

# Further Discussion about Herbicide, Haze and Corresponding Countermeasures

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**Abstract:** This paper is the further discussion about our previous study on herbicide and haze. Here, two experiments reveal the hazards of herbicide again, and a new method to eliminate the hazard of herbicide is pointed out. Based on the process of distribution movement of herbicide caused poisonous gas and powder in atmosphere. The space and time distribution of haze density in China are mentioned and the mechanism is pointed out. The haze in United States and China are compared and analyzed. The issues about a group of people who are more and less likely to suffer from haze are mentioned.

**Keywords:** haze, PM 2.5, burning, herbicide.

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## I. INTRODUCTION

Not only in China is haze a serious problem but in many places in the world. As mentioned in the previous paper [1], it can be caused by spraying herbicides. Once the soil in farmland and woods is sprayed with herbicides once, tiny particles and poisonous gas continuously vapor into air. This forms today's haze. The process may continue for many years. Some regions become uncomfortable for humans to live in so deserted houses and villages exist. Over the past century, serious outbreaks of various lung infection diseases may be the result of herbicide pollution. If herbicides keep expanding, life forms may be extinct one day. The earth will be formless and empty, which is like a throwback to ancient times.

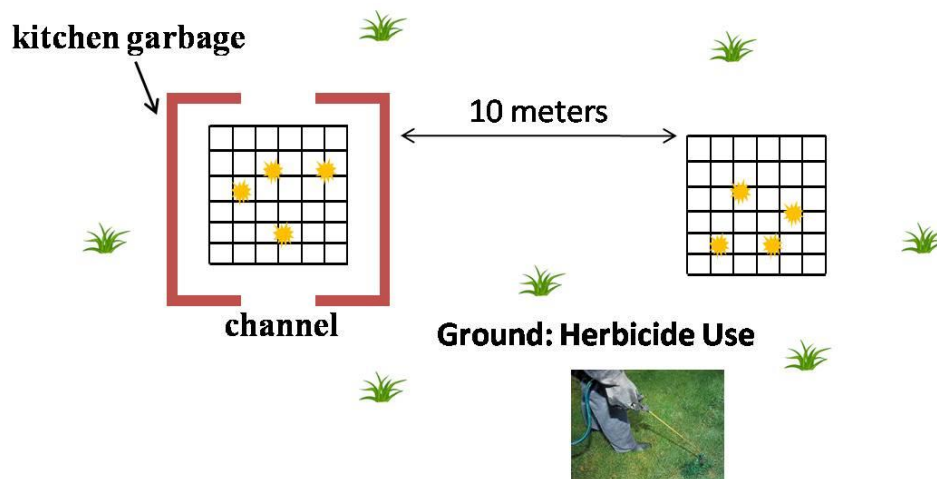
Based on our previous study [1], recent tests on herbicides, the observation of human activities and some new analysis on haze (smog), the hazards of herbicides and other methods to remove it are pointed out. There are some current misunderstandings on haze in the world that have been revised. The traffic safety could be connected to herbicides.

## II. TEST AND EXAMPLES

There are two experiments that were demonstrated to remove hazardous herbicide damage. These two examples were done in the southern part of Fujian Province, China.

### 1. Kitchen garbage was used to remove herbicide pollution:

Two cages of four or five chickens each were placed on open ground (see scheme 1). The cages are 10 meters away from each other. Others were placed dozens of meters away from the two cages where herbicides had been sprayed. The garbage was placed about two meters away from one of the chicken cages and placed around two meters away. The stench of kitchen garbage was piled up, leaving two feet channel in the front and back to let people go in and out. The winds can also blow in and out of the cage. There was enough food, space and water provided for the chickens in the two cages. After four or five days, the chickens in the cage, without placing garbage around, died, while the chickens in the other cage were alive.



**Scheme 1** Schematic illustration of chicken cages with and without kitchen garbage around on the herbicide-sprayed ground.

Observation of many traditional country yards in rural China, the position of the kitchens are normally set in the upwind direction of the house. The layout of the independent house in the countryside is the accumulation of wisdom of many generations. Besides, the region around China's rural market is an intensive living area. Because of convenience in food purchasing, but also a similar taste of kitchen waste produced removes air pollution significantly. So people feel comfortable there. However, modern supermarkets do not have this function so many people do not gather around. Soy sauce breweries, which use pure grain as raw material, produce similar smells as "kitchen garbage". Residential population is also flourishing around them.

### 2. The influence of herbicide on trees:

On a slope of a hill, there are two big trees that are 20 meters away from each other, whose roots grow below the grass. Near the roots of a trees were sprayed with herbicides to inhibit weed growth. The roots of the other trees were not sprayed. A year later, the trees sprayed herbicides showed yellow leaves with cracked and crumbling bark. The tree that was not being sprayed herbicides was still leafy and vibrant. It shows that herbicide is predator for plants.

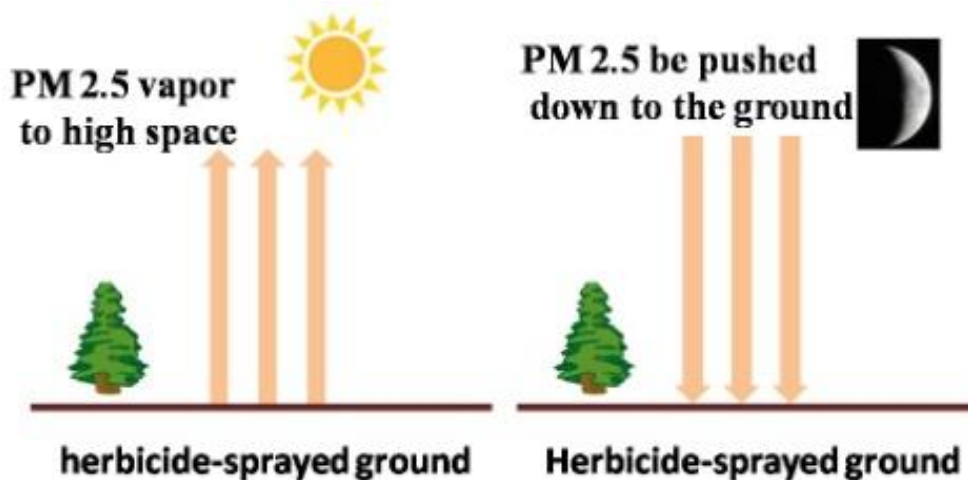
## III. DISCUSSION

### 1. The space and time distribution of the PM 2.5:

According to the recent report, the PM 2.5 concentration decreases as height increases [2]. The closer it is on the ground, the higher PM 2.5 concentration it is. The experimental results is in accordance with our previous study, which shows that the herbicide pollution normally stays, near the ground. If adults and children walk together, the children will breathe in more than adults.

Every major holiday in mainland China, the heating plants shut down, schools were closed, and vehicles were restricted. According to the report, 2014, Xiamen Fujian province, China's national holiday for seven days, the air quality improved. People felt better. Air transparency and the content of sulfur dioxide in the air significantly decreased, but the PM 2.5 level did not fall. This explains that the emergence of PM 2.5 index has little direct connections with the factory, construction and vehicles.

Moreover, it was also reported that the haze in the evening is much stronger. The density at noon is the lowest [3], which further demonstrates human activities of burning coal, cars exhausts and BBQ which are normally used during the day are not related to PM 2.5. During the day, when temperatures are high, PM 2.5 will be elevated to a higher space, vapor like water and its concentration decrease on the ground. However, in the morning, when temperatures drop, PM 2.5 was pushed down to the ground (see scheme 2). So, many people are suddenly awakened by strong breathing of PM 2.5 in the morning.



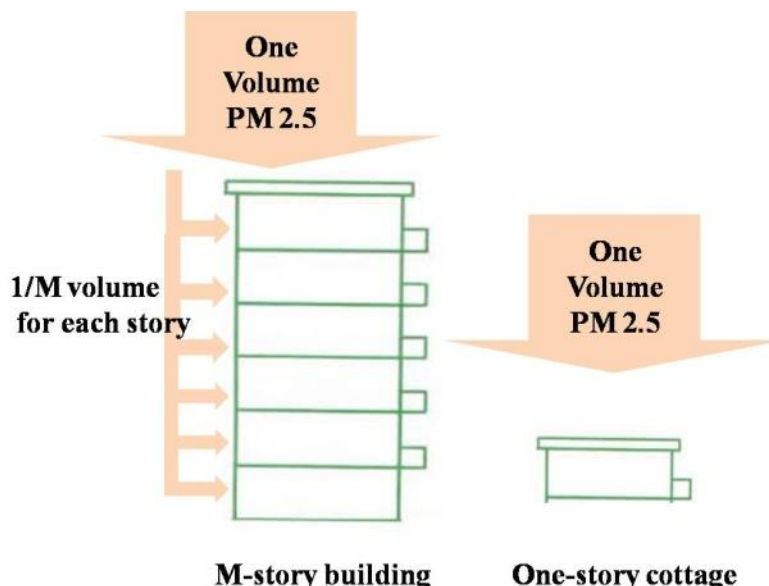
**Scheme 2** Comparison of PM 2.5 movement in day time and at night

Usually in the summer, the haze is not as serious as in winter. The reason is as follows: stronger photosynthesis that greatly enhances the self-cleaning ability of nature. Besides, high temperature and strong sunshine vapor and decomposes PM 2.5 high in the sky. During the summer, monsoons bring the ocean breeze to the mainland China, which effectively cleans the air.

In winter, temperature is low, herbicide-caused PM 2.5 stay near the ground. If observed from the satellite, the ground seems like being covered with burning smoke, No wonder many people believe haze comes from smoke of burning.

**2. The connection of tall building popular in China and PM 2.5:**

People, who live in tall buildings, breathe in less amount of PM 2.5 per person compared to people living in a house or cottage. The reason is as follows (see scheme 3): a certain amount of PM 2.5 is added on a unit area. If the house is one floor, it will bear 1 volume PM 2.5. M-story house only bears 1/M volume PM 2.5 for each floor. Now people in China like to live in tall buildings and many cottages are now empty.



**Scheme 3** The comparison of different-volume PM 2.5 for people live in tall buildings and small cottages

**3. PM 2.5 emissions into the air:**

After stopping the use herbicides to the soil, it continuously releases PM 2.5 into the air. The remaining soil will gradually get stiff. Soil colors will gradually change from black to brown red. Though biological activities on the soil surface will remove some parts of PM 2.5 pollution, it is far less compared to the amount of PM 2.5 releases.

**4. The threat of PM 2.5 to the vehicle driver:**

A high-speed moving object has a strong force to absorb PM 2.5 of appropriate stationary floating air. High-speed vehicles, even when the windows are closed, the PM 2.5 can penetrate the human skin, respiratory system, and organs. This will make the human sick. If not well-sealed, the food that is delivered by vehicles would spoil easily. The person, who drives the vehicle, may have a mental disorder by breathing in too much PM 2.5 and lose control of vehicle, which could cause a traffic accident.

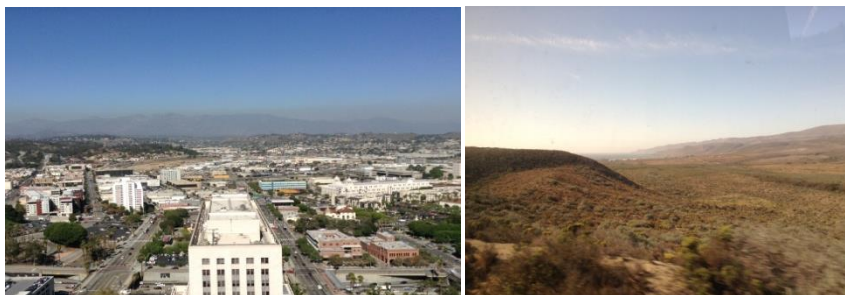
**5. Occupations that suffer PM 2.5 the most:**

Herbicides can be used on farms, scenic areas, greenbelts and hospital areas. Farmers and lawn workers use herbicides the most. They spend all their working time breathing in herbicides. These workers are most likely to get sick. As mentioned in our pervious paper, cooks, since the hot oil steam can remove part of the herbicide pollution, they have the lowest chance to get a disease from herbicides. You must stay away from spraying herbicides.

**6. Haze in America is not from China:**

China and Vietnam shores are hundreds of kilometers of border in the 1960's, the United States sprayed Agent Orange (similar to herbicide) in Vietnam. Not until 1997, on the other side China, spraying herbicides began. On sunny days, the scene over the border in Vietnam's side, the air on trees was not clear. On the Chinese side, there were lush-green trees. The air was clear.

It is noted the trees that weren't sprayed with herbicides on the ground are healthy. It effectively blocks the haze that came from a distance. The haze in United States (see Figure 1) is produced by their self, not from other countries across the sea.



**Fig. 1. Light haze in the city and farmland of California (photos taken on Sep.25th 2015)**

**7. Comparison of severity of PM 2.5 pollution in United States and China:**

United States continued to spray herbicides since late 1960's. The herbicide, Agent Orange, which the American army used in Vietnam, has been generally accepted to be extremely toxic; Glyphosate replaced it as the most popular herbicide. This is similar to Agent Orange. According to our investigation, Chinese farmland had not vastly used herbicides until 1990's, when the technique was imported to China. The total farmland areas of United States and grassland exceed those of China. United States suffers several times more herbicide pollution than China. Haze in California cannot come from China.

Why the United States has much less haze than China? That may be due to the different geographical and climatic conditions from those of China. The mainland United States is generally flatter, and the south, west and east border face the sea. So sea breezes can easily go across the land. That's why United States has so many big winds and tornadoes. The fast moving air does not favor the accumulation of PM 2.5. Only part of the south and east border of China face the sea, the height of the west and north part is much higher. In the south costal and southwest parts are mainly hills and big mountains. The mainland of China only has one east outlet that faces the sea. The geographic condition favors the static atmospheres in which haze is easy to form.

The United States has much less haze than China. The poisonous gas from herbicides is much more than China, which seriously hurts American's health. The long island, for example (see figure 2), though no haze that day, All the plants are always unhealthy because of herbicides. Though it is near beach, people cannot feel fresh air there.

To remove of the herbicide pollution, the measures mentioned in our previous paper [1] can be used.



**Fig. 2. Unhealthy trees and grass in long island, New York (photo taken on Oct.13th 2015)**

#### **8. The influence of pollution from burning:**

Vehicle exhaust, factory emissions, and forest fires can produce some temporary pollution such as carbon particles, dust and some chemicals such as Sulfide Oxide and Nitrogen Oxide, since the filter techniques are much more advanced than in the past. If there are no herbicides, plants grow in good conditions. The cleaning ability of trees can be strong enough to digest the pollution fast. As mentioned in our previous study, some pollution substances such as carbon particles and dust can be even good for plants. There should be less air pollution than in the past. However, herbicides make plants unhealthy so that they cannot digest pollution, which make the condition even worse.

#### **9. Further discussion about remove herbicide pollution by burning:**

In our previous paper [1], burning firewood and garbage in special stove to remove herbicide pollution by decomposition in high temperature has been mentioned. The vent of the long chimney of the stove should be higher than the buildings. The air-in gate should be near the surface of the ground to let more poisonous gas in. For a house, the stove and kitchen can be set in the basement so that people live upstairs can free from the pollution from herbicides. We found that putting the ash that is produced by burning firewood, the herbicide-sprayed earth can reduce its pollution because earthworm and insects come out after continuously put the ash in the ground. The reason may be that the alkaline ash destroys the molecule of herbicides.

It also mentioned that burning garbage [1] is also a good way to remove herbicide pollution. Taipei waste incineration plate in Taiwan is a successful example. In the beginning, there was a lot of protest as people were afraid of burning pollution. Now it has become a very popular recreation park. It illustrates that when done properly, burning is good for the well-being of people. On the contrary, electricity and nuclear energy produces electrical waves and radiation, which are not good energy.

### **ACKNOWLEDGEMENT**

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### ATHOR INTRODUCTION

In September 1969, as most of intellectuals in the Xiamen City, Fujian Province, I went to the mountains near the junction of Jiangxi Province from Xiamen, Fujian province, to serve as a peasant for seven years.

In July 1976, I was recruited by Xiamen University and became the worker manager of a student canteen. In my young age, I always think about serving in work that is needed by society. So in late 1979, I went to work in the financial department of Xiamen University as an accountant.

At that time, as social stability and the life quality improved, what people need most was good health. The campus of Xiamen University has a beautiful beach that was good for winter swimming, which is an economical and time-saving sport. Since summer of 1979, I swam half an hour every day for many years. Sometimes I served as lifeguard. I encouraged people to join the winter swimming exercise for health. Many students and teachers benefited from the sports and had good achievement in their work.

In about 1990, the National Sports Administration launched "National Fitness Program". Running barefoot and swimming at the beach was a good exercise. However, because of no experience, nobody dare to organize such activities. Thanks to the support of many winter-swimming enthusiasts, from 1992 to 1999, winter swimming activities were held annually on the first day of the year. and received lots of praise. Having studied the weather conditions of beach for years, I found the Dragon Boat Festival, as the weather was usually good. The policy makers of Xiamen University appreciated through the reports of media, that barefoot beach running activities in Dragon Boat Festival can improve the school's reputation. In the Dragon Boat Festival of 1995 and 1997, under the approval of the school and the municipal Public Security Bureau office, it was held two times.

In late 1970's, the Computer Science Department was established in Xiamen University. I realized Office Automation would be popular in the near future. But no people believed me. After a few years, computers came to our office. Because I was the first talking about "Office Automation", I had to deal with it. However, the program was so poor that even I did not sleep. It was impossible to finish so much statistical work, summarizing, and printing of the data.

I thank God for giving me the wisdom. I thought about automating my work as well as the associated ones that belong to others to reduce work amount, which was also good for the university. So, I designed the project titled: Automatic Management System for Salary of the Crew of university. I invited Professor Lin, who specialized in software, to build a program which broke down in the improvement of initial testing stage. Professor Lin had no time to handle it. I had to check and correct the errors and do the supplement in the software by myself. In January 1989, the program successfully ran which also built bridges to floppy disks of other department in the university to realize data sharing. As far as I know, in mainland China, it was the first one automated in a large management system.

Then, based on my experience and under the guidance of Professor Li and Professor Sun who specialized in writing software, I wrote a paper titled: On The Problem of Computer Program Superiority In Accounting, which was published in the journal of Xiamen University (Natural Science) 1991,31(3):312-314. Two months later after it published, it was introduced by the magazine of Science and Technology Information Institute in Russia, as a novel and practical topic that was worthy to pay attention to.

After that, based on the experience in economic work for more than ten years and my views on social economic, under the direction of Professor Cai, who was responsible for checking the accounting thesis I wrote a paper titled: Talk About The Difficulties and Countermeasures in Financial Management of Universities, which was published in the Journal of Xiamen University (Arts and social science) 1996, 4, 35-39 and reprinted in full in an excellent thesis collection of by Renmin University of China about two months later. At that time, the views in my two paper were regarded as too whimsical and novel to be accepted by most of people. Now, 20 years has passed, my views have been proved to be correct.

Nearly 20 years ago, I knew from the media of mainland China, in the 1960s United States Army sprayed Agent Orange (a kind of herbicides) in Vietnam forests, which led to many disabled infants in Vietnam. The spirit of God shined on my heart. I realized spraying herbicides may cause air pollution. In the herbicide-polluted environment, doing exercise is harmful, which will lead to carcinoma, a genetic mutation.

At that time, my life started to get hard. Tragedies were probably going to happen at any moment. All the authorities in China do not think air pollution was serious. I did the investigation secretly in order to find methods to handle it. In the capacity of a beggar in China, I went into the ravines, the wilderness, water edge, remote mountainous areas, scenic areas, green belts, and forests to observe and interview people's experiences after sprayed herbicides. I then did some experiments near my house and in the countryside. I found the connection between herbicides and haze, and some methods to remove the pollution. I patiently wait for the opportunity. Finally I wrote down all my findings into the two papers.