this will be the primary tool to be used by any Vector Control Officer. It is important to collect as much information as possible as soon as possible to start making data-driven decisions. It’s also important to note that it’s a lot easier to filter through available data than it is to go back and resurvey locations - if in doubt gather more information and apply filters at a later stage.

Here are a few suggested pieces of data to collect:
   a. GPS Location - imperative for any risk-mapping and forecast modeling
   b. Block / Parcel Location - allows for measuring sub-location changes and easily aggregating data without heavy data-lifting
   c. Site Photo - nice to have, both to show visual changes over time and for team members to locate sites that have been surveyed by different team members
   d. Timestamp
   e. Do you have site access?
   f. Type of Premises
   g. Is Larvae or Pupae Visible?
   h. How Many Breeding Sites?
   i. Types of ACTIVE Breeding Sites
   j. Types of POTENTIAL Breeding Sites
   k. Risk Rating
   l. Intervention or Control Methods Used
m. User ID
n. Comment Field

3. Trap & Equipment Reporting - in the case where mosquito traps and equipment is being deployed in the field, it is helpful to be able to track both effectiveness and location.

Here are a few suggested pieces of data to collect:

a. Date Deployed
b. GPS Location
c. Site Photo
d. Type of Trap / Equipment
e. Trap / Equipment #
f. What Type of Property is it Placed On?
g. Was Permission Granted?
h. Contact Name and Phone Number of Landowner
i. Is Property Accessible for Return Visits?
j. Is Trap / Equipment Active and Functional?
k. When Is the Next Scheduled Service Date?
l. Comments
m. User ID

4. Priority Parcels - by assigning parcel priorities, managers can help inform Vector Control Officers and volunteers about where the focus should be and which areas are of most critical concern. These priority systems can also act as a ranked list of daily jobs for VCOs.

5. Lookup Parcels (Database) - every time an officer makes an entry, it will be stored and uploaded into an online database. For easy access and lookup, Officers can use a Lookup tool to double check their work or view any potential parcel even while out in the field (with or without connectivity).

6. Visit Log - visit logs make it easy for Officers and Managers to communicate and share information between different team members performing similar duties. By being able to check, at a glance, information about recently-visited parcels, managers are able to identify “problem” parcels and team members can leave comments pinned to specific locations, allowing future visitors to pick-up right where the last individual left off.

7. Mapping Suite - allows user to capture his/her location, and/or the location of items on a map (even when not connected to a network). By utilizing GPS, carrier networks (GSM), and wifi users should be able to capture a location within about 3 meters via satellite and/or additional geo-location-enabled services.

a. Off-line Mapping - when network conditions do not allow for securing the user’s location, the App should be able to capture the location within 100 meters from the last known location. This means a cached version of the user area map is kept and pins can be dropped/placed for upload once connectivity is reestablished.
b. “Later Mapping” - users can, at end of day, bring up incomplete reports from earlier in the day and attach certain record entries with locations. **Neighbourhood Specific Risk Maps** - By creating heat maps by blocks and neighbourhoods, individuals and decision makers can see, at a glance, where trouble areas are and either focus on or avoid them. This view can also be shared on any website, social media, or via PSAs to help spread important information within the community.

c. **Crowd-mapping Overview** - users can access “Mosquitoes in My Area” to see heat map of reports/data collected. Heat map created by visualizing data records without showing specific parcel scores (important for individual privacy and security concerns which is another reason neighbourhood-based groupings are important to community-focused PSAs/information).

By collecting all the necessary data in the beginning, decision makers can easily drill into “at risk” areas immediately and as needed. This can be useful for organizing community action, providing PSAs and other announcements, and generating political will and directing resources to specific areas.
8. **Register Volunteers**
   a. Type of Participant
   b. Name
   c. Organisation or Affiliation
   d. Phone Number
   e. Address
   f. I Commit to...
   g. I’m willing to...
   h. Waiver and Release Agreement
   i. Confirmation of Age (18+)
   j. Signature

9. **Requesting Cleanup - Citizen Only.**
   a. What type of cleanup do you need (land, indoors, water, etc.)?
   b. Where is the problem located?
   c. Will we have access to fix the problem?
   d. Do you authorise us to fix the problem, even if you are not present?
   e. Do you have any questions or comments you would like to share?
   f. Name
   g. Phone
   h. Email

10. **Health Reporting - Citizen Only.**
    a. Medical disclaimer (encouraging individuals to seek trained medical professionals)
    b. Where are you located?
    c. Are you or anyone near you pregnant?
    d. Where do you think you were bitten by mosquitoes?
    e. Do you have any visible symptoms?
    f. Do you have any other questions or comments you would like to share?

11. **Management / Assignment Tools**
    a. Create lists based on any criteria in form.
    b. Create alerts based on score types (day’s end: generate list of “hot spot” items that need to show on next day’s route for specific VCO).
    c. Route speed.
    d. Route coverage.
    e. Number of parcels touched.
    f. Total number of parcel compliant.
    g. Total number of parcels not compliant (failing score).
    h. Details.
12. **Push communication** - a program can push alerts, reminders, information, events and other communications to App users. Examples provided below:

“Hi User! It just rained heavily for three days, so you know what that means! Please check your yard for new water collection or larval breeding sites. If you see any, dump them out!”

a. “Hi User, on your way to work, please keep an eye out for standing water, old tires, barrels, buckets, or other debris. Click here to report condition - even if you’re on the move!”

b. “Hi User! Don’t forget that tomorrow is our scheduled visit to your location. Please leave your yard accessible between the following hours.”

13. **Pull communication** - a program can solicit answers or feedback from users on impromptu questionnaires/surveys. Examples provided below:

a. “Hi User! It just rained, and we want to know if you see any breeding sites!”

b. “Hi User! Will you send us a photo of your street, looking left and right, so that we can see how the gutters look?”

c. “Hi User! Will you be attending tonight’s town hall meeting? It starts at 7pm at the Church!”

**Engaging Local Partners**

When developing Apps from scratch, implementing technology solutions can be expensive and time consuming to initially setup. One good way to offset these costs are to integrate such efforts with other local organisations and authorities who have an interest in gathering the same or similar data - once the application-process architecture has been outlined, it requires very little effort to add an additional few fields for data collection.

This approach allows for collaboration with local partners who can potentially help share some of the costs and provide staffing support. Most importantly, tying into existing organisations that already have established modes of communication with the general public can allow program directors easy access through organisations that already have established and trusted reputations. The following is an example of a Vector Control Organisation (BugOut) and Recycling Organisation (Green VI) teaming up to affect behaviour change on Virgin Gorda, BVI.
This application was designed specifically for use by Recycling Captains who volunteer to maintain the various districts on Virgin Gorda. It also includes features currently available to the Vector Control Team such as presentation material and KAP surveys, which can be disabled if needed. This allowed both teams to add value to both program objectives and leverage time in the field in a more effective way. With minimal effort, locations of recycling points were added (right image), questionnaires, and presentation materials were all uploaded to the existing Vector Control application.

Which of the following do you recycle on a regular basis?
How often do you participate in community recycling cleanups?

This, and other, information was captured using the original Vector Control Officer application, adding another question/answer form and allowing team members of a local environmental and recycling organisations to participate in the core operations of the program.
Module 3 - Risk Communications Framework

Risk communications efforts relating to vector control and the threat of vector-borne diseases vary widely but are a critical component to any efforts to engage communities, empower citizens and change behaviours. Unfortunately, risk communications are often managed separately from community engagement strategies and programmes. The author believes that risk communications and community engagement are part of the same strategic framework necessary for empowering communities and citizens to play a direct role in mitigating and reducing the threat posed by mosquitoes that transmit diseases.

That said, there are few vector control-related risk communications templates, leaving vector control agencies to fend for themselves, often using informal efforts or out-of-date methods. This module is designed to help any vector control agency think through the strategic requirements in building a vector control-focused risk communications plan. It is not a plan in and of itself, but it should provide support to an effort to produce one.

For any government, the challenge is to develop an evidence-based risk communication plan to empower the public to make informed decisions and actions relating to behaviours that can minimise or mitigate vector-related risks.

A strategy should include evidence-driven communications efforts intended to inform, alert, empower, educate, influence, and/or equip the public to respond to and play a critical role in eliminating vector-related threats. These initiatives are intended to engage the public in productive dialogue that frames health risks relating to disease-carrying vectors and specific behaviours within a series of efforts and behaviours the public can perform to minimise those risks.

A comprehensive strategy may also include the distribution of various content types across a number of communication channels, including web, social networks, radio, print media, television, visuals/mechanicals (billboards, for example), in-person efforts, and via a range of events and partner organisations, all of which will help deliver critical information to the public across demographics, location, affiliations, and other categories.

Developing a comprehensive risk communications plan.

There are a number of helpful resources available for those seeking to build a new risk communications plan. The CDC has developed a definitive guide in the "CDC’s Crisis and Emergency Risk Communication" model ("CERC"; CDC’s “Crisis Emergency Risk Communication, 2014 Edition). Best practices from The World Health Organization's Communications for Behavioural Impact ("COMBI" model), which speaks more specifically to behaviour change models amidst public health challenges, lay a solid foundation for the mechanical pieces necessary for a robust risk communications plan.

Developing Risk Communications Strategy.

To achieve these goals of behaviour change and community activation in vector control efforts, a strategy may include risk communications and behaviour change efforts that tie specifically to vector control objectives and outcomes, but they may also include outcomes that include knowledge, attitudes and perceptions people have in relation to the threat of vectors and vector-borne diseases and their role in mitigating those threats.
A strategy may include the following components:

1. **Forming a Risk Communications Community Advisory Group:** a diverse group of stakeholders formed into a working group comprised of a small group of experts in risk communications and community engagement for the purpose of developing the risk communications plan initially;

2. **Including community leadership in setting priorities for risk communications:** The risk communications advisory group will be charged with developing a set of priorities for engaging and/or educating the public of critical vector control-related health challenges. They may utilise health and entomological criteria for determining where risk communications will be deployed, via what channels, and with what type of information or messaging, or they may determine that a sustained communications campaign, regardless of threat level, season, or other dynamics, will be pursued throughout the year. The advisory group will also set benchmarks and objectives together, helping to determine how best to measure the success of the risk communications’ efforts in changing behaviours, inspiring community participation, or other variables;

3. **Taking inventory of existing risk communication efforts:** Taking stock of existing risk communications efforts should not be difficult but it is essential for determining how best to bolster, expand, replace, or cover gaps in existing efforts; governments may find that funding spent on risk communications may not be achieving outcomes desired;

4. **Establish partnerships:** Vector control units are often short of the resources necessary to sustain risk communications efforts throughout periods wherein public threats are present; to help supplement efforts, vector control offices are encouraged to establish partnerships with large community-based organisations, employers, institutions of faith, social networks, and other stakeholders in priority districts to help implement risk communications messages and materials, and to help frame, endorse, and/or validate vector control-related efforts. Partnerships can play a key role in amplifying or improving the total adoption of behaviour change deemed critical by the broader vector control effort. Specific objectives may include the type or number of partnerships established, the number of districts where partnerships exist, the number of partnerships per community, and/or the total reach that the partnerships afford the vector control organisation;

5. **Nurture relationships with the media:** Also not often on the top of priority lists within vector control offices, building and maintaining relationships with a network of editors, reporters, media outlets or platforms, editorial boards, social influencers, and a range of other thought leaders - all of whom can play important roles in the distribution of critical risk communication content. Developing a culture of transparency with the media can also help, as journalists will value the openness and be more familiar with the vector control efforts when it comes time to amplify a particular risk communication message or content;

6. **Establish a key point of contact within the vector control office or within the ministry within which it is housed:** This will enable accountability for maintaining risk communication efforts, and allow outside partners or the public to engage with vector control; this person and/or team will serve as the center of gravity for community engagement communications and risk communications efforts. This team may coordinate with and support the other elements within the community engagement strategy, including events, initiatives, and/or contact with key community partnerships and stakeholders;
7. **Maintain an active, accessible website:** Developing an engaging, useful website is no longer an optional effort for vector control organisations. Websites serve as a virtual office and engagement platform, as do social properties, listservs, and potential blogs enabling engagement with large portions of the public in a relatively low-cost manner;

8. **Create exciting and engaging content that speaks to the demographics being targeted for behaviour changes:** while it sounds like an obvious thing, many governments use off-the-shelf messaging with little regard to the purpose, audience, or intended outcome; governments may be best suited by pausing current expenditures and then place those efforts under a rubric or filter to determine whether or not they are having an impact.

These are just the basic components that a government may explore or pursue in an effort to build out a strategy for engaging communities with risk communications. For governments seeking to activate communities in specific vector control activities, dovetailing risk communications with public engagement will help amplify benefits and save resources.
Welcome and Introduction

Orientation and Training Schedule
Mosquito Shield Community Vector Control Team
August 2018

Summary: MosquitoShield’s new Community Vector Control Team (“team”) will be starting in August 2016. This training regime will help equip each team member with the various skills and levels of professionalism needed to present MosquitoShield with the highest levels of integrity, professionalism, collaboration, and commitment to public service.

Welcome to the MosquitoShield Team!
We’re glad you’ve joined us. Your role as MosquitoShield’s first Community Vector Control Team members is critical in the success of our program. Your work on a daily basis will help prevent Zika, dengue, and other vector-borne diseases. As you learn more about our program, about mosquitoes, and about our role in the community, you’ll be reminded routinely of why our work is so important.

Our Core Values:
1. Integrity
2. Professionalism
3. Kindness
4. Consistency
Our Core Beliefs:

1. MosquitoShield can make a significant difference in the lives of residents and businesses in our community.
2. The citizens will play the most important role in preventing disease when taught, empowered, and supported.
3. Our role is to deliver professional vector control services in a direct partnership with citizens. We are “of” the community, and our actions need to reflect our commitment to those we serve.

Core Training Schedule:

**Module 1 - MosquitoShield Orientation**
- About MosquitoShield - Philosophy, Values, Structure, and MosquitoShield Roles
- MosquitoShield Community Vector Control Team (you!) Job Descriptions, Expectations, and Standards
- Reporting Structures
- Resources
- Schedules
- Tools and Equipment
- Handheld App / MagPi and Reporting Tools

**Module 2 - MosquitoShield Vector Control 101**
- MosquitoShield Vector Control Overview (video)
- Core Training with Environmental Health Acting Chief and Head of Vector Control
- Core “In the Field” Training with Vector Control Team
- Video Training on Mosquito Biology and Behaviour
- Customer Service Basics - Honesty, Kindness, and Follow-up
- Residential Inspections
- Public Areas Inspections
- Mapping the Baseline Survey (prepping for week 4)
- Mosquito ID - Species and Patterns
- Mosquito Larval Sources and Patterns
- Applying Basic Control Tools (larvicides)

**Module 3 - MosquitoShield Community Activation and Customer Service**
- MosquitoShield Standards for Engaging the Community
- Spreading the Word on the Routes
- District System and Maps - Establishing Good Data
- Tools to Help Community (App, Website, Phone, Email, Text)
- Small-scale Test Run - live run in select neighbourhood
- Test with Leadership and Volunteer Team
MosquitoShield Uniform Standards:
All MosquitoShield personnel are expected to wear the MosquitoShield uniforms and/or identifying accessories (a MosquitoShield Hat, for example) daily. Any time we are out in the field, we must wear clean uniforms. This demonstrates to the community our respect of them, our level of professionalism, and our commitment to organisation and quality.

Transportation Safety Requirements:
Anytime a MosquitoShield representative is driving, he/she is expected to drive cautiously, safely, and within the traffic laws. Failure to drive in this manner can compromise the overall appearance of professionalism of the program, let alone pose a danger to those we serve. Any accidents, incidents or citations must be reported to MosquitoShield Directors within 4 hours of occurrence.

Typical Weekly and Daily Schedules:
The nature of our work requires us to do our jobs at various times of the day, weeks, months, and throughout the year. We will vary the schedule accordingly.

Training Material
METHOD OF INSPECTIONS

THE ENTRY and THE INSPECTION:
- APPROACH: call out or knock on the door so anyone inside the premises will know you are on the property.
- GET THE HOUSEHOLDER TO THE DOOR - identify yourself and your station and with the words “Good morning, Sir, Maam” / Good Afternoon, Sir, Maam, I am (state name) from the Environmental Health Division.” The Inspector should present his ID card and ask permission to carry out his/her inspection, explaining briefly the reason for the visit before proceeding to do the inspection.
- ARGUMENT: small talk is useful to ‘break the ice’ with whomever comes to the door. Talk about anything you think will draw the interest of the householder. It may be about the children running around the home; the elderly folks sitting inside; the beautiful flower garden; the weather; the nice, fancy car…anything that will assist in getting the householder to warm up to you, trust you and eventually let you go about your business of doing the inspection;
- PURPOSE of the inspection: to inspect premises for the Aedes aegypti mosquito in order to control Dengue Fever (talk about the Dengue situation in the Territory/Locality); doing ‘house-to-house’ work;
- STARTING THE INSPECTION: In making inspections of a premises, the inspector must always draw the householder into the inspection if you can by asking the householder to accompany you inside to do the inspection before proceeding to the yard; dish out technical information and advice on how to deal with breeding places found on the premises and other conditions favourable to mosquito breeding as you go or when the opportunity arises;
VECTOR CONTROL INSPECTION PROCEDURE

Purpose of Procedure
The purpose of this procedure is to provide a framework for:

• *Aedes aegypti* Inspectors to follow in order to achieve a consistent approach to inspections within a time frame hereinafter called a Cycle. The Cycle is determined by the size of the Vector Control team, availability of staff, environmental setbacks (hurricanes, floods, etc.) and the efficacy of the chemical control products in use.

The purpose and objectives of a Vector Control programme are defined in the Public Health Ordinance...

• …to reduce the *Aedes aegypti* mosquito, the vector of Dengue Fever, to negligible levels and to protect the borders from the importation and introduction of the Dengue virus from infested countries, paying special attention to the Ports of Entry.

The specific objectives will be:

• To reduce the House Index of the *Aedes aegypti* mosquito, Locality by Locality, to <1.00%; and where that has been achieved to prevent an increase in the House Index to >1.00%;

• To reduce the Breteau Index of the *Aedes aegypti* mosquito, Locality by Locality, to <2.00%; and where that has been achieved, to prevent an increase in the Breteau Index to >5.00%.

Scope

• This procedure relates to all premises (private, business and public places), inhabited or abandoned, in the regions where people live, work and recreate.

• ‘Routine Inspections,’ ‘Reinspections,’ and ‘Dengue Surveillance’ are defined in paragraphs...

• The inspection programme is based on the... and described in Annex of the Vector Control Inspection Guidelines.

• Inspections of premises may also take place outside of the Inspection Programme, such as following a hurricane, storm, a rainfall event and flooding, and in response to a mosquito-related complaint.

RESPONSIBILITY

Routine Inspections

A Routine Inspection is conducted in all Localities in the affected areas. A Cycle is defined as the time it takes the Vector Control team to survey all Existing Premises. The *Aedes aegypti* Inspector carrying out the survey shall, in the presence of the householder/owner where practical:

• Thoroughly and systematically gather and record information from the observation of the conditions at the premises that permit or have the potential to permit the breeding of mosquitoes, particularly the *Aedes aegypti* mosquito.

• Identify any actual breeding sites and guide the householder/owner in remediating the problems found before resorting to the treatment of open or vulnerable Containers.
Reinspections

Reinspections are carried out at premises designated as “High Risk” after a Cycle of Routine Inspections has been concluded. Such inspections shall verify whether or not the householder/owner followed all instructions given by an Aedes aegypti Inspector geared towards remediating the actual or potential mosquito breeding problems observed during the Routine Inspection and that there is no possibility of a recurrence.

Reinspections may also be done on a house-to-house basis in entire “Blocks” within a Locality if a mosquito infestation does not just involve isolated “High Risk” premises but rather a disproportionate number of “High Risk” premises spanning those “Blocks.”

If the numbers of “Blocks” so infested are widespread across a Locality as to produce a Breteau Index of 2:00% or higher for that geographic area, then the entire Locality may be reinspected, house-to-house.

In the event that a complete reinspection of the Locality does not reduce the Breteau Index to <2.00%, a round of fogging is called for a quick knockdown of the adult mosquito population.

The Aedes aegypti Inspectors must consider all appropriate elements set out in the relevant inspection form.

Surveillance

Surveillance activities are undertaken upon receipt of an official report of a Suspected Case of Zika from the Surveillance Officer of the Ministry of Health and Social Development or from a member of the public who claims to having been diagnosed with Zika.

Contact Tracing would reveal all the names and addresses of the persons (family, friends, and acquaintances) who would have come in contact with Case during the infective period. The same applies to all of places the Case would have frequented during that infective period.

The Aedes aegypti Inspectors are then deployed to the addresses, labeled as “Key Premises,” which are duly inspected along with the premises surrounding it, labeled the “Cardinal Points,” the precise circle of premises around the Key Premises to be left to the discretion of the Programme Manager of the Vector Control team.

The Aedes aegypti Inspectors must consider all appropriate elements set out in the relevant inspection form.

MOSQUITO BREEDING SITES - CHECKLIST

<table>
<thead>
<tr>
<th>INSIDE</th>
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<tbody>
<tr>
<td>Dry flower pots – do not ignore because there is a likelihood that the householder will use it in the future and you want to direct the individual in the right direction;</td>
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<tr>
<td>Wet flower pots: washed once a week by cleaning out at the edge of the container and washing out the roots; Recommend gravel, with the water below it; mosquito larvae cannot penetrate the gravel to find the water;</td>
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<tr>
<td>Cisterns are properly sealed, that is the manhole covers are sitting properly and are not rocking;</td>
</tr>
<tr>
<td>Buckets, pails and other such containers that are kept indoors should be kept covered to prevent not only mosquitoes from breeding, but also to prevent cockroaches and rats from gaining entry. Therefore, the advice it to get containers with secure covers;</td>
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</tbody>
</table>
### OUTSIDE

<table>
<thead>
<tr>
<th>OLD TYRES</th>
<th>Bore holes in them then either take them to the incinerator or secure them under a shelter</th>
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</thead>
<tbody>
<tr>
<td>PET DISHES</td>
<td>Wash the inside of the dishes with a rag or a sponge at least once a week to destroy the mosquito eggs</td>
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<tr>
<td>OLD LAUNDRY TANKS, SINKS, FACE BASINS, AND TOILET BOWLS</td>
<td>Dispose of at the incinerator; in the interim, turn over and/or secure under a shelter</td>
</tr>
<tr>
<td>TANKS/DRUMS/BARRELS</td>
<td>For water storage, keep water storage containers securely covered at all times; screen or tape over the overflow holes to prevent mosquitoes from entering the tank and breeding inside</td>
</tr>
<tr>
<td>DISCARDED BUCKETS AND OTHER SUCH CONTAINERS THAT CAN HOLD WATER</td>
<td>Dispose of in the garbage containers; in the interim, turn over and/or secure under a shelter</td>
</tr>
<tr>
<td>CONCRETE BLOCKS/PIECES OF GLASS BOTTLE</td>
<td>For boundary walls fill up with concrete, gravel or sand</td>
</tr>
<tr>
<td>BOTTLES/DISCARDED TIN CANS/OLD SHOES/TOYS</td>
<td>Dispose of into garbage receptacles</td>
</tr>
<tr>
<td>TREE HOLES/BAMBOO SHOOTS/BROMELIADS</td>
<td>Fill in with concrete, gravel or sand</td>
</tr>
<tr>
<td>FLOWER POTS &amp; SAUCERS</td>
<td>Plant flowers in dirt, not water; be sure to empty out the saucers under the flower pots once per week</td>
</tr>
<tr>
<td>ROOF GUTTERING</td>
<td>Clean out at least once a week to ensure that dirt and leaves do not impound rainwater and cause mosquitoes to breed in them</td>
</tr>
<tr>
<td>GARDENING EQUIPMENT (watering pans, shovels, wheelbarrows and the like)</td>
<td>secure under a shelter or turn over to prevent water from collecting in them</td>
</tr>
</tbody>
</table>
Module 5 -
Monitoring and Evaluation

This module is organised into the following sections:
1. Why Monitor and Evaluate?
2. Priorities
3. Using Knowledge, Attitudes and Perceptions

1. Why Monitor and Evaluate?

Monitoring and Evaluation (M&E) is a valuable component of any public health initiative. Epidemiology and entomology both are known for the intensity and commitment around M&E efforts, as ongoing technical and programmatic progress is dependent on determining whether or not current interventions are working. No doubt readers of this guide are involved in, or have contact with, forms of programme evaluation that help guide the design, process, programme and impact evaluation of their work.

It is no different for initiatives that engage citizens, the public, or specific communities in or around the topic of vector control. The unique challenge associated with M&E in community engagement and vector control stem from the fact that there are two sets of things to monitor – actual human and community-based programmes and outcomes, including measuring behaviours and inclusiveness, and entomological or disease transmission-related data. Not all community engagement projects need to measure entomological or epidemiological outcomes, for sure. But the stronger we can bridge the gap between typical medical and entomological M&E efforts and community engagement-related M&E, the better.

While it may surprise some vector control professionals, the actual practice of M&E in public engagement is well-known and mature. Thankfully, the social sciences bring a number of helpful tools to vector control-related public engagement efforts, but so too do new tools and new thinking about how best to determine whether or not specific efforts are working. Some of those efforts will be discussed below.

In addition, this publication’s bibliography includes dozens of studies conducted using a range of methods for measuring, tracking, evaluating, and cataloguing the specific progress and outcomes of public- and community-based programmes.

As a starting point for those new to vector control-related public and community engagement, there are a few good resources that can help the practitioner gain a good, and efficient grasp of the basics of programme evaluation and general M&E efforts.

The CDC’s Agency for Toxic Substances and Disease Registry developed an excellent overview of evaluation and measurements of public engagement in its manual entitled “Principles of Community Engagement.” While now a few years dated, it remains a pertinently substantive document that covers a range of M&E topics relating to community engagement.

Importantly, it references five types of evaluation efforts:

1. **Formative** – providing information to guide programme improvement (evaluations specific to furthering the objectives of a given initiative);
2. **Process** – measuring whether or not specific processes are working;
3. **Summative** – measuring whether or not the effort was successful and met its intended goals and objectives;
4. **Outcome** – measuring the specific observable outcomes of a programme;
5. **Impact** – measuring the initiative’s overall long-term outcome.

These are all-important types of evaluation and should be considered during the planning stages of any community-based or public-facing programme. Additional work on building formal programme evaluation into initiatives designed to engage or empower citizens or communities is becoming more abundant. A formal and authoritative review of strategies and models for M&E will not be done here, as it is assumed that readers are familiar with the topic in general and can reference pertinent literature as needed, but it is important to note that M&E should not be viewed as an unnecessary, foreign, or burdensome layer of activity in any activities considered within the bounds of this publication.

Another helpful source of inspiration and programmatic recommendations comes from the WHO’s publication “Risk Communication and Community Engagement for Zika Virus Prevention and Control”\(^2\). This is particularly pertinent document because of its focus on Zika’s dual vectors (humans and *Aedes aegypti*) and community engagement and programme evaluation across sectors involved in preventing the spread of Zika.

2. **Purpose:**

   Thinking practically, thoughtful M&E efforts can be added to the smallest or most basic of public engagement efforts – including risk communications, behaviour change programmes, community-based vector control programmes, and others – with little cost and in a manner that provides value to managers.

   M&E efforts in this arena may include the following:

   1. **Measuring Progress to Goals** – how is the initiative tracking against the original goals of the effort, and is it doing so in the times allotted?
   2. **Measuring Progress to Objectives** – how is the initiative tracking against the original objectives of the effort, and are efforts needed to further strengthen, adjust, or recalibrate specific activities to better achieve the intended outcomes?
   3. **Evaluating Depth and Inclusiveness of Community or Citizen Participation** – is the initiative fully engaging or activating all portions of the target community or demographics, and are all portions of said community participating at the levels required for success of the effort?
   4. **Monitoring Costs** – is the initiative within budget, tracking against budget benchmarks, and on track with successful programme outcomes within the allocated budget?
   5. **Evaluating Tactical Performance** – are the specific efforts to engage communities working, and are key messages being received via the right channels?
   6. **Evaluating Knowledge, Attitudes and Perceptions** – are programme efforts achieving a change in how people perceive or behave relating to vector-related threats (or conditions), and are those KAP scores tracking in the right direction?

7. **Evaluating the Speed of Knowledge or News Distribution** – are key messages or alerts being shared throughout a community, and is information transferring between one set and another? How quickly does information travel? Which key network nodes are most efficient or reliable for transmitting information?

M&E efforts are often pursued for the following practical reasons, too:

- Track progress;
- Generate alerts to barriers to progress or challenges;
- Create transparency in both programme inputs (“we will do this”) and outcomes (“because we did that, we achieved this”);
- Track critical indices to determine resource allocation;
- Generate confidence in community-based programmes amongst key stakeholders;
- Generate confidence amongst communities that they’re making progress or to reinforce behaviours or actions;
- Demonstrate to senior government officials the benefits of community engagement or risk communications programmes;

While there are a wide range of M&E configurations or methods, a critical, unifying priority is that whatever M&E efforts a programme manager seeks to employ, they are to be included in the earliest of planning efforts and maintained as a priority throughout and after implementation. While M&E efforts may be seen as burdensome at any given stage of the initiative, the closer the M&E components are to the purpose and intended goals and objectives of the initiative, the better. This will ensure that M&E is not an academic exercise, but instead a set of active management tools designed to ensure that efforts undertaken are indeed advancing the initiative’s intended impact.

Additional questions can help guide or shape M&E efforts in vector control-related programmes:

- How many citizens participated in community clean-up days?
- How many Facebook followers does the initiative have?
- How often do people engage in a specific activity?
- How many households are involved in the monthly breeding site reduction efforts?
- How many citizens signed up for participation in an initiative?
- How many businesses are participating?
- How many articles have been written about the project?
- Were breeding sites reduced as a result of this programme?
- How many breeding sites were removed or eliminated?
- How many communities are participating in the initiative?
- How many institutions of faith are participating in this specific effort?
- How many schools have agreed to distribute information to students?
- How many students have been engaged with the programme’s curriculum?
- What is the total population that heard the radio interview?
- What percentage of the population was engaged via the three news channels that featured a PSA?
- How many individuals participated in the monthly town hall meetings?
- How many neighbourhoods met a specific activation target?
- What percentage change was recorded on citizens’ responses to a questionnaire measuring KAP-type responses?
• How many ovitraps placed on home sites are still operational after X and Y times?
• To what degree did a community meet the objective of reducing breeding sites by 50%?
• How many requests were received for free supplies (or equipment – say, mosquito traps);
• How many households participated in the “free large trash pick-up day”?
• How many vacated homes have been inspected or addressed by the community?
• How many derelict cars have been reported by the community?
• How many disease transmission cases were experienced during the programme period (and after)?
• How many households installed free screens provided by the government?
• How many households covered their open cisterns upon request?
• What was the most useful key message relating to breeding site reduction?
• What demographic was most active in participation?
• Were the programme goals and objectives met, and in the desired times?
• Which community engagement format was most successful at attracting participation?
• What were the changes in KAP before, during, and after the project?
• How many people signed up for the programme element?

There are an unlimited number of additional key M&E measures or metrics that can be built and managed, just as there are an unlimited number of programme types and methodologies.

The simpler the better. And the more quantifiable the better, particularly as it relates to enabling a limited staff or community volunteers to manage both the data collection and the evaluation of said data. Creating a complex M&E effort may in fact place burdens on both the M&E process and on the programme itself. When resources are limited, the essentials are - simple measures of performance against goals and objectives, and quality of delivery.

3. Example Framework:

With that said, governments with little capacity to deploy community engagement programmes on top of an already strained vector control operation, M&E can be daunting. To that end, lessons from small community engagement programmes may be helpful.

The following are M&E constructs that have been developed by the BugOut programme in the British Virgin Islands where the community is leading vector control operations on the island of Virgin Gorda. These were developed to be simple indicators of ongoing performance of the programme and to serve as guides to the ongoing and novel intervention types for which no manual or guide existed.

The four basic areas for limited community engagement initiatives may include:

1. Activation – measuring “activation” can be done with relative ease, as it measures whether or not targeted populations, communities, civil society, the private sector, or any other social element is engaged in the programme’s intended specific set of actions or behaviours, or whether or not a certain number of individuals, parcels, communities, etc. have been “engaged”; building in a time-certain set of “activation evaluations” will help create a set of measurements that will help programme planning and calibrations;
2. **Intelligence** – for community-based vector control programmes that include citizen or community-based breeding site mapping or reduction efforts, measuring total coverage of the data-gathering volunteer effort, and/or the total number of parcels surveyed, can help ensure programmatic coverage is extending to the entire intended geographic area; this has been made easier with the advent of easy-to-use, smart-phone enabled Apps that allow volunteers to report GPS location of specific programmes; building maps that track total “coverage” can help visualise whether or not the initiative is achieving intended coverage;

3. **Vector Control** – it is difficult to measure the impact that community-based programmes have on actual entomological or medical outcomes. However, it can happen with close coordination of the formal and other community-based efforts working in these areas; for example, integrating schedules of community engagement activities in a particular neighbourhood with a schedule for when government vector control officers will be performing trap counts, larval breeding site inspections, or other efforts in that neighbourhood can generate great synergies and provide a unique M&E opportunity to test the progress or impact community efforts are having; linking community and government efforts, and using data from one to help guide the other is a beneficial effort;

4. **Sustainment** – sustainability is another critical area for governments pursuing community engagement programmes; a programme can be measured throughout the life of the programme itself; in the case of governments seeking to “seed” community engagement-related vector control programmes, or to inspire activation of certain new behaviours among a population, measuring the commitments made by the community itself, civil society organisations, the private sector, and even other government agencies (solid waste, water and sanitation, etc.), can yield excellent information about whether or not the programme will meet a certain cliff of funding or support by the vector control agency’s staff; other M&E efforts in this arena can measure total progress to goal for financial resources to sustain the effort in a subsequent budget year; commitments to be sought by governments to provide funding for certain periods of time, or for in-kind contributions.
A quick snapshot of an M&E dashboard for very simple efforts shows a few of these in practice:

These are just a few examples of the more basic measures of impact and progress. There are a range of additional programme measures that would be considered stronger or more helpful.

4. Partners and Resources:

For governments with limited capacity for engaging in, let alone monitoring or evaluating community engagement efforts, the following partners and tools may be useful:

1. **Other government agencies** – often ignored in vector control-related community engagement programmes, these agencies often have a big stake in key components of vector control; solid waste agencies, for example, have a granular view of a community’s waste practices or challenges, and often collect data that can be used to help determine whether or not a community engagement activity focused on source reduction is having an impact; smart work with colleagues in solid waste agencies can often lead to a positive, programme-long relationship that provides critical data at no additional cost;

2. **Social media networks** – social media can be used to measure quantitative participation, message penetration, digital engagements, actions, and shares as it relates to community-focused programmes; using Facebook or Instagram may sound fanciful or unsophisticated (this author has often heard both complaints), but it can be used as both a primary vehicle for engaging communities of certain demographics, and as a gauge for how other, off-line efforts are being absorbed;
3. **Self-reporting or citizen-based feedback** – new technologies are enabling the sending of text messages to “pulse” or query citizens for specific answers, feedback, data, or other information; while many countries or territories do not yet have mobile carriers that can support these types of efforts, this capability is now becoming commonplace in most countries around the world; using SMS to send key messages to citizens, or to ask for feedback on a particular topic, is an affordable way to have direct contact with those with whom a programme is attempting to engage; there are Apps being developed, too, that can help empower sentinel citizens or community-based organisations to provide real-time feedback from the community when asked, or on a routine, scheduled basis;

4. **Community leaders** – often, community leaders – formal or informal – can play a critical role in both designing and implementing community-based projects, and they also can help mobilise volunteers to measure progress; community leaders can also help advise on challenges or problems within the programme; establishing positive, strong relationships with community leaders will almost always translate to either better M&E efforts or a more granular understanding of how the community is accepting or responding to the programme’s intent or operations;

5. **Partner organisations** – many community-based programmes can utilise partners or organisations already active in communities (say, the Red Cross, the United Way, NGOs, institutions of faith, and nonprofits) to carry out efforts, and/or to help measure the success of any particular effort; for example, an organisation implementing a door-to-door waste management questionnaire can also implement a series of questions relating to vector breeding sites or personal behaviours associated with vector control;

6. **Businesses** – many businesses have a direct and lasting stake in successful vector control operations, whether pursued by government or by communities; businesses often are excellent sources of support for community-based programmes and for sharing information that can help shape such programmes; businesses will often help share news, promote community-based programmes, advocate for more resources for community-based projects, and help encourage other businesses to participate; using them to help with M&E efforts is a natural extension of this collaboration – businesses can help track participation, host events, distribute questionnaires to customer lists, promote the use of social media hashtags, etc.;

7. **Software** - there is a growing number of mapping tools that allow for easy data reporting via Apps or SMS, that can help paint an accurate but simple picture of programme coverage areas, source reduction efforts, changes over time in breeding site counts, complaints, etc.; many web-based tools require little to no configuration. Information can be set up to share with communities or programme officers charged with implementing programmes within minutes or hours;

All in all, M&E is a broad concept with multiple positive implications for vector control-related community engagement efforts. For those agencies with more capacity to build in solid M&E elements into their programmes, it is encouraged they do so. For those agencies or offices with little to no capacity to build a formal M&E programme into the initiative, it is recommended that a set of simple benchmarks, metrics, or indices be created during the planning process. This will ensure that progress can be documented, challenges can be reported and mitigated or solved, and so the programme’s overall impact – during and after – can be clearly articulated to key stakeholders. When these efforts are pursued, the broader body of experience is packaged for the benefit of those who will attempt similar programmes in the future, and for the very communities whom these programmes have been developed for in the first place.
Module 6 -
Sample District and Neighbourhood System

The following details a sample architecture for organizing districts and neighbourhoods and outlines the various reporting channels and lines of authority for effective communication and management.

This architecture was influenced by the British Virgin Island BugOut community-vector control program.

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### Organizing Communities to Lead in the Fight Against Mosquitoes

A New Model to Strengthen Capacity to Fight Mosquitoes
Carrying Zika, Dengue, etc.

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**MosquitoShield Program Philosophy and Approach**

<table>
<thead>
<tr>
<th>Philosophy</th>
<th>Approach</th>
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<tbody>
<tr>
<td><strong>Collaboration</strong></td>
<td><strong>Five BugOut Program Areas</strong></td>
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<tr>
<td>Collaboration</td>
<td>Each comes together to form a comprehensive</td>
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<td></td>
<td>approach to combating mosquitoes.</td>
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<td><strong>Four Performance Indicators</strong></td>
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<td>Four specific performance indicators we use</td>
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<td>to measure success.</td>
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<td><strong>Three Years to Demonstrate Success</strong></td>
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<td>MosquitoShield is running for 36 months, start</td>
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<td>to finish, to determine its efficacy as a</td>
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<td></td>
<td>model for controlling mosquitoes.</td>
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<tr>
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<td><strong>Two Enemies We Seek to Defeat</strong></td>
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<tr>
<td></td>
<td>Aedes Aegypti (and other Aedes species) and</td>
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<td>Inaction (taking no action, thereby leading</td>
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<td>to negative health and economic impact</td>
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<td>regionally).</td>
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<td><strong>One Mission</strong></td>
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<tr>
<td>Safety AND Efficacy</td>
<td>To create a new, innovative, sustainable</td>
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<td>vector-control model.</td>
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</tbody>
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CARPHA - Community Engagement and Vector Control in the Caribbean

93
MosquitoShield’s Strategic Pathways

36-Month Pilot

- Community Engagement, Education and Empowerment
- Community Source Reduction & Clean-up
- Surveillance and Monitoring
- Targeted, Safe Mosquito Control
- Continuous Improvement

Ongoing Success

How MosquitoShield is Organized

The Steering Committee is comprised of local and national community leaders, government officials, business owners, educators, and public health experts - all of whom guide the program's direction, priorities, and decisions on each part of the MosquitoShield program.

MosquitoShield is deploying a new Precinct system designed specifically to combat mosquitoes and mosquito-borne diseases. They help empower communities to take action in their local area, to help distribute and collect mosquito-related information rapidly, to develop peer-related accountability, and to help deploy program resources effectively.
MosquitoShield Precincts (and Super-Precincts)

MosquitoShield precincts will allow for scalable, efficient community mobilization, education, useful local information gathering, and management and rapid deployment of localized mosquito control efforts.

Why Develop Precincts in a Mosquito Program?

Benefits:

- **Accountability** = precinct captains monitor, guide, report;
- **Scalable** = precincts allow for systematic programs;
- **Hyper Local** = each precinct is unique;
- **Information Rich** = precinct-level information/reporting beats wide-area reporting;
- **Targeted Responses** = precinct teams can attack problems;
- **Shared Load** = precincts can collaborate together and specialize;
- **Peer Pressure** = precinct captains and teams ensure neighborly participation.

MosquitoShield Precinct Organization & Operations

MosquitoShield HQ provides education, resources, expertise, vector control, emergency back-up, and liaison to the Gov.

- **MosquitoShield Precinct Captains**
  - Precinct Captains are key drivers for precinct participation in all programs.
  - Support for general precinct Ops, sharing/reporting up/down; alternate for Captain’s absence
  - Manager of data reporting, house-to-house survey campaigns, information sharing up and down
  - Manager of rapid response to hotspots, Zika/Dengue outbreak; keeper of stockpiles of supplies; trainer of trainers

- **Rapid Information Sharing System**
  - (i.e. Text, Phone trees)

- **Source Reduction, Mosquito Population Monitoring**
  - (Precinct-wide reporting (100% goal))

- **Community Engagement**
  - (House to House, Businesses, Community Groups)

- **Hot-Spot & Outbreak Response, Reporting**
  - (i.e. MagP)
MosquitoShield Precinct Layering

Precincts enable development (tracking) of layers of new types of data and targeted responses that otherwise have gone untracked or under-appreciated up until this point in IVM, including behavior change, social network (i.e. how important is finding the “right” community members in helping to combat Aedes?).

- **Project Area:** Apieville
- **Precinct Maps** - #1 through 20
- **Parcel Scoring/Mapping** - scorecard tracking
- **Hotspot Areas** - ID, tracking, educating, surveying
- **Hotspot Intervention** - type, dates, details, photos
- **Mosquito Population Data**
- **Mosquito Control Operations**
- **Ongoing Monitoring, Feedback** - crowd-powered reporting; precinct reporting; feedback back to MosquitoShield, etc.

Precinct Resource & Task Distribution

**Diversification Across Precincts:** Each precinct will have standard tools, but some will have additional resources, training or responsibilities. Small precincts will cover just the basics; larger precincts will provide additional support services to other precincts.

- **Hot-Spot Response Team, Equipment**
- **Zika/Dengue Response Teams - for All Precincts**
- **Data Collection Specialists (Monitoring)**
- **Stockpile of Control Equipment, Chemicals for All Precincts**
- **Santry Mosquito Monitoring System (Traps, Lures, Counts)**
- **All Are Draft Allocations**
  - Virus Detection Equipment

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MosquitoShield Feedback and Response System

Key Tasks

Saint Roberts will contain approximately 20 “precincts” - defined groupings for monitoring, deploying and evaluating control efforts and community activation against continued threats.

Priorities in Developing Precincts that will Work:

1. Developing Smart, Cohesive MosquitoShield Precincts - selecting for balanced population density, structural density, and environmental conditions, as well as traffic and social patterns;

2. Conduct Initial Baseline / House-to-House Survey - developing data within each precinct, and island-wide, for baseline surveys, ID of hotspots, etc.; needs to be done after or in concert with precinct creation;

3. Deploy Ongoing Surveillance Equipment - deploying Ovitrap and lethal ovitraps per precinct, and via ideal ratio for trap-to-house density; create protocols for capturing data via MosquitoShield Working Group and Precinct volunteers;

4. Set Rotation Schedule for Precinct Activity - rotating house-to-house surveys; equipment rotation; public education campaign rotation; “emergency response” training rotation; etc.;

5. Create Information Sharing Incentives and Systems - provide each precinct with the tools necessary to report problems, access resources, and call in larger support from the MosquitoShield program or neighboring precincts.
Introduction:

The following desk audit includes more than 130 sources that offer value to the development of a new model for Caribbean-specific community-based vector control and behaviour change programmes. The literature is wide-ranging; this desk audit explored more than 250 articles and sorted through even more resources to find those examples, lessons, best practices, or pitfalls that can best inform, challenge, or lend support to the development of a new model for community-based vector control.

This desk audit was implemented by searching for a set of topics relating to how community-based vector control efforts targeting Aedes aegypti have been implemented and whether or not success was achieved. This desk audit did not discriminate based on geography, time, or size of initiative; this effort attempted to seek the most pertinent catalogue of case studies developed on this specific topic while maintaining discipline around the specificity and pertinence to the development of an Aedes aegypti-specific model for the Caribbean context.

In a small handful of cases, the desk audit included a few non-Aedes aegypti-focused community engagement, mobilisation, behaviour change and risk communications studies with the goal of establishing a body of references that can help shape this project’s goal of building a model that benefits from the most germane literature on the operational and behaviour change-specific programmatic elements that have direct relevance to or that can be translated into future Aedes aegypti-focused efforts.

A number of resources were purposefully left out of this desk audit. Often, cited materials relating to the science and behaviour of Aedes aegypti, efficacy or challenges of formal top-down vector control, epidemiology of vector-borne diseases, and other materials that have sufficiently analysed or investigated many of the broad themes of this specific public health burden in the Caribbean were not explored in depth, as these topics have been covered exhaustively; this desk audit takes it as a given that Aedes aegypti, dengue, Zika, and other vector-borne diseases will be present for some time, and that formal top-down vector control programmes will remain limited in capacity in most countries/territories, and that some of the broad factors cannot be impacted by this type of effort.

This desk audit also spent time going through non-peer reviewed resources. For example, the audit reviewed five new web-based tools that currently exist or are being developed to effectively mobilise communities against Aedes aegypti breeding sites (and other behaviour change-related actions or outcomes). These and others will be included in the project’s primary deliverable.

In addition, this desk audit process also included initial interviews with a number of individuals - subject-matter experts on behaviour change, risk communications and community engagement relating to vector control and/or public health topics (experts in environmental risk management, designers of Zika-related behaviour change efforts, etc.), and a number of individuals working on innovative technologies or methods for organizing communities. The primary take-aways and lessons learned from each of these will be integrated into the manual along with the broader range of interviews conducted during each forthcoming country missions.

Finally, a note on the broad availability of literature on this topic. While most literature on the subject of Aedes aegypti-focused community-based vector control are in English, a considerable amount of work has been done in the Spanish-speaking countries of Central and South America, Cuba and Puerto Rico. Included in this desk audit are a number of Spanish-only articles that were translated for this desk audit with help from a Spanish-speaking medical professional. Additional French materials on these subjects exist as well, but the author’s mastery of the French language remains sub-par for purposes of conducting research for this project.
Methodology of Desk Audit:
The following topics and parameters were used as guides during the desk audit:

- *Aedes aegypti*-specific community-based vector control programmes developed by governments in collaboration with communities;
- *Aedes aegypti*-specific community-based vector control programmes developed by communities;
- *Aedes aegypti*-specific community-based vector control programmes developed by international organisations or non-governmental organisations;
- Caribbean-specific *Aedes aegypti*-specific community engagement programmes;
- Behaviour change-related programmes implemented in vector-borne disease-related settings;
- Programmes implemented in countries or regions without robust top-down vector control capacity;
- Programmes implemented using a specific methodology, including COMBI;
- Formal evaluations of community-based vector control efforts (studies of studies, analyses, etc.);
- Specific programmes with sub-components that may be of interest to model development;
- Analyses or advocacy for the use of social science-related constructs or frameworks for helping to plan and/or inform community-based vector control programmes (i.e. why and how effective social, cultural, political, economic, and psychological determinants may play a role in success of community-based programmes);
- Any other articles or resources of interest to the author for purposes of this project.

This desk audit was aided significantly by CARPHA’s recent development of the “Evidence Brief: Strengthening Household and Community Action for the Prevention and Control of Arboviral Diseases in the Caribbean”, in conjunction with the proceeding of the workshop of the same name on April 26, 2017. This document provided a helpful overview of key challenges, elements and opportunities relating to improving household and community participation in vector control efforts. It included broad recommendations, some of which will be useful for this project, and also provided a range of sources relating to community engagement and mobilisation around other public health challenges (i.e. obesity) that will afford this project useful lessons and best practices.

Control programmes tend to comprise mainly of emergency responses to epidemics, leaving limited resources and capacity for sustained action; require sufficient budgetary support and intensified efforts at both the national and community level, maintaining and expand control activities. Suggests COMBI model. **Effective prevention and control require coordinated, sustained, multi sector approach to addressing environmental, behavioural, and social context of mosquito breeding and disease transmission. Suggests emphasis on larvae and pupae control.**


Emphasises the need for a strategic deployment of the media; highlighting strategies that can enhance the value of social media and stressing the need for two-way communication and working with the audience in developing the appropriate communication strategies.

3. **Al-Muhandis, N. & Hunter, P. R. (23 August 2011).** The value of educational messages embedded in a community-based approach to combat dengue fever: A systematic review and meta regression analysis. 10.1371/journal.pntd.0001278. **Source.**

Evaluates the control measures investigated in previous studies; reviews effectiveness of educational messages embedded in community-based approaches. **Results suggest that such measures do appear to be effective at reducing entomological indices; suggests most effective some 18-24 months after the intervention but then subsequently decline without sustained effort.**


Includes environmental management strategies that reduce/eliminate vector breeding sites combined with improved personal prevention strategies to significantly reduce transmission of these infections; study identified specific groups that can be targeted with vector-control and personal protection interventions to decrease transmission of the infections.


A cross-sectional study was undertaken; all counties were included; one school from each county was randomly selected; data collection was conducted using a questionnaire. **RESULTS: Almost three-quarters of respondents (73.1%) demonstrated sufficient knowledge about dengue.**

A community mobilisation protocol to test whether community mobilisation adds effectiveness to conventional dengue control. Intervention sites showed a lower risk of infection with dengue virus in children; fewer houses with larvae or pupae; fewer containers with larvae or pupae; fewer pupae per person. **Evidence based community mobilisation can add significant effectiveness to dengue vector control; each site implementing the intervention in its own way has the advance of local customisation and strong community engagement.**


Awaiting full content from the presentation.


A study of dengue vector breeding patterns under a variety of conditions in public and private spaces; to achieve effective vector management, a public health response beyond routine larviciding or focal spraying is essential.


A cost-analysis study conducted from the perspective of the Aedes control program, nested in an insecticide-treated curtain (ITC) effectiveness trial, during 2009-2010; annual cost of the routine Aedes control program activities was US$16.80 per household (p.h), 6,714 ITCs distributed; did not lead to further reductions in the already relatively low Aedes infestation levels. **At current curtain prices, ITC deployment can not be considered an efficient option in certain environments.**


Illustrates the importance of using social science research both in planning and implementation of dengue prevention and control. **Lessons learned include: a) social science research should be “pulsed” throughout a community driven-program in order to make ongoing modifications; 2) KAP survey revealed lack of knowledge and concern about mosquito breeding; highlighted importance of behaviour change as part of an overall strategy.**

Predicts dengue to be ubiquitous throughout the tropics, influenced strongly by rainfall, temperature, and urbanisation; approximately three-times the dengue burden estimates of WHO.


This study intended to implement a novel intervention strategy in Brazil using an ecohealth approach and analysed its effectiveness and costs in reducing Aedes aegypti / vector density as well as its acceptance, feasibility and sustainability. Embedding social participation and environmental management for improved dengue vector control was feasible and significantly reduced vector densities.


Pilot demonstrates that adequate knowledge of dengue and its vector are related and requisite to better implementation of suitable preventive measures in households; however, specific aspects of breeding sites should be taken into consideration within the educational programmes carried out in each locality.


This is a qualitative study, aimed at describing community perceptions on dengue prevention in affected areas of Lima. The main identified problems were lack of health professionals, community participation and preventive activities. They also noted that most activities were discontinued after outbreaks. The findings provide an opportunity to discuss and reflect on the preventive work done to face dengue.


Step-by-step guide for community organisation. Highlights: planning; awareness raising; building a coalition; taking action; monitoring and evaluating; working with faith-based organisations; working with health care providers; mobilizing policy makers and opinion leaders; working with the media. Puts emphasis on sound financial management: involvement of volunteers, encouragement of donations, and the prioritisation of key initiatives to maximise budget; behaviour change and awareness-building take long periods of times, and plans should be supported with realistic budgets.

Guidebook. Focus on: mobilizing the community; collecting and organizing data; selection of health priorities; development of a complete intervention plan. Highlights critical elements including: community member participation; data driving development of programmes; emphasises need for feedback and program involvement. Emphasis that program will take several months to a year before community is ready to begin the process.


Indicates a need to increase awareness of dengue prevention measures among international travels to areas where they might be at risk for dengue and other diseases.


Neither pre-travel knowledge nor mosquito-avoidance practices were significantly associated with absence of dengue infection among travelers returning from Haiti and other endemic areas at risk.


This study documents the importance of vector control in the prevention of dengue transmission since no vaccine is currently available and emphasises the urgent need to understand better the environmental factors which contribute to the proliferation of this disease vector *Aedes aegypti*.


Results provide evidence for the efficacy of indoor residual spraying and recommends reintroduction by targeting resting sites of mosquitoes, especially during outbreaks.


Household-specific control and prevention. Suggests that it is not essential to prevent all larval development to limit transmission of pathogens by adults, if containers are cleaned before mosquitoes fully mature; approach could make programmes more efficient, allowing greatest efforts to target medium/high levels of infestation.


Children-focused social mobilisation and communication approach to prevention. Highlights include: introduction of dengue issues into TV soap opera; establishment of children's museum with dengue-related exhibits; close collaboration between Departments of Health and Education.


Evaluation of Arnstein's ladder of participation. *Indicates that if citizens are truly participants of a process then the results should provide some form of citizen power.*


The transmission of disease may suffer a strong impact by surveillance action based on community contribution, since peri- or household water tanks represented the predominant sites for vectors reproduction.


Education campaign that reduced *Aedes aegypti* breeding more effectively than use of chemical spraying; *possibility of both treatments (education and spraying) potentially reducing efficiency, possibly because of false expectation of protection provided by spraying.*


COMBI-based model. Multiple communication channels: posters; jeep-mounted loudspeakers; school rallies; interpersonal communication; approach engendered a strong commitment at multiple levels in the countries and cultures. *Four key elements for long-term sustainability: 1) efforts are led by program champions; 2) program leaders must have autonomy and the opportunity for re-invention at the local level; 3) plans must be developed to fade once progress is sufficient; 4) community must help planners determine what benefits they seek.*

Large-scale social mobilisation and communication plan. **Lessons learned include:** 1) negotiate from the beginning for political support for all stages of the programmes, especially formative research; 2) include expertise in education communication, community organisation, and entomology; 3) work hard at linking research with implementation and at moving from small-scale to large-scale implementation.


Explored knowledge, attitudes, and practices in Trinidad and Tobago. Three recommendations: 1) the government should spray on a more regular basis, particularly just before the rainy season; 2) a pilot study should take place investigating whether a fining scheme would improve vector control; 3) dengue fever health education should be improved.


Survey was conducted among high school students to study experiences, practices and perceptions related to mosquito-borne diseases and to identify socio-demographic, cognitive and environmental factors that could be associated with the engagement in protective behaviours; these results revealed that the adoption of protective behaviours is a multifactorial process that depends on both sociocultural and cognitive factors.


Process highlighted: 1) mobilisation of the community; 2) collecting and organizing data; 3) choosing health priorities; 4) developing a comprehensive intervention plan; 5) evaluation. **Successful implementation depends on:** a) actively engaging community members in the process; b) having adequate time and budget to gather and interpret data to guide program; c) developing cohesion among stakeholder organisations.


Household-prevention with a focus on dissemination of highly specific messaging. **Lessons learned include:** 1) cost-benefit analysis of intervention must take into consideration broader economic costs associated with disease, such as work absenteeism; 2) *Aedes aegypti* control is not a problem that can be resolved by health sector alone - it is a problem of shared responsibilities.

**Financial incentive interventions are more effective than usual care or no intervention for encouraging healthy behaviour change;**


In addition to the existing drivers of vector-borne diseases, such as seasonal weather variation, socio-economic status, vector control programmes, environmental changes and drug resistance; climate change and variability are likely to influence current vector-borne disease epidemiology.


Reviews intervention program in education and community participation. Four levels of intervention used: community participation; biological controls; breeding source reduction; and information transmission from nation medical, health services, social networks, and directly from health educators.


Total reliance on chemical interventions is no longer feasible; programmes of control need to rely on education, behaviour change, and community participation. Perception of risk, curative care and prevention, and environmental risks are explored.


**The top-down approach to *Aedes aegypti* control has no lasting impact after government support is withdrawn.** The bottom-up approach is very slow and may take years before results are observed. Thus, integrated control strategies that utilise the best of both approach in the initial phase, with more emphasis directed to the community-based approach as the program progresses.


Reviews the use of community participation for larval source reduction and discusses programmes in four countries from effectiveness and sustainability. **Concluded:** combination of vertically structures centralised and community-based approaches provide the best short-term/long-term success and sustainability.


Principle drivers for disease increases: 1) urbanisation; 2) globalisation; 3) lack of effective mosquito control. To reverse spread of viral diseases, suggests: a) prevention of viruses and vectors via air travel; b) infrastructure must be prepared to support capacity in endemic countries; c) surveillance must be developed and implemented in all endemic countries; d) integrated prevention and control programmes must be developed and implemented as regional, not national, programmes; e) vaccines must be used for prevention as opposed to emergency response; f) policy makers must develop political will to provide support to maintain these programmes.


One of the most important public health problems facing the tropical developing world at the beginning of the 21st century could be effectively prevented if countries had the resources and the political will to develop and implement integrated community-based prevention and control programmes.


Contributing factors for increase diseases in 20-21st centuries: 1) population growth in tropical developing countries; 2) unprecedented urban growth in these countries; 3) lack of effective mosquito control; 4) globalisation. Past successes were largely based on strong emphasis on larval control; failures highlighted include: ultra-low volume technology and space spraying has no impact on transmission; lessons learned: community control programmes need community involvement and ownership for long-term sustainability; it takes years to achieve efficacy; vertically structured, paramilitary programmes have a general positive impact on control and eradication (but are not sustainable); **conclusion:** no single control method is likely to work in isolation - requires a combination of top-down/bottoms-up approach that integrates chemical, biologic, genetic, and community-based control methods as well as vaccines and antibodies.


The lack of planning, inadequate housing, water, sewage and waste management create ideal conditions for diseases and their mosquito vector. **Evaluated societal distribution of the economic cost of dengue:** individual households bearing the largest burden (48%) compared with only 24% by the government and 22% by insurance.

Underscores major failures by ministries of health: highlights that many disease-prone countries normally only applied adulticides via ultra-low volume space-sprays - an expensive and low-impact method for dealing with transmission - and usually only after epidemics.


Effective communication within and across organisations and with the greater public can help to prove surveillance, prevention, and control programmes for diseases; the current public health infrastructure in most countries is inadequate to deal with epidemic diseases and funding agencies should move quickly to develop infrastructure for surveillance, prevention, and control to prevent major epidemics in the 21st century.


Highlights: late-stage dengue vaccine candidate; safety and efficacy in >9 year individuals in endemic countries; additional data may inform on the impact of vaccinating.


Fifty-seven studies were included; vector control interventions using copepods, environmental cleanup and education are effective and sustainable at reducing dengue in rural and urban communities, whilst insecticide spraying is effective in urban outbreak situations; community-based surveillance interventions can effectively identify avian influenza in backyard flocks, but have not been broadly applied; outbreak control interventions for Nipah virus and SARS are effective but may not be suitable for ongoing control.


Tensions persist regarding the definition, rationales, outcomes and ethics of community development & participation; this case study presents some of the practical and ethical challenges that arose over the course of a participatory project that aimed to analyse and improve quality of life in a residential home for older people in Guyana; adopting a participatory approach brought valuable benefits in a residential home, but others adopting the approach should ensure they critically consider at the outset the ethical and practical dilemmas the setting and approach may produce and have realistic expectations of participation.

A systematic review of literature and vector control studies highlighting: 1) a lack of personnel (entomologists, social scientists, operational vector-control staff); 2) a lack of technical expertise at decentralised levels of services; 3) insufficient budgets; 4) inadequate geographical coverage; 5) interventions relying mostly on insecticides; 6) difficulties in engaging communities; 7) little capacity building; 8) almost no monitoring and evaluation.


Report from a systematic review examining if taking part in activities that enhance the natural environment (such as maintaining paths to access the countryside) can improve people’s physical and mental health; conclusions identified as non-specific and requiring additional research.


The community must be engaged before an agenda is set—the active participation of community leaders, members, and organisations is needed in the earliest stages of community-based public health action, if it is not already the force that drives such action; initial communication and networking necessary to launch a community health improvement project require frank examination and discussion of motivations, approaches, and goals by all stakeholders.


Separating indicators of participation from project impacts is useful to gauge the level and quality of participation in the ongoing development process; the impact of participation on self-development and community capacity, and; the impact of participation on policy or change.


This paper investigates whether the segmentation of social groups in the urban fabric, with differential access to the city’s resources and services, can influence the spatial and temporal distribution of dengue cases. The study’s site is the city of Campinas, state of São Paulo, in which we analysed the dengue cases reported from January to December 2014. For this purpose, geoprocessing and spatial analysis tools were applied. The findings indicated that social inequality could be conditioning the distribution of dengue cases in conjunction with other factors that contributed to the occurrence of the largest epidemic recorded in Campinas so far.

This research aims to evaluate if it is possible to predict epidemiological patterns through data obtained from surveilling social media. For this analysis, Facebook, Twitter, Instagram, Flickr, YouTube and blogs were surveilled in Santa Catarina State, Brazil between January 24th and February 27th, 2016. Rumors about dengue, chikungunya, zika, *Aedes aegypti*, and microcephaly were collected and correlated to the number of suspected, confirmed, and discarded cases settled by the Vigilância Epidemiológica de Santa Catarina (Dive) in the same period.

The results show that there is a strong correlation between the variables and that the surveillance of the social networks can be used as a predictive model for health professionals and public managers.


Illustrates how social mobilisation has improved *Aedes aegypti* source reduction in Indonesia by drawing on experiences of other community-based programmes.


NEPRAM Model. Behavioural trial with emphasis on negotiation with householders who act as program consultants. Involves communities and health planners in the joint development of effective and feasible behaviour change intervention through negotiation and continuous feedback.


Considers the issues impacting conduct of vaccine trials; evaluating logistic, scientific, ethical challenges concerning evaluation and introduction of vaccines. Highlights four challenges: 1) epidemiology of disease varies between Asia, Africa, Latin America; 2) theoretical concern that vaccine might predispose to severe disease if vaccine were insufficient; 3) poor diagnostics and lack of correlates of protection lead to incorrect diagnosis.


Identifies six levels of social participation: 1) doing an activity in preparation for connecting with others, 2) being with others, 3) interacting with others without doing a specific activity with them, 4) doing an activity with others, 5) helping others, and 6) contributing to society.


A community-based integrated intervention to control an outbreak of dengue fever in Guangdong Province, China 2014. Suggests that an integrated dengue intervention program has significant effects to control a dengue outbreak in areas where dengue epidemic was mainly caused by imported dengue cases.


Approach for developing and implementing education materials for community-based *Aedes aegypti* control program. Broken into five stages: formative research; developing recommendations for behaviour change; development of educational messages; development and production of materials; distribution of materials. Intervention was successful in stimulating change in both knowledge and behaviour. Emphasises need to be flexible and adapt to local setting because of ecologic, cultural, and social differences.


Significant changes in knowledge and behaviour were seen; project demonstrated that community-based communication program aimed at larval production site elimination or control can be effective.

Program focused on one day a week when residents were to seek and destroy the sites where Aedes aegypti mosquitoes might occur; tied with communication and education actions to mobilise and motivate people. Program produced materials and methodology of interpersonal communication that generates partnerships with the private sector and community groups. **Highlights inclusion of a mobile dengue exhibit with interactive educational games.**


Focuses on identification of the awareness, attitudes and practices related to dengue in the tire industry in Colombia; 90.9 % of respondents considered it a problem for them and their families; 94.6 % know that is transmitted by mosquitoes; 100 % of participants recognised tires to be a breeding for mosquitoes; 90.8 % throw out unusable tires as if they were garbage; in the population studied, there is good awareness of dengue and its vector; nevertheless, there are problems related to attitudes and prevention practices.


Findings show that a range of issues need to be understood and taken into account to enable sensitive, ethical and effective engagement when seeking public support for new dengue control methods; residents expect to be fully informed and engaged about the science, the project and any future releases and they also want the opportunity to ask questions, engage in critique, determine how the disease is managed and say no to the implementation.


Sample resources. Focus on informing leaders; educating stakeholders; unifying messaging on prevention and control techniques across all systems.

Acknowledges the importance of community participation in health, envisaging a long-term sustainable and equitable vision of partnership with communities, using proven community mobilisation approaches by building participation, community, and capacity. Suggests programmes comprise of four sections: a) strategy document; b) plan of action; c) deployment of plan; d) monitoring and evaluation of plan. **Emphasis on: identification of needs; building of ownership; support of creative potential; recognition of diversity and equity; interpersonal and face-to-face communication; flexibility; inclusion of socially and geographically excluded pockets; creating and enabling environment; evaluating local hierarchy systems; implementing interventions to coincide with local calendars; finding strong, driven individuals; involvement of community/faith based organisations; collecting regular, two-way feedback; gender-specific sensitivity; linking with external resources; and understanding community dynamics.**


Project investigates the effectiveness and feasibility of scaling-up an eco-bio-social approach for implementing an integrated community-based approach for dengue prevention; integration of successful social mobilisation and empowerment strategies with existing and emerging biolarvicide-based government dengue prevention and control programmes is promising in reducing PPI and dengue transmission risk in southern coastal communities.


**Study shows that it takes approximately six weeks for sea surface temperatures (SST -34) to affect dengue incidence adjusted by weather and social variables.** Such models could be used as early as two months in advance to provide information to decision makers about potential epidemics. Elucidating the effect of climatic variability and social variables, could assist in the development of accurate early warning systems for epidemics like dengue, Chikungunya and Zika.


Topic discussed: sustainability; new methods for Operationalising and evaluating participation; the significance of local and cultural variability in determining outcomes; participatory self-determination as raised in the social movements literature; the increasing importance of intersectoral linkages; continuing impediments posed by biomedical ideologies and systems. **Concludes that ideological and political disagreements continue to separate pragmatists from activists.**

Summary: suppression is a practical method to control urban diseases; goal should be to reduce adult Aedes aegypti populations; poorly defined goals and unwillingness to commit resources except during epidemics is exacerbating the challenge of prevention; control should include surveillance and strategies to adult-mosquito eradication and private-sector involvement (this could make national programmes more effective and cheaper); novel innovations can be effectively developed in areas where baseline information is already available.


Conclusion: no consensus as to how an individual is protected from dengue virus.


The MAPP (Mobilisation for Action through Planning and Partnership) model. Centered around community organizing and partnership development and includes four assessments: assessing community themes and strengths; assessing the local public health system; assessing the community's health status; assessing the forces of change.


Lessons learned: To achieve community acceptance and maintenance requires several key elements: 1) sound knowledge base of diseases and vector control must be built amongst the community; 2) systems and campaigns to support long-term preventative practices must be developed in negotiation with community groups; 3) political support from both top-down and bottoms-up approach is vital.


Lessons learned: shift away from exclusively “top-down” approach to one of dialogue, negotiation, and partnership to resolve environmental sanitation and vector control programmes; led to some programmes expanding responsibility beyond Aedes aegypti control, usually to the detriment of the program (magnitude of changes was modest and unlikely to have been of major epidemiological significance).

Of the 25 respondent countries and territories, all but 3 relied mainly on the periodic application of residual insecticides as focal treatments to larval habitats; an integrated approach to control, combining residual, chemical, biological, and source reduction strategies, was reported by 44% of the programmes; routine interventions include: 1) supervision and training/retraining; 2) spatial sprays; 3) biological control; 4) source reduction; 5) education. **Reasons for the lack of progress include continued over reliance on eradication-style larviciding routines and the passive role of communities in addressing the problem.**


Analyzes marketing concepts and techniques that are applicable for social settings. Findings include: 1) social marketing and improve impact and effectiveness; 2) potential to use available resources and mobilise assets more effectively; 3) current approaches unlikely to deliver effective policy goals; 4) social marketing in health systems is under developed; 5) integrating effective research and evaluation into development of programmes is important to maximizing value.


Reports number of cases of dengue and dengue hemorrhagic fever by region of the Americas, and by country.


Includes highlighting techniques for: 1) social communication (emphasis on application of COMBI); 2) epidemiological surveillance; 3) laboratory diagnosis; 4) environment management; 5) clinical case management; 6) and Integrated Vector Management.


Effectiveness of disease containment depends on early detection and diagnosis and aggressive vector control coupled with quarantine.

   Highlights how to effectively build political commitment to prevent and control disease; importance of community participation, health education, and social communication; source reduction of breeding sites. Strong and viable prevention and control programmes should include: firm political and financial support with effective intersectoral coordination.


   Community resistance to vector control efforts to combat dengue, termed “reluctance,” was based on four arguments: 1) fumigation is ineffective; 2) personnel intervening are untrustworthy; 3) the timing of activities is unsuitable, and 4) the larvicide used affected water quality and taste. Study has clear heterogeneity in reluctant groups: community members with high economic status, residents in high-risk or “red zone” areas, families with someone working as a healthcare professional, and houses with an ill or disabled member.


   Summarises key features of 12 national case studies of dengue-related social mobilisation and communication initiatives; social mobilisation and communication for behaviour impact cannot work on their own; instead relies on improvements to public health infrastructure, epidemiological and entomological surveillance, effective clinical management, and emergency preparedness alongside intersectional coordination, active community involvement, and reinforcement of health policy and legislation for more effective vector control.


   Impact of global temperature on mosquito vectors remains undetermined; begins to quantify the influence of projected temperature change on dengue fever globally.

Guidebook. Discusses planning, strategy, objectives, research, analysis, segmentation, testing, monitoring systems, staffing, systems of information and management, structure, budgeting, piloting, implementation.


Four strategies for preventive behaviours were recommended: developing community groups to identify community priorities on prevention, developing volunteer groups to deliver prevention messages, making house visits to demonstrate specific control measures, and conducting a complementary media campaign to support these strategies.


Empirical evidence from 5 years of research in the context of Cuba showed that moves towards community-based Aedes aegypti control are feasible; in order to be successful, community-based dengue prevention should be a social learning process, implying a transfer of power and responsibilities to local people; actions undertaken must be oriented towards: 1) creating local capabilities; 2) strengthening existing structures and organisations, and; 3) promoting group work for learning participation from participation itself.


Identified facilitators and barriers to the process of translating community empowerment strategies into the practice of the national Aedes aegypti control program in Cuba which was explained in such a way that it could be implemented by program staff; and a control program with national coverage capable of implementing the proposal. The principal barriers were the complexity of the strategy and the absence of organisational changes needed to facilitate its insertion into the control program. The analysis of these factors as either static or dynamic makes it possible to design more appropriate and effective strategies that can promote the process and increase the likelihood of success.

Conclusions: suggested strategies to motivate residents’ action include: a) working with government agencies; b) improving access to information on garbage collection and water disposal; c) increasing publicity and information about disease by mass media campaigns, and; d) educating health professionals.


Analyzes the consensus produced by the Community Health Agents (ACS) and Agents to Fight Endemic Diseases (ACE) on actions made for prevention and control of the disease, integrated with the implementation of the ACE Incorporation Ordinance in the Family Health Strategy (ESF) teams. The results point to a consensus regarding: 1) difficulty of integrating and aligning ACSs and ACEs in the control of dengue; 2) inclusion of ACEs in primary care in the ESF; 3) lack of monitoring and evaluation of integrated actions.

It is concluded that it is necessary to: a) sensitize the participants; b) seek behavioural changing initiatives; c) provide a supportive environment to those involved with training courses on dengue; d) follow the integration process and periodically evaluate the creation of indicators of quality and quantity.


Coordinated efforts are necessary to contain the epidemic and continued surveillance is warranted to monitor the incursion and spread of these viruses. Efforts are also necessary to assess the effectiveness of current and future prevention strategies.


Implementation of social mobilisation COMBI mode. Lessons learned: a) Small group of committed and dedicated people can plan and execute a project as well, if not better, than a large committee; b) communities and households will readily get involved if the behavioural targets set are reasonable and achievable; c) sustaining the interest of volunteers is fundamental; d) measuring behavioural impact and trying to determine the role of COMBI are not straightforward - although COMBI did contribute towards positive behavioural outcomes.

The knowledge of dengue symptomatology, its prevention and control suggested a high level of awareness about dengue and its aetiological agents among residents of both communities, but the connection between the vector *Aedes aegypti* (L.) and dengue fever transmission was poorly understood. **The major determinants for cues to action were demographics, prevention of water treatment and garbage collection and disposal.** Data from the present study gave clear indications of the need for health education programmes, defining what garbage is and the further studies using the transtheoretical model of change.


Collection of authored works from primarily African authors. Highlights key areas including: 1) definition dilemmas; 2) the power of participation; 3) CBR as part of community participation; 4) operating within understood cultures and communities; 5) paradoxes and tensions.


Communities building and carrying out surveys of their own areas, building an accurate knowledge of what their community looks like, not only puts them in a strong position to represent themselves with NGOs, local and national governments, but the process itself can enhance skill and build capacity within the community.


Barriers to realizing the health benefits of a global information society were identified in an expert survey reported for project G8-ENABLE, sponsored by the European Institute for Health and Medical Sciences in Surrey, United Kingdom. **These barriers include: the security of personal information; data standardisation; intellectual property and reports; and network and messaging technologies, as well as education, culture, and cost.**


Household pest problem identified by the respondents was related to mosquito nuisance, particularly from night-biting mosquitoes; rodents were also a major concern perceived as being responsible for economic losses, ruined food, and a health hazard; unreliable water supply, a factor associated with *Aedes aegypti* abundance, was an environmental sanitation issue of major importance to
householders in rural areas; no correlation was found between knowledge of dengue and levels of Aedes aegypti abundance as measured by larval surveys of the respondent’s premises.

104. San Martin, J. L. & Brathwaite-Dick, O. (January 2007). La estrategia de gestión Integrada para la prevención y el control del dengue en la región de las Américas. Revista Panamericana de Salud Publica 21(1) - DOI: 10.1590/S1020-49892007000100011. Source. Major factor in the spread of disease has been the diminished capacity of national programmes to respond with prevention and control. Strategy employed to reduce risk factors for transmission; establish integrated epidemiological surveillance system; decrease mosquito populations; increase detection and identification; optimise diagnosis and treatment, and; decrease frequency/effect of outbreaks.

105. Sanchez, L., Perez, D., Perez, T., Sosa, T., Cruz, G., Kouri, G. …Van der Stuyft, P. (12 January 2005). Intersectoral coordination in Aedes aegypti control. A pilot project in Havana City, Cuba. TMIH. DOI: 10.1111/j.1365-3156.2004.01347. Source. Intervention study to document effectiveness of local-level intersectoral approach. Conclusion: the introduction of a participatory approach by social scientists promotes changes in intersectoral management; this facilitates social mobilisation leading to significant changes in knowledge, attitudes and disease-related practices in the population and eventually leading to more effective control of Aedes aegypti.


108. Shuaib F., Todd, D., Campbell-Stennett, D., Ehiri, J. & Jolly, P.E. (2010). Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. West Indian Med J. 2010;59(2):139–46. Source. Describes dengue KAP in Jamaica; campaigns should focus on educating and encouraging individuals and families to adopt such simple, inexpensive preventive actions, such as, use of insecticide treated bed nets and screening of homes; findings suggest a good level of knowledge which is not commensurate with attitudes and practices directed at reducing the prevalence of the disease.

Awareness of dengue fever and Aedes aegypti was high but the illness was not high on the priority listing. Respondents perceived the problem of increases in mosquito population as a Government problem and not a household problem. The study indicates that members of communities were aware of the preventive measures associated with dengue, yet only introduced them when someone they knew was affected by dengue fever. Suggests that overcoming this irrational barrier is most likely if attention is paid to the socio-cultural context.


Discusses how community-based participation and research led to mosquito prevention innovation specific to the region. Lessons learned: even simple interventions require extensive dialogue with community groups; locally appropriate solutions can be adapted but sustainable improvements should be developed in trial phases to actively engage intended users.


Residents may only understand the role of certain container types, and significant gaps in general knowledge of the disease may inhibit vector control. This pilot demonstrates the feasibility of conducting inexpensive, rapid assessment of community knowledge and breeding levels for local governments lacking the resources for a more methodologically robust vector assessment strategy.

112. Stone, C. M., Lindsay, S.W. & Chitnis, N. (December 2014). How effective is integrated vector management against Malaria and Lymphatic Filariasis where the diseases are transmitted by the same vector? PLOS Neglected Tropical Diseases (8(12):e3393). DOI: 10.1371/journal.pntd.0003393. Source.

Evaluation of cross-vector approach to vector control. Findings: long lasting-insecticidal nets and larval control methods near critical densities of mosquitoes, with minor level of vector control, were sufficient to eliminate disease. Despite low level of vector control required to eliminate some vector diseases, suggests that malaria is particularly resistant, even at high levels of preventative measures; cross-disease control methods can facilitate elimination, but management must strike a balance between high levels of coverage with long duration predicted to be required for specific diseases.


Use of mass-media interventions and community-based actions to prevent and control diseases led to limited success in the past; implementation of COMBI model lead to positive outcomes. Highlights: results from intensive monitoring and evaluation suggest that pilot has contributed towards positive behavioural outcomes.
114. Swetlitz, I. (14 March 2017). In a remote West African village, a revolutionary genetic experiment is on its way — if residents agree to it. STAT - Boston Globe Media. 

An overview and spotlight on gene-driver technology (sterile, followed by aggressive mosquitoes) in Africa; technology overrides nature’s genetic rules for mosquitoes to be able to pass vector diseases; important aspects of a launch (six years prior): education; trust building (with special focus on genetically-engineering; DNA); flashcards for risk-communication; following the genetic modifications to cotton in a region.


Successful long-term community engagement in planning and implementation can be achieved by using a mixture of purpose-driven, social, status, and material incentives to encourage community members to become and stay involved; by creatively designing and applying incentives, community leaders and planners can effectively motivate and secure commitment from their community members; barriers identified include (among others): 1) not understanding the task assigned; 2) public response method inappropriate; 3) feeling alone or unsupported, or being attacked for their views; 4) understaffing concerns; 5) unwillingness to work together; 6) unclear what roles/responsibilities are.


Strategies deployed in the vital community participation to prevent and control the spread of dengue in Latin America. These strategies improve the efficacy, cost-effectiveness, environmental impact, and sustainability of vector control strategies. Emphasis on need for a sustainable process to encourage individuals to maintain efforts over longer periods of time.


Illustrates how community mobilisation to prevent and control disease was achieved and how unexpected innovations can occur when national programmes consult with community groups. Lessons learned: programmes run by the health sector without community participation will struggle to be successful; horizontal partnerships encourage community action and lead to sustainable outcomes; developing partnerships with other agencies and NGOs will further improve results.

Monitored five dimensions of the participation process and assessed behavioural and environmental results and entomological outcomes. Participation was weak to good. At the household level, uncovered water storage containers decreased from 49.3% to 2.6% between 2000 and 2002, and removing larvicide from them dropped from 45.5% to 1%; reduction of 75% in the absolute number of positive containers and a significant decrease from 1.23% to 0.35% in the house index; local task forces, in which the interests of householders as well as vector control workers are directly represented, can lead to effective government-community partnerships that resolve problems of mutual concern.


Testing effect of community mobilisation on conventional control methods; conclusion highlights the positive impact of community mobilisation on the outcome. Specific locations implementing the intervention in their own way has the advantage of local customisation and strong community engagement.

120. UNICEF (March 2016). Risk communication and community engagement for Zika Virus prevention and control - a guidance and resource package for country officers for coordination, planning, key messages and actions. World Health Organization International Federation of Red Cross and Red Crescent Societies (IFRC) Source.

Highlights that risk communication and community engagement relies on:

a) informed local context;
b) community knowledge and expertise, including opinion leaders;
c) evidence based approach with language suitable for most/all citizens;
d) particular attention on areas of low access to information; tailored approaches to different population groups; informed from ongoing community monitoring and feedback.

Recommends:

1) tying risk communication into national prevention and control plans;
2) partnership with existing technical and professional groups/networks to add credibility;
3) developing country typology using epidemiological and entomological criteria;
4) mobilizing areas of technical support, local/community asset, academic research institutes, and monitoring and reporting partnership potential.


Successful implementation requires community buy-in, education, and continued diligence, coupled with trust in a functioning and sufficiently resourced Mosquito Control District or local health department. Traditional vector control tools can be expensive to implement; require active, committed and ongoing community engagement; and can elicit substantial social controversy. Recommend additional scientific and technical training and certification support be provided for public-health vector control.
   Illustrates techniques used in epidemiologic studies. Basic elements include: formulation of hypothesis; selection of study populations; selection of indicators; measurement of exposure; analysis of relation between exposure and disease; evaluation of bias; evaluation of chance.

   Summary of approaches including: insecticide-treated bed nets; fogging; Wolbachia treatment; reproduction prevention; sterile insect techniques; use of pyriproxyfen. **Focus on Zika prevention and Aedes aegypti; suggests the right solution is a combination of eliminating as many breeding containers as possible and applying new vector control interventions.**

   The movement of rural Aedes and Culex vectors into urban and peridomestic environments allow effective amplification of transmission cycles in close proximity to humans; incidences are likely to continue increasing until effective vaccines and/or improved control for urban vectors is available.

   Highlights landscape of risk and crisis communications and how social media can be a beneficial tool but can also create challenges if mismanaged. **The three step process spans passive to dynamic use of social media, and provides governments a self-assessment tool to monitor and track progress in the uptake of effective use of social media by emergency services or crisis managers.**

   Describes the household ecology of *Aedes aegypti* and identifies constraints to community-participation activities, and proposes feasible means to overcome the constraints. Suggests that transmission prevention should establish gender-role boundaries; emerge from local views of national political history. **Lack of action to prevent disease can stem not from lack of knowledge of transmission, but from a sense of powerlessness.**

For rapid impact, surveillance and control should be built on existing national structures rather than seeking to establish new or parallel structures; assists with entry into high-context and social communities and facilitate more rapid and effective response to outbreak or threats. **Suggests:** surveillance must be conducted concurrently to vector control; measurement of eggs, larvae, pupae; measurement of targeting adult mosquitoes; advocacy of personal protection measures (with special methods for pregnant women).


To bring about sustainable social and behavioural change, interventions need to be evidence based, **recommends:** 1) defining survey objectives; 2) develop the survey protocol; 3) design questionnaire; 4) implement KAP survey; 5) analyse the data; 6) use the data to drive decision making.


Step-by-step planning and execution. Includes: 1) identification of behavioural objectives; 2) rapid situational market analysis; 3) refinement and statement of communication objectives; 4) designing of strategy; implementation plans and budgets; 5) implement and monitoring; 6) evaluation.


Key elements of strategy include: 1) advocacy, social mobilisation, and legislation; 2) collaboration within the health sector and with other sectors; 3) an integrated, multi-disease control approach, and 4) evidence-based decision-making.


Updated practical information on the clinical management and delivery of clinical services; vector management and the delivery of vector controls services; laboratory diagnosis and diagnostic tests, and; surveillance, emergency preparedness and response.


Short-form COMBI implementation plan. Includes: identifying behavioural objectives; conducting situational market analysis; communication strategy; implementation, monitoring, and evaluation; budgeting.

Targets to reduce mortality and morbidity from at least 50% and 25% respectively by 2020; highlights that this can be achieved by applying existing knowledge: 1) implementing early case detection; 2) reorienting health services; 3) training health personnel along with appropriate referral systems. Recommends implementing: a) outbreak prediction and detection through surveillance; b) promoting the principles of integrated vector management and deploying locally-adopted vector control measures; c) effective behavioural outcomes that augment prevention programmes.


Evaluation of tools, partners, and approach to develop, communicate, and apply disease prevention methods. The application of vector control methods, including source reduction, use of chemical larvicides and adulticides and use of biological control is hindered by: a) weak program capacity; b) absence of well defined indicated and program targets; c) poor understanding of efficacy and cost-effectiveness of control measures. Recommends approaches for: 1) surveillance for planning and response; 2) reducing disease burden; 3) changing behaviours and building partnerships.


Comprises a detailed list of methods and techniques (tools) for promoting social participation throughout the policy process.


Focuses on: 1) preventing and managing medical complications by targeting pregnant women, households, and communities and expanding health systems capacities; 2) integrated mosquito management, sexual and reproductive health counseling and health education; operational objectives include a) detection; b) prevention; c) care and support; d) research; d) coordination among these objectives.

Source.

Televised public service announcement and posters; education programmes; and exhibits at the Children's Museum and their impact was evaluated as a tool for education and disease prevention. **Exposure to elementary school program was associated with slightly lower indices of residential mosquito infestation.** Resulted in high levels of awareness, some behaviour change, and limited change in larval indices; greater emphasis on skills necessary for community members to keep containers free of mosquito larvae would increase effectiveness.