

# **Health and Environmental Conditions of People Living in the Three Communities of Davao City Where Aerial Spraying of Pesticides is a Common Practice”**

**Barangays Sirib and Dacudao, Calinan District and  
Sitio Coog, Mandug, Buhangin District  
Davao City**

**A Study Conducted by**

**Kalusugan Alang sa Bayan, Inc. (KAABAY)**

**in partnership with**

**Interface Development Interventions (IDIS)**

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# CHAPTER 1

## INTRODUCTION

### Background of the Study

All over the world there is a growing consciousness and movements engaged in advocacy campaigns against the practice of aerial spraying of pesticides in agricultural plantations<sup>1</sup>. Common reasons cited for the campaigns are effects of such practice to human health and the environment. The following are some examples of reports of illnesses associated with exposure to spray chemicals directly or through drift:

*“The Health Department in Putumayo, Colombia published a preliminary health report in three municipalities targeted by spray campaigns from December 22, 2000 to February 2, 2001. According to the report, medical personnel in three local hospitals reported increased visits due to skin problems, gastrointestinal infections, acute respiratory infection, and conjunctivitis following spray<sup>2</sup>.*

*Still in Colombia In August 2001, a commission from a European Human Rights Organization found in a visit to the Province of Santander that: “contrary to official declarations about the harmlessness of glyphosate, we were able to verify skin conditions (rashes and itching caused by the skin drying to the point of cracking) in both children and adults who were exposed directly to spraying while they worked their land or played outside their homes.*

*In Ecuador, communities near the border of Columbia have been reported illnesses after aerial spraying on the Colombian side. In October 2000, the health center in Mataje (population 154), Esmeraldas, treated 44 local residents for skin and eye irritation, vomiting and diarrhea in the aftermath of spraying. The Ecuadorian press also reported in June 2001, that the Marco Vinicio Iza Hospital, in Sucumbios Province, was treating 10 to 15 patients a day for skin, respiratory, and other problems that local doctors attributed to the spraying. In September 2001, a class action suit was filed in U.S. federal court in Washington D.C. against DynCorp Corporation - the private contractor conducting the aerial spraying in Colombia alleging that the spray campaign “caused severe physical and mental damage to the plaintiffs, their children, and other similarly situated lawful residents of Ecuador who have nothing whatever to do with the production of illegal drugs in Colombia.”<sup>3</sup>*

In the Philippines, the Fertilizer and Pesticide Authority (FPA) allow only fungicides to be applied aerially. In Mindanao, aerial spraying is done in contiguous area of export banana plantations, primarily to control the *Sigatoka* disease, considered the most serious pest threat to banana production. The *Sigatoka* disease is caused by

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1 There is on-going campaigns some states in the US like Maine, Alaska, in some countries in Europe and Asia. Please refer to the following websites for more information:  
<http://www.pesticide.net>; <http://www.pesticideinfo.org>

2 The Institute for Science and Interdisciplinary Studies accessed through [www.westernmassafsc.org/colombia/SprayReview.pdf](http://www.westernmassafsc.org/colombia/SprayReview.pdf) on June 17, 2006.

3 Aerial Spraying in Colombia: Health and Environmental Effects, March 19, 2000. Retrieved on Sept.6, 2006 from [www.ama-assn.org](http://www.ama-assn.org).

a fungus that makes banana leaves wither prematurely, thus affecting the development of the banana bunches.

The City of Davao is soon to decide whether to ban or not to ban aerial spraying as a method of pesticide application used in banana plantations which have been operating in the City for more than three decades now. A total of 5,200 hectares of agricultural lands in the city have been planted to bananas primarily for export, and 900 hectares or 17% of these have been applied with pesticides through aerial spraying<sup>4</sup>. Aerial spraying happens in barangays Mandug, Tigatoo, Tamayong, Manuel Guianga, Sirib, Subasta and Dacudao.

Non – government organizations (NGOs), People's Organizations and the affected communities where there is aerial spraying and other groups have been pushing for policy change that favor the banning of the use of toxic chemicals by banana corporations. The issue whether to ban or not to ban aerial spraying has been a public debate between the affected communities/concerned environmentalists and the banana industry. Both sectors have supplied the policy makers with data supporting their position on the issue. Until now the City Council has not decided on the proposed ordinance yet. It is waiting for more local studies to be conducted that will document the effects of aerial spraying to people's health and the environment.

To respond to this need, the Kalusugan Alang sa Bayan (KAABAY, Inc.) a health – focused NGO, and with health as its main concern has decided to conduct this study to look at the health condition of three (3) communities with aerial spraying.

### **Objectives of the Study:**

1. To identify the most common symptoms or complaints, and illnesses of the residents in  
Barangays Sirib, Dacudao and Mandug;
2. To identify the common causes of mortality and morbidity of the residents in the above three communities;
3. To enumerate the symptoms or diseases which may be related to pesticide exposure;
4. To describe the environmental conditions which the residents are exposed to; and
5. To describe the coping behavior of the residents in dealing with aerial spray.

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4 Admitted by PBGEA representatives (Dr. Anaclito Pedrosa of AMS and Ms. Evelyn Fanlo, Pilipino Banana Growers and Exporters Association (PBGEA) executive director) to the Technical Working Group on the Aerial Ordinance Banning Aerial Spraying.

## **Significance of the Study**

The findings of the study is significant to the community residents whose enhanced awareness on the hazards of aerial spraying on their own health and the environment as well, can empower them to take concrete action towards freeing themselves from the ill effects of aerial spraying. The public in general can be also enjoined to rally behind the growing concern for human health and environment locally, while recognizing that the problem of pesticide poisoning and toxicity is in fact a popular global issue. Further, the results of this study is also significant to environmental and health NGOs and advocates, whose untiring fight for the cause of environmentally-sound and friendly technologies have stirred public opinion to become critical of the issue on aerial spraying. Moreover, the findings may be significant to the city legislators who are wanting of local studies on health conditions which may be related to pesticide exposure, and which can shed light to an existing policy implementation, policy review and evaluation as basis for a well-informed and relevant policy decision to address the current issue. Finally, the findings can challenge researchers from the medical, health and academic sectors to conduct case study researches in the near future to probe further on the ill health effects of pesticides on humans and the environment, and even provide measures to help those who are found to be victims of pesticide poisoning.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### **The Nature and Purpose of Pesticides**

Technically, pesticides are chemical mixtures or poisons primarily designed to kill, destroy, prevent, control and/or ward off pests. Although some pesticides are more toxic than others, the purpose of these chemicals is to kill pests, so even low levels of exposure can be toxic to humans<sup>5</sup>. We usually mistake pesticides as chemicals only limited to kill insects but in fact, pesticides can also kill a wide range of living things – plants (herbicides), rats (rodenticides), fungus (fungicides), and nematodes or microscopic worms (nematicides).<sup>6</sup>

International research studies have cited the harmful effects of pesticides used in agricultural plantations which led to poisoning and even death in countries that are exposed to high levels of toxic pesticides. All banned pesticides today were once claimed as safe when they first came out. “Even when pesticides are applied according to label directions by professional, well-trained applicators with proper oversight by authorities, these synthetic chemical products will carry out their mission. They are toxic, they do what toxins do, kill.”<sup>7</sup>

The chemical identities of many of the inert ingredients of pesticides, which make up 80-90% by weight of a pesticide, have not been made known to the public because they are classified as business trade secrets. The US Environment Protection Agency (EPA) has started evaluating these inert ingredients and it has labeled 100 of them “of known or potential toxicological concern”. Some are suspected carcinogens, others have been linked to central nervous system disorders, liver and kidney damage, birth defects, and some short-term health effects.”<sup>8</sup>

Only 10% of pesticides in common use today have been adequately assessed for hazards.<sup>9</sup> About 400 pesticides on the market were registered before being tested if they caused cancer, birth defects or wildlife toxicity<sup>10</sup>. The World Health Organization estimates, 20,000 unintentional deaths happen and at least 25 million worldwide are

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5 Adrianna Quintero-Somaini Mayra Quirindongo Hidden Danger: Environmental Health Threats in the Latino Community Natural Resources Defense Council (NRDC), October 2004.

6 Accredited Safety Dispenser of Fertilizer and Pesticide: A Training Manual. Department of Agriculture, Fertilizer and Pesticide Authority. NIA Complex, EDSA Quezon City.

7 Pesticide Action Network

8 G. Tyler Miller, 1996. Living in the Environment. 9<sup>th</sup> Edition. Wadsworth Publishing Company: USA.

9 According to the According to the US National Research Council as cited by Cc. Cox, 1995. Pesticide Drift. Journal of Pesticide Incident Reform 15 (1):2-7. Accessed on May 18, 2005 at [www.seacc.org](http://www.seacc.org).

10 G. Tyler Miller, Jr. 1996, [info@simplelife.com](mailto:info@simplelife.com) accessed on 11/20/05.

poisoned by pesticides every year or 48 percent per minute. Meanwhile there are 806 kinds of pesticides registered in the Philippines from 79 active ingredients.

The Pilipino Banana Growers and Exporters Association (PBGEA) provided a list of Fertilizer and Pesticide Authority (FPA)-registered pesticides that they use in their plantations to control different kinds of pests and diseases in their banana plantations. Please see the list below:

Brand Name	Active Ingredient	Type of Pesticide
Ascend 50 EC	Fipronil	Insecticide
Bankit 25 ec	Azoxystrobin	Fungicide
Basta 20 sl	Glufosinate	Herbicide
Basudin ec	Diazinon	Insecticide
Baycor 300 ec	Bitertanol	Fungicide
Bumper 25 ec	Propiconazole	Fungicide
Calixin 75 ec	Tridemorph	Fungicide
Daconil	Chlorothalonil	Fungicide
Decis	Deltamethrin	Insecticide
Dithane f 448	Mancozeb	Fungicide
Folicor 430 EC, SC	Tebuconazole	Fungicide
Gesapax	Ametryne	Herbicide
Gramoxone	Paraquat	Herbicide
Lorsban 3 E	Chlorpyrifos	Insecticide
Maneb 80 WP	Maneb	Fungicide
Onecide 15 EC	Fluazifop-p-butyl	Herbicide
Round up	Glyphosate	Herbicide
Sico 250 EC	Difeconazole	Fungicide
Tilt 250 ec	Propiconazole	Fungicide
Topsin m 70 wp	Thiophanate methyl	Fungicide
Vondozeb	Mancozeb	Fungicide

*Taken from the Position Paper of PBGEA and Davao Agricultural Ventures Corporation (DAVCO) ,submitted to the Joint Committee of Environment and Agriculture Dava City Council. February 4, 2004.*

## Fungicides

A fungicide is a specific type of pesticide that controls fungal disease by specifically inhibiting or killing the fungus causing the disease.<sup>11</sup> Environmental exposures to fungicides usually involve relatively low concentrations that may occur over long periods of time. While the human health effects associated with chronic (long-term), low-level pesticide exposures are not yet well understood, a growing body of scientific evidence suggests that environmental pesticide exposures are associated with neurological and reproductive damage, effects on growth and development, birth defects, endocrine disruption, cancer, and other adverse effects.<sup>12</sup>

11 As defined by Margaret T. McGrath of Cornell University in What are Fungicides? The Plant Health Instructor, 2004. The FPA shares the same definition.

12 [www.envirohealthaction.org/upload\\_files/fungicides.pdf](http://www.envirohealthaction.org/upload_files/fungicides.pdf)



Among the different kinds of pesticides, the Fertilizer and Pesticide Authority (FPA) allows only fungicides to be aerially sprayed.

Below is a list of fungicides used by banana plantation companies in Mindanao. The list shows the active ingredients, product brand names, and documented health effect/s:

**Table 1. List of Fungicides Used by Banana Plantations and their Effects**

Active Ingredient	Product/Brand Name	Documented Health Effects <sup>13</sup>
Azoxystrobin	Bankit 250 EC	Highly toxic to fish and aquatic invertebrates; not allowed for use in Canada
Biterthanol	Baycor 300 EC	Possible source of birth defects; not allowed for use in US farms
Propiconazole	Bumper 250 EC	Possible carcinogenic/cancer-causing; contains reproductive toxins
Tridemorph	Calixin 750 EC	Causes birth defects ; not allowed for use in Canada
Chlorotalonil	Daconil 720 F	Carcinogenic; highly toxic to fish and aquatic invertebrates; it builds up in fish
Mancozeb (commonly used in aerial spraying)	Dithane	Carcinogenic; contains reproductive toxins; may cause birth defects; suspected to disrupt endocrine functions, <i>can also cause goiter, hindleg paralysis and retinal degeneration</i> <sup>14</sup>
Maneb	Maneb 80 WP	Causes birth defects; probable source of carcinogens; potential source of reproductive toxins
Diteconazole	Sico 250 EC	No information
Propiconazole	Tilt 250 EC	Possibly carcinogenic; contains reproductive toxins
Mancozeb	Vondozeb Plus 80 WP	Potential causes of birth defects
Thiophanate Methyl	Topsin M 70 WP	Very highly toxic to catfish; toxic to earthworms; causes damage to the thyroid gland, producing hyperthyroidism

*Taken from a Position Paper prepared by the Philippine Banana Growers and Exporters Association, Inc. (PBGEA) and Davao Agricultural Ventures Corporation (DAVCO), submitted to the Joint Committee of Environment and Agriculture. Davao City Council. February 4, 2004.*

## Aerial Spraying and Pesticide Drift

Aerial spraying, also referred to as aerial application or crop dusting, is a type of pesticide application involving the spraying of crops from an agricultural aircraft, usually a small airplane or sometimes a helicopter. The US EPA defined drift as any airborne movement of pesticides off the target site during and after application, including

<sup>13</sup> Culled from different international sources such as USEPA, Extension Toxicology Network, a Pesticide Information Project of Cooperative Extension Offices of Cornell University, Michigan State University, Oregon State University and University of California at Davis, and Pesticide Action Network.

<sup>14</sup> Found in the Material Safety and Data Sheet of dithane by Rohm and Haas Company.

droplets, dust, volatilized or vaporized pesticides, and pesticide-contaminated soil particles. In California between 1998 and 2000, approximately half of all reported pesticide poisonings related to agricultural use occurred because of pesticide drift. There are several well-documented cases of pesticide drift poisonings involving entire neighborhoods and communities in the Central Valley, California where the bulk of the state's agriculture lies.

In virtually every study available and reviewed in the Journal of Pesticide Reform, pesticides were detected far away from the area of application. "A predictable percentage of spray reaches as far as 2 or more miles from the treatment site" according to a 1994 report from the US-EPA Ecological Effects Branch.<sup>15</sup> Only 1-2% of the sprayed chemicals actually reach the target pests, according to a study of US Congress Office of Technology Assessment 1990.<sup>16</sup>

The US National Research Council characterizes the amount of aerial drift as "considerable" - from 5% under optimal-low wind conditions to 60% under more typical conditions".<sup>17</sup> The drift can potentially contaminate open/exposed bodies of water such as river, wetlands and springs where people get drinking water.<sup>18</sup> Pesticides evaporate also from soil, leaves, or surface waters and can move away from the site of application and be re-deposited on non-target vegetation or soil. Certain pesticides like the fungicide tridemorph volatilize up to 90% within one day after application.<sup>19</sup> Pesticides could also be absorbed by clouds and hence contaminate rain.<sup>20</sup>

In California where pesticide illness reporting is more complete than in other states or in other countries like the Philippines, over 350 illnesses and injuries were reported as a result of drift in 1991.<sup>21</sup>

Meanwhile the call to ban aerial spraying of pesticides is a worldwide trend - in Ecuador, Alaska, Maine (USA), Victoria (Canada), New Zealand, India and some countries in Europe<sup>22</sup>. Furthermore, aerial spraying of pesticides is banned in some countries. Total ban exist currently in Denmark, Estonia, Slovenia, with partial bans in Italy, Cyprus, Austria and Belgium.<sup>23</sup>

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15 Cited in [www.seacc.org](http://www.seacc.org), accessed on May 18, 2005.

16 Cited by G. Miller, 1996; [www.seacc.org](http://www.seacc.org), retrieved on May 18, 2005. U.S. Congress Office of Technology Assessment 1990. Beneath the Bottom Line: Agricultural Approaches to Reduce Agrichemical Contamination of Groundwater. Report No. OTA-418. Washington D.C.: U.S. Government Printing Office.

17 [www.seacc.org](http://www.seacc.org), accessed on May 18, 2005.

18 1994 US EPA Ecological Effects Branch and the National Research Council in the US.

19 Majewski M. & P. Capel, 1995. Pesticides in the Atmosphere: distribution, trends and governing factors. Vol.1, Pesticides in the Hydrologic System. Ann Arbor Press Inc. p.118.);

20 According to study by Stephan Muller and Thomas Bucheli of the Swiss Federal Institute for Environmental Science.

21 Cited in [www.seacc.org](http://www.seacc.org), retrieved on May 18, 2005.

22 <http://www.pesticide.net>; [www.pesticideinfo.org](http://www.pesticideinfo.org); [www.pan-europe.info/newsletter/news21](http://www.pan-europe.info/newsletter/news21), accessed August 8, 2006

23 [www.pan-europe.org](http://www.pan-europe.org) accessed August 8, 2006

## Environmental Health Threats

The Natural Resources Defense Council in 2004 conducted a study about the environmental health threats of pesticides in the Latino Community in California and came out with the following findings:

- The effects caused by exposure to pesticides range from skin rashes, burning eyes, and cough to acute illness with nausea, vomiting, diarrhea, sweating, twitching, and difficulty breathing.
- Pesticide exposure can also increase a person's risk of certain types of cancer, such as lymphoma, prostate cancer, and childhood cancers.
- Women who work with pesticides may be at higher risk of experiencing a miscarriage or having a child with a birth defect.
- Maternal occupational exposure to pesticides has also been associated with birth defects, including abnormalities of the lungs, heart, musculoskeletal system, and urogenital system and an increased risk of stillbirth.
- There is also evidence of associations between parental or infant exposures to pesticides and childhood brain tumors, leukemia, non-Hodgkin's lymphoma, sarcoma, and Wilm's tumor.
- One California study found that children with leukemia were three to nine times as likely to have a parent who reported using pesticides in the home or garden during pregnancy or lactation.
- Symptoms of pesticide poisoning such as vertigo, nausea, headaches, neurological disorders, memory loss, insomnia and skin rashes, appeared immediately in the surrounding population and worsened after the first rains.

## Environmental and Occupational Causes of Cancer

The Boston University School of Public Health and Environmental Health Initiative, University of Massachusetts Lowell conducted a review of recent scientific literature on cancer *For the Cancer Working Group of the Collaborative on Health and the Environment*. The result was released in September 2005. The following form part of their findings:.

- The scientific literature reviewed provides substantial evidence of environmental and occupational causes of cancer and fully justifies accelerated efforts to prevent carcinogenic exposures.
- To ignore the scientific evidence is to knowingly permit thousands of unnecessary illnesses and deaths every year.
- There is a strong causal links between environmental and occupational exposures to pesticides and cancers of pesticide exposure and cancers of the brain, Wilms tumor, leukemia, and non-Hodgkin's lymphoma,.
- Numerous studies have demonstrated that **pesticide** exposure is associated with CNS and brain cancer among children and adults. Studies generally found greater risks among children associated with parental exposure to pesticides

prior to conception and during pregnancy than for exposures experienced during childhood.<sup>24</sup>

- Substantial evidence indicates that exposure to **pesticides** increases the risk of leukemia in both adults and children. Over a dozen studies found elevated rates of leukemia among children whose parents were occupationally exposed to pesticides or who used pesticides in their home or garden. Increased risks of childhood leukemia have been documented as a result of parental exposures to pesticides prior to conception, in utero exposures, and direct exposures during childhood.
- In addition to all of the evidence cited under “The State of the Science,” the researchers found many other indications that environmental and occupational exposures are linked to cancers.
- The researchers concluded the paper by recommending that environmental and occupational links to cancer be given serious consideration by individuals and institutions concerned with cancer prevention, particularly those involved in research and public education.<sup>25</sup>

In the Philippines, the number of people with cancer is increasing, in fact it in 2003 it was the 3<sup>rd</sup> leading cause of death and has taken over communicable diseases like tuberculosis and sexually transmitted diseases which have been in the top list also of leading cause of death in the previous years. It is estimated that for every 1,000 Filipinos, 1 has cancer or 0.1%.<sup>26</sup>

### **Local Studies on the effects of Pesticides to Human**

In 1999, toxicologist from the College of Medicine, University of the Philippines, Manila, Dr. Romeo Quijano and daughter Ilang-Ilang published a “Study of Kamukhaan: A Village Poisoned” documented the effects of 19 years of regular ground and aerial spraying on a small community near a banana plantation in Kamukhaan, Davao del Sur. “The initial study and consequent international fact finding missions confirmed significant health impact to both children and adults, as well as to farm animals. Contaminated soil and water were also attributed to the spraying of chemicals. While the major causes of diseases were communicable and typical in poor, rural Filipino communities, some atypical patterns were also reported, which were consistent with independent studies documenting health impacts from pesticide exposure such as the following:

- An unusually significant number of adult males showed signs and symptoms of anemia and possible blood dyscrasias.

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24 Richard Clapp, D.Sc., et al., 2005.

25 Richard Clapp, D.Sc., et al., Environmental and Occupational Causes of Cancer A Review of Recent Scientific Literature. Boston University School of Public Health and Environmental Health Initiative, University of Massachusetts Lowell For the Cancer Working Group of the Collaborative on Health and the Environment September 2005.

26 According to the Department of Health as cited in <http://www.newsflash.org/2003/05/si/si001559.htm>

- A significant number of males and females exhibited signs and symptoms of tremors and palpitations suggestive of endocrine disruption.
- A considerable number of children showed developmental delays including stunting, wasting<sup>27</sup>, delays in the development of secondary sexual characteristics, and mental deficiencies.”<sup>28</sup>
- 11 out of 24 individuals (46%) examined and water samples from hand-pump well (source of drinking water in the community) were positive for ETU – ethylenethiourea (metabolite of the fungicide mancozeb).

Results of the study of Dr. Panganiban, OIC– National Poison Management and Control Center and Dr. Maramba of the College of Medicine, UP Manila together with other researchers showed the following results:

- a) there is a significant difference in the blood ETU levels among workers who are directly exposed, indirectly exposed and non-exposed to ethylene bisdithiocarbamates such as mancozeb;
- b) more exposed workers have abnormal thyroid ultrasound compared to the non-exposed or organic workers; and
- c) there is a significant direct relationship between blood ETU and size of the thyroid nodules meaning, the higher the blood ETU level the bigger the size of thyroid nodules” .<sup>29</sup>

## **Problems in Monitoring Pesticide Poisoning**

In getting the true number of pesticide poisoning, Dr. Carissa Paz C. Dioquino, M.D. a neuro-toxicologist of the National Poison Management and Control Center gave the following limitation/weaknesses in her paper about pesticide poisoning in the Philippines<sup>30</sup>

1. Hospital statistics alone in a developing country like the Philippines are not adequate sources of data about poisoning for many reasons. A great majority of minor incidents are not treated in hospitals or are not issued charts of treatment. The statistics generated therefore are viewed to be an underestimation of the true incidence of poisoning due to pesticides.
2. Incidents of poisoning due to pesticides could not be ascertained by clinical signs alone. To make the cases more valid, laboratory confirmation of pesticide poisoning is needed.

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27 Wasting, in medical circle refers to the process by which a debilitating disease causes muscle and fat tissue to “waste” away; sometimes referred to as “acute malnutrition” because it is believed that episodes of wasting have a short duration, in contrast to stunting which is regarded as chronic malnutrition. (wikipedia.org)

28 [www.pan.org](http://www.pan.org)

29 Panganiban L, Maramba NC, et al. 2004: p 42-45.

30 Pesticide Poisoning in the Philippines Presented a paper presented at the 7<sup>th</sup> GINC Meeting in Tokyo, Japan. April 2001.

3. Lack of knowledge among physicians about pesticide poisoning hampered adequate reporting.
4. The case record form does not lend itself to collection of data on chronic effects of pesticide poisoning which in the years to come may be a more significant health problem.

## CHAPTER III

### CONCEPTUAL FRAMEWORK

The study has two independent variables namely – 1) *health condition*, and 2) *environmental condition* of people living in three communities, and a moderator variable, i.e., *aerial spraying* as a common practice. Under health condition, the main concepts or indicators are the common symptoms or complaints, common illnesses, perceived causes of illness, perceived causes of morbidity and mortality, an enumeration of the symptoms and diseases that may be related to pesticide exposure, and the people's coping behavior in the event of aerial spray. On environmental condition, the main concepts or variables include the source of water, its distance from the banana plantation, ways of waste disposal, reported cases of domestic animals and plants, trees and backyard vegetables exposed to aerial spray.

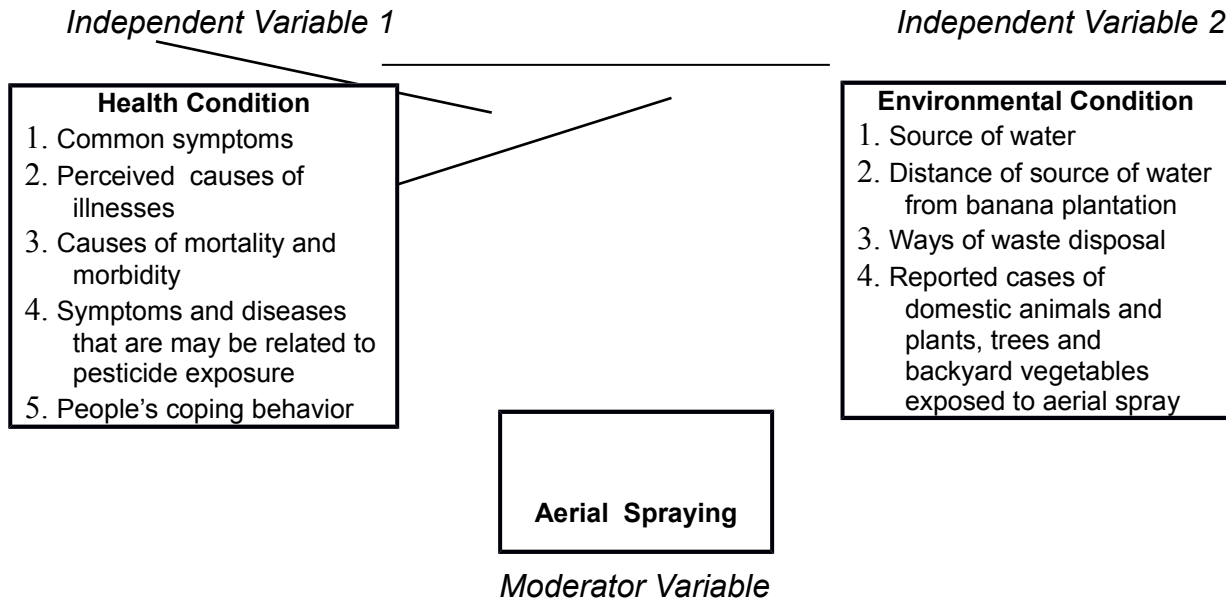


Fig. 1. Conceptual Framework Showing the Relationships Among the Independent Variables and Moderator Variable.

## **CHAPTER IV**

### **METHODOLOGY**

This was a descriptive type of study which used both quantitative - survey method, and qualitative method through focus group discussions, informal interviews, and direct observations to describe the phenomena being investigated as they were actually occurring and experienced by the community (please see appendix B and C for the used survey instruments). Secondary sources of information from the records of the barangay health workers, and barangay nutrition scholars were also helpful in providing statistics.

With the help of an outside research consultant, KAABAY staff did research planning and conceptualized on the problem, objectives, methodology on data collection/processing, and analysis and interpretation of the findings, final report and dissemination of results. The research instruments both survey and the focus group discussion guide were prepared by the entire team and were validated by the consultant. The researchers were divided into three sub-teams, each sub-team was assigned to one community of study. The same instruments and research process were observed in all three areas.

Review of literature related to pesticides and aerial spraying formed part of the methodology of this study to understand more the nature of pesticides being aerially sprayed and their potential effects to people exposed to them.

Non – probability sampling was adopted which used convenience sampling technique for the survey, while purposive sampling was done for the selection of FGD participants through the recommendation of the barangay health workers and other barangay leaders. There was a total of forty-five (45) survey respondents: twelve (12) from Dacudao; twelve (12) from Mandug; and twenty – one (21) from Sirib. FGD participants totaled fifty-six (56): sixteen (16) in Dacudao; sixteen (16) in Sirib; and twenty – four (24) in Mandug.

After the data were collected in all three areas, the sub-teams each did a manual tabulation first, then next a computer-based tabulation using the SPSS software version 12.0.

#### **Scope and Delimitations of the Study**

The study was confined only in the three areas of Barangays Sirib and Dacudao, Calinan District, and Sitio Coog, Mandug, Buhangin District. Due to limitations of time and budget in the conduct of the study, the research team covered only a selected portion of the communities in these barangays but was careful in the selection process to ensure that there would be adequate representative samples of respondents for the survey and focus group discussions to yield accurate and reliable information. The



study was also delimited to the describe the general health conditions of the communities, and was not specifically concerned with making a direct causal relationship between health condition and pesticide exposure, rather it only attempted to enumerate the symptoms or complaints and illnesses which may be similar or closely associated to the symptoms or diseases resulting from exposure to pesticides.

Some respondents did not arrive because they were afraid to give information that they thought might jeopardize their work, or any members of their families who were working in the banana plantations. Some were banana plantation workers, and were hesitant to volunteer information concerning aerial spray, nor diseases or at least symptoms and complaints by people they know who have been exposed to aerial spray. Some women respondents quipped they were afraid to share information because their husbands might go out of job from the plantation. Moreover, during the conduct of the FGD in Mandug, a plantation leadman voluntarily participated in the discussions, which somehow intimidated others from sharing openly about the issue, resulting to underreporting of cases of illnesses and symptoms. The same underreporting was observed in other communities. There were few survivors of cancer diseases (hernia, goiter) that the researchers actually visited in their homes, but they were not willing to submit for photo documentation to preserve their privacy.

## **Operational Definition of Terms**

**Health condition** - refers to the description of the state of health of the three communities where aerial spray is applied in the banana plantations operating in the communities which is expressed in terms of the incidence of common symptoms and complaints, illnesses, causes of illnesses, causes of death, symptoms identified to be similar and associated with the symptoms of diseases that are caused by pesticide exposure, and the coping behavior of the communities in the event of aerial spraying.

**Common symptoms and complaints** - refer to what the people exposed to aerial spraying identified as the most prevalent forms of physical, biological or mental discomforts that are only but symptomatic of a disease, usually recurrent and undiagnosed.

**Illnesses** - are diseases of the residents in these areas as verified by medical practitioners, usually chronic, which even led to death to many of those who were inflicted with the illness.

**Pesticides** - are chemical mixtures or poisons primarily designed to kill, destroy, prevent, control and/or ward off pests. These are proven, according to studies as also hazardous to humans.

**Aerial spraying** - refers to the method of pesticide application used in banana plantations in these communities done by a small airplane.

**Spray drift** - adopting the USEPA definition, refers to the physical movement of a pesticide through the air at the time of application or soon thereafter, to any site other than that intended for application (often referred to as off target).

**Buffer zones** - are zones adjacent to the plantation which are planted with plants or trees to protect communities and water sources such as springs and rivers from getting exposed to the hazards of pesticide drifts. If near rivers buffer zone should be 20 meters, near houses and school should be at least 30 meters.

**Coping behavior** - are the ways by which the people would react to take cover , or other acts they resorted to in order to protect themselves in the event of an aerial spraying in their communities.

**Environment** - refers to the natural physical resources like air, water , soil, living things like plants and animals, especially human beings affected by the hazards of aerial spraying .

## CHAPTER V

### RESULTS

The table below is a summary-information of the respondents and some basic profile of each study site.

**Table 2. Summary Profile of Respondents and other Relevant Information**

Respondents	SIRIB	COOG Mandug	DACUDAO	TOTAL	Mean Average
No of Respondents					
FGD	16	24	16	56	
Survey	21	12	12	45	
Age Grouping (survey respondents)					
13-20	1	0	0	1	
21-30	12	0	0	12	
31-up	8	12	12	<u>32</u>	
				45	
Ave. Age (years)	30.42	50.33	50.33		43.69
Ave. Household size	5.83	5.19	5.08		5.4
Ave. no. of years or residence (years)	19.42	32.08	38.5		23.66
Total Land Area (has.)	1,713	1,243.5	1,250	4,206.5	
Total land area occupied by banana plantation (has.)	1,284.75	350	300 (estimate)	1,934.75	
Name of banana companies operating in each barangay	DFC*, Highland Dole, Lapanday	Lapanday Foods, Inc.	DFC	2,059	
Total households	1,065	225	769		
Total Population	5,324	995	3,590	9,969	
Source of water	spring water	jetmatic pump	DCWD		
Distance of water source from the plantations (meters)	51 to 100	Less than 50	Less than 50		

\* Davao Fruits Corporation (DFC)

#### A. Brief Description of the Study Sites

Barangay Sirib is about 3 to 5 kilometers from Calinan proper. It has a total land area of 1,713 hectares with a population of 5,314 in 22 puroks with 1,106 households<sup>31</sup>. Its main agricultural products are coconut, cacao, durian and lanzones. Banana Plantations started operating in the area as early as 1967. The banana plantations in Sirib are owned by Progressive Highland, Dole, Lapanday, DFC and AMS. Aerial spraying of pesticide was practiced since then until operations stopped in the 80s and resumed again in 2003. But due to consistent clamor of the people to stop aerial spraying, the company shifted to the use of boom and manual spray since last week of June 2006.

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<sup>31</sup> data were obtained from City Planning Office, Barangay Office and validated during FGD.

Meanwhile, Barangay Dacudao is about 3 kilometers from Calinan Poblacion. It has around 1,250 hectares in land area with 12 puroks and a population of about 3,700 in 725 households, with 1,820 males and 1,880 females. Its main agricultural products are coconut, rubber, durian and corn. The Ayala owned Davao Fresh Fruits Corporation (DFFC) is the biggest banana corporation operating in Dacudao since 1970, occupying an estimated land area of 300 hectares. It stopped operation in 1994 and resumed in 2000 under the management of AMS by Soriano Group of Companies.<sup>32</sup>

Sitio Coog, Mandug is about 2 kilometers away from the poblacion with around 900 populations in 187 households. Banana plantations surround the entire barangay since Lapanday Development Corporation started its operations in 1970. Around 350 hectares are occupied by Lapanday.

## **B. Profile of Respondents**

Of the total 45 survey respondents, the eldest is 90 years old male and the youngest is 18 years of age, female. There were 7 of 45, or 15.6 (%) male respondents, while 38, or 84.4 (%) were females, indicating that there were more females than males among the respondents. According to age brackets, only one respondent fell between age 18 years to 20, and 12 respondents were between 21 to 30 years old, all from Sirib; while for ages 31 up, 8 from Sirib, 12 from Dacudao and another 12 from Coog, Mandug were noted. The average age of respondents of Sirib is 30.4 years; 50.3 years both for Coog and Dacudao respondents, mean average age in three areas is 43.69 years, (Please refer to table 2).

In terms of barangay distribution of respondents, 12 (or 26.7 %) came from Sitio Coog, Mandug, another 12 (or 26.7%) came from Dacudao, Calinan and 21 (or 46.7), nearly half of the respondents were from Sirib.

The average household size for Sirib was almost 6; and 5 for both Mandug and Dacudao, with the mean average household size of 5.36. Meanwhile the number of years of residence ranged from a minimum of one year to a maximum of 59 years. The average year of residence for respondents of Sirib was 19.4; 32.08 years for Coog; and highest average number of years of residence was noted in Dacudao with 38.5 years. The mean average year of residence for the 3 communities was computed at 23.66 years.

In terms of educational education, majority of the respondents (91 %) have at least reached secondary level and out of the 91%, 26.6% have at least reached college and nearly half or 42.2 % were high school graduates.

Among the total 138 children of the 45 respondents who live close to plantations, 74 or 53.6 % were girls, and 64 or 46.4 % boys, which indicated that more than half of

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32 data were obtained from City Planning Office, Barangay Office and validated during FGD.

the children population are girls. Among boy-children, 40.6% were between 0 – 10 years old, and 35.9% were female children of the same age bracket, which suggests that more boy-children between 0-10 years old are exposed to pesticides than girl-children are. Moreover, there were 32.8% of the boy-children and 37.8% of the girl-children between 11-20 years old. On the other hand, there were 17.2 % between age 21 to 30 years old , while no females were noted in this age bracket, which suggests that no women at this reproductive age are vulnerable. Finally, only 6.3 % are 31- to 40 years old, and 3.2% are above 41 years old.

Meanwhile, about one – third of the respondents (33.%) were housewives, while 42. % of them were farmers, 20% of which till their own lands. The remaining 25% were barangay health workers.

From a total of 4,206.5 hectares of land in all three areas, nearly half or 46 % (1,934.75 hectares) have been used by banana plantations. In Sirib alone, three-fourths of its total land area has been occupied by export-banana corporations. While roughly 28 and 24 % of the lands in Coog and Dacudao respectively, have been devoted to the banana industry. The total population in all three communities is 9,969 with total household population of 2,059<sup>33</sup>.

### C. Common Symptoms and Complaints

The over-all ranking of the top five common symptoms and complaints of the respondents in three areas were: *first* – cough; *second* – fever; *third* - skin rashes; *fourth* – diarrhea and epigastric pains; and *fifth* – colds. The individual ranking of the communities showed more or less similar results. Cough and fever, followed by colds and skin rashes were the most frequently cited symptoms and complaints cited by Sirib respondents. While in Coog, Mandug - fever and diarrhea / epigastric pains ranked *first*; *followed by* skin rashes, cough then colds. Finally in Dacudao, the symptoms and complaints came in the following rank order: cough, fever, colds and skin rashes, and diarrhea. Please refer to *table 3 below*.

**Table 3. Top Five Common Symptoms and Complaints in Three Areas**

Common Symptoms and Complaints	SIRIB	COOG, MANDUG	DACUDAO	Overall Rank
	Rank	Rank	Rank	
<b>Colds</b>	3	4	3	<b>5<sup>th</sup></b>
<b>Cough</b>	1	3	1	<b>1<sup>st</sup></b>
<b>Fever</b>	2	1	2	<b>2<sup>nd</sup></b>
<b>Diarrhea and Epigastric Pains</b>	5	1	4	<b>4<sup>th</sup></b>
<b>Skin Rashes</b>	4	2	3	<b>3<sup>rd</sup></b>
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	

Source: Individual Survey Interviews and validated through Focus Group Discussion

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33 Barangay profile data

## D. Common Illnesses

The respondents were asked to identify the most common illnesses they observed in their communities from 1970 to the present based on their personal knowledge or awareness. In Barangay Sirib, tuberculosis ranked as the most common with 6 cases. This was followed by hypertension, then cancer. In Coog, Mandug, cancer ranked first with 12 cases followed by hypertension and goiter, then cerebral palsy and myoma. Across all three communities, only Coog, Mandug identified cases of cerebral palsy. While in Dacudao, tuberculosis and cancer topped the list with both having 8 cases each followed by hypertension and measles then goiter and asthma. On the over-all, cancer and hypertension ranked first, followed by tuberculosis, measles, goiter, cerebral palsy, myoma, and asthma. (Please see *table below*)

**Table 4. Identified Top Five Common Illnesses in Three Areas**

Common Illnesses	SIRIB		COOG, MANDUG		DACUDAO		Overall Rank	
	Freq.	Rank	Freq.	Rank	Freq.	Rank	Freq	Rank
Tuberculosis	6	1 <sup>st</sup>	2		8	1 <sup>st</sup>	16	2
Cancer	2	3 <sup>rd</sup>	12	1 <sup>st</sup>	8	1 <sup>st</sup>	22	1
Measles	1	4 <sup>th</sup>	5	5 <sup>th</sup>	4	3 <sup>rd</sup>	10	3
Hypertension	4	2 <sup>nd</sup>	11	2 <sup>nd</sup>	7	2 <sup>nd</sup>	22	1
Goiter			8	3 <sup>rd</sup>	2	4 <sup>th</sup>	10	3
Cerebral Palsy			7	4 <sup>th</sup>			7	4
Myoma			7	4 <sup>th</sup>			7	5
Asthma			4		2	4 <sup>th</sup>	6	4
<b>Total</b>	<b>13</b>		<b>56</b>		<b>31</b>		<b>100</b>	

( Note: The researchers validated the above information of cases of cancer, goiter and cerebral palsy with the BHW, BNS and barangay midwife of Coog)

Table 5 below shows the most frequently cited leading causes of illnesses common in three communities. Respondents from the 3 communities - Sirib, Mandug, and Dacudao gave similar responses citing aerial spraying as the top cause. Climate change ranked second most frequently cited in two communities, Coog and Dacudao.

**Table 5. Most Frequently Cited as General Leading Causes of Illnesses in Three Communities**

Causes of Illnesses	SIRIB	COOG, MANDUG	DACUDAO
1. Aerial spray from the banana plantation	1	1	1
2. Climate change		2	2
3. Water	2		
4. Smoking	3		3
5. Mosquito bites		3	

Source: Individual Interviews and Focus Group Discussions

Moreover, focus group discussions explored on the leading causes of illnesses by age groups, and results revealed that among children between age 0 – 12, chemical aerial spray was the most frequently cited by respondents in Sirib and Coog, and while

poultry was the most frequently cited in Dacudao, it is still significant to note that chemical aerial spray ranked second in Dacudao. (please refer to table 6 below).

Among the youth (13-20 years old), again chemical aerial spray was the most frequently mentioned leading cause of illness in Coog and Dacudao, while in Sirib it was climate change. Water was also prominently mentioned in both Sirib and Coog.

Among adults (21 years up), results were consistent as the majority of them pointed out chemical aerial spray as leading cause of illnesses, followed by climate change and water.

**Table 6. Most Frequently Cited Leading Causes of Illnesses by Age Group in Three Areas**

AGE GROUP	SIRIB	COOG, MANDUG	DACUDAO
0 – 12 (children)	1. <b>Chemical aerial spray</b> 2. Climate Change 3. Lack of Vitamins	1. <b>Chemical aerial spray</b> 2. Water 3. Junk foods	1. Poultry (odor) 2. <b>Chemical aerial spray</b> 3. Climate Change
13 – 20 (youth)	1. Climate Change 2. Mosquito Bites 3. Water	1. <b>Chemical aerial spray</b> 2. Water 3. Junk foods	1. <b>Chemical aerial spray</b> 2. Junk foods 3. Dust
21 – up (adult)	1. <b>Chemical aerial spray</b> 2. Climate Change 3. Water	1. <b>Chemical aerial spray</b> 2. Water 3. <i>Pasar sa Kaon</i> “Pasma”	1. Water 2. Climate Change 3. <b>Chemical aerial spray</b>

Source: Individual Interviews and Focus Group Discussions

## E. Leading Causes of Death

From the focus group discussions, most of the participants frequently mentioned cancer, hypertension, tuberculosis, dengue and goiter as the common leading causes of death in their communities. Their ranking though varied from one community to another. In Sirib for example, the participants claimed tuberculosis as the number one leading cause, while in Coog and Dacudao both pointed to cancer as the number cause of death. Hypertension was second in both Sirib and Coog, and tuberculosis in Dacudao. In Sirib, dengue fever ranked third, while goiter and hypertension in Coog and Dacudao, respectively (Please see Table 7 below).

**Table 7. Most Frequently Cited Leading Causes of Death in Three Areas**

Causes of Death	SIRIB	COOG, MANDUG	DACUDAO
1. Cancer		1	1
2. Hypertension	2	2	3
3. Tuberculosis	1		2
4. Dengue fever	3		
5. Goiter		3	

Source: Focus Group Discussions

Table 8 below summarizes the cases of cancer incidence as mentioned during the focus group discussions in three communities. The researchers were able to validate these information with reliable health service workers in the barangays, i.e., BHW, BNS and midwife. A total of 22 cases were recorded: 2 cases from Sirib; 8 cases from Dacudao. And the highest cancer report was noted in Sitio Coog, Mandug with 12 cases..

**Table 8. Reported Cases of Cancer in Three Areas**

Cases Of Cancer	Sirib	Coog	Dacudao	Total F	Rank
Liver		1		1	
Colon		1		1	
Brain		2		2	3 <sup>rd</sup>
Breast	1	3		4	2 <sup>nd</sup>
Uterine		2		2	3 <sup>rd</sup>
Leukemia		1		1	
Bone		1	1	2	3 <sup>rd</sup>
Throat		1		1	
Prostate	1		5	6	1 <sup>st</sup>
Thyroid			1	1	
Lung			1	1	
<b>TOTAL</b>	<b>2</b>	<b>12</b>	<b>8</b>	<b>22</b>	

Source: Focus Group Discussion results.

## **F. Symptoms and Diseases which may be related to pesticide exposure:**

Based on the data gathered from the community and the list of pesticides being used by banana companies and the review of literature on the toxicity of pesticides (Please Refer to Chapter 2), this study was able to identify the following cases as similar to if not identical to the documented effects of exposure to pesticide from other studies reviewed:

**Cancer** (a total of 22 cases in three areas - breast, prostate, throat, liver, colon, lungs, brain, etc.) may be associated with single and or combined effects of pesticides such as: propiconazole, chlorotalonil, mancozeb, maneb, propiconazole.

**Birth Defects** (physical and mental abnormalities like, cerebral palsy- 7 cases) may be associated with single and or the combined effects of bithertanol, tridemorph, maneb and mancozeb.

**Reproductive Diseases** (myoma, 7 cases - uterine cancer, 2 cases; prostate cancer, 6 cases) may also be related to propiconazole and maneb.

**Thyroid** (goiter, 10 cases- kidney problems, uncertain number in Dacudao) may be related to pesticides mancozeb and maneb which are carcinogenic, and are converted into ethylene thiourea (ETU) which causes thyroid abnormalities by altering levels of thyroid hormones, it can cause kidney problems too.



**Contact Dermatitis** (skin rashes/allergies, 45 cases or 100% of the respondents experienced skin rashes). **Diarrhea** (45 cases), **and respiratory diseases** (cough, 69 cases; colds, 43 cases) may be associated to exposure to pesticides in general.

**Fever** (65 cases), **hypertension, heart diseases, fever, convulsions/involuntary movement, and vomiting** (although uncertain in number) were also common occurrence in these communities as claimed by the FGD participants.

The above findings conform to the findings of the studies of Dr. Romeo Quijano, and the International Fact-finding Mission to Kamukhaan led by Dr. Hernandez and company. The preceding symptoms and diseases are similar, if not identical to the ones identified by experts who are themselves toxicologists, fall within the spectrum of symptoms of pesticide exposure and poisoning.

## **G. Environmental Conditions**

Majority of the respondents live within the first 50 to 100 meters from the plantation. As announced in the signboards, aerial spraying followed a weekly schedule, but according to the respondents there were times that aerial spraying were done even outside of the announced schedule, which rendered most of them unprepared.

Survey results showed that 32 of the 45 respondents, or 74.4% affirmed that pesticide showers from aerial spray reached their houses, which seeped through their roofs that bore holes, as well as through their doors and windows even if they closed them. This shows therefore that even if the people had to scamper and hide themselves under cover inside their own houses, they still were not spared from toxic showers. Further, 62% of the respondents revealed that they were directly hit by pesticide drift while walking in the community. This has been the case for many years now, since aerial spraying started.

## **Water Sources**

In Sirib, the main source of water is spring water but many still use rainwater for household chores such as cooking and washing dishes. While jetmatic pump in Coog and the Davao City Water District for Dacudao. The distance of water source from banana plantations was just about 100 meters for most of the respondents in Sirib, while in Coog, the distance was even lesser, i.e., below 50 meters from banana plantation. However, in Dacudao, most of the respondents availed of the tap water serviced by DCWD. This findings showed the close proximity of people's sources of water to banana plantations. Twenty-three or 54.8 (%) affirmed that pesticide drift reached their sources of water.

In terms of distribution , 18 or 43 % of the families across all surveyed communities, used spring water, 10 or 23.8 % used jet pump, while 8 or 19 % are

connected to DCWD lines, and 5, or 11.9 % use open deep well. Combining the nearly half (43 %) of the families surveyed across all three communities used spring water, with nearly one-fourth (23.8 %) who used jet pump, and 11.9 % who use deep well, a total of 78.7 % would indicate that more than three-fourths of the respondents are dependent on getting water from open sources including jet pump users since pesticide residues will surely go down as far as the water level sooner or later in time.

As to the distance of water source to the plantation, 20 or 44.4% cited less than 50 meter - distance, while ten or 22.2 % cited 51 to 100 meters, and the farthest was between 401 – 501 meters by 7 respondents or 15.6 %.

Highly visible in the communities were trees and plants which as a result of aerial spraying, the leaves turned yellowish and withered like coconuts and fruit trees; while vegetables like malonggay, alugbate, tinangkong, etc. developed whitish spots making the vegetables inedible. But from focus group discussions it was shared that many of the respondents would still use sprayed vegetables for food, for they had no choice. They claimed that they would subject the backyard vegetables to several washing before cooking

From the focus group discussions, there were consistent reports of deaths in domestic animals like carabaos and cows after these grazed on sprayed grasses, including poultry after feeding on backyard contaminated with chemical spray. Hogs were reported to have developed scouring after aerial spraying, which led to mortality of several of their domestic animals.

#### **H. Description of the coping behavior of residents in dealing with aerial spray**

The sound or sight of the agricultural plane bringing the aerial spray in these areas sent the respondents and majority of the residents to scamper for cover in their own houses, fearing they would be hit by the toxic spray as it would give them allergies, or to get rid of its strong bad smell. In Sirib, majority of them mentioned that they would close their house – doors and windows immediately, and would go out only after the bad smell was gone. Others kept their children including their hanged clothes to safety from the aerial spray by shutting their windows; while some resorted to removing their gutters in order not to catch the toxic pesticides. In Mandug, the most frequent responses were the same with those in Sirib, except that there were those who complained to the plantation management, but their complaint only fell on deaf ears. On the other hand, there were few who said they did not mind anymore the aerial spraying, after all they had been so used to it. In Visayan dialect, these were their common responses:

*“Manirado sa balay, unya ra mi mogawas og wala nay baho sa kemikal”*

*“Panirado sa bintana, hipuson ang mga hinayhay og mga bata sulod sa balay”*

*“Tago jud mi”*

*“Tangtangon and sandayong”*

*“Siraduan and bintana og pultahan”*

*“Molikay kay makaallergy”*

*“Wala lang, ... Naanad na mi...”*

In Dacudao, most of the responses were similar to those in Sirib, except that while they closed their houses, doors and windows alike, still they were not spared from the toxic spray because their houses had holes and made of light materials where pesticide drift seeped through - *"Magsira apan buslot ang balay, lusot gihapon ang hangin"*, *"Makasulod gihapon maskin sirad-an ang bintana"*. There were also those who scampered themselves to hide in order to get rid from aerial spray while riding on a motor vehicle. *"Magtago aron dili maigo, kung nagsakay mi og motor"*. Others mentioned that even during aerial spraying there were still those people working in the plantations who despite their long-sleeved clothes on, undeniably got sprayed as well. *"Mogamit og taas nga sinina pero naay mga tawo sa ilalom sa sagingan panahon sa pag-spray."*

Still others found the effects of aerial spraying a burden to the family, as they have to wash hanged clothes again after these got sprayed. *"Ang mga nilabhan nga nahayhay na, usbon og laba. Dugang sa trabaho."* Some of the housewives interviewed, said that during aerial spraying they leave the house and whatever work they still have to do and bring their children to their neighbors/relatives' house located farther from the plantation in order not to smell the pungent odor of chemicals which causes nausea and headache.

The above responses of the residents in the three areas point to some commonalities which describe their coping behavior in dealing with aerial spray. It is noted that a quick and natural way of coping by the residents is to hide themselves to safety inside their houses, closing their doors and windows to keep them from air drift, yet there seems to be no real way to escape from it as their houses are not made of concrete and other air pollutant-free materials that could completely shield them from the contaminated air. The residents are not provided with air masks to prevent them from inhaling toxic air, or body cover so that even when outside their homes, they could be protected from the hazards of chemical spray. More so, the spraying schedule is not strictly followed, thus leaving them unprepared which increases their exposure to these toxic showers.

## CHAPTER VI

### DISCUSSIONS

#### Risk Related to Pesticide Exposure

The respondents' average length of residency (24 years) in the area implies that the residents had been long exposed to pesticides being used in aerial spraying. Twenty-four years is quite a long time already of continuous exposure to pesticides. This further implies their increased risk to the toxic effects of pesticides (**risk is computed by experts as = (toxicity) X (exposure)**). Exposure refers to amount of pesticides available for absorption and is affected by the frequency people are subjected to pesticide or exposed to it whether directly hit by drift, or indirectly by using plants and water with pesticide residue - water that is used for drinking, cooking, washing dishes or for bathing. Exposure could also be through inhaling pungent odor of pesticides every time plantations spray. It was learned from the 3 communities that aerial spraying is usually done at least twice a month. Toxicity is the ability of the substance to cause injury to a biologic agent and is a function of the nature of materials being sprayed.

Given the close proximity (50 -100 m) of many houses to the plantations, the frequency of aerial spraying (at least 2x a month) and their length of residency (24 years) would only mean one thing - the people have been exposed to pesticides in varying degrees, especially the housewives because they are just at home most of the time during aerial spraying without personal protective equipment (PPE) unlike the workers who were provided with PPE. However, only workers directly handling pesticides are given PPE.

#### Pesticide Drift on Water Resources and Health Effects

As mentioned earlier drift can contaminate open/exposed bodies of water such as river, wetlands, and springs. These open bodies of water are non-targets at the event of aerial spraying, but are surely contaminated as the aerial drift in fact travels to as far as 3 kilometers from the treatment site<sup>34</sup>. This makes the water source of almost 70% of the respondents who are dependent on getting water from open sources vulnerable to chemical-contamination from aerial spray. Respondents linked this to the incidence of diarrhea and gastro-epigastric pains that many complained about.

Thus chemical aerial spray and water were consistently mentioned as two of the leading causes of illnesses by the majority of the respondents from the three areas. Specifically, regardless of age group in Mandug, chemical spray was the consistent top answer perceived as the leading cause of illness by the respondents, based on their experience.

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34 Can be accessed at [www.seacc.org](http://www.seacc.org)

It can be noted that skin rashes is always on the top 5 common symptoms and complaints. People notice the appearance of skin rashes that are very itchy after being hit by pesticide drift. It is the most common acute effect of pesticide exposure.

The top common symptoms and complaints identified in this study are similar to the results of the study of a toxicologist from UP-Manila College of Medicine, Dr. Romeo Quijano on a small village in Kamukhaan, Davao del Sur, as well as that of the international medical mission team that followed after the study of Dr. Quijano. The same symptoms such as cough, colds, fever diarrhea and skin rashes were a common occurrence also in Kamukhaan, a village adjacent to a banana plantation owned by Lapanday, the same company that operates the banana plantation in Mandug.

Two in the top 5 leading causes of mortality namely; cancer and goiter can be caused by multiple factors one of which is fungicide. This is supported by international studies as potential effects of exposure to pesticides, particularly the fungicides mancozeb, maneb, chlorothalonil and propiconazole, (as discussed in chapter 2). It is also clear during the interviews that people lack information about the toxicological effects of both the active and inert ingredients used in pesticides where some are carcinogenic and are therefore not aware of chronic toxicity.<sup>35</sup>

The 12 cases of cancer in Coog (all were still alive in 1998) is unusually high for a place with only less than a thousand population because the Department of Health estimate for the Philippines is that only one for every 1000 Filipinos is expected to develop cancer given the prevention program of the government.<sup>36</sup> Among the 12, only 3 are alive today. The 3 cases of cancer today over almost a thousand population is still three times the DOH estimate of cancer incidence in the country. (Appendix B shows the list of these cancer patients) . Even the 8 cases over a population of 3,590 in Dacudao is still high, this is twice the DOH rate.

While this phenomenon cannot be entirely attributed to aerial spraying as one major cause, still it cannot negate the fact that the people had been exposed to some carcinogenic chemicals used in aerial spraying for a long time as they lived in and within the plantation areas. This is supported by the testimonies of the 62% of the respondents who claimed they experienced actual pesticide showers during aerial spraying.

While the human health effects associated with chronic (long-term), low-level pesticide exposures are not yet well understood, a growing body of scientific evidence suggests that environmental pesticide exposures are associated with neurological and reproductive damage, effects on growth and development, birth defects, endocrine disruption, cancer, and other adverse effects.<sup>37</sup>

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35 According to US EPA Office of the Inspector General, , of the 1,820 inert ingredients currently in use, the toxicity of approximately 1,350 remains unknown

36 According to studies by the Department of Health, can be accessed at [www.newsfash.org/2003/05/si/si001559.htm](http://www.newsfash.org/2003/05/si/si001559.htm)

37 [www.envirohealthaction.org/upload files fungicides.pdf](http://www.envirohealthaction.org/upload_files fungicides.pdf)

This finding further implies that people are highly at risk considering that they do not have any protective masks nor body covers to wear in times of spray. And since according to studies the effects of prolonged exposure to the toxic pesticides are not immediate but rather on a long-term, it can be said therefore that the longer the exposure the higher the risks on life and health the people are faced.

These findings point to the fact that all of them live in or within the adjacent areas of the banana plantation. According to a 1994 report from the US-EPA a “predictable percentage of spray will transport potentially as far as 2 or more miles from the treatment site”, while “only 1-2 percent of the sprayed chemicals actually reach the target pests”.<sup>38</sup> These international studies become the basis of the researchers’ interpretation on above findings that the nearer the distance of people’s residence to the plantation, the more they are exposed to pesticides, and more likely the higher the risks for them to develop symptoms and diseases commonly reported as caused by pesticides.

. Oral intake of food exposed to pesticides may not be highly toxic, even in acute exposures, but studies support that chronic toxicity or delayed effects can occur months or years after exposure, and may develop from low levels of exposure over a long period of time. Three major chronic effects associated with pesticides are cancer, neurological damage, and adverse effects on the reproductive system.

The top 3 (aerial spraying, climate change and water) commonly cited leading causes of illnesses in 3 communities are interrelated. Aerial spraying no doubt contaminates air and water. Studies have shown that drift from aerial spraying could reach as far as 3.2 km or even more and the drift varies from about 5% (under optimal-low wind conditions) to 60% (under more typical conditions). Spray drifts also contaminate the roofs of houses within and adjacent to plantation areas thereby endangering more the health of those still dependent on rainwater. )

These findings on the hazardous effects of pesticide exposure on animals, plants and vegetation as well are consistent with previous international and local studies such that of Dr. Romeo Quijano and the subsequent study done by Drs. Rodney Fernandez, Gene Alzona Nisperos, and Pamela Claveria on the “Health Effects of Pesticides on the Village of Kamukhaan” in Digos, Davao del Sur, which documented cases of suspected pesticide poisoning not just on humans, but also on animals, and vegetation.

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38 as cited by G. Miller, 1996 and the U.S. Congress Office of Technology Assessment 1990

## **CHAPTER VII**

### **CONCLUSIONS AND RECOMMENDATIONS**

The study concludes that the residents in the three barangays of Sirib, Dacudao and Mandug have been exposed to toxic chemicals, specifically fungicides for many years now through aerial spraying by the surrounding banana plantations. According to several international research studies, the use of aerial spraying exposes humans to high levels of pesticides that are not only causing poisoning and sickness, but even death due to chronic exposure. Its hazardous effects do not just harm and kill humans after long years of exposure, but also to animals and vegetation. The documented unusually high incidence of cancer, goiter, respiratory, gastro-intestinal, skin rashes, mental and physical defects (i.e., cerebral palsy) and other diseases in the three (3) communities being studied calls for an in depth study or investigation. Since these diseases resemble the international and local documented effects of pesticides to people. It is more likely that the major factor that cause them is people's long-term exposure to pesticides

Based on these findings therefore, the researchers strongly recommend for the Sangguniang Panlungsod, Government and Non-Government Organizations, other concerned sectors - academe, media and the public in general:

1. To engage in massive education and information dissemination to all affected communities within banana plantations, nearby communities, the schools, and the public in general on the toxicological effects of aerial spraying on human health and the environment.
2. There should be an active collaborative efforts between and among the government, the banana plantation corporations, NGOs, and other stakeholders to exhaust all means possible to shift to safe alternative method of controlling pests that is environmentally-sound like organic pesticides that are less harmful to humans, animals, plants and water resources.
3. To conduct immediate medical investigation by medical practitioners, academic institutions and public and private sectors, of those identified cases in this study as bases for interventional measures, and make proper referrals and other forms medical assistance.
4. For agricultural professionals or the academe to comprehensively look at the complaints of farmers adjacent or near the plantations regarding their crops, particularly, coconuts that are damaged by the pesticides used by plantations.

@ @ @ @ @ @ @ @



## Appendix A - PHOTO DOCUMENTATION



A house in Dacudao, surrounded by banana plantation gets drenched with pesticides every time there 's aerial spraying schedule which is usually 2x-3x a month.





The community warning sign in Dacudao, informing passers by of the schedule of aerial spray. But some complained that sometimes it is not followed and they sprayed not according to the date stipulated on their announcement board sometimes spraying continues beyond the scheduled time.

The community warning sign in Mandug, informing passers by of the schedule of aerial spray. But some complained that sometimes it is not followed and they sprayed not according to the date stipulated on their announcement board, sometimes spraying continues beyond the scheduled time.







The damaged coconut trees near banana plantations in Dacudao

The damaged coconut trees adjacent to a banana plantation in Sirib





The lorsban (organophosphate insecticide)-laced plastics used to wrap Cavendish bananas are just dumped openly on this site in Mandug.







Another house surrounded by Cavendish bananas in Dacudao

## **Appendix B- Profile of Cancer Cases in Sitio Coog, Mandug, Buhangin District**

### **Cases of Dead Cancer Patients :**

1. RUFINO REDOLAS - cancer of the liver
  - died year 2000, 60 years old, Male
  - LAPANDAY worker for 16 years as harvester, mixer and stem pruning.
  - was confined at DDH/SPH.
2. ELSA ENDRINA - intestinal colon cancer, 48 years old
  - packer for 20 years, died year 2003
  - was confined at CHDC
3. BONIFACIO LUNOY - 48 years old, died last March 26, 2005
  - cancer of the brain
  - 16 years worked as cable checker and field work.
  - was confined at Davao Medical Center (DMC).
4. VICTORIA CUENZA - breast cancer, 50 years old
  - died year 2005
  - worked in the banana plantation for 2 years.
5. DOMINADOR NORETE - 45 years old, died year 1999
  - 29 years worked in the plantation as packer
  - brain cancer ( had complications, described to have had lymphnodes in the neck
6. CITA DEBUTA - 45 years old, died year 1998
  - housewife,
  - myoma – ovary
  - uterine CA
7. JESUS GALON - 29 years old, died year 1979
  - non plantation worker
  - leukemia
8. THELMA AGOL - 52 years old, died year 2005
  - worker sa packing house
  - cancer of the bone
9. EUPHEMIA SAZ - 50 years old., died year 2000
  - banana plantation worker since the start of plantation as researcher – studies and monitors diseases of bananas
  - breast cancer

**Cases of Alive Cancer Patients :**

10. EDNA CUADAQUIBEL - cancer of the throat
11. DAISY ILLORANDO - operated breast cyst
12. RITA GULANE - operated myoma stage 3



**KALUSUGAN ALANG SA BAYAN, INC.**

**KINATIBUK-ANG IMPORMASYON:**

Asa nagtrabaho: Kaugalingong umahan \_\_\_\_\_  
Plantasyon sa saging \_\_\_\_\_  
Opisina \_\_\_\_\_  
(Uban pa (Pls. specify)

[illegible]

Estado sa Eskwela: O.G – on-going  
D - dropped  
c - completed

Byu- Byudo

**KASAYSAYANG PANGLAWAS SA LUGAR:**

1. Unsa ang mga balatian nga nasinati sa mga lumulopyo dinhi sa inyong lugar sa milabay nga mga tuig?  
Unsa ang mga nag-unang hinungdan niini?

1.1 1970 - 1980 1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

1.2 1981 - 1990 1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

1.3 1991 - 2000 1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

1.4 2001 sa kasamtangan 1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

2. Aduna ba kamoy nahibaloan nga nagkasakit og (names are asked so it's easy to interview them also for more info on how they got the disease...)

- a) Cancer \_\_\_\_ pila \_\_\_\_ kinsa kini sila \_\_\_\_\_
- b) Tumor o mga bukol \_\_\_\_ pila \_\_\_\_ kinsa kini sila \_\_\_\_\_
- c) Patay daan ang bata pag anak \_\_\_\_ pila \_\_\_\_ kinsa kini sila \_\_\_\_\_
- d) Physical abnormalities sa mga bag-ong anak \_\_\_\_ pila \_\_\_\_ kinsa kini sila \_\_\_\_\_
- e) parkinson's disease \_\_\_\_ pila \_\_\_\_ kinsa kini sila \_\_\_\_\_

**PANGLAWAS SULOD SA PAMILYA:**

1. Mga tulo (3) ka nag-unang sakit nga nasinati sa mga sakop sa panimalay sa milabay nga 10 ka tuig (1996-2006), mga sintomas, ug gituhonang hinungdan niini:

<u>EDAD</u>	<u>SAKIT (3)</u>	<u>SINTOMAS</u>	<u>GITUHONAG HINUNG DAN</u>
0 -5	babaye:		
	lalaki		
6 – 12	babaye		
	lalaki		
13 – 17	babaye		
	lalaki		
18 – 25	babaye		
	lalaki		
26 – 45	babaye		
	lalaki		

46 - ↑ babye

lalagi

2. Aduna bay masakiton nga sakop sa pamilya sa kasamtangan? Oo Wala Kung Oo, unsang matang sa sakit?

Pila na ka tuig nga giantos ang maong sakit? Nagbalik balik ba ang sintomas sa maong sakit? Kapila sa usa ka bulan?

3. Nagpakonsulta ba sa doktor ang masakiton? Oo, wala

Kung Oo, asa man? Doktor pribado hilot BHW

Doktor gobyerno Albularyo Uban pa

(specify)

Kung wala, ngano man?

KAHIMATNGON SA KATILINGBAN ONG PANGLAWAS:

1. Mga nag-unang tulo (3) ka mga sakit nga nasinati sa katilingban, mga sintomas, ug gituhoang hinungdan:

EDAD		SAKIT (3)	SINTOMAS	GITUHOANG HINUNGDAN
bata 0 – 5	babaye			
	lalaki			
school Age 6 – 12	babaye			
	lalaki			
high shool age 12 - 17	babaye			
	lalaki			

young adults 18 - 25	babaye			
	lalaki			
middle age 26 – 45	babaye			
	lalaki			
Old age 46 pataas	babaye			
	lalaki			

Note: Segregate data for male and female

**KAHIMTANG SA BAKUNA**

- Aduna bay bakuna nga nadawat ang inyong sakop sa pamilya? Kung oo, unsang klase nga bakuna?

EDAD	SEX	KLASE SA BAKUNA						
		BCG	DPT	Hepa B	Oral Polio	Anti measles	Tetanus toxoid	Anti Tetanus
Bata: 0 – 5	babae							
	lalaki							
6 - 12	babae							
	lalaki							
Batan-on 13 – 17	babae							
	lalaki							
Hamtong 18	babae							
	lalaki							

- Aduna bay sakop sa panimalay nga namatay sa milabay nga napulo sa tuig? Oo \_\_\_\_\_ Wala \_\_\_\_\_

Gituhoang kasagarang hinungdan sa kamatayon.

**EDAD**

**BABAYE**

**LALAKI**

Bata	0 – 5	_____	_____
	6 – 12	_____	_____
Batan-on	13 – 1	_____	_____
Hamtong	20 pataas	_____	_____

**KABAHIN SA INAHAN**

**Prenatal**

1. Naka pa prenatal ba ang inahan panahon sa pagbuntis?
2. Kung oo, kasagaran kapila nakapatan-aw usa nanganak?
3. Kinsa ang nagtan-aw? Asa?
4. Unsa ang ginahatag samtang nagbuntis?
5. Nakapa tetanus toxoid ba ang inahan panahon sa pagbuntis?
6. Kung wala nagpaprenatal ang inahan, unsa ang hinungdan?
7. Aduna bay trabaho ang inahan sa panimalay? Oo \_\_\_\_\_Wala\_\_\_\_\_. Kung nagbuntis nagpadayon ba sya sa pagpanarbaho? Oo \_\_\_\_\_Wala \_\_\_\_\_  
Unsang matang sa trabaho? (Ihulagway...)\_\_\_\_\_

### **Nanganak**

- 8 . Sa panahon sa pagpanganak, asa ginadala ang inahan?
9. Kinsa ang nagpa-anak? Giunsa niya pag-atiman ang inahan? Ang bata?
10. Aduna bay nahibaloan nga kaso nga namatay ang inahan sa pagpanganak? Kung naa unsa ang hinungdan?  
Aduna bay namatay nga bag-ong inanak? Kung naa, unsay mga hinungdan niini?
11. Aduna bay mga kaso sa mga bag-ong inanak nga adunay mga depektp sa lawas? Kung aduna, unsa kini nga mga depekto?  
(lhulagway.....)
  - 11.1 Unsa ang posibleng mga hinungdan niini? \_\_\_\_\_
  - 11.2 Aduna bay “exposure” ang inahan sa mga mosunod? (I-tsek)
    - \_\_\_\_\_ a. Pagtrabaho sa plantasyon nga naggamit og kemikals.
    - \_\_\_\_\_ b. Ang bana nagtrabaho isip “applicator” ug madala niya sa balay ang iyang mga sapot nga napatara sa kemikals.
    - \_\_\_\_\_ c. Nagpuyo duol sa plantasyon

### **Nakuhaan**

12. Aduna bay kaso nga nakuhaan sa panahon sa pagbuntis? Unsa man ang hinungdan?
13. Sa inyong tan-aw, sa hisgotanang panglawas, unsa ang nag-unang problema? Ngano man? Unsaon kini pagsulbad

**ENVIRONMENTAL**

**Kahimtang Sa Tubig Ug Palibot**

1. Unsa ang inyong pamaagi sa paghipos og basura?

Ginalabay bisan asa  
Ginasunog  
Ginabutang sa lungag  
Uban pa (lhulagway..) \_\_\_\_\_

2. Unsang tipo sa kasilyas sa panimalay?  
3. Unsa ang gilay-on sa kasilyas gikan sa tubig ilimnon? Pila kametros? \_\_\_\_\_  
4. Unsa ang tinubdan sa tubig ilimnon?

Tinubdan sa Tubig	Pila ka buok	Gilay-on gikan sa panimalay	Ihulagway asa kini nahimutang/Kahimtang niini (limpiyo, hugaw dili na mainom, etc. nagkahubas, duol sa mga sagingan o pinyahan )
<b>Tubod</b>			
<b>Busay</b>			
<b>Atabay</b>			
<b>Balon</b>			
<b>Suba</b>			
<b>Poso/Bomba</b>			
<b>Uban pa</b>			

5. Unsa ang mga pamaagi sa pagpondo sa tubig?

	Mainom	Pangkaligo	Panghugas
<b>BALDE</b>			
<b>CONTAINER</b>			
<b>TANGKE</b>			
<b>GALON</b>			
<b>Uban pa</b>			



6. Sa inyong banabana, unsa kalayo ang ginakuhaan og tubig sa mga plantasyon? Sa mga pabrika etc.. pila ka metros?
7. Mo agi ba kamo sulod o sa kilid sa plantasyon sa pagkuha ninyo og tubig?
8. Nakasinati naba kamo nga nag aerial spray habang nagakuha kamo ug tubig? Makaabot ba ang pinisik nga pesticides sa kuhaanan ug tubig?
9. Maabot ba ang inyong panimalay sa pinisik sa kemikal nga gi spray pinaagi ang eroplano? \_\_\_\_00 \_\_\_\_dili
10. Kung oo, unsa man ang inyong gibuhat aron dili makasulod ang pinisik sa inyong panimalay? \_\_\_\_\_
11. Nagagamit ba kamo ug tubig ulan? \_\_\_\_pang inom \_\_\_\_pang hugas \_\_\_\_ pang ligo \_\_\_\_ pangdilig sa tanum \_\_\_\_\_
12. Kung di ginagamit ang ulan pang inom, unsa man ang hinungdan? \_\_\_\_\_
13. Sa unang panahon ginainom ba ninyo ang ulan \_\_\_\_ 00 \_\_\_\_ dili (kung dili, since when dili na ginainom ug ngano?  
\_\_\_\_\_
14. Aduna ba moy kasayuran kung asa ginalabay/ginapagawas ang mga hugaw gikan sa plantasyon, pabrika etc.? Kung aduna, asa man kini ginalabay/ginapagawas?
  - 14.1 Aduna ba kini kahisol nga nahatag diha sa pang adlaw-adlaw ninyo nga pagpuyo?
15. Aduna bay mga kaso nga naay nangasakit tungod sa pag-inom og tubig? Ihulagway kini...  
Kinsa ang naapektuhan niini? \_\_\_\_\_ Pila ka buok? \_\_\_\_\_
  - 15.1 Nahibaloan ba unsang hinungdan? Oo \_\_\_\_\_ Wala \_\_\_\_\_ Kung Oo \_\_\_\_\_  
Unsa ang hinungdan?
  - 15.2 Aduna bay gibuhat ang inyong barangay, o lokal nga gobyerno niini? Oo \_\_\_\_\_ Wala \_\_\_\_\_  
Kung Oo unsa kini? \_\_\_\_\_

**KABAHIN SA MGA BINUHING HAYOP**

- 1. Aduna ba moy binuhing hayop? Oo   Wala   Unsa kini? \_\_\_\_\_
- 2. Ihulagway ang pamaagi sa pagbuhi.   Binuhian   kinulong   hiniktan
- 3. Aduna bay mga kaso nga nangasakit ang mga binuhing hayop? Oo \_\_\_\_Wala \_\_\_\_ Kung aduna unsa man ang hinungdan?

**KABAHIN SA MGA PANANOM**

- 1. Aduna ba moy mga pananom sa palibot

GULAY	PERENNIAL /CASH CROP/PRUTAS

- 2. Naggamit ba kamo og mga kemikal sa inyong mga pananom? Oo\_\_\_\_\_ Wala\_\_\_\_\_ kung oo unsa kini?
- 3. Kung naggamit og mga kemikal, kapila sa usa ka semana kini gina apply? \_\_\_\_\_  
Asa niniyo kini ginatago/ginahipos kada human og gamit? \_\_\_\_\_
- 4. Aduna bay mga aksidente nga nahitabo nga naay kalambigitan sa paggamit og mga kemikal?
- 5. Aduna bay mga kaso nga naay myembro sa pamilya nga nasakit o naglain ang lawas tungod sa pagkaon sa mga gulay, prutas o lagutmon nga nagamitan og  
kemikal? Kung aduna unsa kini nga sakit? Unsa ang ginabati?
- 6. Panahon sa pag aerial spray sa kompanya, aduna bay higayon nga mapisikan sa pestisidyo nga gi spray sa eroplano ang inyong mga gulay?  
Oo\_\_\_\_\_ wala\_\_\_\_\_

7. Kung oo, kada spray ba dyud sa eroplano kini mahitabo? Oo \_\_\_\_\_ dili \_\_\_\_\_
8. Unsa inyong ginabuhay mahitungod niini? Di na lang kaonon ang gulay? \_\_\_\_\_ Kaonon pero hugasan pag ayo? \_\_\_\_\_ Undang na lang sa pagtanum? \_\_\_\_\_
9. Sa kinatibuk-an unsa ang mga kasamtangang problema o isyu sa komunidad nga nakahatag og kakuyaw o kahingawa ngadto sa kinaiyahan, ug sa kalidad sa kinabuhi sa tanang lumulopyo sa inyong lugar.

**HEALTH SERVICES** (Anaa sa komunidad)

1. Kun kamo adunay balatian, unsay inyong ginabuhay? \_\_\_\_\_ magpakonsulta \_\_\_\_\_ dili magpakonsulta. Kung dili ngano? \_\_\_\_\_
2. Asa mo moadto kung adunay magkasakit sa inyong pamilya? (I-tsek)
- |                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| arbularyo _____ | Doktor _____  | Center _____  |                |
| hilot _____     | Nurse _____   | Ospital _____ | Pribado _____  |
| BHW _____       | Midwife _____ |               | Gobyerno _____ |
3. Unsa kalayo ang health center gikan sa inyong balay? \_\_\_\_\_ Problema ba ang kalay-on alang sa pagkuha og serbisyo gikan sa health center?
4. Aduna bay insakto nga serbisyo gikan sa health center, o ospital sa gobyerno base sa inyong kasinatian?
- |                         |                            |
|-------------------------|----------------------------|
| Health center. Oo _____ | Gobyerno ospital. Oo _____ |
| Wala _____ Ngano? _____ | Wala _____ Ngano? _____    |
5. Unsa mga serbisyo ang inyong nakuha gikan sa:
- |                         |
|-------------------------|
| A. Health Center _____  |
| B. Govt. Hospital _____ |

## Appendix D: FGD Guide Questions

1. Unsa ang mga 5 ka nag-unang sakit nga nasinati diha sa katilingban sa milabay nga 10 ka tuig (1996-2006)?
  - a. 0-5 ka tuig
  - b. bata-6-12 ka tuig
  - c. batan-on-13-25 ka tuig
  - d. hamtong- 25-40 ka tuig
  - e. tigulang- 41 pataas
2. Unsa ang mga 5 ka nag-unang hinungdan sa kamatayon diha sa katilingban sa milabay nga napulo ka tuig?
  - a. 0-5 ka tuig
  - b. bata-6-12 ka tuig
  - c. batan-on-13-25 ka tuig
  - d. hamtong- 25-40 ka tuig
  - e. tigulang- 41 pataas
3. Asa mo moadto kung adunay magkasakit sa inyong panimalay?
4. Unsang mga serbisyong panglawas nga anaa diha sa katilingban?
5. Unsa ang inyong pamaagi sa paghipos sa basura?
6. Unsa ang tinubdan sa tubig ilimnon?
7. Unsa ang pamaagi sa pagpondo sa tubig ilimnon?
8. Aduna bay mga binuhing hayop? Kung aduna, unsa kini?
9. Unsa ang mga kasagarang sakit sa mga binuhing hayop? Unsa ang hinungdan niini?
10. Aduna bay nobserbahan o nabalitaan o na report sa community nga nahilong hayop tungod sa kemikals o mga talagsaon nga sakit sa hayop o abnormalities (describe) (ask sad since when?)
11. Unsa ang mga pananom diha sa palibot?
12. Nagagamit ba kamo og kemikal sa inyong mga pananom? Kung oo, unsa kini nga mga kemikal? Unsa ang pamaagi sa paglabay sa sudlanan niini?
13. Unsang mga sakit ang mitakboy sa mga tanom diha sa inyong palibot? Unsa ang mga hinungdan niini? (since when naobserbahan o gisinati?)
14. Unsa ang mga plantasyon ang ana sa inyong komunidad? Gi deretso ko na kasi given na man na may mga plantasyon talaga ang 3 communities selected natin
15. Unsa ang kahimtang sa panglawas sa mga trabahante diha sa mga plantasyon? Palihog ihulagway.
16. Aduna bay mga dili maayong epekto sa panglawas sa inyong komunidad ang presensiya sa mga plantasyon? Kung aduna, ihulagway kini.
17. Aduna bay mga nitumaw nga talagsaong (cancer, parkinson's disease, abnormalities, tumor, sige makuhaan, etc) sakit diha sa katilingban sa kasamtangan nga wala nasinati kaniadto? Kung aduna, unsa man kini? Kinsa man kini sila? (para mas matanong sila mismo)

### **Appendix 3. The Research Team**

**Team Leader: Jessibel Marie Sanchez**

***Sub-Team 1: Barangay Sirib, Calinan***

Jessibel Marie Sanchez  
Felicisima Píala  
Angel Marie Arpon  
Wangyu Cayanong

***Sub-Team 2 : Sitio Coog, Mandug***

Venancio Estrada, Jr.  
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