Impacts of Synthetic Chemical Spraying to the Health and Wellbeing of Women Agrarian Reform Beneficiaries: A Case Study

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LIST OF ACRONYMS

ARB	Agrarian Reform Beneficiary
BHW	Barangay Health Worker
DDT	Dichloro-Diphenyl-Trichloroethane
DFBGARC	Davao Fruit and Banana Growers Agrarian Reform Cooperative
EDC	Endocrine-Disrupting Chemicals
FGD	Focus Group Discussion
IATF	Inter-Agency Task Force for the Management of Emerging Infectious Diseases
KII	Key Informant Interview
TB	Tuberculosis

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Executive Summary

This case study tackles the **impacts of synthetic chemical spraying processes, both manual and aerial, on the health and well-being of agrarian reform beneficiary (ARB) households, especially women in the Philippines.** The findings of this case study may serve as references for future policy advocacy initiatives.

Data and information were collected via key informant interviews, focus group discussions, and direct observation. A focus group discussion was conducted with some officers and members of Davao Fruit and Banana Growers Agrarian Reform Cooperative (DFBGARC), whose community is located within the banana plantation of one of the country's biggest banana exporters, Sumifru Corporation in the Municipality of Compostela, Davao de Oro, where aerial and manual spraying is a practice. The majority of the members interviewed during the focus group discussion (FGD) were women members and/or wives of male members of DFBGARC. Key informant interviews with the local community health workers were also conducted to validate and substantiate the information gathered from the FGD.

The case study finds out that **high levels of toxic agrochemical use in the banana plantation cause men, women, and children to suffer skin conditions like rashes and lesions as well as respiratory problems, most commonly tuberculosis (TB).** It seems that TB is a common disease among male workers on banana plantations. Banana plantation workers who usually acquired TB are those who are tasked with synthetic pesticide and fungicide application on the plantations, such as manual spraying or boom sprays.

Another health condition that is predominant in the community, especially among women, is **myoma, a gynecological condition where fibroids or tumors develop in or around the uterus.** A lack of adequate affordable medical check-ups and medical equipment, meaning women have no access to essential services such as gynecology and breast examination also posted one of the challenges mentioned by the health worker. Other diseases mentioned by the local health workers that are predominant in the community include **asthma, diabetes, and kidney failure.**

When the head of the household, in most cases, the male ARB, falls ill, the burden to care for the sick usually falls on the wives' or daughters' shoulders. Women tend to be the natural and default caregivers of the family, hence, the burden to care for a sick family member usually adds to the women's multitude of responsibilities. Further, since the main income earner, in this case, the male family member, can no longer work due to his illness, the responsibility to earn for the family also becomes the wife's additional responsibility. Thus, **women's multiple roles and burdens are exacerbated.**

Aside from the aforementioned health conditions and the multiple burdens experienced as a result of constant exposure to synthetic pesticides, women participants also mentioned that aerial spraying causes limitations in the control of their physical environment due to the pesticide drift. For example, during the FGD, women expressed that they want to establish their vegetable and fruit garden as a means to add additional nutritious food for the family, to save money, and also an opportunity to earn additional income. However, they cannot tend one because they fear that the chemical drift from the aerial spray will affect the vegetables and will be poisonous once consumed. Community members cited that the chemical drift from the aerial spraying causes some vegetables and other plants to wilt and die. The plants exposed to the drift are deemed poisonous by the community and cannot be eaten.

Women also tend to be more concerned about the quality of their drinking water in the community. Women ARBs shared that they are concerned if the community's deep well, the main source of drinking water in the community, has been contaminated by the pesticide either through drift or seepage.

The different perceptions of the effects of synthetic spraying vary across gender as evidenced in the case study. Male participants are more concerned about the economic implication of pesticides on their already meager incomes. Costing of the farm inputs, including fertilizers and fungicides are automatically deducted by the banana company from their income. Lack of transparency as to how the costs of these inputs and how they are being used are among the concerns of the male ARBs. **Women ARBs, on the other hand, are also concerned about the economic implications of pesticides like their male counterparts. However, they are more concerned about the effects of pesticides on the health and well-being of their families and community.**

During the examination of related literature for this case study, it was found that a substantial amount of research conducted to associate occupational exposure to pesticides was "gender blind." **There are several published studies on how the use of synthetic pesticides affects men, but studies on the effects of pesticides on women are scarce.** This focus on men may be due to the exposure to pesticides being higher among men because they usually are the ones to apply pesticides, whereas women get exposed indirectly or through re-entry activities. Hence, **a gender-differentiated approach to how women and men are being affected by the chemicals is needed to determine sound and strong policies and programs in the area of pesticide management and regulation in agriculture.**

In light of the various sources of women's exposure to pesticides, as well as the social and physical conditions surrounding such exposures, there is probably a significant underestimation of the resulting health problems. There is a need to conduct gender-based analyses in occupational and environmental health and the recognition of the differences between men's and women's working and living conditions.

Businesses and financial institutions need to reevaluate the impacts of their operations and investments. Financial institutions are urged to adopt stronger social policies and enhance due diligence processes to protect the wellbeing of communities that are affected by their investments. Further, financial institutions are urged to require due diligence in partners and third parties to avoid the negative effects of irresponsible investments.

Lastly, regulators are urged to monitor and evaluate the impacts of these investments, the results of which can be used to further strengthen the implementation climate of the country's Sustainable Finance Roadmap.

Scope and Limitation of the Study

This study aims to understand the impacts of the synthetic chemical spraying processes, both manual and aerial, on the health and well-being of ARB households, **especially on the increased burden on women.** This study heavily relied on primary data through information and anecdotes gathered from the participants through FGD and key informant interviews (KIIs). It is also noted that there have been some limitations in the availability of the existing health data by the affected community. Thorough research of similar studies was made to reinforce the primary data gathered in the field.

This case study was made during the height of the COVID-19 pandemic which limits mobility and logistics as imposed by the local government units and the Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF) to curb the spread of the virus. Restrictions in movement were one of the limitations and main challenges during the data gathering in the field. Participants to FGDs were limited to a small number following local government protocols.

Further, this study focuses on the perspective of ARB communities; previous initiatives to engage the company in dialogue on farm operations and management were made in past years but have been unsuccessful.

Background and Case Findings

I. Situational Analysis: Gender Inequalities in Agriculture and Rural Development

AGRICULTURAL SECTOR
HOUSEHOLD FOOD AND NUTRITION SECURITY
NATURAL RESOURCE MANAGEMENT

Filipino women in agriculture play indispensable roles in the agricultural sector, in household food and nutrition security, and in natural resource management. **They spend between eight to eleven hours a day in paid work and unpaid labor such as housework.** They contribute to household income primarily through their participation in farming and other income-generating opportunities. Their domestic tasks include preparing farm tools and food for the farm laborers, gardening, raising poultry and livestock, and other livelihood activities.[1]

However, Philippine agriculture is fraught with gender issues that make it systematically harder for rural women to have equal access to rural and agricultural resources.[2] Due to lack of property rights and outdated inheritance laws, land ownership of women as indicated by the total emancipation patent awarded and the total certificate of land ownership award given were only 23 percent and 31 percent respectively, as of 2019. **Women farmers largely remain relatively disenfranchised in comparison to their male counterparts.** Agrarian reform programs of the country have awarded land titles and ownership to male farmers. Wage disparity still persists in the agricultural workforce as well, as female labor is generally underpaid and not equally valued. In terms of agricultural inputs, women are significantly disadvantaged as well and have less access to resources such as farmlands and financial capital.[3]

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[1] Sourcel, Maria Daryl L. Leyesa, Who are the women in agriculture? Philippine Peasant Institute.

[2] https://ap.fftc.org.tw/article/1872

[3] Ibid

During the FGD, there were common patterns in the division of labor among men and women. Specific tasks done mostly by men include land preparation, fertilizer spraying and pesticide application. Some tasks are shared between men and women, including transplanting and weeding, stem sanitation, and repruning. Women are only involved in the preparation of lunch and snacks for the laborers and their delivery to the field. Land preparation is mainly undertaken by men.

UNPAID LABOR

Women's labor and contribution in banana farming is usually unpaid because the roles that women have in farming is deemed as an extension of their household responsibilities, such as (but not limited) to cooking meals for the laborers, among others.

Women participants shared that they make the majority of the decisions about savings, food and non-food expenditures, and household needs, such as education and medical expenses. Day-to-day household management decisions are commonly undertaken by the wife alone. Women participants say that they have more control over managing the household rather than farming. Farming and cooperative work was usually being done by men.

Women farmers in the Philippines have more control over managing household expenses and are among the most empowered in the region, according to a 2017 study titled *Women's Empowerment and Gender Equity in Agriculture: A Different Perspective from Southeast Asia*. **However, they are also the most overworked.**

Compared to their Southeast Asian counterparts, WHO Filipina farmers juggle the most significant workload at home and at the farm.[4]

Women are not as widely represented as men in agricultural organizations, cooperatives, and rural councils, among others due to gender biases. Leadership positions the women hold are oftentimes extensions of their domestic roles; for example, the positions of secretary and treasurer are often assigned to a woman. During the FGD, the participants confirmed that women have limited representation in the cooperative they belong to. The majority of the women interviewed in this case study are proxies of their husbands or fathers who serve as members or officers of DFBGARC.

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[4] Akter, S. et al, Food Policy, Elsevier

According to Alkire et al (2013), empowerment in agriculture is generally defined as participation and one's ability to make decisions on matters related to agriculture as well as one's access to the material and social resources needed to carry out those decisions. The Gender and Agriculture Research Network of the Consultative Group of International Agricultural Research (CGIAR) in 2014 recommended **two indicators to track and evaluate empowerment.** The **first was women's control over productive resources** such as land, livestock, water, forests, common property, seeds, fertilizers, machinery, financial assets, and the income from sales of crop, livestock or forest products. The **second was women's decision-making power** over time-use and income, and their decision-making power in groups and collective organizations. [5]

II. Effects of synthetic spraying (both manual and aerial) on health of ARB households, especially women

Starting in the 1990s, growers began aerial spraying to control black sigatoka, justifying it by claiming that the 83,840 hectares under export banana cropping make it the second largest export crop after coconut oil. Bananas provide 335,372 direct and indirect jobs and pay 6.5 billion pesos (about $142.86 million US) in taxes. **In the Philippines, aerial spraying of pesticides is predominantly used to combat the fungal disease in export banana plantations planted with the Cavendish cultivar.** Almost all plantations are located in Mindanao.

[5] Ibid

IMAGE FROM: news.agropages.com

A 2006 study by the Department of Health found that aerial spraying of pesticides was having negative effects on the health of residents. [6] However, the findings were contested by big banana growers which led to a series of filing of legal cases. In addition, a number of Bills proposed new regulation of aerial spraying. Thirteen House Bills have been filed in Congress between 2010 and 2016, spanning three administrations and four Congresses. However, none of the House Bills surpassed the "pending" status. [7] **It has been a long and winding battle for communities affected as well as the environmental advocates who aim to regulate or ban synthetic spraying, both manual and aerial.**

Farmworkers, as well as the general populations in the vicinity of the plantations, may **get exposed by direct handling and application of pesticides, as well as by entering pesticide-treated fields, cleaning and storing equipment, indirect routes, and contamination of water, food or clothing.** Recent developments in Philippine agriculture have also resulted in the propagation of monocultures, and thus an increased pest population. To address this situation, large amounts of pesticides and other agrochemicals are used to manage pests and ensure the cultivation of high-quality products.

Much effort is put into promoting the use of pesticides to boost productivity, and less effort into protecting health and the environment. Although the banana plantations provide employment opportunities, occupational health issues for both men and women working in the industry or how pesticides affect the health and wellness of community members living within banana plantations are not adequately documented.

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[6] https://foodfirst.org/

[7] Nikol, J and Jansen, K, The Politics of Counter-Expertise on Aerial Spraying: Timeline of Selected Developments in the Philippine Civil Society Struggles Around Risk Regulation, 1997 – 2016.

[8] Ngowi AV, Maeda DN, Partanen TJ, Int J Occupational Med Environ Health, 2001; 14(4):349-56.

Thus, men and women who are frequently exposed directly when working as pesticide applicators or indirectly during harvesting, planting, and soil preparation are at a greater risk of accumulated exposure because of long working hours from an early age and multiple exposures at work and in domestic settings. Washing pesticide-contaminated clothes and reusing empty containers, two tasks traditionally done by women, are further causes of exposure to pesticides. Consequently, women who are constantly exposed to synthetic pesticides may suffer adverse health effects. Further, **women have a unique susceptibility to pesticides because of their physiological characteristics, lifestyle, and behavior.**[9]

During the KII conducted with the Barangay Health Worker (BHW), she mentioned that myoma (the development of non-cancerous tumors in the uterus) is one of the recurring health issues among the childbearing aged women in their barangay.

Myoma or uterine fibroids is a gynecological condition where fibroids or tumors develop in or around the uterus. The cause of fibroids is associated with the female hormone, estrogen. Fibroids appear during the childbearing years when a woman's estrogen levels are high.[10] Although myoma or uterine fibroids are benign tumors, they can cause a variety of symptoms such as pain, bleeding, and bladder dysfunction as well as complications leading to infertility, miscarriage and other reproductive disorders.

According to the BHW, approximately 15 women of reproductive age in their community were diagnosed with myoma in 2019. However, **the BHW believed that the numbers could increase if women have the capacity to access medical check-ups.**

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[9] Ibid

[10] https://www.healthgrades.com/right-care/womens-health/myoma-fibroid

According to a research study conducted by Bretveld et al in 2006, **some pesticides may interfere with the female hormonal function, which may lead to negative effects on the reproductive system** through disruption of the hormonal balance necessary for proper functioning. Previous studies primarily focused on interference with the estrogen and/or androgen receptor, but hormonal functioning may be disrupted in many more ways through pesticide exposure.[11]

Pesticides that may disrupt hormonal functions are often called **endocrine-disrupting chemicals (EDCs)**, just like other agents with similar mechanisms of action. An EDC may be defined as an exogenous agent that interferes with the synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body that are responsible for the maintenance of homeostasis, reproduction, development, and/or behavior. The route of exposure is dependent on the individual EDC, common routes of exposure in humans are ingestion, inhalation, and dermal absorption.

Another study conducted by the Endocrine Society in 2016 examined rates of uterine fibroids, benign tumors on the uterus that can contribute to infertility and other health problems, and an often-painful condition called endometriosis where the tissue that normally lines the uterus develops elsewhere in the body. The study has linked the development of uterine fibroids and endometriosis to chemicals found in pesticides. Past studies also suggest a byproduct of the pesticide dichloro-diphenyl-trichloroethane (DDT), can raise the risk of developing uterine fibroids.

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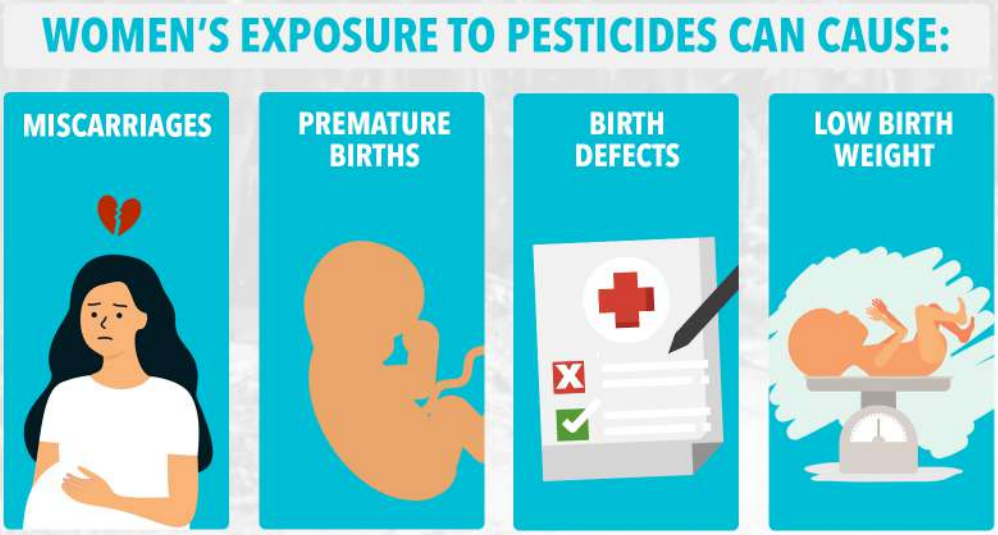
[11] Bretveld, Reini W et al. "Pesticide exposure: the hormonal function of the female reproductive system disrupted?" Reproductive biology and endocrinology: RB&E vol. 4 30. 31 May. 2006, doi:10.1186/1477-7827-4-30

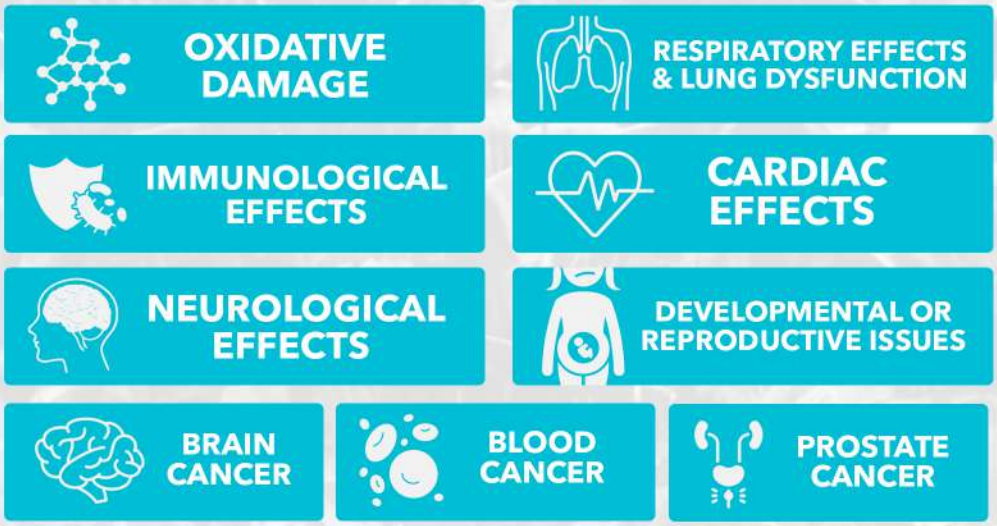
Another group of chemicals called **phthalates**, which are found in plastic products and cosmetics, have been tied to the growing risk of endometriosis.

Women, men, and children vary in their physiological susceptibility to the effects of exposure to toxic chemicals. Women may have different susceptibility to the impacts of toxic chemical exposure due to differences in physiology and connection with their reproductive cycles. **With generally a higher proportion of body fat, women are also more likely to store more environmental pollutants in their tissues.** At particular stages of their lives, such as pregnancy, lactation, and menopause, women's bodies undergo rapid physiological changes that also may change their vulnerability to health damage from toxic chemicals. According to WHO in 2004, studies suggest that **women's exposure to pesticides can cause miscarriages, premature births, birth defects, and low birth weight.** In addition, a substantial portion of a woman's chemical burden can be passed on to the unborn child through the placenta, as well as during breastfeeding. For maternal and infant health protection, exposure of girls and women before and during childbearing years to chemicals poses risks to the future generations and thus must be minimized to the extent possible.

According to CDC, farmworkers are approximately six times more likely to develop tuberculosis than the general population of employed adults. This is associated with poor living conditions of the farmers as well as their occupational exposure to pesticides, which is associated with increased susceptibility to TB infection.



OCCUPATIONAL EXPOSURES TO PESTICIDES CAN LEAD TO HEALTH RISKS SUCH AS



Pesticides contain several toxic active chemical compounds. Within the human body, pesticides may be metabolized, excreted, stored, or accumulated in body fat. Occupational exposures to pesticides can lead to health risks such as oxidative damage, immunological effects, neurological effects, respiratory effects, lung dysfunction, cardiac effects, developmental or reproductive issues, and even could lead to cancer of the brain, blood, and prostate. Pesticides have also been reported for cytotoxicity and genetic damage. Hepatotoxicity and hematological alterations can occur due to prolonged exposure to pesticides. The toxic effects of pesticides may lead to a weak immune system that could increase the susceptibility to tuberculosis infection among farmworkers.[12]

In another research study conducted by Riaz et al in Pakistan and published in Journal of Exposure Science and Environmental Epidemiology in 2017, it identified a strong correlation between pesticide exposure and susceptibility to TB. The researchers identified the impact of chronic exposure to pesticides for at least 10 years on those workers who apply pesticides.

In the mentioned study, the spray workers' blood parameters and liver enzymes revealed that they had a high susceptibility to tuberculosis compared to those with no history of pesticide exposure.

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[12] Maulidya Utami and Nurdian, Pesticides Exposure Among Farmworkers Increase Risk Susceptibility to Tuberculosis, April 2018

The pesticide-exposed workers were evaluated for the presence of tuberculosis by a sensitive molecular test. The study found that toxic effects of pesticides on liver enzymes and blood parameters coupled with clinical symptoms reflected a weak immune system, hence, an increased tuberculosis susceptibility was observed. It is suggested that occupational exposure to pesticides in field workers increases their risk of various harmful effects on hematological and liver.

In the gathered information from the participants during the FGD, three (3) former members of DFBGARC suffered from TB. The participants also shared some experiences and anecdotes that some workers before were shown with TB-like symptoms, although they are uncertain if it is indeed TB since they did not undergo medical check-ups to clinically diagnose their health issues. Meanwhile, those who were able to access a medical check-up, before the diagnosis of their respiratory disease, these former members confirmed that they worked as manual/boom sprayers of pesticides in the banana plantation. Their wives and daughters, who were able to participate during the FGD, believed that their husbands and fathers became susceptible to TB because of the constant exposure to pesticides.

Even where women do not directly apply pesticides, opportunities for exposure may be substantial but undetected. Although they did not physically apply the pesticides in the area, women were usually present during application activities. Because of traditional gender roles, women are assigned to wash pesticide-contaminated clothes or containers of the pesticide applicator, who is traditionally male. This causes women's exposure to pesticides. **Women were oftentimes disregarded as "directly exposed" to chemicals because pesticide exposure is associated only with crop spraying which is, by tradition, a "man's work."**

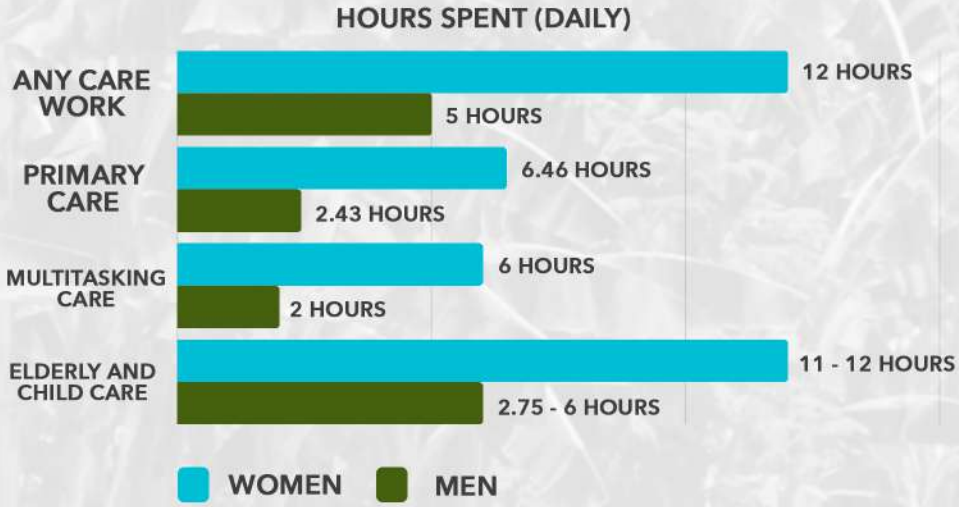
Acute conditions such as skin burns or rashes are also common among residents living within the banana plantation. Men and women participants in FGD agreed that they experienced a burning sensation and itching along the areas of eyes, nose, and skin after getting directly hit by the pesticide spray. The barangay health worker in the area validated these statements by the participating ARB household as she herself experienced it. However, when asked about the data as to how many people complained or reported these mentioned health concerns, the BHW admitted that they do not keep such data because it is not a "major" health concern and that **skin rashes are perceived as "normal" especially among children and adults.** In addition, underreporting of health conditions that may be contributed as effects of pesticides is widely recognized as a significant obstacle to ascertaining the true burden of disease.

III. Effects of Synthetic Spraying on Women's Multiple Burdens

Women's multiple burden refers to the fact that **women tend to work longer and more fragmented days than men** as they are usually involved in three different gender roles, namely: **productive, reproductive, and community work.** Productive refers to tasks contributing to the household economy such as crop and livestock production; reproductive role refers to tasks to reproduce and care for the household such as water collection, food preparation and child care; community management on the other hand are tasks supporting community improvement and the community's social welfare.

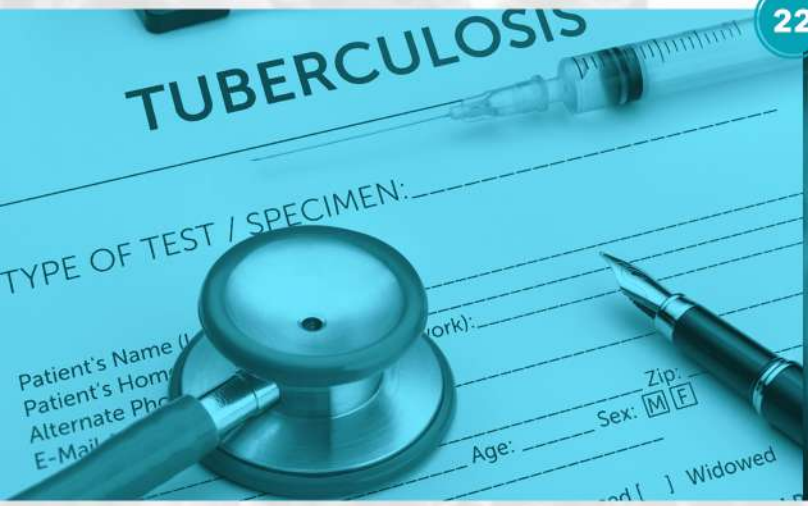
Women are expected to juggle and balance these three roles by themselves. In the Philippines, the 2017 household care survey by Oxfam showed that women spend 12 hours a day on any care work, while men spend five (5) hours a day. In the same survey, it was found that women spend 6.46 hours for primary care, while men spend 2.43 hours a day; multitasking care is six (6) hours for women and two (2) hours for men, and 11 to 12 hours a day of elderly and/or childcare, which is two to four times longer than men. Across countries, especially in the Philippines, Uganda, and Zimbabwe, girls as young as eight to twelve years old spend two (2) hours a day on care work more, compared to the boys (Oxfam, 2017). **What is worse is that women are expected to carry out their multiple tasks for free.**

HOUSEHOLD CARE SURVEY (Oxfam, 2017)



Women's unpaid care work has long been recognized as a driver of inequality with direct links to wage inequality, lower income, and physical and mental health stressors. As countries rebuild economies, the crisis might offer an opportunity to recognize, reduce and redistribute unpaid care work once and for all.[13] Before the pandemic happened, it is said that **women do nearly three times as much unpaid work at home than men.**

[13] unwomen.org



The health effects brought about by the synthetic pesticides used in the banana plantation to the community and family members of women ARBs in the area add to the **unending tasks of women.** Women tend to be the default caregivers when someone in the family is not feeling well. As experienced and shared by one of the women participants in the FGD, whose husband suffered TB later in his life, the caregiving tasks fall to her and her eldest daughter. And because her husband can no longer work due to his failing conditions, the burden to provide for the family falls on her shoulders as well. **She is expected to provide an income for the family while running a household and caring for her children and her sick husband.**

The example above is just a concrete example of how the state of health and wellness of the family directly affects women's responsibilities. It also shows an **interconnectedness between the health effects brought about by synthetic pesticide and how it impacts women's roles and workload.** Women are overburdened by economic and household responsibilities, which leads to low well-being in general, and in specific cases, leads to poor health.

In addition, the **traditional gender roles and the multiple burdens experienced by women limit every woman's capacity** to develop herself, such as pursuing opportunities in education, employment, political engagement, and leisure activities.

IV. Aerial Spraying as Barrier to Women's Opportunities in the Community

During the FGD, women participants shared that their actions and control of resources are limited because of aerial spraying. Women ARBs expressed that they want to establish a vegetable and fruit garden for themselves and their families.

This could provide additional nutritious food for the family and at the same time can be a potential additional income source for them. However, vegetables, especially the leafy ones e.g. camote tops, malunggay, kangkong, etc. had curled up or had a sticky residue that could not be washed off. Hence, they are forced to buy from the market what had once been a daily supply of fresh produce from their backyard. This becomes a missed opportunity for them to save and earn money.

Women also expressed that they wanted to raise livestock, however, according to them, livestock, such as goats and pigs, need to be secured and sheltered from the pesticide drift. They also feared that when they let their livestock roam or graze on pasture lands hit by the pesticide spray, their livestock would get sick. Hence, they have this notion that one can raise livestock in their area as long as it is cooped up, secured from the pesticide drift, and fed with pure animal feed. This method can be costly, especially for women who have little to almost no source of income.

V. Economic Impact of Aerial Spraying on ARBs

Under their contract signed with Sumifru in 2014, DFBGARC smallholders are paid just $4.25 or roughly P230 per 13.5-kilogram box of their produce. From that meager income, the price of fertilizers and other farm materials are being subtracted. Therefore, they get approximately around $3.46 or P187 per box, which is barely enough to support their families.

Aerial spraying constitutes the largest chunk of the deduction from the income of smallholder farmers. P6,000 per month is being deducted as an aerial spraying fee from their supposedly monthly income. Because of this, most of the farmers have meager profits or sometimes negative profit margins, meaning the production cost is more than the total revenue from growing an export-quality banana.

Conclusion

As seen by evidence described in this study, men and women are exposed to differing levels of toxic chemicals and they have different health reactions. Thus, **gender is a critical component to consider when formulating policies and programs in the area of sound management of chemicals.** However, current health and exposure models have not been targeted by gender.

Synthetic pesticides **pose a great threat not just to physical health, but also to the mental and emotional health of women** community members.

This case study of the problems faced by women with exposure to pesticides highlights the critical importance of **involving women as active agents in decision making** that bears on their health and that of the environment.

Therefore, it is important to collect epidemiological health data on chemical exposures that are gender-specific. This information will enable policymakers to formulate policies and take action that is targeted by gender. It is **important to document the experiences of both women and men and to collect sex-disaggregated data** that take to account the realities of people's everyday lives to ensure that development policies are relevant, effective, and on target.

There is also a need for the banana plantations to be transparent to the growers and communities on the active components of the pesticides that they use. Further, overexposure to pesticides should be avoided for occupational safety. More comprehensive research is required to explore these processes so that these chemicals stop contributing to harmful chronic health effects.

Opportunities for Further Research

Long-term systematic observation of the health and environmental effects of spraying pesticides in communities close to banana plantations must be made to establish concrete data on its effects. There is thus a clear **lack of information about the long-term effects of pesticide exposures among women.** Researchers also need to consider focusing on women in pesticide studies and developing new techniques for evaluating their exposures, both occupational and non-occupational.

In light of the various sources of women's exposure to pesticides, as well as the social and physical conditions surrounding such exposures, there is probably a **significant underestimation of the resulting health problems.** Indeed, there is a need to conduct gender-based analyses in occupational and environmental health and the **recognition of the differences between men's and women's working and living conditions.**

Businesses and financial institutions need to reevaluate the impacts of their operations and investments. Financial institutions are urged to adopt stronger social policies and enhance due diligence processes to protect the wellbeing of communities that are affected by their investments. Further, financial institutions are urged to require due diligence in partners and third parties to avoid the negative effects of irresponsible investments.

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