Program Assessment Form (Non-Academic Program)

Agriculture Production

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General Information (Program Assessment Form (Non-Academic Program))

Standing Requirements

NMC MISSION STATEMENT & ESIP (COLUMN 1 OF THE 5-COLUMN MODEL)

NMC Mission Statement:Northern Marianas College, through its commitment to student learning, provides high quality, affordable and accessible educational programs and services for the individual and people of the Commonwealth.ESIP for Agriculture Production:Agriculture Production Program (APP) provides opportunities and services to the people of the CNMI. The APP focuses on educating through non-instructional education, evaluating current agriculture production and improved management systems, and enhancing agriculture through the transfer of knowledge from the science and research in our experiment stations.

OUTCOMES (COLUMN 2 OF THE 5-COLUMN MODEL)

Agriculture Production Program Outcomes 2020-2021

Agriculture Production PLO 1

Agriculture production program will conduct pest surveillance to increase biosecurity and protect biodiversity.

Mapping

No Mapping

Agriculture Production PLO 2

Agriculture production program will conduct research on crop varieties to identify locally suitable and appropriate crop varieties to increase local production for the food security.

Mapping

No Mapping

2020-2021 Assessment Cycle (2018-2019 Assessment Cycle)

MEANS OF ASSESSMENT AND SUCCESS CRITERIA (ASSESSMENT PLAN)

Mission Statement

NMC Mission Statement:Northern Marianas College, through its commitment to student learning, provides high quality, affordable and accessible educational programs and services for the individual and people of the Commonwealth.ESIP for Agriculture Production:Agriculture Production Program (APP) provides opportunities and services to the people of the CNMI. The APP focuses on educating through non-instructional education, evaluating current agriculture production and improved management systems, and enhancing agriculture through the transfer of knowledge from the science and research in our experiment stations.

Measures

Agriculture Production Program Outcomes 2020-2021

Outcome

Outcome: Agriculture Production PLO 1
Agriculture production program will conduct pest surveillance to increase biosecurity and protect biodiversity.

Measure: Fire Ants Monitoring
Direct - Other

Details/Description:	Ants monitoring through fire ants bait stations that will be deployed around the islands.
Acceptable Target:	80% of deployed fire ants bait stations monitored.
Ideal Target:	100% of deployed fire ants bait stations monitored.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Extension Agent - Arnold Route

Measure: Insect Monitoring
Direct - Other

Details/Description:	Insect monitoring through insect traps that will be deployed around the islands.
Acceptable Target:	80% of deployed insect traps monitored.
Ideal Target:	100% of deployed insect traps monitored.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Extension Agent - Arnold Route

Outcome: Agriculture Production PLO 2
Agriculture production program will conduct research on crop varieties to identify locally suitable and appropriate crop varieties to increase local production for the food security.

Measure: Conduct Research on Fruit Crop Varieties
Direct - Other

Details/Description:	Agriculture production program will conduct research on fruit crop varieties to identify locally suitable and appropriate fruit crop varieties through sustainable agricultural practices including irrigation management, nutrient management, weed management and pest management resulting in improved crop yields and performance.
Acceptable Target:	Conduct randomized block design research on five (5) varieties of one (1) fruit crop.
Ideal Target:	Conduct randomized block design research on eight (8) varieties of one (1) fruit crop.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Program Leader and Scientist (Horticulture/Crop) - Dr. Virendra M. Verma

Measure: Conduct Research on Vegetable Crop Varieties
Direct - Other

Details/Description:	Agriculture production program will conduct research on vegetable crop varieties to identify locally suitable and appropriate vegetable crop varieties through sustainable agricultural practices including irrigation management, nutrient management, weed management and pest management resulting in improved crop yields and performance.
Acceptable Target:	Conduct randomized block design research on five (5) varieties of one (1) vegetable crop.
Ideal Target:	Conduct randomized block design research on eight (8) varieties of one (1) vegetable crop.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Program Leader and Scientist (Horticulture/Crop) - Dr. Virendra M. Verma

SUMMARY OF DATA COLLECTED AND USE OF RESULTS (ASSESSMENT FINDINGS OR COLUMNS 4 & 5 OF THE 5-COLUMN MODEL)

Finding per Measure

Agriculture Production Program Outcomes 2020-2021

Outcome

Outcome: Agriculture Production PLO 1

Agriculture production program will conduct pest surveillance to increase biosecurity and protect biodiversity.

Measure: Fire Ants Monitoring
Direct - Other

Details/Description:	Ants monitoring through fire ants bait stations that will be deployed around the islands.
Acceptable Target:	80% of deployed fire ants bait stations monitored.
Ideal Target:	100% of deployed fire ants bait stations monitored.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Extension Agent - Arnold Route

Findings for Fire Ants Monitoring

Summary of Findings:	The presence or absence of the red imported fire ants were monitored through 2,500 peanut butter and sugar bait pair traps that were deployed at various sites on Saipan and Rota. No red imported fire ants were captured. Less than 10% of peanut butter and sugar bait pair traps were missing due to unknown reasons.
Results :	Acceptable Target Achievement: Met; Ideal Target Achievement: Approaching
Recommendations:	Red imported fire ants are absent on Saipan and Rota.
Reflections/Notes:	The objective of this activity is to survey for the presence or absence of the red imported fire ant in the Commonwealth of the Northern Mariana Islands (CNMI). Solenopsis invicta Buren, known commonly as the Red Imported Fire Ant (RIFA), is an aggressive ant known for its painful sting and their damage to agriculture crops. RIFA already occur in the southern United State, Taiwan, China, and the Philippines. Saipan is the major port of entry into CNMI and any introduction of this pest will greatly affect the island's ecology, environment, and economy, as well as provide a pathway to the islands of Tinian and Rota.

Measure: Insect Monitoring
Direct - Other

Details/Description:	Insect monitoring through insect traps that will be deployed around the islands.
Acceptable Target:	80% of deployed insect traps monitored.
Ideal Target:	100% of deployed insect traps monitored.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Extension Agent - Arnold Route

Findings for Insect Monitoring

Summary of Findings:	The presence or absence of mango fruit flies were monitored through 41 traps with cue lure pheromones that were deployed at the airport, agriculture farm plots, hotels and seaport on Saipan. No mango fruit flies were captured. The presence or absence of oriental fruit flies were monitored through 41 traps with eugenol pheromones that were deployed at the airport, agriculture farm plots, hotels and seaport on Saipan. No oriental fruit flies were captured. Two eugenol pheromones traps to monitor oriental fruit flies were missing and one for the same was damaged due to unknown reasons.
Results :	Acceptable Target Achievement: Met; Ideal Target Achievement: Approaching
Recommendations:	Mango and oriental fruit flies are absent on Saipan.
Reflections/Notes:	The objective of this activity is to survey for the presence or absence of mango and oriental fruit flies in Saipan and Tinian. The oriental fruit fly is native to Asia. The pest is widely spread throughout Asia and is currently present on all major Hawaiian Islands after being accidently introduced in 1944 or 1945, and also has been reported on Palau in 1995. This pest attacks a wide variety of fruits such as guava, mango, banana, papaya, starfruit, and tangerine. The mango fruit fly is widely spread throughout the Federated States of Micronesia, Republic of Palau, Republic of Nauru, Republic of the Marshall Islands, Solomon Islands, Kiribati, Papua New Guinea and Australia. This pest also attacks a wide variety of fruits such as guava, tropical almond, mountain apple, breadfruit and orange. With the increasing flow of travelers throughout the Pacific, via commercial airplane or cruise ships, the opportunities for invasive fruit flies entering CNMI is high. Cargo planes and cargo ships, also provide another pathway for the introduction of these two invasive species, which would cause major damage to the agriculture areas in CNMI.

Outcome: Agriculture Production PLO 2
Agriculture production program will conduct research on crop varieties to identify locally suitable and appropriate crop varieties to increase local production for the food security.

Measure: Conduct Research on Fruit Crop Varieties
Direct - Other

Details/Description:	Agriculture production program will conduct research on fruit crop varieties to identify locally suitable and appropriate fruit crop varieties through sustainable agricultural practices including irrigation management, nutrient management, weed management and pest management resulting in improved crop yields and performance.
Acceptable Target:	Conduct randomized block design research on five (5) varieties of one (1) fruit crop.

Ideal Target:	Conduct randomized block design research on eight (8) varieties of one (1) fruit crop.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Program Leader and Scientist (Horticulture/Crop) - Dr. Virendra M. Verma

Findings for Conduct Research on Fruit Crop Varieties

Summary of Findings:

Agriculture production program has conducted randomized block design experiments on nine (9) varieties of cantaloupes (Shockwave, Ambrosia, Aphrodite, Dream, Maverick, Passport, Athena, Superstar and Sugar cube) in five (5) replications and has identified six (6) varieties that are suitable and appropriate to grow on our islands. The average weight of the recommended varieties ranges from 5 to 10 pounds. They possess the desired sweetness, color, flavor and shelf life and can be harvested between 60 to 85 days. The program has examined these varieties through applied sustainable agricultural practices to manage irrigation, nutrients, weeds and pests to achieve maximum crop yields and performance. All of the recommended varieties performed very well when compared with conventional practices.

Results :

Acceptable Target Achievement: Exceeded; Ideal Target Achievement: Exceeded

Recommendations:

The recommended six (6) varieties of cantaloupes are Shockwave, Ambrosia, Aphrodite, Maverick, Athena and Superstar. Cantaloupes grow best in organically rich and well-drained soil with a pH of 6.0-6.5. Therefore, it is highly recommended to test the soil for pH and fertilizer requirement. When examined under sustainable agricultural practices, the recommended varieties proved more resistant among the tested ones to common diseases (leaf blight, anthracnose, gummy stem blight, powdery mildew, southern blight, bacterial wilt, cucumber mosaic and downy mildew), pest (aphids, cucumber beetles, melon worm and squash bug) and root knot nematodes. The use of reflective plastic mulch to control insects and weeds, and maintain humidity and soil temperature also proved beneficial, therefore, their use is encouraged for the stakeholders.

Reflections/Notes:

Our ideal target was to conduct randomized block design research on eight (8) varieties of cantaloupes, and we were able to exceed the ideal target by one (1) variety or 12.5%. We have a responsibility to ourselves and our descendants to find methods of producing food that minimize damage to the farm ecosystem on our pristine islands otherwise we would not be able to keep farming indefinitely. Therefore, we have used sustainable agricultural practices for irrigation, nutrient, weed and pest management such as cover crops, crop rotation, natural and organic pesticides, green manure, composting and crop diversity etc. to achieve maximum crop yields and performance. The main targeted audience to use these results and information are extension staff, farmers and backyard gardeners. We have organized field days for our stakeholders to showcase and communicate results of our experiments. Also, planning is underway to organize additional extension and outreach activities to further promote adoption and sustainable cultivation of recommended varieties by our stakeholders.

Development of evaluation strategies to gauge the adoption of recommended varieties and sustainable agricultural practices by the stakeholders is under progress and research will be conducted during 2022-23.

Measure: Conduct Research on Vegetable Crop Varieties
Direct - Other

Details/Description:	Agriculture production program will conduct research on vegetable crop varieties to identify locally suitable and appropriate vegetable crop varieties through sustainable agricultural practices including irrigation management, nutrient management, weed management and pest management resulting in improved crop yields and performance.
Acceptable Target:	Conduct randomized block design research on five (5) varieties of one (1) vegetable crop.
Ideal Target:	Conduct randomized block design research on eight (8) varieties of one (1) vegetable crop.
Implementation Plan (timeline):	2020-2021
Key/Responsible Personnel:	Program Leader and Scientist (Horticulture/Crop) - Dr. Virendra M. Verma

Findings for Conduct Research on Vegetable Crop Varieties

Summary of Findings:	Agriculture production program has conducted randomized block design experiments on nine (9) varieties of tomatoes (Plum Regal, Big Beef, Nature's Bites, Bluish Tiger, Sunbrite, Dixie Red, Chef's Choice, Florida and Bellini) in five (5) replications and has identified all nine (9) varieties that are suitable and appropriate to grow on our islands. They possess the desired sweetness, juice, color, flavor, size, shape and shelf life. Varieties Plum Regal, Big Beef, Sunbrite, Dixie Red, Chef's Choice and Florida are bright-colored and good for slicing while others such as Nature's Bites, Bluish Tiger and Bellini are smaller and juicy. These varieties of tomatoes were harvested between 80 to 120 days. The program has examined these varieties through applied sustainable agricultural practices to manage irrigation, nutrients, weeds and pests to achieve maximum crop yields and performance. All of the recommended varieties performed very well when compared with conventional practices.
Results :	Acceptable Target Achievement: Exceeded; Ideal Target Achievement: Exceeded
Recommendations:	The recommended nine (9) varieties of tomatoes are Plum Regal, Big Beef, Nature's Bites, Bluish Tiger, Sunbrite, Dixie Red, Chef's Choice, Florida and Bellini. Tomatoes grow best in organically rich and well-drained loamy soil with a pH of 6.0-7.0 and it is highly recommended to test the soil for pH and fertilizer requirement. Tomato is a warm season crop and suitable temperature for best

	fruit color and quality is between 21-24°C (maximum 30°C). Bright sunshine at the time of fruit set will results in dark red colored fruits and avoid water stress to prevent cracking of fruits. When examined under sustainable agricultural practices, the recommended varieties proved slightly resistant to common diseases (black and gray mold, anthracnose, early blight, Fusarium wilt, Septoria leaf spot, bacterial spot, bacterial wilt, blossom end rot, buckeye rot, late blight, mosaic virus and leaf curl), pests (aphids, fruit worm, flea beetles, hornworm, leafminers, thrips and spidermites) and root knot nematodes. The use of compost mulch to control insects and weeds and maintain humidity also proved beneficial, therefore, their use is encouraged for our stakeholders.
Reflections/Notes:	Our ideal target was to conduct randomized block design research on eight (8) varieties of tomatoes, and we were able to exceed the ideal target by one (1) variety or 12.5%. We have a responsibility to ourselves and our descendants to find methods of producing food that minimize damage to the farm ecosystem on our pristine islands otherwise we would not be able to keep farming indefinitely. Therefore, we have used sustainable agricultural practices for irrigation, nutrient, weed and pest management such as cover crops, crop rotation, natural and organic pesticides, green manure, composting and crop diversity etc. to achieve maximum crop yields and performance. The main target audience to use these results and information are extension staff, farmers and backyard gardeners. We have organized field days for our stakeholders to showcase and communicate results of our experiments. Planning is also underway to organize additional extension and outreach activities to further promote adoption and sustainable cultivation of recommended varieties by our stakeholders. Development of evaluation strategies to gauge the adoption of recommended varieties and sustainable agricultural practices by the stakeholders is under progress and research will be conducted during 2022-23.

Overall Recommendations

The recommended nine (9) varieties of tomatoes are Plum Regal, Big Beef, Nature's Bites, Bluish Tiger, Sunbrite, Dixie Red, Chef's Choice, Florida and Bellini, and six (6) varieties of cantaloupes are Shockwave, Ambrosia, Aphrodite, Maverick, Athena and Superstar, and are suitable and appropriate to grow on our islands. Both crops grow best in organically rich and well-drained soil with a slightly acidic pH and warm season. It is highly recommended to test the soil for pH, nutrient requirements and fertilizer application for both crops. The recommended varieties when examined under sustainable agricultural practices proved more resistant to common diseases, pest and root knot nematodes. The use of reflective plastic mulch for cantaloupe to control insects and weeds, and maintain humidity and soil temperature, and compost mulch for tomatoes to control insects and weeds and maintain humidity proved beneficial, therefore, their use is encouraged for our stakeholders. All of the recommended varieties performed very well when compared with conventional practices.

Mango and oriental fruit flies on Saipan, and red fire ants on Saipan and Rota were monitored through traps that were deployed at different locations and no targeted pests were captured.

Overall Reflection

Our ideal targets for PLO 2 were to conduct randomized block design research on eight (8) varieties of cantaloupes and tomatoes each, and we were able to exceed the ideal target by one (1) variety of each or 12.5%. We have a responsibility to ourselves and our descendants to find methods of producing food that minimize damage to the farm ecosystem on our pristine islands otherwise we would not be able to keep farming indefinitely. Therefore, we have used sustainable agricultural practices for irrigation, nutrient, weed and pest management such as cover crops, crop rotation, natural and organic pesticides, green manure, composting and crop diversity etc. to achieve maximum crop yields and performance. The main targeted audience to use these results and information are extension staff, farmers and backyard gardeners. We have organized field days for our stakeholders to showcase and communicate results of our experiments. Planning is also underway to organize additional extension and outreach activities to further promote adoption and sustainable cultivation of recommended varieties by our stakeholders. Development of evaluation strategies to gauge the adoption of recommended varieties and sustainable agricultural practices by the stakeholders is under progress and research will be conducted during 2022-23.

Our acceptable targets for PLO 1 were to monitor 80% of deployed pest traps, and we were able to achieve the acceptable target. Mango and oriental fruit flies on Saipan, and red Fire ants on Saipan and Rota were monitored through traps that were deployed at different locations and no targeted pests were captured. Only objective of this monitoring activity is to ascertain the presence or absence of fruit flies on Saipan and fire ants on Saipan and Rota, and these pests are absent.

OPERATIONAL PLAN (THIS IS WHERE YOU CAN LINK AN OUTCOME TO AN ACTION PLAN WITH OR WITHOUT A SPECIAL BUDGET REQUEST.)

STATUS REPORT (THIS SIMPLY STATES THE STATUS OF YOUR OPERATIONAL PLAN.)

2021-2022 Assessment Cycle (2018-2019 Assessment Cycle)

MEANS OF ASSESSMENT AND SUCCESS CRITERIA (ASSESSMENT PLAN OR COLUMN 3 OF THE 5-COLUMN MODEL)

SUMMARY OF DATA COLLECTED AND USE OF RESULTS (ASSESSMENT FINDINGS OR COLUMNS 4 & 5 OF THE 5-COLUMN MODEL)

USE OF RESULTS

STATUS REPORT

OPERATIONAL PLAN (THIS IS WHERE YOU CAN LINK AN OUTCOME TO AN ACTION PLAN WITH OR WITHOUT A SPECIAL BUDGET REQUEST.)

STATUS REPORT (THIS SIMPLY STATES THE STATUS OF YOUR OPERATIONAL PLAN.)

2019-2020 Assessment Cycle (Actual Cycle) (ACTUAL Data)

MEANS OF ASSESSMENT AND SUCCESS CRITERIA

Mission Statement

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Measures

SUMMARY OF DATA

Finding per Measure

Overall Recommendations

No text specified

Overall Reflection

No text specified

USE OF RESULTS

STATUS REPORT

USE OF RESULTS

STATUS REPORT