## 4 INFORMING POLICY & PRACTICE

## CALL TO ACTION

- ✓ Sustain the efforts of the DA through Fertilizer and Pesticide Authority (FPA) in regulating pesticide-use through pesticide product registration, licensing of pesticide companies and other handlers, and DA-RFOs, SUCs and LGUs in continuous farmers' and consumers' education on food safety, and Good Agricultural Practices.
- ✓ Prioritize development of innovations in the regulation and monitoring of insecticide-use and promotion of less harmful or less toxic insecticides.
- ✓ Sustain funding for research and development (R&D) and commercialization of biological control agents, botanicals, and other biological and cultural pest management practices for highland vegetables.
- ✓ Support R&D on local pesticide formulation in collaboration with farmers. Encourage farmer-to-farmer extension on pesticide combination, ensuring safety, and considering the principles of human- and environment-friendly pesticide use and application.

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## ABOUT THE MATERIAL

Informing Policy and Practice is published quarterly by the Institute of Social Research and Development and R & E Publications Office of Benguet State University. It synthesizes findings from research and development activities, or presents results of quick survey and opinion poll on social, economic, and policy issues and concerns affecting the Cordillera region. It also distills the key messages and provides recommendations for the information and consideration of relevant stakeholders and policymakers.


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# Pesticide-Use Profile of Benguet Vegetable Farmers in 2019


*By Cheryll C. Launio and Mary-an J. Altaki*


## HIGHLIGHTS

- ✓ Most Benguet vegetable farmers use Category IV or practically non-toxic herbicides, but around 15% still use harmful or moderately hazardous herbicides.
- ✓ Almost 100% of farmers interviewed use Category IV or green-labeled fungicides, such as Mancozeb and Chlorothalonil. A few still use yellow or harmful fungicides.
- ✓ Majority of the Benguet vegetable farmers used Category II "moderately toxic" or yellow or "harmful" insecticides, such as Lambda-cyhalothrin, Chlorpyrifos, Cartap hydrochloride, Profenofos, Cypermethrin. This is a big improvement from the use of most toxic or Category I insecticides such as those reported in an earlier study.
- ✓ Highland vegetable farmers intensively use pesticides. Average pesticide use ranged from 1.19 to 2.53 kg ai/ha herbicides, 14.78 to 41.42 kg ai/ha fungicides, and 1.49 to 5.51 kg ai/ha insecticides. Insecticides and fungicides were mostly applied at intervals of 7 days, 5-days, or 3 days interval. Most herbicides were applied before planting.

## INTRODUCTION

The use of pesticides in Philippine agriculture, especially in the vegetable industry, continues to increase despite the adoption and promotion of integrated pest management in the 1990s and the good agricultural practices in the 2000s. The value of Philippine imports of pesticides were below USD 5 million from 1961 to 1975, increased sharply from USD 14 million in 1990 to USD 214 million in 2013 (Magcale-Macandog et al., 2016). Pesticide cost in vegetable enterprises comprise 3% to 6% of total production costs (BAS, 2012) and 6% to 15% in 2019 (Launio et al., 2021).

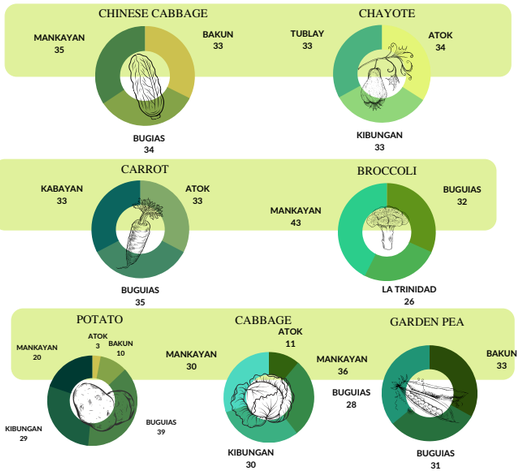
However, the extensive use of pesticides and the risks they pose to human health and the environment continue to be a focus of global concern and interest (Davis, 1993; Antle and Pingali, 1995). Literature in the Philippines documents environmental and health costs associated with pesticide use in vegetable production in the Philippines (Tirado and Bidoya, 2008; Lu, 2007; 2009; Cheng, 1994; Panganiban, 2005).

These pesticide residues can contaminate crops subsequently grown on the same parcel, and can eventually contaminate groundwater which is the source of drinking water. Also, pesticides harm the environment because they kill non-target organisms, wildlife, birds, fish, bees and beneficial insects, and pest's natural enemies (Panganiban, 2005). The same author further argue that pesticide use leads to loss of biodiversity and upsets delicate balance of ecosystems. Such evidences indicate that while pesticides play a significant role in food production and security in the country, efforts toward sustainable agriculture practices and protocols need to be supported.

This brief presents an update of the pesticide use and pesticide profile of Benguet highland vegetable farmers based on 2019 farmers' survey. It shows the common type of insecticides, fungicides and herbicides used; average amount used; and associated practices. The study is limited in that data is from interviews and no actual measurements were done.

## DATA AND SOURCE

Data for this descriptive paper were based on the farmer survey conducted using face-to-face interviews in 2019 under the DA-BAR-funded project "Highland Vegetable Value Chain Analysis for Policy Formulation and Future Impact Evaluation of Agricultural Trading Centers." There were a total number of 704 farmer-respondents covering seven major highland vegetable crops and eight municipalities. Sampling design was multi-stage: first, the top three municipalities were selected based on the area planted to the crop; three barangays from the sample municipality randomly sampled; and 10 households randomly sampled from households planting the crop in the sample barangay .




*Distribution of respondents across the selected crops and municipalities*

For the classification of pesticides used by farmers, this brief mainly uses the Philippines Fertilizer and Pesticide Authority (FPA) classification table of pesticide toxicity categories, sometimes referring also to the World Health Organization (WHO) classification of pesticides by hazards adopted from the Acute Toxicity Hazard Categories from the GHS (WHO, 2019).

The GHS classification are as follows: Ia-extremely hazardous, Ib-highly hazardous, II-moderately hazardous, III-slightly hazardous and U-Unlikely to present acute hazard.

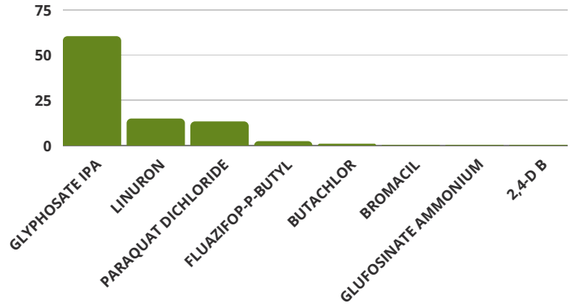

*Philippine FPA classification of Pesticide Toxicity*



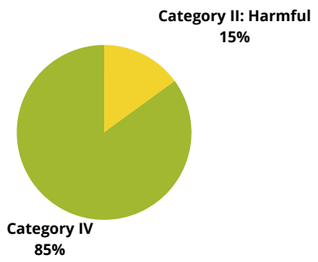
## FINDINGS

### Most farmers use green category herbicides, but around 15% still use harmful or moderately hazardous herbicides

Overall, only 15% of the highland vegetable farmers use yellow category (warning: harmful) herbicides. More than 70% of broccoli, cabbage, Chinese cabbage, and potato farmers while 91% of chayote farmers use post-emergent Glyphosate IPA classified as green under the FPA classification and "unlikely to present acute hazard" under the WHO classification. However, around 20% of farmers planting these crops still use Gramoxone, which is categorized yellow or moderately hazardous. Paraquat, the active ingredient in Gramoxone, is a restricted pesticide in the Philippines (FPA, 2021). In the case of carrots, majority (58%) use Linuron and 7% use Fluazifop-p-butyl which are classified blue or caution or slightly hazardous. Most farmers use herbicides before planting. Linuron is commonly applied 30 days after sowing, mostly for carrots.




*Most commonly used herbicide active ingredients in Benguet vegetable farms (% of responses)*

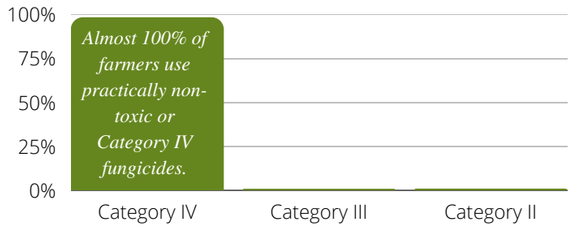



*Toxicity level of herbicides used by Benguet highland vegetable farmers*

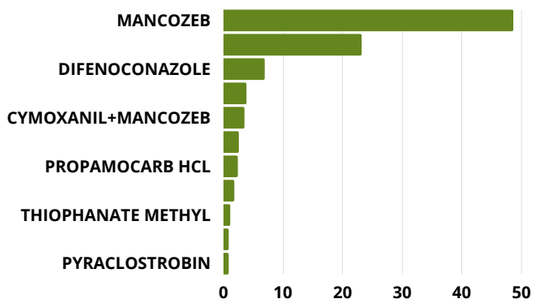
### Almost 100% of farmers use practically non-toxic or Category IV fungicides

Majority of the Benguet farmers interviewed used toxicity Category II "moderately toxic" or yellow or "harmful" insecticides, such as Lambda-cyhalothrin (mostly Bida, Kriss, Karate), Chlorpyrifos (mostly Lorsban®, Siga®, Brodan®), Cartap hydrochloride (mostly Padan®, Voltz®), Profenofos (Selecron®), Cypermethrin (mostly Magnum®, Sabidong®). This pesticide use status in Benguet vegetable farms is a big improvement compared to the results of Lu (2011), which presented that 47% and 13% of Benguet farmers use Tamaron® and Matador®, which are classified "most toxic" or Category I. In this study, only one respondent

Farmers planting chayote appear to not apply any fungicide. However, unlike Lu (2011) who showed that farmers only used fungicides with toxicity Class of III and IV, this survey indicated the emergence of the use of systemic fungicides with toxicity Level II such as Cabrio® with active ingredient Pyraclostrobin and Level III such as Triforine although only less than 1% each of the total respondents. Fungicide applications are mostly done every 7 days (34%), every 5 days (22%), and every 3 days (13%).




*Toxicity level of fungicides used by farmers*




*Top ten fungicide active ingredients used (% of total 1265 responses)*

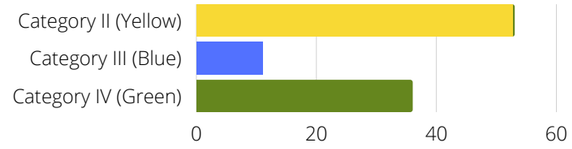
| Fungicides | Frequency of application | |
|---|---|---|
| | Most common | Range of interval |
| CHLOROTHALONIL | every 5 days | every 3 days to every 14 days |
| DIFENOCONAZOLE | every 5 days | every 2 days to every 14 days |
| MANCOZEB | every 7 days | every 3 days to every 14 days |

*Frequency of fungicide application*

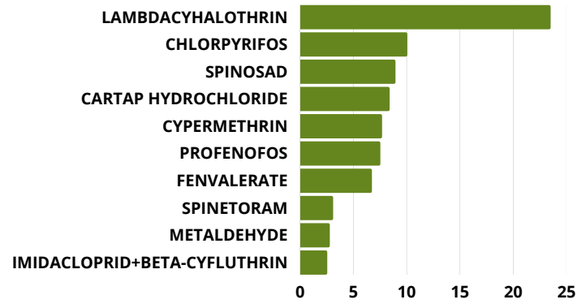
### Majority of Benguet farmers use harmful or "moderately toxic" insecticides, but use of red-labelled insecticides almost zero

There are 84 different brands of fungicides mentioned by the farmers interviewed. Most (97%) use green-labeled or toxicity Category VI pesticides, which are practically non-toxic as they are only deemed "dangerous if not properly used". Majority of the farmers for any crop apply Mancozeb, a carbamate pesticide that comes in various brands such as Dithane®, Manager®, Rainfast®, Torogi Blue®, and others.

reported using Tamaron®. A few reported using Methiocarb, Carbofuran, and Methomyl, which are classified as "highly hazardous" based on the WHO classification, although still under toxicity Category 2 under the FPA classification. The survey shows a wide diversity of over 120 brands of insecticides being used by farmers. Insecticides were mostly applied at 7 days- (29%),5 days- (26%), or 3 days-interval (15%). Around 5% explicitly mentioned mixing insecticides with fungicides in one application.




*Toxicity level of insecticide used by farmers*




*Top ten insecticide active ingredients used (% of total 1175 responses)*

| Insecticides | Frequency of application | |
|---|---|---|
| | Most common | Range of interval |
| LAMBDACYHALOTHRIN | every 7 days | every 3 days to every 15 days |
| CHLORPYRIFOS | every 7 days | every 3 days to every 15 days |
| SPINOSAD | every 5 days | every 3 days to every 14 days |
| CARTAP HYDROCHLORIDE | every 5 days | every 2 days to every 10 days |
| CYPERMETHRIN | every 7 days | every 3 days to every 7 days |

*Frequency of Insecticide Application*

### Highland vegetable farmers intensively use pesticides as seen in the average total kg or L a.i.

The average total pesticide use in highland vegetable farming is high, especially fungicide and insecticide use. For example, vegetable farmers use an average of more than 10 to 40 kg or L a.i./ha per crop cycle, compared to rice where the average amount of insecticides and molluscicides used is only 0.31 to 0.34 kg a.i/ha. (Beltran et al, 2016).

| Items | Broccoli | Carrot | Cabbage | Cha-yote | Chinese Cabbage | Garden Pea | Potato |
|---|---|---|---|---|---|---|---|
| n | 101 | 101 | 99 | 100 | 102 | 100 | 101 |
| Area planted (ha) | 0.39 | 0.39 | 0.55 | 0.56 | 0.37 | 0.26 | 0.48 |
| Pesticides (kg/ha) | | | | | | | |
| Herbicides | 2.02 | 1.59 | 2.53 | 1.19 | 1.90 | 2.30 | 2.27 |
| Fungicides | 19.46 | 21.69 | 19.27 | 0.00 | 14.78 | 18.62 | 41.42 |
| Insecticides | 5.51 | 1.49 | 3.32 | 0.00 | 3.08 | 3.36 | 2.24 |
| Rodenticides | 0.0031 | 0.01 | 0.001 | 0.02 | 0.002 | 0.00 | 0.02 |

*Average pesticide use (kg or L a.i./ha) by crop*