



**EXTENSION ACTIVITY
ACCOMPLISHMENT REPORT**

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I. BASIC INFORMATION:

Activity Title : **Webinar on Research Results in Arabica Coffee and Microbes in Organically Grown Vegetables and Strawberries**

Date and Venue : **March 25, 2022; Carnation Hall, R&E bldg., La Trinidad, Benguet**

Target Participants [Type & Number] : **A total of 247 participants (Farmers, LGUs, NGOs, Faculty, Researchers, Students and other Stakeholders):**

- 40 Face to face participants
- 10 Training Management Team
- 197 Online Participants

Estimated Cost : **PHP 15,000.00**

Fund Source : **BSU-ORS**

Proponents/Implementors : **BSU-HERRC, BSU-ORS & BSU-College of Agriculture**

Cooperating Agencies/Units : **N/A**

II. REPORT:

A. Rationale

In the pursuit of Benguet State University's mission *i.e.* to challenge innovation and advancement of technology and facilities, the R&E sector through the various centers is earnest in its mandate to conduct research, and development and extension activities to help improve livelihood and income of the people within its service communities. BSU research focuses on the improvement of crop management practices, farming systems, generating new varieties, machinery/equipment, and value-added products. The university also continues to generate new information, products and policy recommendations. For the research outputs to be meaningful, it needs to be disseminated through various platforms such as publication of article/journals, and presentation during trainings and seminars. Two of the researches under HERRC (Higher Education Regional Research Center) which generated technologies and information are the "R and D Program on Arabica Coffee in the Cordillera Administrative Region" funded by CHED-HEDF and "Monitoring Microbes of Public Health Importance in Organically Grown Strawberry and Vegetables" funded by CHED DARE TO. In line with this, the HERRC in collaboration with the Office of Research Services (ORS), and the College of Agriculture, will conduct a seminar/webinar to present the research outputs of the abovementioned research projects to various stakeholders.

R&D Program on Arabica Coffee in CAR

Coffee is one of the top priority crops in the CAR. Among the cultivated coffee species, Arabica is the most popular though other species exists (BPI, 2006) with *Arabica typica* being the best variety planted in the Cordillera for the past 100 years (Killip, 2010). Arabica coffee is also regarded as one of the promising industrial crops in the Cordillera highlands as it is adapted to high elevations between 1,300- and 1,500-meters altitude of the region. The Coffee Foundation Institute of the Philippines reported that the Arabica coffee produced in CAR is of the best quality comparable to top Arabica coffee producing countries in the world while the Philippine Coffee Board Incorporated stated that Benguet province is one of the sources of best Arabica coffee beans (Cordillera Coffee Industry Development Plan 2016-2022, 2016).

Coffee production in the Cordillera accounts to 7% (5,464.82 mt) of the total country's production. Compared with the national average of 0.3 t yield, the region showed better



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productivity although production was found to be declining in the past 10 years. Kalinga was the largest producer of 68%, 19% from the Ifugao province, 9% from Benguet and Mountain Province while 3 and 1% are contributed by Apayao and Abra provinces, respectively. Arabica coffee is largely produced in Benguet and Mountain Province while Robusta is mainly produced in Kalinga and Ifugao while Liberica is produced by the province of Abra only (Cordillera Coffee Industry Development Plan 2016-2022, 2016).

Thus, the R & D Program on Arabica Coffee in the Cordillera Administrative Region (CAR) was implemented to enhance the sustainability of the coffee industry through conservation and determination of the suitable farming practices for growing Arabica Coffee in Benguet and Mountain Province. It is composed of five projects implemented from November 2017 to April 30, 2020.

Monitoring microbes of public health importance in organically Produced Lettuce and strawberry in Benguet Province

Benguet is the primary producer of temperate vegetables in the Philippines. Around 31,000 hectares of its land area is used for vegetable cultivation, with over 471,200 tons of vegetables produced per annum (Batt *et al.*, 2007). Among the significant vegetable products of the province are the salad vegetables that are often consumed raw. Growing health consciousness among consumers has increased the demand for these vegetable products, with the more health-conscious populace preferring organically grown vegetable products. These past years have seen some diversification in the agricultural practices of vegetable farmers in the province in response to this demand.

Organically grown fruits and vegetables can be fertilized with natural nutrients such as animal manure, plant debris (green manure), fish emulsion, and kelp. Since animal manure is a commonly used fertilizer in organic vegetable production, organic fruits and vegetables may have a higher risk of contamination with pathogens that farm animals carry in their gastrointestinal tracts than those grown conventionally. *Salmonella* caused most reported outbreaks, *Escherichia coli* O157:H7, *Shigella*, and *Listeria monocytogenes* (Reddy *et al.*, 2015; Mazaheri *et al.*, 2014; Koseki *et al.*, 2011; Mukherjee *et al.*, 2004); a few outbreaks have also been linked to viruses such as hepatitis A virus and noroviruses, and parasites such as *Giardia lamblia* (Cheong *et al.*, 2009; Dubois *et al.*, 2007;).

Many factors can contribute to microbial contamination throughout the production and packaging of fresh produce. Machado-Moreira *et al.* (2019) provide a summarized view of potential sources of microbial contamination of fresh produce. Potential pre-harvest sources of contamination include soil, feces, irrigation water, water used to apply fungicides and insecticides, dust, insects, inadequately composted manure, wild and domestic animals, and human handling (Beuchat, 1996). Post-harvest sources of contamination include feces, human handling, harvesting equipment, transport containers, wild and domestic animals, insects, dust, rinse water, ice, transport vehicles, and processing equipment (Burnett and Beuchat, 2001).

Moreover, the seminar specifically aims to present the results and findings of the projects to the public which includes researchers, local government officials, line agencies, and State Universities and Colleges whose interests are relevant to the results of these researches. This webinar/seminar also aims to tap shoulders with professionals whose interests are aligned to the preservation of Arabica coffee and enhancement of the agro enterprise development of Arabica Coffee industry in Benguet and Mountain Province and the documented farming practices and bio-physicochemical assessment of soil and irrigation water of organic farms producing lettuce and strawberry in Benguet province.



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B. Objectives

Generally, the activity aims to present the outputs of the completed projects under HERRC to different clientele including farmer cooperatives, line agencies, local government units, universities and colleges in the Cordillera Region, and fellow-researchers in the university.

Specifically, it aims to:

1. Present research highlights to line agencies, LGUs, farmer cooperatives, CARASUCs, and other clientele.
2. To obtain recommendations or feedbacks on research gaps in Arabica coffee in CAR and microbes and parasites of public health importance in lettuce and strawberry produced in Benguet Province.

C. Type and Number of Clients

The activity was attended by 247 participants, 50 individuals joined on-site while 197 individuals joined on-line via Zoom and Facebook livestream. The on-line participants were composed of farmers, students, teaching and non-teaching personnel from the academe and different local government units, private institutions and other interested individuals from different municipalities/cities and provinces of the Philippines such as Benguet, Baguio City, Abra, Apayao, Ifugao, Kalinga, Mountain Province, Nueva Vizcaya, La Union, Nueva Ecija, Isabela, Catanduanes, Ilocos Sur, Butuan City, Rizal, Pampanga, Davao del Sur, Bataan, Iloilo City, Albay, and Quezon City.

D. Methodology

The activity was held on March 25, 2022. The venue and equipment were arranged on the 24th of March 2022 at 3:30 pm to 5:00 pm. The webinar was conducted at the Carnation Hall, Research and Extension Building where the resource speakers presented their respective topics onsite (2) and online (1). The webinar was opened to all interested participants. It was advertised through the centers' Facebook account a week before the day of the webinar. The webinar was live-streamed in the Center's official Facebook account and via Zoom. The speakers were given sufficient time to discuss their topics. After each presentation, an open forum was conducted where resource speakers and invited panelists answered queries from the participants. For online participants, comments and queries were written in the chat box section of the zoom and comment's section of the Center's Facebook account.

E. Brief Summary of Accomplishment:

The activity started with an invocation followed by the singing of the national anthem through audio-video presentations (AVP).

Dr. Belinda A. Tad-awan, the director of the Office of Research Services welcomed the guests, participants, and resource speakers. She stated that the webinar was the "first of a series of seminars" to be conducted by the R & D Sector after its three-year hiatus which was revived with the effort of the different R&E sectors, institutes and colleges of the university. She further stated the objectives of the webinar which were: to disseminate research outputs to the various university stakeholders; obtain feedback for the improvement of researches and as well as the researchers; strengthen and improve the modalities of the dissemination of such research results and adoption of the research products; and to establish or strengthen existing linkages with the different government offices, organizations and other stakeholders of BSU. Dr. Tad-awan also mentioned that she was delighted and honored that the participants from various stakeholders of



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the university were interested in attending the webinar where all stakeholders of BSU come together in partnership for a common good. She also encouraged everyone to accelerate and exchange ideas and scale up the production of crops such as Arabica Coffee, organically grown vegetables and strawberry.



Dr. Romeo A. Gomez Jr., the Vice President for Research and Extension also delivered a message. He acknowledged the participants, both on-site and online, for attending the webinar. He mentioned that the webinar was a cross-sectional representation of society where everybody could acquire knowledge and information about the completed researches of the university. Dr. Gomez also said that it is a way of demonstrating the maturity and the continuing impact of the RDE activities of the university. He also mentioned that such activities will propel us into higher levels of engagements in order to capacitate not only the workers but also offering better services to the university's stakeholders.

Dr. Nordalyn B. Pedroche, the Director of the Higher Education Regional Research Center gave an overview of the activity. She mentioned that three topics will be presented, first was the production and post-harvest of the Arabica coffee. Second was the biocontrol agents against pests and diseases of Arabica Coffee. Lastly, the present microbes in the organically produced fruits and vegetables and the diseases we can get by eating contaminated fruits and vegetables. With the mentioned topics, she hoped that participants could apply what they learned in the webinar when they go back to their farm.



Dr. Nordalyn B. Pedroche also served as the first speaker. She presented the topic on "Research Results for Arabica Coffee" which was an R&D Program on Arabica Coffee in the Cordillera Administrative Region funded by the Commission on Higher Education (CHED). She briefly presented the history of the coffee. Dr. Pedroche also discussed the different Arabica coffee varieties, sustainable Arabica coffee-based agroforestry system, development of Arabica Coffee Pulp Wine (Cascara Wine), strategies in order to push the Cordillera Arabica Coffee Industry and the Arabica Coffee Agro-enterprise.

Dr. Gemma S. Das-ilen, Assistant Professor III of the Department of Plant Entomology - College of Agriculture, served as the second resource speaker. She presented the topic on "Biocontrol-based Strategies in Arabica Coffee". She discussed the major and other insect pests associated with the Arabica coffee such as the scale insect, coffee berry borer, and aphids. Dr. Das-ilen also presented the different parasitoids, predators and pathogens associated with arabica coffee pests. She also elaborated on the different diseases of arabica coffee and the identified microorganisms as potential bio-control agents.

Dr. Sherlyn C. Tipayno, the last resource speaker presented the topic on "Microbes of Health Concern in Organically Grown Vegetables and Strawberries". The topic was the results generated from the research study titled: "Monitoring Microbes of Public Health Importance in Organically Grown Strawberry and Vegetables". She enumerated the present pathogenic microorganisms or bacteria found in the organically grown vegetables and strawberry in Benguet. She also shared where the microbes originated and how they are being transferred to the organic crops. Identified causes of the contamination were the animal manure used as a fertilizer and the



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water that they are using in watering their crops. Lastly, she recommended that before consuming organically grown fruits and vegetables, we have to wash it thoroughly.

The activity was formally ended by Dr. Janet P. Pablo, the dean of the College of Agriculture with her closing remarks. She expressed her gratitude to the resource speakers and participants. She said that Coffee is an all-season friend, an all-ready crop, and an economic driver. She also emphasized the importance of awareness in the farming management of the produced commodity to ensure the safety of the consumers. She then concluded with a quote from Jackie Chan: "Coffee is a language itself".



Figure 1. Resource persons with some of the on-site participants after the activity.

Table 1. Collated questions and answers during the open forum.

| Questions/Comments | Answer |
|--|--|
| First Topic on: Research Results in Arabica Coffee | |
| <p><i>Mr. Donnel Tiedra:</i> Are these varieties registered in Bureau of Plant Industry (BPI)?</p> | <p><i>Prof. Andres Basalong:</i> Yes, we have only two (2) varieties registered by the Bureau of Plant Industry-Baguio, the Yellow and the Red Bourbon. We are also trying to register the varieties we have here in the Benguet State University. We have been conducting meetings with the panel of evaluators of the varieties that we have submitted. The criteria were changed in presenting the morphological characterization of these varieties so there was a delay in the approval of the registration.</p> <p><i>Prof. Valentino Macanes:</i> We are in the process of registering the other varieties while the others varieties were already registered as told by Prof. Basalong. It was already registered by the Bureau of Plant Industry-Baguio and we are hoping that the BSU-IFHSA will be able to register the other varieties. When we did the initial registration of our varieties here in our university in 2016, there were requirements that they were asking. We are continuously attempting to register these varieties through Prof. Basalong. Thank you very much.</p> |



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| | <p><i>Dr. Nordalyn Pedroche:</i> Like what sir Basalong mentioned earlier, it was already published in NSIC website for Variety Plant Protection. There were several varieties already applied for by sir Basalong and I have read the published material. It is already published as one of the varieties to be protected. You can also see that information sa NSIC. Makikita niyo po kung ilan yung mga varieites na na-apply na namin sa NSIC.</p> |
| <p><i>Mr. Donnel Tiedra:</i> I hope we can also try these varieties here in Mindanao, or you can also conduct trials here.</p> | <p><i>Dr. Nordalyn Pedroche:</i> Anything is possible with the right support. However, we need to discuss this in a serious manner with the university and the researchers. Should they be willing to conduct it in Mindanao. But of course, we are open to collaboration.</p> <p><i>Prof. Valentino Macanes:</i> Yes, in fact, coffee farmers from Mindanao and Visayas have been getting Arabica Coffee seeds from our university since 2000. We also did studies together with the Cavite State University and we have collected different Arabica varieties from Mindanao and we have planted it here at Benguet State University. Further, research on Arabica coffee through collaborations will be most welcome. Research and Development for coffee is integrated in the enhanced Philippine National Coffee Roadmap 2021.</p> |

Second Topic on: Biocontrol-based Strategies in Arabica Coffee

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| <p><i>Mr. Jeem Carlo Pula (UNP):</i> Is there also a need to give fertilizer to coffee plants? Because coffee plants may also experience nutrient deficiencies that may lead them to be prone or vulnerable to different diseases. Thank you.</p> | <p><i>Prof. Alexander Fagyan:</i> With our findings, the nutrient cycling in the coffee growing areas can provide some of the nutrients. However, it is supplemented with the organic fertilizer. There is a need also to apply fertilizer. The farmers are not applying fertilizer but rather depend on the leaf litters that are dropped in the surface of the coffee plantation. Another soil characteristics that constraints the production is the soil pH. It is extremely acidic with a pH of 3.3 here in Puguis and Talinguoy. They can apply lime on soil. They can apply fertilizer to support the nutrient content. If the nitrogen content of the soil is very low, leaves are very succulent especially during the vegetative growth of the coffee plant that are vulnerable to attack of pest. We really have to apply fertilizer for the coffee plants.</p> <p><i>Addition from Prof. Valentino Macanes:</i> Yes, you have to put fertilizer. In the enhanced coffee roadmap 2021, we have really pushed for fertilization of coffee not only Arabica coupled with irrigation. These practices are lacking in our farmers. We have been talking fertilization of our coffee plants to increase not only the resistance against pest and diseases but also the yield. Our farmers really depend on the natural soil fertility. In other countries which are coffee exporters, despite a very small area of production, but because of</p> |
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| | <p>fertilization and irrigation, they have improved the yield. It could also improve the cup quality of the coffee.</p> <p><i>Dr. Bernard Tad-awan:</i> Yeah, it is necessary to fertilize or apply fertilizer. You have to integrate organic fertilizer (not in-organic) with that of lime. It has to be organic because we need to provide the amount as needed by the coffee plants but at the same time not compromising the soil properties.</p> <p><i>Prof. Andres Basalong:</i> Trying to connote to the statement of Prof. Fagyan that we should apply organic fertilizer and refrain from inorganic fertilizer for the protection also of the natural enemies especially the microorganism that are present in the soil. We would like to promote the diversity of beneficial microorganisms in the soil. It is also good to note that we have isolated rhizobacteria isolated from the rhizosphere of the coffee plants. We would like to promote the abundance of those by using organic fertilizer.</p> |
| <p><i>Ms. Catherine Canam:</i> I've been hearing of <i>Beauveria bassiana</i> for almost like 5 years now. I am a coffee farmer and one of the major pests in my farm is the cherry borer. Pwede yung <i>B. bassiana</i> right? Is it not really commercially available or ada ba pag-alaaan dito Benguet sir?</p> | <p><i>Prof. Andres Basalong:</i> For the <i>B. bassiana</i>, it is not really commercially available so we are producing it in the laboratory as per request by our clients. We are maintaining it in our BSU-Plant Health Clinic. You can obtain that by arrangement to our laboratory personnel. The same is true with the Trichoderma. The cherry borer was not reported because it has not been considered as a major insect pest. But to some areas, we observed that it is prevalent especially the moth stem borer and not the cherry borer. But as to the distribution in the coffee growing areas here in the Cordillera, hindi naman masyado.</p> |
| <p><i>DENR-CAR:</i> The Forestland Management Project of DENR-CAR is establishing a Coffee Production and Processing Value Chain in Ifugao (Banaue, Asipulo and Lagawe municipalities). Is it possible to collaborate with you re this initiative and how po? Coffee Upland farmers in Ifugao also encounter similar pests and diseases in their plantation and it would help them greatly if you could share these valuable knowledge and information to them as a capacity building initiative. Thank you very much and more power po!</p> | <p><i>Prof. Andres Basalong:</i> we are ready to work with anybody who would like to work with us because that is the mandate of the Institute of Highland Farming Systems and Agroforestry (IHFS). We would like to promote Arabica coffee production within the Cordillera region and to other areas of the Philippines where Arabica is favorable to be grown. If you would like to work with us then we will have a memorandum of agreement and we will push through with the program.</p> <p><i>Prof. Valentino M. Macanes:</i> Yes, we have been going around, not only in CAR but the whole country lecturing and promoting our technology on agroforestry, Arabica coffee pine tree agroforestry system, that is what our university is known for. In fact, even internationally. We are open for further collaboration and also as part of our extension. We have been there, especially in the rice terraces area. On the top of the area, may mga Arabica coffee sila. Ang maganda pa doon ay <i>Typica</i> ang kanilang variety which we would like to preserve because parang this <i>Arabica typica</i> is our heirloom coffee.</p> |



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| <p><i>DENR-CAR:</i> We follow the holistic watershed management approach po so they are located in Upper Ibulao, Lamut, Cadaclan and Lagawe Subwatersheds. Thank you very much po and looking forward to it.</p> | |
| <p><i>Mr. Jefferson Himson (KSU):</i> Sir, do we need to promote use of Nano fertilizer, because it's hard to fertilize coffee farms in Cordillera due to the topographic characteristics of the areas. The same with the problem of establishment of irrigation system.</p> | <p><i>Dr. Janet Pablo:</i> With regards to fertilizer application as mentioned by sir Andres na any form or the different types and kinds of fertilizer can be used. For the nano fertilizer, it's actually on the amount. But if you are going to use those that the quantity that is placed in carriers and of course including the mode of release from the carrier. Basically, for coffee, we can use any form of fertilizer material based on the recommended rate. If there are available nano forms of fertilizer in the locality which is affordable then you can use. But, still following the recommended rates and looking into the proper timing of application. This is very important because the release of these nutrients is very precise.</p> <p><i>Prof. Valentino Macanes:</i> What I understood in nano fertilization and even in irrigation is parang precision agriculture ito. You only put the right amount at the right time so that there will be no leaching and dripping (for chemicals). If we could do that the better. If we do this precision agriculture in coffee, then why not.</p> |
| <p><i>Dr. Belinda Tad-awan:</i> With regard to the R&D Program on Arabica Coffee funded by CHED which was just concluded, we can include HERRC. We are now on the process of disseminating information and technologies to our stakeholders. If you are interested in disseminating to your colleagues or constituents, then you can write us a letter inviting us so that we can disseminate all the information we have researched on or the results. We need an official invitation from your agency. The researchers can go to your respective places if you are interested. It's part of disseminating all the research results which we have generated from the program.</p> | |
| <p>Third Topic on: Microbes of Health Concern in Organically Grown Vegetables & Strawberries</p> | |
| <p><i>Dr. Nordalyn Pedroche:</i> Yung threshold, kapag nandiyan na siya, malaking problema na ba natin siya? Or is there a certain population by which our digestive</p> | <p><i>Dr. Sherlyn Tipayno:</i> The sources usually of <i>E. coli</i> is in water or food that we take in. For <i>E. coli</i>, it should not be present in the food or water that we take in. Our body has our own defense mechanisms, so kung okay lang yung defense</p> |



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| <p>system or immune system can actually tolerate?</p> | <p>mechanism mo, you have a very good population of good microbes in your system that may challenge them. But the standard is, it should not be present at all.</p> |
| <p><i>Ms. Catherine Bagsan:</i> Based on you research results, it is dangerous to eat always fresh lettuce and strawberries because they carry the microbes that can affect our health.</p> | <p><i>Dr. Sherlyn Tipayno:</i> our samples were collected after harvest and there are some things that we can do to eliminate them. So far, sa health system natin wala pa namang matinding kaso na confirmed na contamination or infection because of ingesting vegetables in our area. There are ways by which we can prevent them prior to consumption such as proper washing. Definitely, it is not advisable that you eat them right away after picking them.</p> |
| <p><i>Prof. Valentino Macanes:</i> Kapag inilabas natin ang result ng study natin, hindi kaya affected ang production and even sales ng mga farmers natin?</p> | <p><i>Dr. Sherlyn Tipayno:</i> We actually want to share the information with the farmers because it's better that we know and we can do something about it. With regards to farming practices, farmers can shift their management and minimize their presence. The information is for the farmers to make necessary adjustments in order to minimize them. In conventional farming, these microbes can also be found. If you want to maintain the reputation of our product, it is also important that we have to be open to the microbial quality also so that their presence can be minimized. Hindi po namin i-papublish yung mga pangalan ng mga farmers dito. We present these results particularly because of the situation of the farm and the practices being employed.</p> |
| <p><i>Prof. Valentino Macanes:</i> Have you disseminated this sa farmers natin? Sa atin muna? We have to invite you one time so that at least malaman din nila. Dito sa Balili and sa swamp area? Have you disseminated this already?</p> | <p><i>Dr. Sherlyn Tipayno:</i> We disseminated it first to the farmers that we worked with in the research kaya iyong recommendation namin, sana may regular na monitoring talaga para yung product sa ating municipality or province, may monitoring din with regards to microbial contamination. Kahit na sabihin natin sa farmers, for example if we go to the farmers in swamp and tell them, your water is contaminated or your soil is contaminated, where will they get their water? I think it should be a concerted effort of the community as well as the leaders or the local government maybe in also ensuring that the farmers are being provided with clean irrigation sources.</p> |
| <p><i>Mr. Jethro Gapasin:</i> Is water chlorination recommended to disinfect water for agricultural purposes?</p> | <p><i>Dr. Sherlyn Tipayno:</i> I'll be talking in terms of microbial presence and I would say yes. In terms of whether it is advised in general to use chlorinated water for irrigation maybe someone from the soils department could answer that. In terms of microbial control, yes it is. Some plants however maybe sensitive to the presence of Chlorine and yung ionized formula kung nag-interact na sa soil, so hindi ko alam kung ano yung possible effect sa growth niya, pero pag sa pagmimize ng mikrobyo, it is. Yung level niya kailangan yung recommended lang, hindi naman yung masyadong mataas.</p> |



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Figure 2. On-site participant asking questions and screen shots of queries of online participants from Zoom chat box during the open forum.



Figure 3. Members of the panelists answering questions from participants during the open forum.

F. Actual Financial Report:

| Particulars | QTY | Amount | Estimated Cost [PhP] | Fund Source |
|----------------------------|--------|----------|----------------------|----------------|
| Meals & Snacks: | | | | BSU-ORS |
| AM Snack | 50 pax | 60.00 | 3,000.00 | |
| Lunch | 50 pax | 180.00 | 9,000.00 | |
| Tokens: BSU Products | 3 pax | 1,000.00 | 3,000.00 | |
| TOTAL | | | 15,000.00 | |

G. Highlights of Evaluation:

The activity was conducted to present the research results of the R&D program on Arabica Coffee and microbes of health concern in organically grown vegetables and strawberries. In



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addition, to obtain feedback from the various university's stakeholders to improve the researches and enhance the capacity of researchers.

Participants in the webinar were composed of teaching personnel or faculty researchers (22.5%), non-teaching (28.3%), students (28.3%) and other interested individuals (20.9%) which included LGUs, farmers, NGOs, private sectors, business owners from various places in the country. Resource speakers and panelists were the project proponents from the Benguet State University.

Majority of the participants rated the activity from "very good (27.3%) to excellent (71.7%)" based on the evaluation conducted right after the activity. Some of the participants' significant learnings were as follows:

- The different varieties of coffee, its pests and diseases including the management and control.
- Learned about microbes associated with organically grown vegetables and strawberries.
- The different insect pests of Arabica Coffee and the natural enemies/beneficial microorganism (parasitoids and predators) used as bio-pesticides against pests of coffee.
- Awareness to microbial contamination of agriculture fresh produced.
- Coffee varieties that have excellent cup qualities.
- The significant learnings that I acquired is that coffee can be planted under sayote. I also learn that coffee parchment can be processed into wine. I also learn about the fertilization of coffee and etc.
- The challenges in coffee production. Farming activities can be improved to minimize microbial pathogens going to the "table".
- The various economic problem and microbial concentration encountered by Benguet farmers.
- Different coffee varieties with recommended processing practices, insect pests and diseases. Presence of microbes in strawberry and lettuce and recommended management.
- Role of different microorganisms as biological pest control.
- The significant learnings I have acquired in this activity include the importance of research (technology, characteristics and pest) for the improvement of the quality and yield of the different crops like the Arabica coffee, strawberry and organic vegetables. Thus, research results should be disseminated to the growers/farmers.
- "NOT SAFE TO ALWAYS EAT FRESH LETTUCE AND STRAWBERRY".
- I've learned a lot more about the topics on Arabica Coffee and Microbes in Organically Grown Vegetables and Strawberries. Importantly, learnings on the various methods, management or strategies, and practices being presented or discussed that we can apply for better production and higher yield of coffee and other crops (organically grown).
- "I learned how microorganism can be beneficial or detrimental to coffee plants and other organic plants. In addition to this, I also learned that we could still apply "organic" fertilizers to organic plants. However, we should first make sure to test the pH and other surrounding factors that may affect the plant before applying. We should conduct an analysis of the environment of the plant.
- I had also noted the importance of *Beauveria bassiana* and the limitation of its use.
- I was convinced that microorganisms could also be tools for the survival and healthy growth of plants such as coffee and strawberries. However, limitations of their uses should be well noticed to avoid farming failures 😊 😊.
- Possible improvements we can apply to our vegetable production, sources of contaminants. Control measures against coffee pests.
- I have learned that most of the coffee varieties planted in CAR has a very good cupping quality, and that coffees can be planted under shaded and open areas which farmers always ask during our field days.
- I learned that Organic as well as cultural activities are recommended for us to use in order to improve coffee, vegetable and strawberry crop production. The same from the other crops aside from the presented crops in this webinar.



**EXTENSION ACTIVITY
ACCOMPLISHMENT REPORT**

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- I learned that there are many cultivars of Arabica Coffee and the different microbes in organically grown vegetables and strawberries are quite alarming.
- The different use of entomopathogenic fungi that are naturally available in the environment.
- Thankful to this significant webinar/activity of which new knowledge acquired on morphological characterization of coffee varieties; beneficial microorganisms and arthropods that can be used to manage coffee diseases and insect pests and microbes/contaminants of organic vegetables which needs an awareness dissemination to prevent health risks.
- The significant learnings that I have acquired from the activity includes the importance of conducting research on the different crops like coffee, strawberry and organic vegetables. It is important to know their characteristics and pest. In addition, information dissemination is also important.
- I learned more about various ways, techniques/methods, practices being presented or discussed for better productivity and higher yield /income of coffee, vegetables (organically grown) and other crops that we could apply.
- Good agricultural practices lead to food safety.
- I have learned that a coffee can have a life span of 100 years, can be processed into wine, and different varieties of coffee. Also, the different microorganisms that can be a potential biocontrol agent such as Trichoderma against pests of coffee.
- Researches are very important for continuous learning and discovery for improvement.
- Studies on locally grown vegetables and fruits enable us to help local farmers in maximizing their yield and to locals to be informed of the possible effects of pathogenic microorganisms to health and food-borne illnesses.
- Being able to distinguished Arabica coffee varieties and postharvest technologies for producing good quality coffee are some earnings that I acquire from this activity.

H. Problems Met:

The major problem that was encountered during the webinar were technical issues especially on the unstable internet connection due to simultaneous conduct of webinars which had affected the live streaming (especially on Facebook live) as well as the sound system which affected the audio quality during the livestream. The equipment used such as desktop computer, during the webinar to host the Zoom platform had lower specifications which also affected its broadcasting.

I. Recommendation:

It is recommended that technical aspects such as stable internet connection and quality sound system should be secured in conducting such webinars to avoid technical problems during the activity. It is also recommended to conduct a dry run prior to the activity to minimize or avoid such technical problems.



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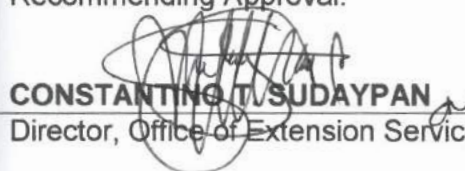
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