

Republic of the Philippines

Department of Education

REGION VIII - EASTERN VISAYAS

July 24, 2024

REGIONAL MEMORANDUM

CLMD-2024- 8 3 8

ENDORSEMENT OF THE CONDUCT OF THE PROJECT "MAINSTREAMING BIOTECHNOLOGY AND BIOSAFETY IN THE PHILIPPINE EDUCATION SECTOR"

To:

Schools Division Superintendent

School Heads

} Division of Borongan City

} ESNCHS

St. Mary's College

All Others Concerned

- 1. In line with the attached Memorandum DM-OUOPS-2024-12-00381 from the Office of the Undersecretary for Operations titled "Endorsement of the Conduct of the Project "Mainstreaming Biotechnology and Biosafety in the Philippine Education Sector", this Office, through the Curriculum and Learning Management Division (CLMD), requires the identified schools to submit the accomplished survey instrument to the Department of Science and Technology National Committee on Biosafety of the Philippines (DOST-NCBP) and the conduct of the said project in the first quarter of the School Year 2024 2025.
- 2. For more information, refer to the attachment or contact Mr. Enrykie Fortajada, S&T Fellow I of DOST-NCBP at **ebfortajada@dost.gov.ph**.
- 3. Immediate dissemination of and compliance with this Memorandum are desired.

EVELYN R. FETALVERO CESO IV
Regional Director

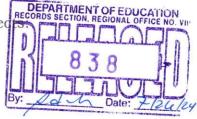
Enclosures: As stated References: As stated

To be indicated in the Perpetual Index under the following subject

BIOTECHNOLOGY

BIOSAFETY

SURVEY



CLMD-RRT



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Website: region8.deped.gov.ph



Republic of the Philippines

Department of Education

OFFICE OF THE UNDERSECRETARY FOR OPERATIONS



MEMORANDUM DM-OUOPS-2024-12 - 80381 OFFICE OF THE DIRECTOR

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TO

REGIONAL DIRECTORS (I, III, IV-A, V, VI, VIII, IX, NCR, CAR,

CARAGA)

MINISTER, BASIC, HIGHER, AND TECHNICAL EDUCATION -

BARMM

SCHOOLS DIVISION SUPERINTENDENTS CONCERNED

ALL OTHERS CONCERNED

FROM

FRANCIS CESAR B. BRINGAS

Assistant Secretary for Operations and

Officer-in-Charge, Office of the Undersecretary for Operations

SUBJECT

ENDORSEMENT OF THE CONDUCT OF THE PROJECT

"MAINSTREAMING BIOTECHNOLOGY AND BIOSAFETY IN THE

PHILIPPINE EDUCATION SECTOR"

DATE

: JUNE 19, 2024

This is in reference to the request of the Department of Science and Technology (DOST) to conduct their project entitled "Mainstreaming Biotechnology and Biosafety in the Philippine Education Sector", which is part of the continuous effort of the DOST – National Committee on Biosafety of the Philippines (NCBP) to mainstream biosafety in various sectors.

A component of such project is the conduct of a nationwide survey to assess the students' perception towards genetically modified organism and its regulation in the country. After thorough review of the survey instrument, through the Curriculum and Teaching Strand's Bureau of Curriculum Development (BCD), and the subsequent revision of the survey instrument through the DOST-NCBP, this Office respectfully endorses the conduct of the said project in the 1st quarter of the S.Y. 2024-2025.

The list of target schools and the revised instrument are attached in this Memorandum, for your reference.

For further coordination regarding this matter, Mr. Enrykie Fortajada, S&T Fellow I of the DOST – NCBP shall coordinate with your good office regarding the conduct of this project. Likewise, Mr. Fortajada may be reached through his email at ebfortajada@dost.gov.ph.

For your usual cooperation and appropriation.

[OASOPS/JRGC]













AWARENESS TOWARDS BIOTECHNOLOGY AND BIOSAFETY EDUCATION OF SENIOR HIGH SCHOOL STUDENTS IN THE PHILIPPINES

General directions: This nationwide survey aims to assess the personal knowledge, attitude, perception, and aspirations towards biotechnology and biosafety of Senior high school Science, Technology, Engineering, and Mathematics (STEM) students. It also seeks to understand the status of biotechnology and biosafety education in the Philippine secondary education.

Please answer the questionnaire HONESTLY without any reservations. Your responses will be treated with utmost concern and confidentiality. This survey will take about 20-30 minutes.

Data Privacy Statement

We, the National Committee on Biosafety of the Philippines (NCBP), recognize our responsibilities under the Republic Act 10173 also known as the Philippine Data Privacy Act of 2012 with respect to the data that will be collected from this survey. Any personal information that you will provide us will be kept strictly confidential. By completing this form, you agree and allow us to collect, process, transmit and store the data provided herein subject to the rules and regulations set by the Data Privacy Act.

Part I. Students' demographic profile

Instructions: Complete the following demographic information. Please put CHECK (\checkmark) mark on the appropriate box that corresponds to your answer or fill in the blanks.

Name (Optional):	Age:	Sex: □Male	□Female	Grade: \square 11	□12
School classification:	School lo	cation:			
Public	□NCR		□Region VI		
□Private	□CAR		□Region VII		
□Sectarian	□Region		□Region VII	1	
□Non-sectarian	□Region		□Region IX		
□International	□Region	ı III	□Region X		
□National	□Region	n IV-A	□Region XI		
□Local		ROPA	□Region XI		
□SUC-managed school	□Region	١V	□Region XII	ì	
☐Philippine Science high School (PSHS)			□BARMM		
☐ Regional Science High School (RSHS)					
□Others, please specify	_				
5 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		- <i>lf</i> l	.d:/d:	ational backers	arrad.
Father/male guardian's educational backgr				ational backgro	ouna:
□No formal education		formal educa			
□Elementary undergraduate	□Ele	mentary und	ergraduate		
☐Elementary graduate	□Ele	mentary grad	luate		
☐High school undergraduate	□Hig	gh school und	ergraduate		
☐ High school graduate	□Hig	gh school grad	duate		
□Vocational course graduate	□Voc	cational cours	se graduate		
□College undergraduate	□Col	llege undergr	aduate		
□College graduate	□Col	llege graduat	е		
□Post-baccalaureate (MS, PhD, etc.)	□Pos	st-baccalaure	ate (MS, Phí	D, etc.)	
□Not applicable	□No	t applicable			
Type of residence: □Urban □Suburba	n 🗆 Rural				

Project title: Mainstreaming Biotechnology and Biosafety in the Philippine Education Sector Implementing agency: National Committee on Biosafety of the Philippines (NCBP) 2nd floor, DOST Main Building, DOST Compound, Gen. Santos Ave., Bicutan, Taguig City







		1990			
Househol	d monthly income:	Recent general weigh	ted average (GWA):		
□less th	nan ₱12,000	□96-100% (1.00)	□80-82% (2.50)		
	00 – ₱24,000	□94-95% (1.25)	□78-79% (2.75)		
	00 – ₱48,000	□91-93% (1.50)	□75-77% (3.00)		
1,000,000	00 – ₱84,000	□88-90% (1.75)	□Below 75% (5.00)		
	00 − ₱144,000	□85-87% (2.00)	□Others, please spec	ify	
	000 – ₱241,000	□83-84% (2.25)	\$1000 P. J.		
	000 – and above	,			
	dent's knowledge towards bio				
	s: For each statement, you ar				
	standing on biotechnology an	id biosafety. Please put C	HECK (✔) mark on the a	opropri	ate box
that corres	ponds to your answer.				
		is manda from DNA			
A. Ur	nderstanding on how protein	tatements		True	False
1. 0	eoxyribonucleic acid (DNA) r		al process of producing		
	wo identical copies of DNA w				
	n eukaryotic cells, DNA transc				
	ibonucleic acid (RNA) to make			_	
3. A	messenger RNA (mRNA) is b	eing decoded and turne	d into a series of		
	amino acids to produce a series of amino acids during translation.				
B. Ui	nderstanding on how mutatio		protein's structure and j		
		statements		True	False
1	mutation is a change in the		nat may cause changes		
	n the structure and function		II		
	All genetic mutations can lead				
	here are ways to induce mut				
	ntroduce desirable changes in genetic engineering, and gene		uues irraulation,		
<u></u>	genetic engineering, and gene	e culting.		ii	
C. UI	nderstanding on products of t	raditional biotechnology			
0. 0.		Statements		True	False
1.	easts are microorganisms that	at initiate the fermentation	on process, which is		
	mportant for making bread, b				
2. (Cheesemaking is a modern ap	plication of biotechnolog	gy utilizing various		
	microorganisms to produce cl				
	Conventional breeding includ				
	such as selective breeding, hy	bridization, mutation bre	eeding, etc., that yield		
1	valuable traits in agriculture.				
D //	nderstanding on histochnolog	ay and its wide range of	annlications		
D. U	nderstanding on biotechnolog	Statements	пррисистонз	True	False
1.	The genetic materials of crop		ahoratory-based		П
	technology to develop varieti			-	_
	to pests and diseases.				
	Biotechnology uses cellular a	nd biomolecular process	es to develop		
	technologies, products and p	rocesses that is not yet w	videly used in medicine,		
	agriculture, industry, and env				

Project title: Mainstreaming Biotechnology and Biosafety in the Philippine Education Sector **Implementing agency:** National Committee on Biosafety of the Philippines (NCBP)

2nd floor, DOST Main Building, DOST Compound, Gen. Santos Ave., Bicutan, Taguig City







Н.	Understanding on biosafety and regulation of biotechnological products		
	their use and release.		
	deliver toxins and microorganisms hence, authorities are carefully regulating		
5.	Biotechnological products could potentially be used as biological weapons to		
4.	GMOs are not adequately tested prior to its approval for commercial use.		
	consequence.		
J.	thus, regulations and biosafety measures are in place to prevent unwanted		
3.	Biotechnology, like other emerging technologies, has associated risks and		
2.	Potential risks from emerging technologies can be calculated or analyzed.		
1.	meet the ever-growing demand for basic human needs.		
1.	Biotechnology is one of the tools in the modern-day society that can help		
G.	Understanding on societal, environmental, and ethical implications of modern bi Statements	True	False
_	Understanding an enrictal anticommental and athird involved on a fundamental	otoch	ology
	pharmaceutical and industrial products.		
	organs, for disease control, for food, and for the production of		
3.	GM animals are created as disease models and as sources for tissues and		
	enhance nutrient availability for plants.		
	such as e.g., enzymes, amino acids, etc. and develop bio-fertilizers to		
2.	Genetically engineered microbes are widely used to produce food products		
	providing a mechanism of handling infringement, piracy, and unauthorized use.		
1.	Intellectual property rights (IPR) enhance technology advancement by		
	Statements	True	False
F.	Understanding recent trends and issues in modern biotechnology		pr. 1
	technique used to fertilize an egg outside of the body.	_	
4.	In vitro fertilization, widely being used in livestock, is a biotechnological		
٥.	carotene, a precursor of vitamin A.		
3.	Golden rice contains additional genes that enables it to produce beta		
2.	Genetic engineering methods are considered to be more precise than conventional breeding methods because only specific genes are transferred.		
^	improved characteristics by changing its genetic makeup.		
1.	Both genetic engineering and traditional plant breeding produce crops with		
	Statements	True	False
Ε.	Understanding on examples of biotechnological processes and products		
7.	Microorganisms like bacteria can purify contaminated water.		
o.	identity of a person based on the fingerprints that are unique to individuals.		
6.	DNA fingerprinting is a laboratory technique used to determine the probable		П
J.	ingredients and laundry detergents, among others.		
5.	Biotechnology can be used to produce basic household materials such food		
4.	biomass production to address environmental problems.		
1	certain strains of microorganisms. Biotechnology has not yet been applied in renewable energy generation or		
	stocks (e.g. corn, sugarcanes, etc.) into bioethanol through the action of		
	industrial biotechnology, which involves the conversion of sugars from fuel		

MAINSTREAMING
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	1.	Possible adverse effects of GMOs to the environment and human health are		
		being reduced or eliminated through biosafety.		
2	2.	Risk assessment is a process that uses scientific data to determine potential		
		hazards, exposure and the likelihood of adverse impacts of, for instance,		
		GMOs in the environment.		
	3.	The Philippines has not yet established its own regulatory system that will		
		assess and manage the potential risks posed by GMOs.		
	4.	Products developed using New Breeding Techniques (NBTs) or Plant Breeding		
		Innovations (PBIs) can be classified either GMO or non-GMO.		
	5.	Genetic modifications can result in a decreased, unchanged or increased		
		ability to cause harm.		
	6.	Genetically modified (GM) crops such as Bacillus thuringiensis (Bt) corn,		
		golden rice, Bt eggplant and Bt cotton approved for commercial use were		
		evaluated as safe as the conventional counterparts.		
	7.	GM crops and its products are now being commercially grown and sold for		
		human food and animal feed in the Philippines.		
	8.	The Philippines is not yet a part of the Cartagena Protocol on Biosafety – an		
		international agreement which aims to ensure the safe handling, transport		
		and use of GMOs.		
	9.	Biosecurity measures aim to prevent the deliberate use of deadly pathogens		
	٠,	for malicious purposes.		-
	10	Good Laboratory Practices (GLP) include the responsible and safe handling of	П	П
	10.	microorganisms to ensure the health of laboratory personnel, the		
		community, and the environment.		

Part III. Student's perception and attitude towards biotechnology and biosafety

Instructions: For each statement, you are asked to provide your response by using the scale 4 – strongly agree, 3 - agree, 2 - disagree, and 1 - strongly disagree to rate the level of your perception and acceptance towards biotechnology and biosafety. Please put CHECK (✔) mark on the appropriate box that corresponds to your answer.

Renefits of hiotechnology

	Statements	4	3	2	1
PERCE	PTION				
1.	The risks of modern biotechnology have been exaggerated and its benefits outweigh its potential risks.				
2.	Genetic modification is unethical and should not be done by humans.				
3.	Organics are safer than GMOs.				
ACCEP	TANCE				
4.	I am worried about the transfer of genes from an organism into a specific crop because this does not usually occur in nature.				
5.	I support genetic modification to produce crops that are more resistant to pests, diseases, herbicides and abiotic stresses.				
6.	I do not support the use of GMOs to produce pharmaceutical substances for human medical treatments.				
7.	I believe that GMOs are beneficial in reducing poverty, hunger and malnutrition and improving the economy specially in developing countries.				

B. Real world applications of biotechnology

22 22 Pm MAINSTREAMING



ebfortajada@dost.gov.ph



	Statements	4	3	2	1
PERCEF	PTION				
1.	Eating GM foods are not safe for human consumption. They cause				
	allergies, cancer, homosexuality, birth defects, and other negative side				
	effects.				
2.	A person's genes could also be modified or altered by eating GM foods				
	which could lead to cancer.				
3.	Transgenic DNA in food is taken up by bacteria in the human gut.				
4.	Human insulin, synthetically made in the lab using genetically				
	engineered bacteria, has long been used in treatment of glycemia.				
ACCEP					
5.	It is important to me that the food products containing GMOs are				
	labeled even though they are substantially equivalent to their				
	conventional counterparts.	-			
6.	Eating food that has GM ingredients such as GM fish or other GM				
	animals is against my personal belief, moral values or religion.	-	_		_
7.	I support the development of GM ornamentals grown for decoration			Ш	Ш
	and aesthetics but not for food.				
C [Petantial adverse impacts of modern histochnology				
C. F	Potential adverse impacts of modern biotechnology Statements	4	3	2	1
PERCEF		4	3		1
1.	GM crops cause harm to the environment compared with conventional			П	П
1.	agricultural farming methods (i.e., application of fertilizer, pesticide,				Ш
	herbicide, etc.)				
2.	GM crop technology can result in a net increase in herbicide use and				
۷.	can foster the growth of herbicide resistant weeds.				
3.	The release of GM mosquitoes in the environment to suppress or				
J.	control the population of virus-carrying insects (e.g., dengue, malaria,				
	etc.) will have harmful effect to the environment or public health.				
ACCEP					
	I support the use of products of modern biotechnology as long as its			П	
	potential impact on the environment and public safety are addressed.	-	_		
5.	I do not support GMO because it can cause harm to human health and				
	the environment.	-	_	_	_
6.	I believe both GM and traditional plant breeding are used to produce				
	crops with improved characteristics by changing their genetic makeup				
	to meet human needs.				
D. F	Regulations of modern biotechnology				,
	Statements	4	3	2	1
PERCE					
1.	Field trials of biotech crops are dangerous. There is a high risk of				
	contaminating other crops in nearby fields.				_
2.	The current Philippine biosafety regulations are sufficient to protect				
	people from any risks linked to this technology.				
3.	Government regulatory agencies are equipped with scientific facts and				
	technical information needed to make good decisions in managing the				
	country's R&D on modern biotechnology.	Ĺ	İ	L	İ
ACCEP	IANCE				

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4.	I know that government agencies are doing their best to ensure that		
	the food we eat is safe.		
5.	I believe public consultation is important in approving research and] [
	development (R&D) and products of modern biotechnology.		

Part IV. Biotechnology and biosafety-related career decisions and curriculum exits for Senior high school STEM students.

Instructions: For each statement, you are asked to provide your response by using the scale 4 - strongly agree, 3 - agree, 2 - disagree, and 1 - strongly disagree to rate the level of interests on biotechnology and biosafety. Please put CHECK (\checkmark) mark on the appropriate box that corresponds to your answer.

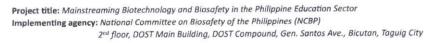
	Statements	4	3	2	1
1.	I am interested to take a bachelor's degree in biotechnology or other				
	biotechnology related courses in college after Senior High School.				
2.	I know some universities in the country that offer bachelor's degree in				
	biotechnology and other biotechnology related courses.				
3.	I am interested to have a career in biotechnology to improve the quality				
	of lives of Filipinos.				
4.	I am interested to have a career in biosafety to ensure safe use and				
	management of biotechnological products.				
5.	I am worried that there are no job opportunities that exist in the field of				
	biotechnology in the Philippines.				
6.	I am interested to establish a start up company in biotechnology.				
7.	I know that I can start a business or company on biotechnology to solve				
	complex human challenges using science, technology and innovation.				
8.	I know some biotech companies established in the country focused on				
	pharmaceutical research, food production, fuel production, chemical				
	manufacturing, and breeding for conservation.				

Part V. Current condition of biotechnology and biosafety education

Instructions: For each general question on biotechnology and biosafety education, you are asked to answer yes, no or not sure. Please put CHECK (\checkmark) mark on the appropriate box that corresponds to your answer.

wer.			
1.	Had biotechnology been discussed by your science teacher during your Junior H	igh Scho	ool?
	□Yes □No		
	If yes,		
	1.1 Is the concept of DNA recombinant technology included in the lecture?	□Yes	□No
	1.2 How about GMOs and other products of modern biotechnology?	□Yes	□No
	1.3 How about the biosafety of GMOs?	□Yes	□No
2.	Does your school provide their students with learning materials (such as module of material) for science subject?	or instru	ıctional
	□Yes □No		
	If yes,		
	2.1 Is the concept of DNA recombinant technology included in the learning material?	□Yes	□No
	2.2 How about GMOs and other products of modern biotechnology?	□Yes	□No
	2.3 How about the biosafety of GMOs?	□Yes	□No







3.	What are your primary sources of knowledge on biotechnology? You may check more than 1 item.					
	□Learning materials □Published journal □Scientific articles □Science magazine □Textbook	□ Newspaper, newsletter, brochure, pamphlet □ Movies and TV series □ Social media □ Please specify,				
4.		de you with sufficient hands-on laboratory activities crucial in iples of biotechnology? □Yes □No				
5.	Did your Junior High School promeducation and awareness on biot	ote the spirit of scientific inquiry of students through science echnology? Yes No				
	If yes, what specific activity relate 1 item. □Classroom discussion □Laboratory or simulation activ □Student project or research □Study tour/field trip	d to biotechnology was conducted? You may check more than □Biotech activities e.g., webinar, conference, etc. ity □Lecture/talk from invited resource person □Seminar on career path on biotechnology □Please specify,				
6.		studying biotechnology is relevant to you? ☐Yes ☐No				
7.	biotechnology relevant to you?	studying biosafety of GMOs and other products of modern				
8.		nation/knowledge you got about biotechnology especially on other products of modern biotechnology is sufficient and				





Target Schools

Philippine Science High School-Ilocos Region Campus (DOST-managed)
City of Mandaluyong Science High School
Notre Dame University - Junior High School
ARMM Regional Science High School
Benguet National High School
STI College - Surigao
Gubat National High School
University of Negros Occidental Recoletos
Angeles City National High School
Bucal National Integrated School
Eastern Samar National Comprehensive High School
Laureano Salusod National High School

*Additional alternative schools:

Don Bosco Technical College, Inc.
Lussoc National High School
STI College - Cotabato
Notre Dame of Sarmiento, Inc.
Cordillera Regional Science High School
Saint Paul University Surigao
Gallanosa National High School
Bacolod Tay Tung High School, Inc.
Jocson College, Inc. (Jocson Junior College)
Cavite Science Integrated School
St. Mary's College of Borongan, Inc.
Dimataling National High School

^{*}In case the no. of respondents from the target schools is

Address	SDO	Region
Pob. East San Ildefonso Ilocos Sur	Ilocos Sur	Region I
E. Pantaleon St. Hulo Mandaluyong City	Mandaluyong City	NCR
Notre Dame Avenue, Cotabato City	Cotabato City	BARMM
Sarmiento, Parang, Maguindanao	Maguindanao II	BARMM
Stockfarm, Wangal, La Trinidad, Benguet	Benguet	CAR
04220 Narciso St., Surigao City	Surigao City	CARAGA
Bonifacio St., Paradijon, Gubat, Sorsogon	Sorsogon	Region V
#51 Lizares Avenue, Bacolod City	Bacolod City	Region VI
Arayat Blvd. Pampanga, Angeles City	Angeles City	Region III
Bucal II, Maragondon, Cavite	Cavite	Region IV-A
Real St., Brgy. Alang-alang, Borongan City, Samar	Borongan City	Region VIII
Purok 5, Kagawasan, Dimataling, Zamboanga del Sur	Zamboanga del Sur	Region IX
736 General Kalentong St., Brgy. Pag-asa, Mandaluyong City	Mandaluyong City	NCR
Sto. Domingo, Ilocos Sur	llocos Sur	Region I
A. Dorotheo St., Cotabato City	Cotabato City	BARMM
Notre Dame Zone 2, Parang, Maguindanao	Maguindanao II	BARMM
Stockfarm, Wangal, La Trinidad, Benguet	Benguet	CAR
Corner San Nicolas and Rizal Streets, 8400 Surigao City	Surigao City	CARAGA
San Pedro, Irosin, Sorsogon	Sorsogon	Region V
P. Hernaez St., Bacolod City	Bacolod City	Region VI
1st St. Balibago, Pampanga, Angeles City	Angeles City	Region III
Maragondon - Ternate Road, Maragondon, Cavite	Cavite	Region IV-A
E. Cinco St., Brgy. A, Borongan, Easter Samar	Borongan City	Region VIII
Poblacion, Dimataling, Zamboanga del Sur	Zamboanga del Sur	Region IX
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not enough, additional respondents/students will be tapped from these schools.

Cluster