



MS HORTICULTURE RESEARCH

AACCUP Accreditation
September 9-11, 2026

1.1 RESEARCH AGENDA

The institution's research agenda is in consonance with institutional, regional and national priorities such as DOST, CHED-National Higher Education Research Agenda, NEDA, etc.

Revised USM Research, Development and Extension Agenda (2022-2031)

Prepared by: Dr. Ma. Teodora N. Cabasan, Former Vice President for RDE

**AS PER APPROVED BY THE USM BOARD OF
REGENTS THROUGH BOR RESOLUTION NO. 69,
SERIES OF 2021**

CHED MANDATE FOR RDE (as read)

- ☐ Pursuant to CHED Republic Act 7722, the national government's commitment to transformational leadership puts education as the central strategy for investing in the Filipino people, reducing poverty, and building national competitiveness shall:
- ☐ **Sec a.** Promote relevant and quality higher education (i.e. higher education institutions and programs are at par with international standards and graduates and professionals are highly competent and recognized in the international arena);
- ☐ **Sec c.** guarantee and protect academic freedom for continuing intellectual growth, **advancement of learning and research**, development of responsible and effective leadership, education of high level professionals, and **enrichment of historical and cultural heritages**;
- ☐ Specifically, CHED aims to achieve that the overall societal goal is the attainment of **inclusive growth and sustainable development** while the higher education sub sector goals are: the formation of high-level human resource, and generation, adaptation, and transfer of knowledge and technology for national development and global competitiveness.

As indicated in Section 5. PROGRAMS, ACTIVITIES, AND

PROJECTS and Article 5.1.1 Aligning HEI programs with national development goals the relevant and Responsive Research, Development and Extension (RDE), CHED supports the conduct of RDE aimed at generating, adapting and transferring or applying new knowledge and technologies for improving productivity and livelihood, promoting peace, empowering women, protecting the environment, reducing disaster devastation, and alleviating poverty.

Thematic Areas of the USM Research Agenda

The USM Research Agenda is anchored on regional and national priorities, with specific academic units identified to contribute to the different thematic areas. Of particular relevance to the **MS Horticulture Program is the College of Agriculture (CA)**, where its faculty members are primarily based. The College is directly involved in several key thematic areas, including Promotion of Peace, Gender Equality and Development; Environmental Protection and Conservation; Food Security and Poverty Alleviation; and Health and Proper Nutrition.

Among these, Food Security and Poverty Alleviation is particularly significant to the MS Horticulture Program, as it directly supports research on crop productivity, high-value crops, sustainable production systems, postharvest management, and technology development. The inclusion of CA in Environmental Protection and Conservation likewise provides a framework for research on climate-resilient and environmentally sustainable horticultural practices. These thematic areas therefore provide clear institutional direction for MS Horticulture faculty and graduate research, ensuring that research undertakings contribute to the University's priorities while responding to broader agricultural and societal needs.

THEMATIC AREA	UNIT CONCERNED
1. Access to education and literacy	CED, CENCOM, IMEAS, CIT, CAS
2. Promotion of peace, gender equality and development	CBDEM, IMEAS, CED, CAS, CA
3. Preservation of arts, culture, language and literature	CAS, IMEAS, CIT
4. Environmental protection & conservation	CAS, CENCOM, CBDEM, CA , CIT, GS
5. Food security and poverty alleviation	All Colleges , USMARC, PICRI

6. Health and proper nutrition	CHEFS, CHS, ISPEAR, CAS, CVM, CA, CBDEM
7. Engineering and Technology	CENCOM, KCC-CIT, DIT
8. Halal	IMEAS

2015-2020 RESEARCH AGENDA REVISION

(Excerpt from the Minutes of the Meeting)

B. Expiration of research agenda 2015-2020 as stipulated at 2015 USM RD'E Guidebook (2020 12th URDEC Regular Meeting New Business Office of the Vice President for Research., Development and Extension issue/sand concern/s No. 4)

Dr. Edward A. Barlaan presented the 2022-2031 research agenda and development plan. Hearing no comments from the URDEC members, Dr. Efren E. Magulama moved for the adoption and approval of the research agenda for presentation to the Admin Council. This was seconded by Dr. Ma. Teodora N. Cabasan.

The research agenda was developed based on the following inputs: sustainable development goals, harmonized national research agenda, internal inputs (actual needs analysis of the university, including capabilities), external/stakeholder inputs, and other statutory and regulatory requirements. The research agenda should also complement the VMGO of the University and its expected organizational outcomes.

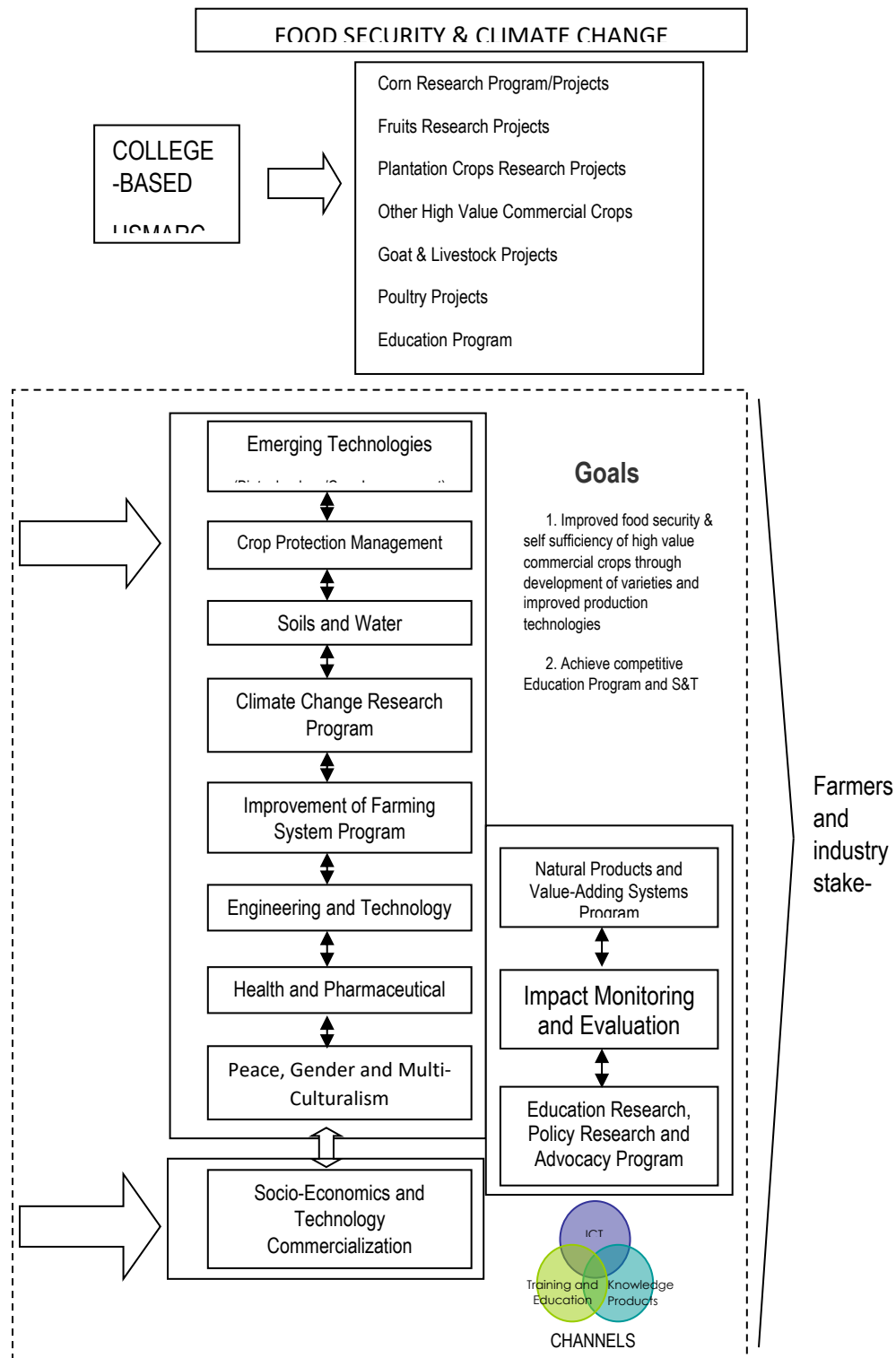
The formulation of research agenda in Region 12 was participated by various stakeholders like administrators, faculty, students, government organizations (GOs) and non-government organizations (NGOs) representatives to identify institutional thrusts and priorities in the region.

USM RDE AGENDA (2022-2031)

	RDE THEMES	RDE PRIORITY AREAS
1	Quality Learning, Skills Development and Literacy	Innovative teaching strategies; development and evaluation of functional education materials and modality; development of strategies/ approaches for increased learning interest, motivation and engagement; school management; knowledge management; special education; remedial education; alternative learning system; assessment, soft skills; practical skills; adult education; language literacy; numerical literacy; data literacy; computer literacy; international studies; tracer studies
2	Social Development, and Strong Institutions	Gender and development GAD; peace initiatives; community development; human security; justice; public policy and legislations; social rehabilitation; governance; organizational studies; behavioral studies; social institutions; ethics and public accountability; programs/ project assessment; community needs assessment and interventions; partnerships and linkages
3	Preservation of Culture	Multicultural studies; educational materials for IPs; indigenous knowledge systems and practices; development of materials for cultural knowledge and promotion; arts; language and literature studies
4	Environmental Protection, Conservation, and Risk Reduction	Environment rehabilitation studies; biodiversity; climate change adaptation; risk hazard and mitigation; biosafety; natural resources conservation and management; bioremediation; flood control; waste management; ecological preservation and care; environmental impact assessment;
5	Food Security and Poverty Reduction	Agricultural and fisheries research; biotechnology; innovations; quality food product development; technology development; halal food production; sustainable production; responsible consumption; organic agri-culture; food testing; smart agriculture; precision farming; livelihood programs; subsidy impact assessment; capacity building; capability building; farm machineries; post harvest facilities; vertical farming; indigenous food

6	Good Health and Well-Being	Nutrition; sports, physical education; resilience; psycho-social health; medical and medicinal studies; sanitation; functional foods; food and water quality and safety; mental and emotional health; therapy; coping mechanism; preventive measures; emerging diseases; health management; alternative medicine.
7	Innovations in Science, Engineering, and Technology	Innovations; product and technology development; energy; materials sciences; nanotechnologies; robotics; artificial intelligence; internet of things; Science, Engineering, Communication, and Technologies (SECT) 4.0; biotechnology and OMIC technologies; Inventions and Discoveries; Basic research; Information technologies; electronics; drug discovery; mathematics; emerging technologies; fabrication; transport system; waste management; infrastructure; water systems; simulation studies; industrial and allied technology
8	Sustainable Entrepreneurship and Management	Economics; micro and macro scale business; product development; marketing commercialization; networking; franchising; financial management; business feasibility studies; risk and opportunities; value adding; value chain analysis; organizational management; quality service assessment; human resource management; production management,

USM Research Development and Extension Agenda 2017-2021



- As indicated in Section 5. Programs, Activities, and Projects and article 5.1.1. Aligning HEI programs with national development goals the relevant and responsive Research, Development and Extension (RDE), CHED supports the conduct of RDE aimed at generating, adapting and transferring or applying new knowledge and technologies for improving productivity and livelihood, promoting peace, empower women, protecting the environment, reducing disaster devastation, and alleviate poverty.

A study entitled “Assessment on the Alignment of USM Faculty and Student Researches with the University Research Themes”, was conducted by FGNGarcia, PJBongcoy, RFPinsoy and AGMQuinero. [You may check and download the full paper from the site).

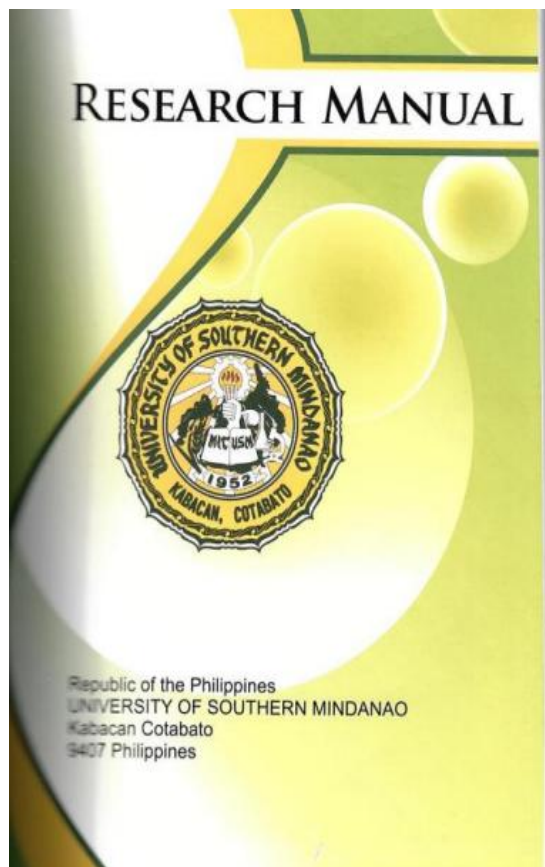
Main Objective: To assess the alignment of USM faculty members for the past 5 years.

Specific Objectives

- Determine the research themes of researches conducted by USM for the past 5 years;
- Assess the research themes of researches conducted by USM students for the past 5 years;
- Suggest recommendation to solve problems and meet the grapes between the researcher conducted and the University research themes.

Approved Research Manual

- There is an approved research manual (the [USM Research and Development Guidebook](#), approved by the BOR in 2016) and [Undergraduate Research Handbook](#) (revised 2019).



The 2015 USM Research and Development Guidebook

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Registration No. 0-2016-0721
October 5, 2016

Approved by the USM Board of Regents (BOR) by virtue of Resolution No. 54, s. 2016

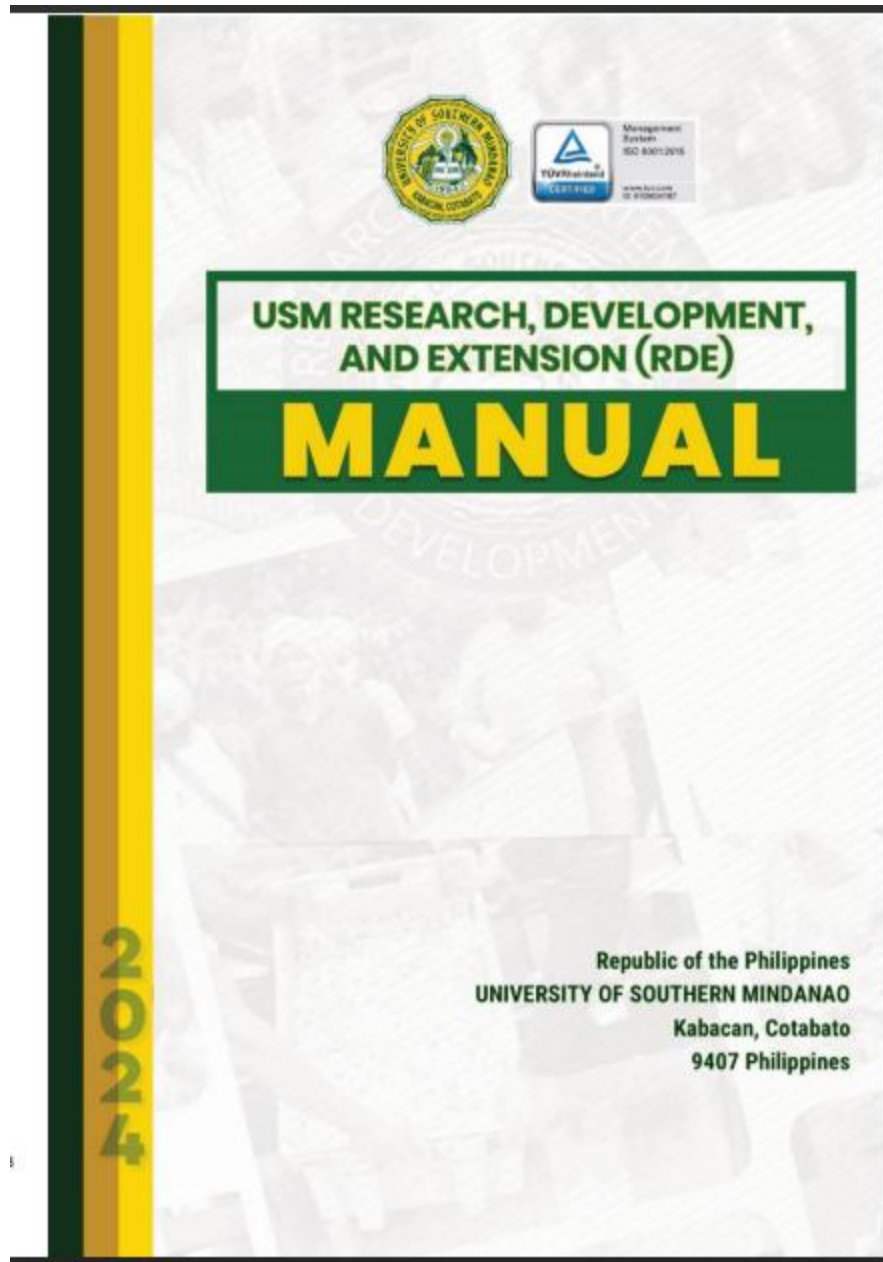
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Pomares, C.C. 2015. **The 2015 USM Research and Development Guidebook**, 2015 Edition, University of Southern Mindanao, Kabacan, Cotabato, Philippines. 171p.

The USM RDE Manual

Recently, the University of Southern Mindanao has an updated research, development and extension (RDE) manual revised in 2024. Such manual was approved by the USM Board of Regents by virtue of Resolution No. 106, s. 2023. Moreover, the revision was approved by the USM BOR by virtue of Resolution No. 119 s. 2024. The manual is comprised of seven major topics, specifically pertaining to USM research, development, and extension; Research, Development, and Extension Processes, Ethics in Research; Community Engagement and Outreach; Intellectual Property; Publication; and Policies and Guidelines.



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Management
Support
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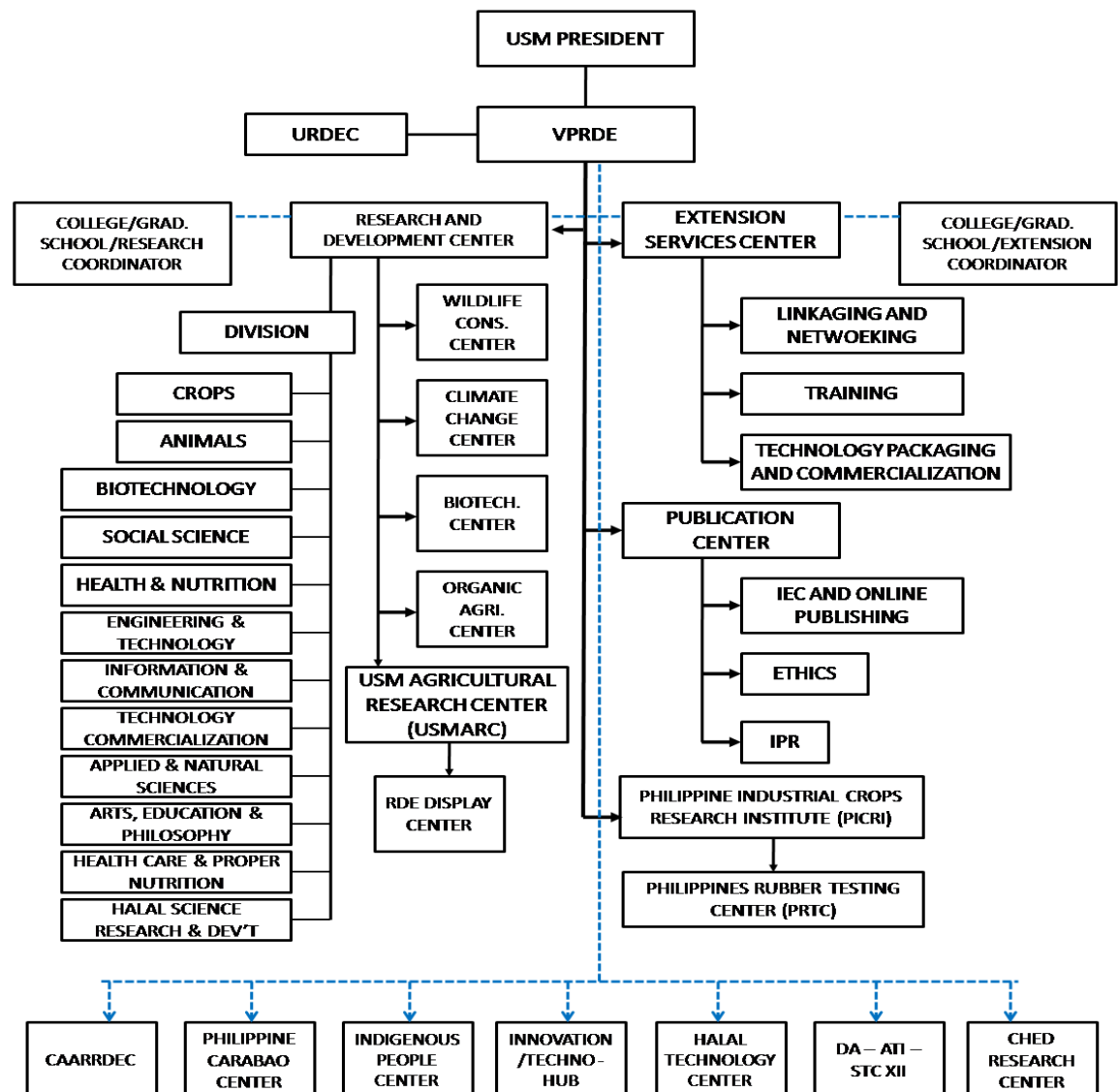


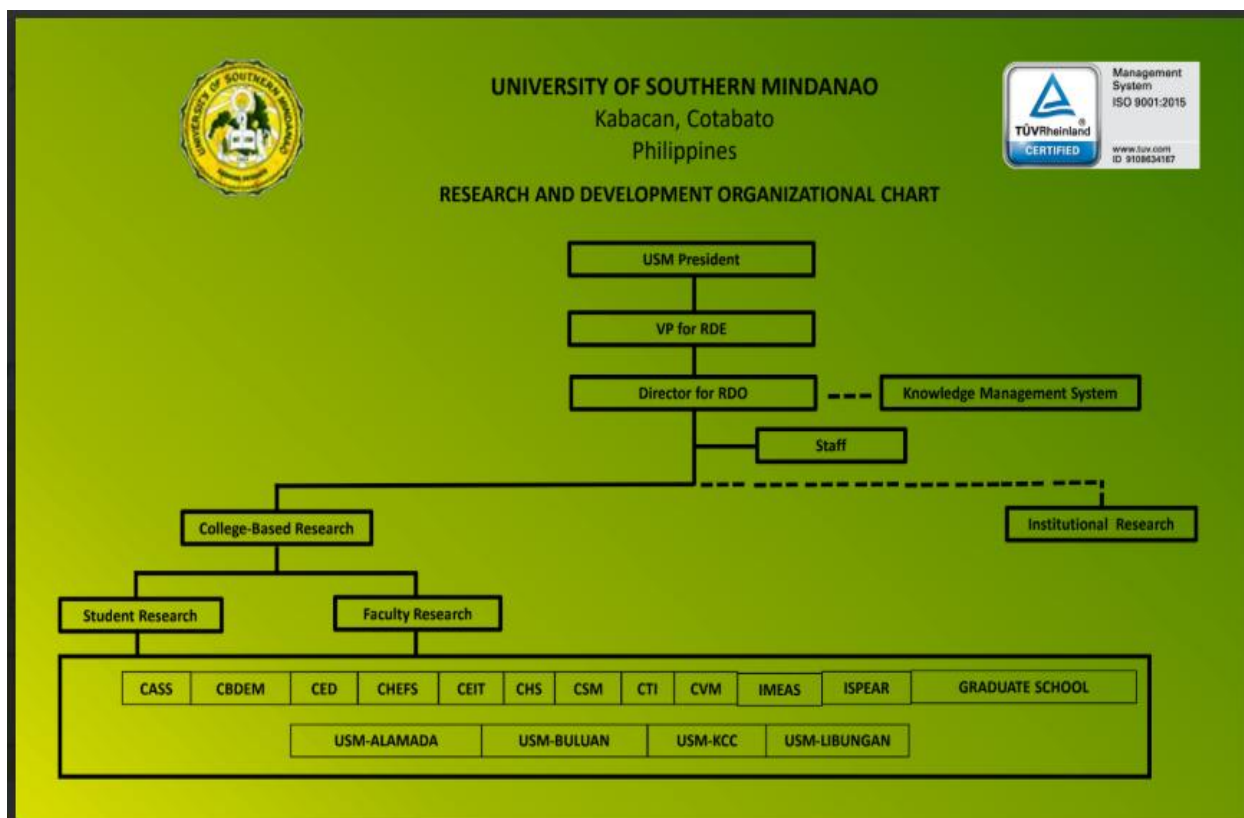
AN EXCERPT FROM THE MINUTES OF THE 154th REGULAR MEETING OF THE USM
GOVERNING BOARD ON 15 DECEMBER 2023 AT THE COMMERCIAL BUILDING,
UNIVERSITY OF SOUTHERN MINDANAO, KABACAN, COTABATO
AND VIA ZOOM TELECONFERENCE

"UNITY IN DIVERSITY AND
SUSTAINABLE DEVELOPMENT IN
MINDANAO THROUGH QUALITY AND RELEVANT EDUCATION."

Approved Organizational Structure of the Research Program

The institution has a Research Unit managed by competent staff. The figure below shows the USM Research and Development table of organization. The table shows the educational qualification, specialization, and length of experience of personnel managing the University research.





Research and Development Leadership and Management

The research activities supporting the MS Horticulture Program are guided by qualified and experienced research and academic leaders at both the institutional and academic-unit levels. The University's R&D leadership includes personnel with doctoral and graduate qualifications and expertise in diverse disciplines, providing multidisciplinary support for the implementation and management of research activities.

At the academic-unit level, the USM Graduate School Research Coordinator and the MS Horticulture Program Head provide more direct research leadership relevant to graduate education. The MS Horticulture Program is headed by Dr. Mark Al-Jamie J. Muttulani, whose specialization in Crop Production and Management is directly aligned with the discipline and research thrusts of the program. The College of Agriculture leadership further complements the program through expertise in agricultural and horticultural sciences.

This organizational arrangement provides the MS Horticulture Program with an established mechanism for research coordination, supervision, monitoring, and implementation. The combination of institutional R&D management and discipline-based academic leadership helps ensure that faculty and student research activities are appropriately guided and aligned with the University's research directions and graduate education objectives.

Head	Name	Highest Educational Attainment		No. of Years of R & D Experience
A. Institution R&D Head				
VP for Research & Extension	Debbie Marie B. Verzosa	PhD	Mathematics Education	16
Director, Research and Publication Office	Jurhamid C. Imlan	PhD	Animal Production (Halal Slaughter Management & Forensic Science)	28
Director, Phil. Industrial Crop Research Institute	Bernadith T, Borja, MSc	MSc	Plant Pathology	8
Head, Publication and Printing Unit	Jan Clyden B. Tenorio, DVM, PhD	PhD	Tropical Medicine	6
B. Academic Unit R&D Heads				
Dean, USM Graduate School	Philip Lester Benjamin, PhD	PhD	Mathematics	20
Research Coordinator, USM Graduate School	Anna Jean S. Garcia, PhD	PhD	Mathematics	5
Program Head, MS Horticulture	Mark Al-Jamie J. Muttulani, PhD	PhD	Crop Production and Management	8
Dean, College of Agriculture	Tamie C. Solpot	PhD	Plant Pathology	20

Congruence of the Institutional Research Agenda with National and Regional Priorities

The USM Research, Development and Extension (RDE) Agenda demonstrates strong congruence with major national and regional development priorities. Its research directions are aligned with the CHED National Higher Education Research Agenda, AmBisyon Natin 2040, and the DOST Harmonized National Research and Development Agenda, ensuring that institutional research responds to broader development goals.

The alignment encompasses priority areas such as food security and poverty alleviation, environmental protection and conservation, health and nutrition, education, engineering and technology, climate change, gender and development, and cultural preservation. In particular, the University's emphasis on food security, environmental sustainability, and technology development provides a strong framework for agriculture-related graduate programs.

For the MS Horticulture Program, this congruence provides clear direction for faculty and student research toward addressing challenges in sustainable crop production, high-value crops, climate resilience, food security, technology development, and improved agricultural productivity. Consequently, MS Horticulture research contributes not only to the University's institutional research priorities but also to the attainment of regional and national agricultural development goals, reinforcing the relevance and responsiveness of the program's research undertakings.

	National Research Agenda	Institutional (USM) Agenda
National Higher Education Research Agenda (2009-2018)	Education and education management	Access to education and literacy
	Food safety and security	Food security and poverty alleviation; Halal
	Enhancing indigenous renewable energy source in the domestic energy mix	Environmental protection and conservation; Engineering and technology
	Development of vaccines and diagnostic kits using indigenous materials	Health and proper nutrition
	Disaster risk management	Engineering and technology
	Pollution control	Environmental protection and conservation
	Climate change specifically on the issue of global warming	Environmental protection and conservation
	Future ASEAN	Preservation of arts, culture, language and literature
	Peace process and conflict resolution	Promotion of peace, gender equality and development
	Matatag (family is together; time with friends; work-life balance, volunteering	Food security and poverty alleviation; Preservation of arts, culture, language and literature

**Ambisyon
Natin
2040**

Maginhawa (free from hunger and poverty; secure home ownership; good transport facilities, travel and vacation

Panatag (enough resources for daily needs; peace and security; long and healthy life comfortable retirement

Food security and poverty alleviation; Engineering and Technology; Access to education and literacy

Food security and poverty alleviation; Health and proper nutrition; Promotion of peace, gender equality and development

Excerpt from the Minutes of the Meeting

B. Expiration of research agenda 2015-2020 as stipulated at 2015 USM RDE Guidebook (2020 12th URDEC Regular Meeting New Business – Office of the Vice President for Research, Development and Extension issue/s and concern/s No. 4)

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C. Creation of RDE Procurement and Disbursement Support Committee (2020 12th URDEC Regular Meeting New Business – Office of the Vice President for Research, Development and Extension issue/s and concern/s No. 5)

Dr. Edward A. Barlaan informed the URDEC Secretariat to prepare details of the procurement process and problem encountered for presentation to the BAC Chairperson. Thus, a proposal for creation of the RDE Procurement and Disbursement Support Committee will be lobbied to mitigate those problems. As further discussed, Dr. Edward A. Barlaan mentioned that part of the function of the committee is to check and keep procurement documents.

Stakeholders' Participation in the RDE Agenda Review and Consultation

The University conducted an RDE Agenda Review and Consultation to ensure that its research, development, and extension priorities remain relevant and responsive to the needs of its stakeholders. The consultation provided an avenue for various sectors to contribute their perspectives, experiences, and recommendations in reviewing and strengthening the University's RDE directions.

The activity involved representatives from different stakeholder groups, including faculty members, government agencies, farmers, parents, and other community stakeholders. Their participation provided important inputs on research priorities and emerging concerns that may be addressed through the University's RDE programs and initiatives.

The involvement of diverse stakeholders demonstrates the University's participatory and consultative approach to research agenda formulation and review. Through this process, institutional research priorities are informed not only by academic expertise but also by the actual needs and concerns of government, industry, communities, and intended beneficiaries. This approach strengthens the relevance and responsiveness of the RDE agenda and promotes greater stakeholder engagement in the University's research and development initiatives.

Faculty



University of Southern Mindanao
EXTENSION SERVICES CENTER
Kabacan, Cotabato



ATTENDANCE SHEET

ACTIVITY: RDE AGENDA REVIEW/ CONSULTATION

VENUE: USM Extension Conference Room DATE: April 13, 2024

SPONSORS: USM Extension

No.	Name	Designation/Affiliation	Office/Unit/Organization	Mobile No./Email add	Signature
1	<u>Edmund Barlan</u>	<u>VP RDE</u>	<u>OVPRPE</u>	<u>09885408131</u>	<u>[Signature]</u>
2	<u>PT NABANUN</u>	<u>MANU.</u>	<u>PRTC</u>	<u>09151589155</u>	<u>[Signature]</u>
3	<u>STANSON C. KAPOZA</u>	<u>Res. Coord.</u>	<u>CTI</u>	<u>09612613463</u>	<u>[Signature]</u>
4	<u>JOSEPHINE R. MIGALIB W</u>	<u>DEAN</u>	<u>CA</u>	<u>09107440436</u>	<u>[Signature]</u>
5	<u>MARCO S. MONDERIL</u>	<u>Dean</u>	<u>CASS</u>	<u>09267959182</u>	<u>[Signature]</u>
6	<u>Glyn G. Magbanua</u>	<u>Extension Corr</u>	<u>ESG</u>	<u>09474440466</u>	<u>[Signature]</u>
7	<u>Leorence C. Tandog</u>	<u>GS Dean</u>	<u>GS</u>	<u>09466115568</u>	<u>[Signature]</u>
8	<u>Delia Mae V. V. V.</u>	<u>Pub'n Director</u>	<u>Pub'n</u>	<u>09189540888</u>	<u>[Signature]</u>
9	<u>JONALD L. PIMENTEL</u>	<u>CSM Dean</u>	<u>CSM</u>	<u>09107561365</u>	<u>[Signature]</u>
10	<u>TITO TUN T. TIDUA</u>	<u>OTPRPE</u>	<u>RDE</u>	<u>09469451125</u>	<u>[Signature]</u>
11	<u>Joseph M. M. M.</u>	<u>RA</u>	<u>EXTDE</u>	<u>0943801507</u>	<u>[Signature]</u>
12	<u>NENTA E. OLERO</u>	<u>EKS</u>	<u>USMAEC</u>	<u>0906929125</u>	<u>[Signature]</u>
13	<u>JERAMIL L. PANDATES</u>	<u>Director</u>	<u>EXCR</u>	<u>09514821293</u>	<u>[Signature]</u>
14	<u>MELINDO CORDON</u>	<u>CEIT Dean</u>	<u>CEIT</u>	<u>0948963572</u>	<u>[Signature]</u>
15	<u>Sonia F. Almazan</u>	<u>CEIT - OIC Dean</u>	<u>CEIT</u>	<u>09515161981</u>	<u>[Signature]</u>

USM-EXT-F02

ma-corsten@brigitte.com

Government agency representatives

Attendance Sheet (RDE Agenda Review/Consultation)

Participated by Government agency representatives




University of Southern Mindanao
EXTENSION SERVICES CENTER
Kabacan, Cotabato
ATTENDANCE SHEET

ACTIVITY: RDE AGENDA REVIEW/CONSULTATION
 VENUE: USM EXTENSION Conference Room DATE: April 13, 2021
 SPONSORS: USM EXTENSION

No.	Name	Designation/Affiliation	Office/Unit/Organization	Mobile No./Email add	Signature
1	Judy Mar B. Cabornida	Dean	CAETS	09107828387	<i>[Signature]</i>
2	Jeannie H. Duka	Dean	OSDEN	0944-4937330	<i>[Signature]</i>
3	Ma. Teodora B. Cabalan	RDO Director	RDO	0935027544	<i>[Signature]</i>
4	Amie M. Pinyon	FS	FSO		<i>[Signature]</i>
5	Chen B. Organas	Clerk	ESO		<i>[Signature]</i>
6	Alminda Guzman aldo	parent	Kabacan, Cotabato		<i>[Signature]</i>
7	Verde Gert T. Opih	PA I	DOST XII		<i>[Signature]</i>
8	Omarah P. Sultan	GRA	SOXARDEC	0950689924	<i>[Signature]</i>
9	Reges, Vannyrre J.	RDO Student	RDO	09102505766	<i>[Signature]</i>
10	Nolasa, Dennis S	Student	RDO	0	<i>[Signature]</i>
11	Cadungco, Edrel Lynn C.	Student	RDO	0935027544	<i>[Signature]</i>
12	Athene Pineda	Farmer	Mlang	09089300590	<i>[Signature]</i>
13	Tessie Encogco	Farmer	Mlang	09512662002	<i>[Signature]</i>
14	April Kimberly D. Lamosa	Farmer	Carmen	09106645633	<i>[Signature]</i>
15	Ravin A. Caston	Parent	Matalam	09494562219	<i>[Signature]</i>

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Other stakeholders (alumni, parents, etc)

Attendance Sheet (RDE Agenda Review/Consultation)

Participated by other stakeholders (farmers, parent)

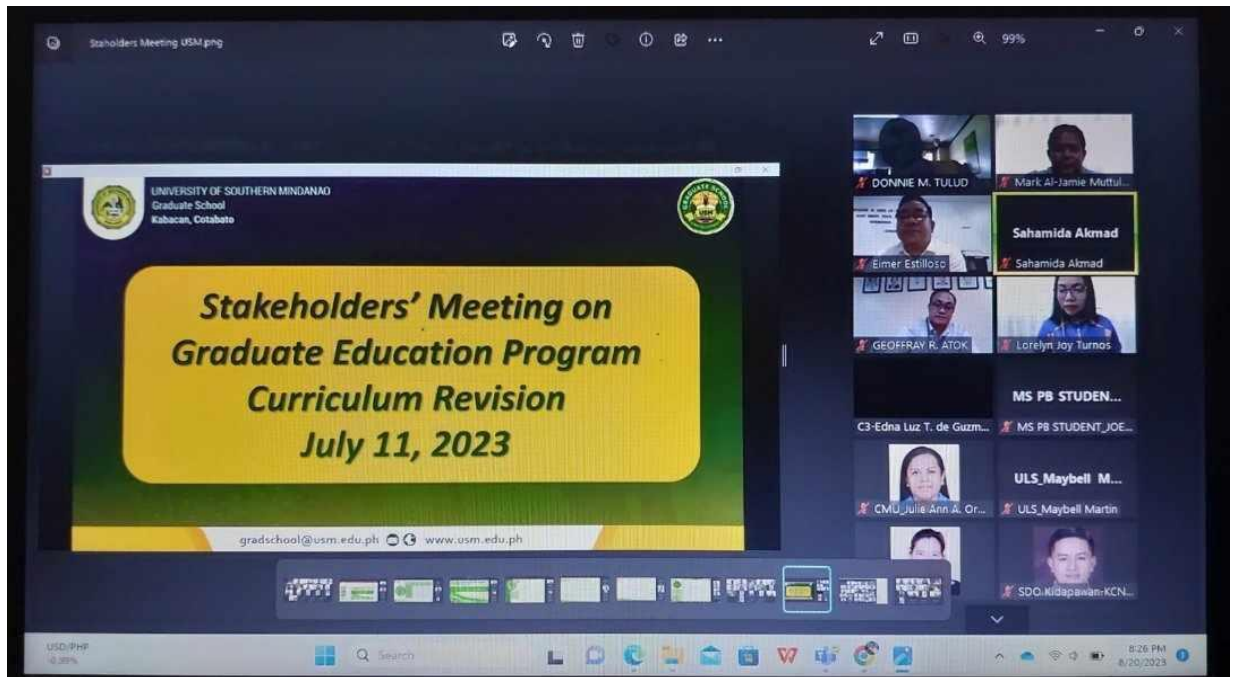



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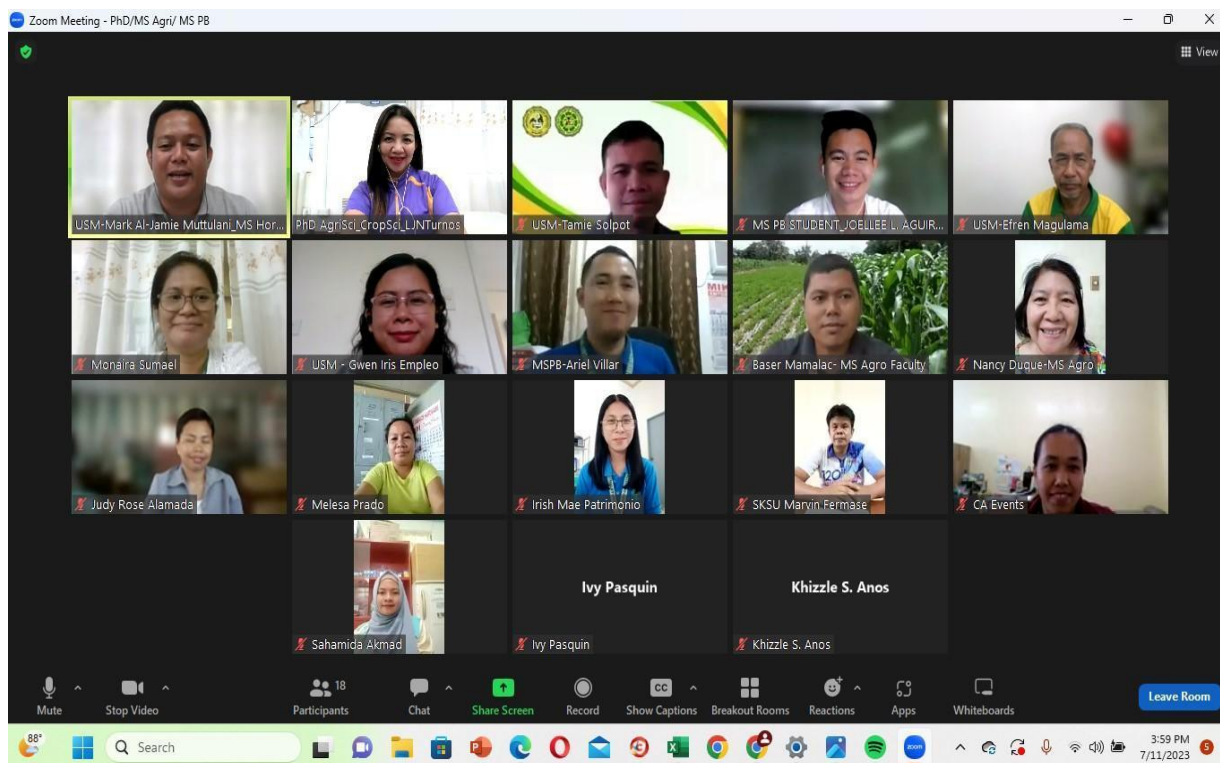
Stakeholders' Meeting on MS Horticulture Curriculum Revision



A Stakeholders' Meeting on Graduate Education Program Curriculum Revision was conducted on July 11, 2023, with the MS Horticulture Program included among the graduate programs subjected to curriculum review and consultation. The activity provided an important venue for reviewing and strengthening the MS Horticulture curriculum through the participation and inputs of faculty members and other relevant stakeholders.

For the MS Horticulture Program, the consultation helped ensure that its curriculum remains relevant, responsive, and aligned with current developments in horticultural science, research, agricultural technologies, and the needs of the horticulture sector. Stakeholder inputs provided valuable perspectives for enhancing course offerings and ensuring that the program continues to develop graduate students with advanced competencies in horticultural research and practice.

The activity demonstrates the program's commitment to participatory curriculum development and continuous quality improvement. Through stakeholder consultation, the MS Horticulture Program strengthens the alignment of its graduate education, research orientation, and academic preparation with the evolving needs of the academe and agricultural sector.



Linkages Established with Research Agencies/Institutions

The MS Horticulture Program benefits from the established research linkages of the University with local, national, and international agencies and institutions. These partnerships provide an enabling environment for faculty members and graduate students to undertake research, access technical and financial support, and participate in collaborative research and development activities.

Key partner institutions include the Australian Centre for International Agricultural Research (ACIAR), National Seed Industry Council (NSIC), Department of Agriculture–Bureau of Agricultural Research (DA-BAR), DOST-PCAARRD, CHED, DA-RFO XII, Agricultural Training Institute (ATI), and selected Local Government Units (LGUs). The nature of assistance includes research funding, seed testing and screening, research facility improvement, faculty scholarships and travel grants, technology transfer, and capacity-building activities.

For the MS Horticulture Program, these linkages are particularly valuable in strengthening faculty research capability and facilitating research activities involving high-value crops and other agricultural commodities. Partnerships with government agencies and LGUs also provide opportunities to connect research with actual production concerns and stakeholder needs. Collectively, these institutional linkages enhance the program's capacity for collaborative research, resource mobilization, **technology development and transfer, and research-based graduate education.**

Linkages Established with Research Agencies/Institutions

No.	Agency or Institution	Address	Level (Int'l, Nat'l, Reg'l, Local)	Nature of Assistance
1.	Australian Centre for International Agricultural Research (ACIAR)	Canberra, Australia	International	Financial support for collaborative research and development activities
2.	National Seed Industry Council (NSIC)	Quezon City	National	Technical assistance in seed testing, evaluation, and screening
3.	Department of Agriculture – Bureau of Agricultural Research (DA–BAR)	Quezon City	National	Financial support for research and extension activities on priority agricultural commodities and improvement of research facilities
4.	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCAARRD)	UPLB	National	Financial and technical support for research and extension activities; provision of research-related travel grants and scholarship opportunities for faculty-researchers
5.	CHED	Quezon City	National	Financial assistance and support for research and academic development initiatives
6.	DA-RFO 12	Koronadal City	Local	Technical and institutional support for agricultural research, development, and extension activities

7.	ATI	Koronadal City	Local	Financial and capacity-building support for agricultural training and extension activities
8.	Selected LGUs	Cotabato, Sultan Kudarat, South Cotabato and North Cotabato	Local	Collaboration in technology transfer, field implementation, stakeholder engagement, and local capacity-building activities utilizing University-developed technologies and faculty expertise

1.2 MS HORTICULTURE FACULTY RESEARCH AND DEVELOPMENT PROJECTS

1.2.1 Completed Research and Development Projects Conducted by MS Horticulture Faculty Members

The faculty members of the MS Horticulture Program are actively engaged in research and development activities addressing relevant concerns in horticulture, crop production, sustainable agriculture, product development, and technology innovation. Completed studies cover diverse areas such as high-value crop production, plant propagation and tissue culture, organic and sustainable production, crop improvement, postharvest management, value-adding, and commercialization. These research undertakings demonstrate the faculty's capacity to respond to emerging agricultural challenges while generating knowledge and technologies with potential applications for farmers, producers, and other agricultural stakeholders.

The research portfolio also demonstrates the faculty's capacity to participate in internally and externally funded projects. Research support has been provided by USM and partner agencies and institutions, including DOST-PCAARRD, DA-BAR, DA-ACEF, ACIAR, PCAARRD, CAMP-Asia/KOICA, GGGI, and USM-PICRI, reflecting institutional support, research collaboration, and linkages with government and development organizations.

These completed researches are aligned with the USM Research, Development and Extension Agenda, particularly in Food Security and Poverty Reduction; Environmental Protection, Conservation and Risk Reduction; Innovations in Science, Engineering and Technology; and Sustainable Entrepreneurship and Management. Overall, these accomplishments demonstrate the program's active research culture, faculty research capability, and commitment to research-based graduate education. They strengthen the MS Horticulture Program by providing a research environment that supports scientific inquiry, collaboration, technology generation, and the advancement of sustainable horticultural production.

Completed Research and Development Projects Conducted by MS Horticulture Faculty Members

Research Title	Researchers	Funding Agency	USM Research Agenda	Duration
Development of Rubber-Based cropping system in Southern Philippines	MCASales , JCastillo, RCana, MRacoma, AGGarcia, POCahatian, JPSadoral	ACIAR & PCAARRD	Environmental Protection	July 2019 to Aug 2023
Project 7: SMART Technology Transfer for High Value Crop Stakeholders	AABaladjay , JMBangoy	DA-BAR	Food Security and Poverty Reduction	Jan to Dec 2021
Upgrading of Tissue Cultures Facility in University of Southern Mindanao	MAJMuttulani , HRRoca, EABarlaan	DA-ACEF	Engineering and Technology	Jan to Dec 2021
Sustainable Agricultural Environment Through the Organization of Durian Producers in Mindanao, Philippines	MCASales CAMP-Asia	CAMP-Asia/KOICA	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	March 25 2022-Dec 2025
Utilization of Corn Sprouts as Fodder for Livestock Production	EEMagulama , MARama, JRMigalbin	USM	Food Security, Sustainable entrepreneurship and management	January to December 2023
Seed Propagation Techniques in Growing Various Herbs and Spices and Their Pesticidal Efficacy Against Bacterial and Fungal Diseases of Red Pepper (<i>Capsicum annuum</i>)	LJNTurnos-Milagrosa , MAJ Muttulani , TCSolpot	USM	Innovations in Science	January to December 2023
Innovative Growing of Corn Microgreens (Zea mays) as Potential New Food for Commercialization	MAJMuttulani , LJNTurnos-Milagrosa	USM Future's Thinking	Innovations in Science	January to December 2023
Enhancing Propagation Techniques, Organic Based Fertilization, Bio-Plant Extracts and Shelf-Life Evaluation of Selected Herbs	LJNTurnos-Milagrosa , MAJMuttulani , BBorja, SJPahm	USM	Food Security	January to December 2023

Research Title	Researchers	Funding Agency	USM Research Agenda	Duration
and Spices Using Good Agricultural Practices and Its Compatibility with Halal Standards				
Collection, Propagation, and Marketing of Forage Crops for Ruminants	MJCanolas, GRArok, LJNTurnos-Milagrosa	USM	Food Security and Poverty Reduction, Sustainable entrepreneurship and management	January to December 2023
Innovation in Product Development: Soap Formulation from Selected Plantation Crops	LJNTurnos-Milagrosa , AMurray, SMurray	USM-PICRI	Innovations in Science, Engineering, and Technology	January to December 2023
Maximizing Adlai Farm Productivity Through Integration of Selected Field Legumes, Vegetables and Rootcrops	EMagulama , BMarmalac , NDuque, ARCunanan	USM	Food security and poverty reduction, Sustainable entrepreneurship and management	January to December 2023
Characterization and Performance of Ten (10) Promising Varieties of Cacao in Different Agro-Climatic Zones in the Philippines.	Ardniel, A. Baladjay & Sheena B. Lucena	DOST-PCAARRD	Food Security and Poverty Reduction	May 16, 2023 to November 2024
Developing Land Management Options for Diverse Cacao-Based System in Mindanao	MCSales	Global Green Growth Institute (GGGI)	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	Jan. 08, 2023/ Mar. 07, 2024
Phenotypic Evaluation of Multi-Cross Hybrids and Synthetic with Tolerance to Herbicides	EEMagulama , JImlan, SLucenna	USM	Food Security and Poverty Reduction	January to December 2024
Development of Potential Coffee and Cacao Agri-Product Based beverages	MAJMuttulani , LJNTurnos-Milagrosa , SMurray	USM PICRI	Food Security and Poverty Reduction/ Innovations in Science,	January to December 2024

Research Title	Researchers	Funding Agency	USM Research Agenda	Duration
Development and Evaluation of Corn (<i>Zea mays</i> L.) Microgreen-Based Products	MAJ Muttulani, LJN Turnos-Milagrosa, MLogronio	USM	Engineering, and Technology Food Security and Poverty Reduction/Innovations in Science, Engineering, and Technology	January to December 2024
Onwards Commercialization: Halal-Plant Based Concoctions as Nutrient Sources for Crucifers and Solanaceous Vegetable Crops Through Field Validation and Market Analysis	MAJ Muttulani, LJN Turnos-Milagrosa, JDLlanto	USM	Innovations in Science, Engineering, and Technology	January to December 2024
Harnessing Rhizobacteria And Actinomycete's Potential As Biofertilizer And Biocontrol Inputs Supportive Of Strengthening The Organic Agriculture Industry (HARDIN-Organic)	Mel Chrisel A. Sales , Ma. Teodora N. Cabasan, and Neil Pepa Dave N. Sumaya	DA-BAR	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	April 2024 - March 2025

1.2.2 Ongoing Research and Development Projects Conducted by MS Horticulture Faculty Members

The ongoing research and development projects reflect the continuity and expanding engagement of MS Horticulture faculty members in externally supported research initiatives. The projects extend from 2024 to 2029, indicating sustained research activities that can contribute to the program's research productivity in the succeeding years. A significant feature of the current portfolio is the faculty members' participation in projects supported by DOST-PCAARRD, DOST-NRCP, and CAMP-Asia/KOICA. These collaborations provide opportunities for the faculty to work with other researchers, institutions, government agencies, and agricultural stakeholders beyond the academic setting. The projects address strategic areas such as soil and water management, sustainable cropping systems, environmental and wildlife conservation, farmer livelihood enhancement, and coconut hybrid production.

The involvement of MS Horticulture faculty in these projects also demonstrates the program's connection with broader agricultural and environmental development initiatives. Several projects are designed not only to generate research findings but also to develop practical approaches and technologies that may benefit farmers and industry stakeholders. Collectively, these ongoing projects provide a strong pipeline for future research outputs, technologies, publications, partnerships, and graduate research opportunities, thereby supporting the continuing development and sustainability of the MS Horticulture Program.

Research Title	Researchers	Funding Agency	USM Research Agenda	Duration
Income Enhancement of Farmers through Strengthening a Sustainable Agricultural Environment in Mindanao, Philippines	MCASales CAMP-Asia	CAMP-Asia/KOICA	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	March 25, 2026- March 24, 2029
Development of Soil and Water Management Guide to Improve Coconut Hybrid Nut Productivity and Quality	MCASales , MISumael	DOST-PCAARRD	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	October 1, 2025 - Sept 30, 2028

Program: Developing Soil Knowledge, Information and Capacity to Improve the Productivity and Sustainability of Key Cropping Systems in the Philippines	AABaladjay	DOST-PCAARRD	Food Security and Poverty Reduction, Environmental Protection, Conservation and Risk Reduction	October 3, 2024 -
Promoting the Conservation of MANP through the Establishment of the MANP Wildlife Rescue and Conservation Center (MAWRCC)	LJTurnos-Milagrosa, MAJMuttulani , Other DOST-NRCP researchers (UPLB, CFCST)	DOST-NRCP	Environmental protection & conservation	October 01, 2024 – December 31 2026
Development of Appropriate Treatments to Coconut Inflorescence to Improve Hybridization Operations	LJTurnos-Milagrosa, MAJMuttulani	DOST-PCAARRD	Food Security and Poverty Reduction	July 01, 2026 to December 31, 2028
Influence of Plant Growth Regulators to Improve Hybrid Nut Production in Dwarf Coconuts	LJTurnos-Milagrosa, MAJMuttulani	DOST-PCAARRD	Food Security and Poverty Reduction	July 01, 2026 to December 31, 2028

1.3 MS HORTICULTURE FACULTY RESEARCH PUBLICATIONS

MS Horticulture Faculty Research Publications

The research publications of the MS Horticulture faculty members demonstrate the program's continuing commitment to the dissemination of research findings through national and international scientific journals. The published works cover diverse areas relevant to horticulture and agricultural sciences, including crop production and management, propagation, plant nutrition, postharvest physiology, crop protection, product development, and sustainable production practices.

Faculty research outputs have been published in national, international, peer-reviewed, and Scopus-indexed journals, indicating progressive engagement in scholarly publication and wider dissemination of research results. Notably, recent publications include studies on corn microgreens, postharvest quality of strawberry and chrysanthemum, anthurium propagation, cacao production, and vase-life improvement of cut flowers, reflecting the breadth and relevance of faculty expertise.

The publication record also shows faculty collaboration and co-authorship, contributing to a stronger research culture within the program. The presence of recent publications, particularly in internationally recognized and indexed journals, enhances the research visibility and academic standing of the MS Horticulture Program. These scholarly outputs also provide research-based knowledge that can support graduate instruction, thesis development, technology generation, and the advancement of horticultural science and practice.

MS Horticulture Faculty Research Publications

1.3.1 Scopus-Indexed Research Publications in International Journals

Author/Co-Author	Title of Paper	Name of Journal	Year	Scope
Muttulani, MAJ	Enhancing hydroponic leaf lettuce production through optimized nutrient formulations.	Asian Journal of Agriculture 9 (Number 2), 415-422, 2025.	2026	Scopus
Muttulani, MAJ; Turnos-Milagrosa, LJN; Moscoso, L.	Varietal screening and maturity stage evaluation of corn (<i>Zea mays</i> L.) microgreens through sensory and acceptability study as potential food in Southern Philippines	Asian Journal of Dairy and Food Research, 1–8	2025	Scopus
Marcelino, JW Muttulani, MAJ; Turnos-Milagrosa, LJN	Utilization of Carbonized Wastes as Ethylene Absorbers for Shelf-Life Extension of Major Tropical Fruits in Southern Philippines	Asian Journal of Dairy and Food Science	2026	Scopus
Amoy,MA; Turnos-Milagrosa, LJN; Muttulani, MAJ	Response of Banana Varieties and Seaweed Extracts on Plantlet Formation and Root Development Using Corms	Journal of Tropical Agriculture	2026	Scopus
Sales, MCA	Cacao productivity and soil carbon storage in two cropping systems with selected soil amendments applied in Kabacan loam soil	Journal of the International Society for Southeast Asian Agricultural Sciences Vol. 32, No. 1:93-112	2026	Scopus
Turnos-Milagrosa, LJN	Extending vase life and reducing ethylene production in rose cut flowers using calamondin (<i>Citrus macrocarpa</i>) extract	Journal of Horticulture and Postharvest Research	2025	Scopus

1.3.2 Scopus-Indexed Research Publications in National Journals

Author/Co-Author	Title of Paper	Name of Journal	Year	Scope
Sales, MCA	Land suitability evaluation of cocoa (<i>Theobroma cacao</i> L.) production areas in Davao City, Philippines	Mindanao Journal of Science and Technology, 22(1), 1–19	2024	Scopus

1.3.3 Peer-Reviewed Research Publications in International Journals

Author/Co-Author	Title of Paper	Name of Journal	Year	Scope
Orejudos, RD; Duka, JU; Baladjay, AA	Factors influencing smallholder cardava banana farmers' participation in collective marketing in Southern Philippines	Asian Journal of Agriculture, 6(2)	2022	Peer-reviewed
Esgrina, OF; Baladjay, AA	Optimizing the productivity of eggplant grown in polybags with the application of buffalo manure tea.	<i>Tạp Chí Nông nghiệp Và Phát triển</i> 25(3), 1-12.	2026	Peer-reviewed
Muttulani, MAJ	Response of mulching and organic fertilizers on the growth performance of strawberry (<i>Fragaria ananassa</i> L.) in Southern Philippines	Current Agriculture Research Journal, 12(1)	2024	Peer-reviewed
Meperanum, RD; Muttulani, MAJ; Turnos-Milagrosa, LJN	Plant-based hydrating solutions for extending vase life and postharvest quality of chrysanthemum (<i>Dendratherma × grandiflorum</i>)	Current Agriculture Research Journal, 13(1)	2025	Peer-reviewed
Dacanay, KO; Muttulani,MAJ; Turnos- Milagrosa LJN	Basal Scarification : A Technique for Improved Grapevine Rooting and Propagation	Bhartiya Krishi Anusandhan Patrika	2026	Peer-reviewed
Muttulani, MAJ; Turnos, NA	Postharvest quality and physicochemical analysis of strawberry (<i>Fragaria ananassa</i> L.) to various application of mulching and organic fertilizers	Bhartiya Krishi Anusandhan Patrika, 1–7	2025	Peer-reviewed
Turnos-Milagrosa, LJN; Baladjay, AA	Varietal characterization and diversity analysis of Blue Ternate (<i>Clitoria</i> sp.)	International Journal of Sciences: Basic and Applied Research (IJSBAR)	2021	Peer-reviewed
Turnos-Milagrosa, LJN	Influence of light intensity on the growth and yield of Blue Ternate (<i>Clitoria</i> sp.)	Asian Journal of Fundamental and Applied Sciences	2021	Peer-reviewed
	Blue Ternate (<i>Clitoria ternatea</i> L.): Nutritive analysis of flowers and seeds	Asian Journal of Fundamental and Applied Sciences, 2, 103–112	2021	Peer-reviewed

1.3.4 Peer-Reviewed Research Publications in National Journals

Author/Co-Author	Title of Paper	Name of Journal	Year	Scope
Denona, MA; Baladjay, AA ; Turnos, N.A.	Enhancing leaf mustard (<i>Brassica juncea</i> L.) productivity using nitrogen-based fermented plant juice (FPJ)	Journal of Agricultural Research, Development, Extension, and Technology, 2(1), 31–39	2020	Peer-reviewed
Masnar, AL; Baladjay, AA ; Magulama, EE	Enhancing productivity of sakurab (<i>Allium chinense</i> G. Don) using corn stalk mulch and suitable fertilizer type	Journal of Agricultural Research, Development, Extension and Technology, 5(1)	2023	Peer-reviewed
Muttulani, MAJ ; Turnos-Milagrosa, LJN	Propagation and productivity evaluation of Anthurium (<i>Anthurium andraeanum</i>) using organic fertilizers in tropical conditions	Journal of Agricultural Research, Development, Extension and Technology, 5(1), 86–95	2023	Peer-reviewed
Muttulani, MAJ	Grape (<i>Vitis vinifera</i> L.) propagation using different types of cuttings and root-initiating substances	Journal of Agricultural Research, Development, Extension and Technology, 4(1), 1–9	2022	Peer-reviewed
Sumael, MI	Detection of downy mildew [<i>Peronosclerospora philippinensis</i> (W. Weston) C.G. Shaw] resistance in sugarcane (<i>Saccharum officinarum</i> L.) based on chlorophyll and biomass content	Journal of Agricultural Research, Development, Extension and Technology, 2(1)	2020	Peer-reviewed
	Seasonal effects on the morphological traits, yield characteristics, and nutritional components of ratooned adlay (<i>Coix lacryma-jobi</i> L.) varieties	Journal of Agricultural Research, Development, Extension and Technology, 6(1)	2024	Peer-reviewed

1.3.5 Others: Policy Brief

Sales, MCA	Adapting Cacao Farming in Mindanao to Soil and Climate Challenges	MinDA Policy Brief 2025 (001)	2025	National
	Empowering smallholder durian farmers: a thorny flight for a creamy bite	MinDA Policy Brief 2025 (005)	2025	National

Research Citations

The research citation profile of the MS Horticulture faculty members reflects the scholarly visibility and utilization of their published research outputs within the academic and scientific community. Based on the citation records presented, the five faculty researchers have accumulated a combined total of 137 citations, indicating that their research works have been referenced and utilized by other researchers.

Among the faculty members, Dr. Efren E. Magulama recorded the highest number of citations at 86, with an h-index of 4 and i10-index of 3. This is followed by Dr. Lorelyn Joy N. Turnos-Milagrosa with 21 citations, an h-index of 2, and an i10-index of 1, and Dr. Ardniel A. Baladjay with 18 citations and an h-index of 2. Dr. Mark Al-Jamie J. Muttulani and Dr. Monaira I. Sumael likewise recorded citations for their scholarly works.

These citation indicators complement the faculty's publication record and demonstrate the reach, relevance, and emerging research impact of the MS Horticulture Program. Continued publication in reputable and indexed journals is expected to further enhance the program's research visibility and scholarly influence.

Faculty Researcher	Number of Citation	h-index	i10-index
Baladjay, Ardniel A.	18	2	0
Magulama, Efren E.	86	4	3
Muttulani, Mark Al-jamie J.	9	2	0
Sumael, Monaira I.	3	1	0
Turnos-Milagrosa, Lorelyn Joy N.	21	2	1

1.4 SCIENTIFIC PRESENTATIONS

Scientific Presentations of MS Horticulture Faculty Members

The MS Horticulture faculty members actively disseminate their research findings through scientific conferences, research fora, and institutional RDE reviews at the international, national/regional, and institutional levels. These presentations provide opportunities for faculty researchers to communicate research results, obtain feedback from fellow researchers and experts, and establish professional and research networks.

At the international level, faculty members have presented studies covering diverse areas such as cacao production, corn microgreens, crop sustainability, adlay production, plant-based inputs, postharvest management, crop propagation, and value-added agricultural products. Participation in international scientific gatherings demonstrates the program's continuing effort to extend the visibility of its research beyond the University.

Faculty members also participate in national and regional scientific conferences, commodity-based training and technical fora, facilitating the exchange of research-based knowledge with researchers, practitioners, and agricultural stakeholders. At the institutional level, research outputs and project accomplishments are regularly presented during USM Midyear and Year-end In-House RDE Reviews, which serve as mechanisms for monitoring, evaluation, and technical assessment of ongoing and completed studies.

Collectively, these scientific presentations demonstrate the active research engagement, knowledge dissemination, and scholarly participation of the MS Horticulture faculty, while strengthening the program's research visibility and contribution to horticultural and agricultural development.

1.4.1 International Research Presentation Conferences

Name of Faculty	Title of Paper	Name of Fora/Conference	Date	Location
Baladjay, Arndiel A.	Tablea: Pangkabuhayan para sa Kotabateñong Pamayananan	Southeast Asian Multidisciplinary Research Expo and Extension Conference (SEAMREEC)	March 1-4, 2023,	Sorsogon State University Sorsogon City, Philippines.
Muttulani, Mark Al-Jamie J.	Harnessing the Potential of Corn Microgreens in Southern Philippines: Innovative Growing Methods and Market Opportunities	2025 ISSAAS National Congress and International Forum on Agri-Future	July 22-24, 2025	Baler, Aurora

	Market Potential of Developed USM Corn (Zea may L.) Microgreens-Based Products in Southern Philippines	3 rd International Conference for Women Empowerment and Leadership in Agriculture 2025	May 14-16, 2025	Butuan City
Sales, Mel Chrisel A.	Effects of Soil Amendments on Cocoa Productivity and Soil C Storage In Tugbok Clay Loam, Davao City, Philippines	ISSAAS Congress 2025	Nov 6-8, 2025	Vietnam National University for Agriculture (VNUA)
	Cacao Productivity and Soil C Improvement by Cacao-Cropping Systems and Soil Amendments Application in Kabacan Clay Loam	International Agri-Life and Bioresource Sciences Symposium	March 16-19,2025	Visayas State University, Baybay City, Leyte
	Transforming System and Strengthening Development for Agricultural Sustainability	ISSAAS Congress 2021	Nov. 4-5, 2021	Kasetsart University, Thailand
Sumael, Monaira I.	Morpho-Physiology and Nutritional Content of Adlay Varieties Grown During Two Succeeding Seasons in Kabacan, Cotabato	CSSP-SABRAO 2024 - International Conference for Crop Science and Breeding	August 12-16, 2024	Muntinlupa City
	Morpho-Physiological and Nutritional Components of Adlay (<i>Coix lacryma-jobi</i> L.) Intercropped with Mangosteen Across Ratooning at Kabacan, Cotabato	ISSAAS International Scientific Congress and General Meeting 2023	Nov. 8-10, 2023	Muntinlupa City
Turnos- Milagrosa, Lorelyn Joy N.,	Potentials of Fermented Crops as Plant Nutrient Booster in Improving Vegetable Production and Promoting Sustainable Agriculture	International Society for Southeast Asian Agricultural Sciences (ISSAAS) National Congress 2025 and International Forum	July 22-24, 2025.	Aurora, Baler

	Development of Potential Coffee (<i>Coffea canephora</i>) and Cacao (<i>Theobroma cacao</i>) Agri-Product Based Beverages	3 rd International Conference on Women Empowerment and Leadership in Agriculture (WELA) 2025	May 14-16, 2025	Butuan City
	Pod Maturity and Seed Germination of Blue Ternate (<i>Clitoria ternatea</i> L.)	2 nd International Conference on Management, Education, Social Sciences and Innovation(ICMESSI 2021)	June 12, 2021	Online platform
	Nutritive Analysis of Blue Ternate (<i>Clitoria ternatea</i> L.) Flowers and Seeds	ICMESSI 2021	June 12, 2021	Online platform
	Diversity Analysis of Blue Ternate (<i>Clitoria</i> sp.) Using Morphological Traits and Nutritive Values	International Multi-disciplinary Research Conferences on Education, Sciences and Arts (IMReCESA 2021)	April 22-24, 2021	Online platform
	Response of Blue Ternate (<i>Clitoria</i> sp.) to Different Light Intensities and Planting Methods	3 rd Kuala Lumpur International Multi-disciplinary Academic Conference (KLIMAC 2021)	April 2021	Online platform

1.4.2 National/Regional Research Presentation Conferences

Name of Faculty	Title of Paper	Name of Fora/ Conference	Date	Location
Baladjay, Ardniel A.	Innovating Agriculture: Cultivating Prosperity and Nourishing Communities	1 st Provincial Conference on Development Studies, Best Practices and Innovation	October 25, 2023	Prosperidad, Agusan del Sur
	Cacao Production, Post-harvest and Coconut Intercropping	Agricultural Training Institute	Sept 18-22 and Oct 2-5, 2023	USM, Kabacan, Cotabato
	Open Pollinated Variety (OPV) Corn Seed Production and Certification for Seed Inspectors	Bureau of Plant Industry	Sept 21-25, 2020	Midsayap, Cotabato
Mamalac, Baser L.	Training on Good Agricultural Practices for Rice, Corn and Vegetables	Support to Agriculture and Agribusiness Enterprises in Mindanao for Sustainable Development	Sept 20-25, 2021	Koronadal, South Cotabato
Muttulani, Mark Al-Jamie J.	Grape (<i>Vitis vinifera</i> L.) Propagation Using Different Types of Cuttings and Root-Initiating Substances	28 th FPSAP Scientific Conference	August 26-28, 2025	Cebu City
	Learning Skills Session, Crop Science- Asexual Plant Propagation of HVC	2025 PAA SOCKSARGEN Regional Conference	August 13, 2025	General Santos
	Nutrient/ Water and Pruning Management of Pomelo	Community-Based Mentorship and Support	August 6, 2025	DA Training Center, Mlang Cotabato
	Sustainable Vegetable Crop Production and Kratky	Vegetable Garden Establishment,	April 23,	

	Hydroponic Production System	Nangaan, Kabacan	2025	
	Crop Phenology of Vegetable and Fruit Crops	Crop Phenology and Pest Control Training for High Value Crops	November 2024	Kidapawan City
	Cultivation and Management of High Value Crops (Crop Solanaceous Crops)	Cultivation and Management of High Value Crop, PCIC		Midsayap Cotabato
Sumael, Monaira I.	Morpho-physiological and Nutritional Components of Adlay (Coix lacryma-jobi L.) Across Seasons and Ratooning at Kabacan, Cotabato	11 th ASTHRDP Graduate Scholars' Conference	September 26-27, 2023	PICC, Pasay City
Turnos-Milagrosa, Lorelyn Joy N.	Potential of Underutilized Parts of Coffee and Cacao as Key Ingredients for Wine and Tea Beverages	28 th FPSAP Scientific Conference	August 26-28, 2025	Cebu City
	Crop Phenology of Vegetable and Fruit Crops	Crop Phenology and Pest Control Training for High Value Crops	November 2024	Midsayap, Cotabato

1.4.3 INSTITUTIONAL: USM RDE InHouse Review

Name of Faculty	Title of Paper	Name of Conference	Date	Location
Magulama, Efren E.; Elarde, JG; Olero, NE	Breeding and Yield Trial of Herbicide Tolerant Multi-Cross Hybrids)	USM Midyear Inhouse Review	July 17, 2025	USM, Kabacan, Cotabato
Magulama, Efren E.; Bangoy, JM., Olero, N.	Project: Impact of USMs Pre-Storage Chemical Treatment on Corn Seed Storability and Germination	USM Midyear Inhouse Review	July 17, 2025	USM, Kabacan, Cotabato
Magulama, Efren E.	Organic Corn Seed Production in Brgy. Saniag, Ampatuan, Maguindanao del Sur	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Magulama, Efren E.	Enhancing Adlai Farming Techniques through Precision Agriculture	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Magulama, Efren E.	Breeding of White OPVs, Glutinous, and Sweet Corn for Herbicide	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Magulama, Efren E.	Development of Corn Hybrids and Synthetic with Tolerance to Herbicide	2024 USM Midyear Inhouse Review	July 25, 2024	USM, Kabacan, Cotabato
Magulama, Efren E.	Promoting Resilient OPV Corn Seed Production for Enhanced Economic Development and Sustainability (PROSEEDS)	43rd USM Year-end Inhouse Review	Dec 4-5, 2023	USM, Kabacan, Cotabato
Magulama, Efren E.	Spatial and Temporal Crop Diversification in Adlay-Based Cropping System for Land-Use Efficiency and Improved Crop Productivity and Sustainability	43rd USM Year-end Inhouse Review	Dec 4-5, 2023	USM, Kabacan, Cotabato

Magulama, Efren E.	Trait Enhancement of USM Varieties and Family Selections with Herbicide and Corn Borer Resistance	42nd USM Year-end Inhouse Review	Dec 1-2, 2022	USM, Kabacan, Cotabato
Muttulani, Mark Al-Jamie J.	Upgrading of Tissue Culture Facility in USM- DA BAR ACER	USM RDE In-House Review 2022	December 1-2, 2022	USM, Kabacan, Cotabato
Muttulani, Mark Al-Jamie J.	Innovative Growing of Corn Microgreens as Potential New Food For Commercialization	USM RDE In-House Review 2023	December 4-5, 2023	USM, Kabacan, Cotabato
And Turnos-Milagrosa, Lorelyn Joy N.	Sustainable Production of Culinary Ingredients Using Halal Plant-Based Extracts as Root Promote, Nutrient Booster, and Bio-Fumigants	USM RDE In-House Review 2022	December 1-2, 2022	USM, Kabacan, Cotabato
Sales, Mel Chrisel A.	Developing Sustainable Agricultural Environment Through the Organization of Durian Producers in Mindanao, Philippines	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Sales, Mel Chrisel A.	Developing Land Management Options for Diverse Cacao-Based System in Mindanao	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Sales, Mel Chrisel A.	Harnessing Rhizobacteria and Actinomycete's Potential as Biofertilizer and Biocontrol Inputs Supportive of Strengthening the Organic Agriculture Industry (HaRBIS-Organic)	2024 USM Year-end Inhouse Review	November 28-29, 2024	USM, Kabacan, Cotabato
Sales, Mel Chrisel A.	Developing Land Management Options for Diverse Cacao-Based System in Mindanao	2023 USM MidYear-end Inhouse Review	July 20, 2023	USM, Kabacan, Cotabato

Sales, Mel Chrisel A.	Verification of Soil pH, OM, N, P, and K Test Methods Mineral Nutrition of Rubber and Rubber-Based Cropping in Southeast Asia/Mel Chrisel A. Sales	42nd USM Year-end Inhouse Review	Dec 1-2, 2022	USM, Kabacan, Cotabato
Sales, Mel Chrisel A.	Developing Robust Diagnostic Tools and Effective Chemical Formulation for Rubber and Companion Crops to Improve Rubber Productivity Developing Rapid and Affordable Soil Nutrient Test Fertilizer Formulation	41st USM Year-end Inhouse Review	Nov 4-5, 2021	USM, Kabacan, Cotabato
Sumael, Monaira I.	Plant To Learn: Establishment of Vegetable, Herbs, Spices and Medicinal Plants; and Forage Garden at Nangaan High School Breeding of White OPVs, Glutinous and Sweet Corn for Herbicide Resistance	USM RDE Midyear In-House Review 2025 USM RDE In-House Review 2024	July 17, 2025 November 28-29, 2024	USM, Kabacan, Cotabato USM, Kabacan, Cotabato
Turnos-Milagrosa, Lorelyn Joy N.	New Formulation of Bar and Liquid Soap from Selected Industrial Crops with Potential Anti-Microbial Activity	USM RDE In-House Review 2023	December 4-5, 2023	USM, Kabacan, Cotabato
Turnos-Milagrosa, Lorelyn Joy N.; and	Seed Propagation Techniques in Growing Various Herbs and Spices and their Biocontrol Efficacy Against <i>Ralstonia</i> sp. and <i>Phytophthora</i> sp.	USM RDE In-House Review 2023	December 4-5, 2023	USM, Kabacan, Cotabato
Muttulani, Mark Al-Jamie J.	Organic-Based Interventions for Selected Crops and Sheep Nutrition Impact of Different Concoctions on the Seed Germination, Seedling Growth, Productivity and Yield of Tomato (<i>Lycopersicum esculentum</i>)	USM RDE In-House Review 2022	December 1-2, 2022	USM, Kabacan, Cotabato

1.5 PATENTED/COMMERCIALIZED RESEARCHES

1.5.1 UTILITY MODEL

1.5.1.1 Approved Utility Models

The MS Horticulture Program demonstrates its capacity for innovation and intellectual property generation through approved Utility Models developed by its faculty members. These innovations include compositions and formulations utilizing plant-based resources, particularly sibucao and blue ternate, for the development of herbal tea, coffee substitutes, bar soap, and liquid soap. The approved Utility Models, principally developed by LJNTurnos-Milagrosa, with one co-developed with AABaladjay, reflect the faculty's ability to translate research findings and scientific knowledge into potentially useful and value-added products. The protection of these innovations through Utility Model registration further demonstrates the program's commitment to research utilization, product development, intellectual property protection, and innovation, extending faculty research beyond scholarly outputs toward technologies with potential applications and commercialization opportunities.

Authors	Title	Registration No.	Date Published	Date of Validity	Remarks
Lorelyn Joy N. Turnos-Milagrosa	Herbal Tea Composition	2/2024/05 0331	June 23 2025	June 2032	Sibucao tea
Lorelyn Joy N. Turnos-Milagrosa	A Coffee Substitute Composition	2/2023/05 1634	Sept 23 2024	Dec 2030	Sibucao coffee
Lorelyn Joy N. Turnos-Milagrosa	Bar Soap Composition	PH 2- 2021- 051129	Oct 6 2021	Sept 27 2028	Blue ternate bar soap
Lorelyn Joy N. Turnos-Milagrosa	Coffee Substitute (Blue Ternate Coffee)	PH 2- 2020- 050376	Dec 11 2020	Aug 05 2027	Blue ternate coffee

Lorelyn Joy N. Turnos-Milagrosa and Arndiel A. Baladjay	Formulation for Blue Ternate Liquid Soap and the Process Thereof	PH 2-2020-000136	March 2020	March 05, 2027	Blue ternate liquid soap
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1.5.1.2 Utility Model Application

Lorelyn Joy N. Turnos, Mark Al-Jamie J. Muttulani	Method of Treating Robusta Coffee Berries for Good Quality Coffee	Application No. 22020000134 (March 2020)
Lorelyn Joy N. Turnos, Mark Al-Jamie J. Muttulani	Produce of Treating Robusta Coffee Berries for Good Quality Coffee	Application No. 22020000135 (March 2020)

- *These Utility Model applications were generated as outputs of USM-funded research projects conducted by MS Horticulture faculty members Dr. Lorelyn Joy N. Turnos and Dr. Mark Al-Jamie J. Muttulani. The applications focus on methods and processes for treating Robusta coffee berries to improve coffee quality, demonstrating the translation of University-supported research into protectable technologies and intellectual property outputs.*

1.5.2 COPYRIGHTS AND TRADEMARKS

Registered Copyrights of MS Horticulture Faculty Research Outputs

Faculty	Cert. No	Title	Classes	Creation Date	Period of Protection
Nenita E. Olero, Ariston D. Calvo, Ardniel A. Baladjay	A-2020-00571	Manual on Macro-Propagation Technique: An Alternative Way of Producing Quality Planting Materials of Lakatan	A	November 29, 2019	Lifetime of the author and for fifty (50) years after the author's death
Muttulani, Mark Al-Jamie	2025-0053-A-TCCR 2025-00532-A-TCCR	General Guidelines for Halal Production Halal Crop production			

- The MS Horticulture faculty members have translated research and technical expertise into copyrighted knowledge products, demonstrating research utilization beyond conventional scientific publications.
- Registered outputs include a manual on macro-propagation techniques for Lakatan planting materials involving AABaladjay and the General Guidelines for Halal Production by MAJMuttulani. These copyrighted works contribute to the protection, dissemination, and practical application of research-based knowledge and technologies relevant to horticulture and agricultural production.

1.5.3 REGISTERED COMMERCIAL CORN VARIETIES, CACAO AND PEANUT

The University's research and crop improvement initiatives have resulted in the registration of several crop varieties and clones with the National Seed Industry Council (NSIC). These include ten corn varieties registered from 2012 to 2016, three cacao clones registered in 2014, and one peanut variety registered in 2011. The registered materials demonstrate the University's sustained contribution to crop improvement, varietal development, and the availability of improved planting materials for agricultural production. For the MS Horticulture Program, particularly relevant are the registered cacao clones: PBC 123, USM CH 1, and USM CH 2, which reflect institutional capability in the development and evaluation of high-value horticultural crops. These accomplishments provide a strong research environment that supports faculty and graduate student engagement in crop improvement, varietal evaluation, and sustainable agricultural production.

NSIC Registration Number	Variety Name	Year Registered
Corn		
1. NSIC 2012 Cn 272	USM Var 32	2012
2. NSIC 2014 Cn 290	USM Var 33H	2014
3. NSIC 2014 Cn 291	USM Var 35H	2014
4. NSIC 2014 Cn 287	USM Var 40	2014
5. NSIC 2014 Cn 288	USM Var 38	2014
6. NSIC 2014 Cn 289	USM var 39	2014
7. NSIC 2015Cn 298	USM var 42H	2015
8. NSIC 2015 Cn 299	USM var 37	2015
9 NSIC 2015 Cn 300	USM var 39	2015
10. NSIC 2016 Cn 307	USM var 41	2016
Cacao		
1.NSIC 2014 Cc 11	PBC 123	2014
2. NSIC 2014 Cc 12	USM CH 1	2014
3. NCSIC 2014 Cc 13	USM CH 2	2014
Peanut		
NSIC Pn 16	USM Pn 1	2011

1.5.4 COMMERCIALIZED TECHNOLOGY

Name of Technology	Fairness Opinion Report Issued	Licenses	Cost of Technology
USM Corn Variety NCH 35	FOB XII-2021-01	Promland Company	200,000.00
USM Corn Variety Var 30H	FOB XII-2021-02	Promland Company	200,000.00
USM Corn Variety NCH 30H	FOB XII-2021-03	Miracle Hybrid Corn Company	200,000.00

USM Corn Variety Var 24	FOB XII-2021-04	Miracle Hybrid Corn Company	200,000.00
USM Corn Variety NCH 33	FOB XII-2021-05	Miracle Hybrid Corn Company	200,000.00

- The research and development efforts involving MS Horticulture faculty members extend to technology commercialization, demonstrating the practical value of University-generated innovations.
- Five USM-developed corn varieties were licensed to Promland Company and Miracle Hybrid Corn Company, with each technology valued at ₱200,000, for a total of ₱1,000,000.
- The issuance of Fairness Opinion Reports and licensing of these technologies demonstrate the University's capacity to translate research outputs into commercially viable technologies.
- These accomplishments strengthen the MS Horticulture Program's exposure to research utilization, technology transfer, intellectual property management, and commercialization.

1.5.5 RESEARCH OUTPUTS TRANSLATED INTO POLICY

The research activities of the MS Horticulture faculty have contributed not only to knowledge generation but also to the formulation of local policies, demonstrating the practical utilization and societal relevance of research outputs. A notable example is the research on developing land management options for diverse cacao-based systems in Mindanao, undertaken by faculty researcher Mel Chrisel A. Sales.

Research findings and recommendations from the project provided a basis for the adoption of local resolutions promoting sustainable land management practices, agricultural lime application, and organic fertilizer utilization to improve cacao productivity. These policies were implemented in selected cacao-producing communities in Calinan and Tugbok Districts, Davao City from 2025 to 2026.

The translation of research findings into local policy demonstrates the responsiveness and applicability of faculty research to actual agricultural concerns. More importantly, it highlights the capacity of the MS Horticulture Program to contribute to evidence-based decision-making, sustainable cacao production, and community-level agricultural development, extending the value of research beyond academic publication toward tangible benefits for farmers and local stakeholders.

Research/ Research Output	Policy	Date Implemented
Published Policy Brief: Adopting Cacao to Soil and Climate Challenges GGGI-BKCF Project: Developing Land Management Options for Diverse Cacao-based Systems in Mindanao Researcher: Sales, Mel Crisel A.	Resolution No. 007-A01: A Resolution Promoting Sustainable Land Management Practices to Assist Farmers in Improving Cacao Yields in Brgy. Wangan, Calinan District, Davao City	Feb 16, 2026
	Resolution No. 13, Series of 2026: A Resolution Promoting Sustainable Land Management Practices to Assist Farmers in Improving Cacao Yields in Brgy. Manuel Guianga, Tugbok District, Davao City	Jan. 19, 2026
	Resolution No. 42, Series of 2025: A Resolution to Promote the Utilization of Agricultural Lime and Organic Fertilizer as Support to Farmers to Boost Production of Cacao in Brgy. Sirib, Calinan District, Davao City	November 3, 2025

1.6 SOFTWARES

The MS Horticulture Program is supported by institutional access to various licensed software and ICT resources that facilitate instruction, research, data analysis, scholarly writing, and academic collaboration. Available resources include SPSS for statistical analysis, Turnitin for plagiarism checking and promoting academic integrity, and Microsoft Office 365 and Google Workspace for documentation, communication, and collaborative academic activities. Other institutional software and platforms, including Zoom, Foxit PDF Editor, AutoCAD, SQL Server, and Windows Server, provide additional support for teaching, research, and administrative functions. The availability of these active subscription-based and perpetual software resources strengthens the program's capacity to support graduate-level research, data management and analysis, preparation of scientific outputs, and effective delivery of academic activities.

Item No.	Name of Software	Type	Status	Expiration Date
1	AutoCAD LT and AutoCAD – including specialized toolsets	Subscription	Active	October 30, 2027
2	Foxit PDF Editor	Perpetual	Active	n/a
3	Google Workspace for Teaching and Learning Upgrade	Subscription	Active	February 25, 2026
4	MS Office 365 A3 for Faculty	Subscription	Active	February 26, 2026
5	SPSS	Perpetual	Active	n/a
6	SQL Server 2022 Standard Core – 2 Core License Pack	Perpetual	Active	n/a
7	Turnitin for Plagiarism + AI	Subscription	Active	December 22, 2025
8	Windows Server 2022 Datacenter – 16 Core	Perpetual	Active	n/a
9	Zoom	Subscription	Active	April 19, 2026