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## SMART FOGGER

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## CHAPTER 1.0 : EXECUTIVE SUMMARY

Dengue fever (DF) causes a lot of suffering to mankind. DF is a mosquito-borne disease that caused by any one of four dengue fever virus serotypes which are DENV-1, DENV-2, DENV-3 and DENV-4 and belonging to the genus *Flavivirus*, family *Flaviviridae*. They are spherical in shape, lipid-enveloped, 40–50-nm single-stranded RNA particles which share structural and pathogenic features but have distinct genetic and serological characteristics. The relationships between the serotypes and transmission efficiency or disease expression are uncertain, but DENV-2 and DENV-3 are likely to contribute the most to disease severity and death.

Dengue is endemic to tropical and subtropical countries and is the arboviral disease that has spread most rapidly among the tropical and subtropical regions of the planet. It also can behave in an epidemic fashion when appropriate conditions exist. The occurrence of conditions that favor endemicity and epidemic, namely the presence of large territories with *Aedes* mosquito breed, sizeable susceptible human groups and the continuous introduction and/or circulation of one or more serotypes are factors responsible for endemic and epidemic. Environmental parameters such as temperature and precipitation affect the demography and behavior of *Aedes*, therefore climate, the disordered increase in the global population, international travel, poverty and lack of sustained program at various levels are assumed contributing factors. However, the specific contribution of each factor is difficult to measure.

Preventing or reducing dengue virus transmission depends entirely in controlling the mosquito vectors or interruption of human–vector contact. WHO promotes the strategic approach known as Integrated Vector Management (IVM) to control mosquito vectors, including those of dengue. One of IVM to control mosquito vectors with thermal fogging machine, however some studies show that the machine can cause ergonomic problem to the handler.



## CHAPTER 2.0: INTRODUCTION

### 2.1 Introduction.

In Malaysia, there are many control measures that can be taken when dengue cases were reported from health facilities. One of the compulsory control to destroy adult mosquitoes is through fogging activity (Kumarasamy, 2006). All the fogging activities were employed by the trained practitioners of Ministry of Health. Fogging activity mainly uses the Thermal-fog machine or Swing-fog machine.



*Figure 1: Health Officer conduct fogging activity*

There were several studied states that health workers are at risk of adverse health to the long-term exposure of pesticide. Even though, their were using full personal protection equipment (PPE), it is not a guarantee. Also, the machine is heavier which give negative side effect to the foggers posture and can lead to musculoskeleton disorders.

Through this observation our company found that this activity needed to be upgrade, using modern machine which can help the communities as well as the workers. We dedicated to find a solution to ease the workers works and effectively eliminate mosquitoes. Thus, our team came up with the idea to create “SMART FOOGER”.



## 2.2 Problem statement.

Frequent exposure of pesticide while conducting fogging have determinant health effect to the foggers and it is proof by past studies. Imagine conducting fogging in high incident rate of dengue cases, which force the same workers to fog every day. Besides, there was serial of complaint received from foggers when our team went to the field conducting research. The foggers complaint that they are tired, also experience pain in certain body parts such as arm, elbow, shoulder and leg after done fogging. The physical strained felt by the workers felt lead to some serious ergonomic problem which are musculoskeletal disorders. To prevent this problem continues affecting the foggers, our company keen on designing and finally invent efficient solution for the arise matter.

## 2.3 Purpose of development.

The purposes of the development are: -

- i. To effectively invent product that can increase efficiency of fogging activity.
- ii. To reduce direct exposure of output pesticide on workers.
- iii. To eliminate the burden that the workers need to carry excessive weight of fogging machine.  
Thus, avoiding ergonomic disorders.

## 2.4 Methodology.

### 2.4.1 Identify Problem

A research was conducted at Beaufort Health District. Where questionnaires were given to the 20 workers and observation on fogging activity will be conducted.

### 2.4.2 Data Collections

Market research was done to estimate the cost of every part in the product thus calculating the overall cost of the final product. Also, suppliers were identified to compare the price and quality of the materials