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MONOGRAPH

1 **C10**

2 Enhancement of the forest genetics laboratory of the College of Forestry and Natural Resources (CFNR) University of the Philippines Los Baños (UPLB) [Laguna, Philippines]. **Tolentino, E.L., Jr.** *Department of Science and Technology, Bicutan, Taguig City (Philippines). Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development.* 2016 *TR-1826.*

3 4 5 6

9 Laboratory mass rearing of the five lepidopteran pests of corn namely the…

10 FORESTS; LABORATORY EQUIPMENT; FORESTRY EQUIPMENT; UNIVERSITIES;

BOOK CHAPTER

1 **E14**

2 Bioethanol production from macroalgae and socio-ecological implications: Project 1: socio-ecological assessment and analysis for algal biomass production, development and promotion.

3 **Fernandez, P.R.,Jr, Geganzo, L.G.L., Subade, R.F., Napilan-Espectato. L.** Bioethanol production from macroalgae and socio-ecological implications. Fernandez, P.R.Demafelis, R.B.Geganzo, L.G.L.Subade, R.F.Napilan-Espectato, L.Santiago, D.E.O.Movillon, J.L.Hourani, K.Gatdula, K.M.Magadia, R.V.Jr.- College, Laguna (Philippines), *2016. TR-1732. p. 1-71 .*

11 12 5 6

9 IPB Var 6 is a white-flint open pollinated variety. It is a quality protein maize (QPM) that is high yielding and

10 ZEA MAYS; MAIZE; VARIETIES; SEED; PROTEINS; PROCESSED PRODUCTS; FOODS; TECHNOLOGY; TECHNOLOGY

SERIAL ARTICLE

1 **D50 - LEGISLATION**

2 Will patients benefit from the current Philippine Legislative Bill on medical cannabis? a cost-benefit analysis. **Dalmacion, G.V. Philippines Univ. Manila, Pedro Gil St., Ermita, Manila City (Philippines). Dept. of Clinical Epidemiology. Ramirez, P.J.B. Philippines Univ. Los Baños, College, Laguna (Philippines). Dept. of Economics. Regencia, Z.J.G., Baja, E.S. Philippines Univ. Manila, Pedro Gil St., Ermita, Manila City (Philippines). Inst. of Clinical Epidemiology. esbaja@up.edu.ph.** *Philippine Agricultural Scientist (Philippines). 0031-4454. v. 104 (3) p. 197-222. 2021.* *https://pas.cafs.uplb.edu.ph/download/will-patients-benefit-from-the-current-philippine-legislative-bill-on-medical-cannabis-a-cost-benefit-analysis/*

3 8 13

9 Philippine Congress is pushing House Bill (HB) 6517 to decriminalize medical cannabis use in the Philippines. This study aims to evaluate the cost and benefit that will likely result from ...

10 CANNABIS; DRUG PLANTS; PUBLIC HEALTH LEGISLATION; COST BENEFIT ANALYSIS; GOVERNMENT

BOOK CHAPTER

1 **E14 - DEVELOPMENT ECONOMICS AND POLICIES**

2 Bioethanol production from macroalgae and socio-ecological implications: Project 1: socio-ecological assessment and analysis for algal biomass production, development and promotion. **Fernandez, P.R.,Jr, Geganzo, L.G.L., Subade, R.F., Napilan-Espectato. L.** Bioethanol production from macroalgae and socio-ecological implications. Fernandez, P.R.Demafelis, R.B.Geganzo, L.G.L.Subade, R.F.Napilan-Espectato, L.Santiago, D.E.O.Movillon, J.L.Hourani, K.Gatdula, K.M.Magadia, R.V.Jr.- College, Laguna (Philippines), *TR-1732. 2016. p. 1-71 .*

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9 IPB Var 6 is a white-flint open pollinated variety. It is a quality protein maize (QPM) that is high yielding and

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1. Subject category
2. Title
3. Author (s)
4. Corporate author
5. TR No.
6. Date
7. Conference title, place, and date
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ORYZA SATIVA; ZEA MAYS; COCOS NUCIFERA; CROP MANAGEMENT; DIVERSIFICATION; TECHNOLOGY; TECHNOLOGY TRANSFER; DIFFUSION OF INFORMATION; INNOVATION ADOPTION; FARMERS; PHILIPPINES

New management structure for agriculture. **Dy, R.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 40-41. Nov 2018.*
https://www.agriculture.com.ph/2019/08/16/a-new-management-structure-for-agriculture/

AGRICULTURE; MANAGEMENT; ADMINISTRATION; PLANNING; PRODUCTIVITY; INDONESIA; MALAYSIA; THAILAND; VIET NAM

C – EDUCATION, EXTENSION AND INFORMATION

C10 - EDUCATION

Culinary school unveils 'Culinary Agripreneurship' Diploma Program. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 20-21. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/06/14/culinary-school-unveils-culinary-agripreneurship-diploma-program/

STUDENTS; EDUCATIONAL INSTITUTIONS; TRAINING COURSES; CONTAINER PLANTING; VEGETABLE CROPS; SUSTAINABILITY; FOOD SECURITY

C20 - EXTENSION

Drawing Filipinos back to agri through rice paddy drawings. **Caballong, N.L. nlcaballong@philrice.gov.ph., Barroga, R.F., Carbungco, P.V. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 170. 2019.*

In order to boost interest in rice farming agriculture from the youth and the public, and promote farm tourism, the rice paddy art was first created in 2015 at the FutureRice Farm, Philippine Rice Research Institute, Maligaya, Science City of Muñoz, Nueva Ecija. The rice paddy art is an image created on the rice paddy using green-leafed and purple-leafed rice varieties. By employing anamorphosis on the image, the image can be viewed in perfect proportion from the ground level. As of 2019, FutureRice Rice and the PhilRice Genetic Resources Division has featured on rice paddy artworks 8 sets of famous Filipino personalities that had inspired the youth and Filipinos during the cropping seasons they were featured. During 'rice paddy art season' more farmers, students, bloggers, local government units, and private companies, and other groups from different parts of the Philippines visit the FutureRice Farm. Their farm visits become leading opportunities to see and understand smart farming, clean energy, farm mechanization, and other technologies in rice farming demonstrated in the farm. Moreover, the increased reach and engagements in social media and numerous features in national newspapers, television shows, radio shows, and websites because of the paddy art also become avenues to widely publicize the technologies in the farm that can help Filipino rice farmers.

RICE; DIFFUSION OF INFORMATION; TECHNOLOGY TRANSFER; AGRICULTURE; RURAL AREAS; TOURISM; PHILIPPINES

DTI [Department of Trade and Industry] programs and services for MSMEs [Micro, Small and Medium Enterprises]. **Maglaya, Z.C. Department of Trade and Industry (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 52.*

The 7Ms for MSME [Micro, Small and Medium Enterprise] Development highlights the Department of Trade and Industry (DTI)'s holistic strategy for specific and targeted interventions for our MSMEs. The 7Ms is comprised of mindset, mastery, mentoring, money, machines, markets, and models of business. Through mindset, DTI helps MSMEs to embrace the right and positive entrepreneurial attitude that will carry them through their vibrant entrepreneurial journey With mastery, DTI teaches MSMEs to master the knowledge and how-to's of entrepreneurship. With mentoring, the department provides MSMEs with continuous guidance in partnership with the private sector. In money, DTI provides MSMES access to financing from both government and private financing institutions for setting up or expanding their businesses. Under machines, MSMEs are

equipped with the right tools and equipment to level up production and increase productivity. Through market access, DTI helps promote MSMEs products and link them to big companies in the global value and supply chain. With models of business, the department gives different business ideas to help aspiring entrepreneurs start building the next big thing. DTI will continue to push for efforts to provide the necessary services to help the MSMEs thrive even expand in an increasingly global and competitive market and to implement programs and projects that will better equip and capacitate the MSMEs to face the challenges and opportunities ahead as we enter an increasingly globalized economy.

ENTERPRISES; MODELS; MARKETS; EXTENSION ACTIVITIES; EXTENSION PROGRAMMES

e-Damuhan: a weed photo recognition and catalog app. **Caballong, N.L. nl.caballong@philrice.gov.ph., Alday, P.A.A., Barroga, R.F., Donayre, D.K.M., Martin, E.C., Cayabin, H.DC. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 171. 2019.*

Weeds pose great threat to rice production. If not controlled, this group of pest can reduce yield from 44-96% by competing with rice on nutrients, water, and even sunlight. Correct identification of weed species is prerequisite to selecting, deciding and implementing effective and economical weed management strategies and techniques. Materials needed for weed identification (books, pamphlets, and techno-bulletins), however, are very limited to country. Nevertheless, mobile application tool that is capable of recognizing weed species. The app lets the users capture the photo of the unknown weed then it automatically analyzes the captured image and provide a shortlist of the possible identity of the weed. eDamuhan features a digital catalogue of the book Weeds that grow in irrigated and rainfed lowland rice fields in the Philippines. It shows common rice field weed species with their morphological characteristics, life cycle, habitat, photosynthetic activity, and impact on rice. It explains the importance of proper weed management in rice production and provides measures to control weeds. With the recognition and catalogue features of the app, farmers and AEWS will be more equipped in correctly identifying and managing weeds of rice in the field.

RICE FIELDS; WEEDS; IDENTIFICATION; WEED CONTROL; COMPUTER SOFTWARE; DIFFUSION OF INFORMATION; TECHNOLOGY TRANSFER

Put up a farm school and earn millions. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 8-9. Apr 2020.*

https://www.agriculture.com.ph/2020/05/02/put-up-a-farm-school-and-earn-millions/

FARMS; EDUCATIONAL INSTITUTIONS; DIFFUSION OF INFORMATION; TRAINING PROGRAMMES; TECHNOLOGY TRANSFER

E - AGRICULTURAL ECONOMICS, DEVELOPMENT AND RURAL SOCIOLOGY

E10 - AGRICULTURAL ECONOMICS AND POLICIES

Adding diversity as a new dimension in the food security framework. **Shun-Nan Chiang, Capiña, X.G. Southeast Asian Regional Center for Graduate Study and Research in Agriculture, Los Baños, Laguna (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 94.*

The international development field is undergoing a paradigm shift from a focus on hunger to an increased focus on the coexistence of multiple forms of malnutrition. The composition between the United Nation's MDG and SDG demonstrates this paradigm shift. While the indicator of MDG-1 only focuses on energy deficiency, in contrast, in SDG, relevant indicators include energy deficiency, subjective experience of food security, chronic undernutrition, and over-/underconsumption of calories. Overall, the shift from MDGs to SDGs involved two major changes namely: (1)ending all forms of malnutrition has become a central part of the goal and (2)sustainable agriculture now shares the same goal with hunger to multiple forms of malnutrition calls for an update of the original food security framework. However, since 'food security framework' and nutrition security framework, However, since 'food security framework' and 'nutrition security framework' both have distinct dimensions, it is not easy to develop an operationalize. Based on this observation, the authors argue that it may be more realistic to consider specifically how the food system could contribute to one specific dimension - adequate and nutritious food - of nutrition security. As a result, the authors intend to propose a 'food security for nutrition framework by adding a new dimension of 'diversity' to the original food security framework. Based on the results of the study, the authors argue that 'diversity' should serve as the precondition of all other dimensions and be achieved throughout the entire food system from production to consumption, including agricultural diversity, dietary diversity, cultural diversity, and the diversification of the entire food system.

FOOD SECURITY; MALNUTRITION; AGRICULTURE; HUMAN NUTRITION

Are we food secure? **Dy, R.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p.30-31. Nov 2018.*
https://www.agriculture.com.ph/2019/08/13/are-we-food-secure/

FOOD SECURITY; PRICES; FOOD SUPPLY; FOODS; QUALITY; FOOD SAFETY; HOUSEHOLDS; POVERTY; FARMERS; INCOME

Bamboo offers many agricultural and agribusiness possibilities. **Dela Cruz, R.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 30-32. Apr 2020.*
https://www.agriculture.com.ph/2020/05/15/bamboo-offers-many-agricultural-and-agribusiness-opportunities/

BAMBUSA; BAMBOOS; USES; ORNAMENTAL PLANTS; LANDSCAPING; ENVIRONMENTAL IMPACT; FURNITURE; ENTERPRISES; AGROINDUSTRIAL SECTOR

Coffee statues, trends, and opportunities bared during farmers' forum. **Sagpa-ey, J.S.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 10-11. 2020.*

COFFEE; INDUSTRY; SUPPLY BALANCE; CONSUMPTION; CONSUMER SURVEYS

Fiesta underscores importance of cacao industry. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 59. Nov 2018.*

THEOBROMA CACAO; PRODUCTION; TECHNOLOGY; INDUSTRY; MARKETS; RAW MATERIALS; CROP MANAGEMENT; PLANT ESTABLISHMENT; PROCESSED PLANT PRODUCTS

Food waste and food security among Filipino households. **Capanzana, M.V. Department of Science and Technology, Bicutan, Taguig City (Philippines). Food and Nutrition Research Inst.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 67.*

The world is still challenged by the persistent problems of hunger and malnutrition, yet it is producing more than enough food. Food loss and food waste, collectively termed as 'food wastage' refers to decrease of food throughout the subsequent pathways of food in the

supply chain. This food wastage is seen to represent a missed potential opportunity to improving food security.FAO data in 2015 revealed that one third of the food produced in the world for human consumption, or approximately 1.3 billion tons, are lost or wasted every year. This food wastage can already feed millions of individuals suffering from hunger and malnutrition across the globe. The review paper aimed to described the food waste among Filipino households, particularly during the final stage of the supply chain - household food consumption. It also highlights food waste implication to nutrient intake and food security status. The Department of Science and Technology (DOST)Food and Nutrition Research Institute (FNRI) estimates food waste through the Household Food Consumption Component Of the National Nutrition Survey. In particular, post-consumption waste or the food left unutilized in the household's plate or table discarded or fed to pets were measured through weighing. In 2015, the average food wastage per day was 62 grams with highest contributions from cereals and cereal products, fish, meat and poultry, and vegetables. A wide variation in the amount of household plate waste was observed across regions, with the highest amounts recorded in CAR (103 grams) and Eastern Visayas (100grams). Rural households reported significantly higher amount ($p<0.05$) of plate waste that their urban counterparts. While total plate waste was observed to be similar across wealth quintiles, waste from fish, meat and poultry was highest in the richest quintile and lowest in the poorest quintile. Converting the amount of household plate waste into its nutrient equivalent, a total of I 72 kilocalories or 2.3% of the available energy is lost per day. Similarly, this accounted for about 2.7%, 1.9%, and 0.7% of available carbohydrate, protein and fat intakes. Furthermore, food waste at the household level is associated with being food insecure. Thus, strengthening support to the government's initiative for a zero hunger Philippines, also call for a zero food waste starting at home. Further studies on food waste outside home or how different food establishments and how these can alleviate food insecurity problem should also be conducted.

FOOD WASTES; FOOD SECURITY; HUMAN NUTRITION; HOUSEHOLDS; PHILIPPINES

Governance aspect of nutrition-sensitive food systems. **Carada, W.B. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Governance and Rural Development.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 53.*

Governance is a cross-cutting issue in the discussion and practice of nutrition-sensitive agriculture. The paper highlights governance of nutrition-sensitive agriculture as an

approach to enhance the supply and demand for nutritious food and to add nutritional value or minimize food and nutrient loss thereby improving food security. Governance — the systems of rules, authority and institutions that steer or coordinate state and non-state actors — of food systems are usually not coherent and harmonized in developing countries. To enhance integration, coordination, and inclusiveness the paper endorses a nutrition-sensitive food systems governance approach. The food system approach advocates an interconnected and adaptive governance covering the various subsystems of the chain — from input provision, production, distribution, trading/marketing, consuming of food, utilization, and disposal. The paper further upholds that a strong link between the food system and its external environment should be maintained, as any distortion in any element and/ or environment of a food system affects the other subsystem/s or element/s of the chain. Inflation, for example, disturbs food access and ultimately, nutrition status. The paper strongly supports the governance of nutrition-sensitive food systems as an approach to food security, granting individuals the right to sufficient, healthy, and culturally appropriate food for all. The study recommends the strengthening of local governance of nutrition-sensitive food systems where food providers and consumers make joint decisions on food issues that benefit and protect all.

GOVERNANCE; FOOD SAFETY; FOOD SECURITY; HUMAN NUTRITION

Nutrition-sensitive humanitarian food assistance. **Gluning, S. UN World Food Programme Philippines (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 68.*

As the world's largest humanitarian organization addressing the challenges of global hunger and nutrition, the UN World Food Programme Philippines (WFP) embraces Sustainable Development Goals 2 (Achieving Zero Hunger) and 17 (Partnerships to support achievement of the SDGs) as its core- mandates. In the next five years, WFP along with its partners will continue providing support to the Philippine government to end hunger, improve nutrition, and achieve food security in contexts of development, humanitarian, and emergency. Food insecurity and malnutrition are widespread in the country. Many Filipinos suffer from lack of food or poor diets despite increasing food availability. This is because of inadequate access to food due to high poverty and low income, especially a among the rural population that are generally engaged in agriculture. This situation is exacerbated by recurrent natural and man-made emergencies and disasters. The Philippines is the second most at risk country from the effects of climate change that largely affects agriculture,

income, food insecurity, and nutrition. WFP provides nutrition-sensitive support during humanitarian events. It contributes to addressing the displaced population's immediate hunger needs through general food distribution and unconditional cash transfers. WFP initiatives also work towards preventing malnutrition from worsening, particularly -among young children, as well as pregnant and lactating women, through its nutrition program. The organization provides nutritious food through its emergency school feeding so that children stay in school and support communities from the onset of emergency until recovery and rehabilitation through its livelihood programs (i.e food for asset, cash for asset) From 2018-2023, the WFP's Country Strategic Plan will support the Philippine Development Plan in its vision. 'All citizen are from hunger and poverty, have equal opportunities, enabled by fair and just society that is governed with order and unity. A nation where families live together, thriving in vibrant, culturally diverse, and resilient communities'.

HUMAN NUTRITION; FOOD SECURITY; MALNUTRITION; EXTENSION PROGRAMMES; DEVELOPMENT PROJECTS

Obstacles of Philippine SMEs' [smal and medium enterprise] participation in global value chains. **Francisco, J.P.S., Canare, T.A., Labios, J.R.D. Philippine Inst. of Development Studies, Quezon City (Philippines).** *Research paper series no. 2019-05. Quezon City (Philippines). Philippine Inst. of Development Studies. 2019.*
https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsrp1905.pdf

Small and medium enterprise (SMEs) play an important role in the economy of many developing countries. In the Philippines, SMEs, including microbusinesses, account for 99.5 percent of firms and 63.2 percent of employment. However, this sector remains such less productive than their large counterparts. One way to help SMEs achieve higher productive than their large counterparts. One of the way to help SMEs achieve higher productivity is to connect them to global value chains (GVCs). There are, however, a number of obstacles that make participating in GVCs difficult to SMEs. This paper attempts to determine the challenges as well as the enables of connecting SMEs to GVCs. It uses data from a survey of SMEs in Metro Manila and a set of key informant interviews (KIIs) of SME owners and officials of government agencies tasked to assist SMEs. Survey findings indicate the Philippine SME are weakly linked to GVCs. A thematic analysis of KII data suggests that challenges and enablers can be grouped into five themes: (1)competition among countries in the Association of Southeast Asian Nations and East Asia; (2)international standards, regulatory requirements, and local institutions; (3)role of government and institutions; (4)adapting to changes in international market demand and inputs supply; and (5)entrepreneurial mindset demand and input supply; and (5)entrepreneurial mindset and skills. Based on the results, some policy implications were formulated.

SMALL ENTERPRISES; ECONOMIC SYSTEMS; POLICIES; MARKETING; PHILIPPINES

Planters made of pandan leaves provide income for Laguna [Philippines] farmers. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 22-23. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/10/planters-made-of-pandan-leaves-provide-income-for-laguna-farmers/

PANDANUS; LEAVES; PLANT CONTAINERS; ORGANIC AGRICULTURE; FARMERS; INCOME; PHILIPPINES

Production and marketing practices of abaca farmers in Caraga Region [Philippines]. **Sagocsoc, R.A., Atega, T.A., Fetalsana, R.S., Alcantara, E.D.D. Caraga State Univ., Ampayon, Butuan City (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 89.*

Abaca known internationally for its world-class fiber Manila hemp, continues to be one of the priority agricultural commodities of the Department of Agriculture (DA) with the country supplying more than 87.4 percent of the total fiber market and earning more than USD 111.13 million in global trade annually. With continuing development of fiber craft industry in the Philippines, the abaca fiber market has been witnessing boost due to the growing demand for gifts, toys, and housewares. Moreover, increasing consumer inclination lifestyle products is further expected to strengthen the growth trend for abaca crafts in the coming years. Currently, there are only two major exporters of abaca fiber in the world-Philippines and Ecuador, with the Philippines for over 80% of the global production of abaca fiber. The study aimed to: (1) address current gaps of abaca industry profile for Caraga region; (2) provide baseline data/information of the abaca industry; (3) capture the production and marketing practices of the various abaca farmers, traders; (4) determine the strategic importance of abaca in Caraga economy its contribution to annual household and (5) present the problems and constraints encountered by the farmers and traders. The study was conducted in the four provinces in Caraga region, namely. Agusan del Norte, Agusan del Sur, Surigao Norte and Surigao del Sur. The researchers come up with two sets of respondents, the farmers and traders using structured questionnaires. There was also a focus group discussion among the different stakeholders. A total 1,249 respondents were interviewed. This research study is a partnership with the Philippine Rural Development am

(PRDP) Results revealed that the in Caraga, planting is generally dependent on available number of seedlings readily awesome to farmers. Majority of the farmers using corms and suckers from mother plants in own farm experience sourcing sufficient quantity of seedlings, especially when they have to rehabilitate the whole farm or setup a new farm. It is recommended that the use of abaca disease resistant seedlings will be introduced to abaca farmers for ion. Proper care and maintenance of abaca plants may be followed by abaca farmers to pro demand better price.

ABACA; PRODUCTION; INDUSTRY; MARKETING; SUPPLY; FARMERS; PHILIPPINES

E11 - LAND ECONOMICS AND POLICIES

Price policies that penalize agriculture hinder development. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 45. Nov 2018.*

ECONOMIC DEVELOPMENT; PRICE POLICIES; LAND REFORM; LAND; POVERTY

E14 - DEVELOPMENT ECONOMICS AND POLICIES

157th farmers' training program in Kinalupihan, Bataan [Philippines]. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 48. Jul 2018.*

FARMING SYSTEMS; TECHNOLOGY; FARMERS; HARVESTING; STEMS; GREENHOUSES; TRAINING; PHILIPPINES

Dar [Dr. William D. Dar]: rice, corn, and coconut Philippines' poverty crops. **Usman, E.K.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 20-22. Jul 2018.*

ORYZA SATIVA; ZEA MAYS; COCOS NUCIFERA; CROP MANAGEMENT; DIVERSIFICATION; TECHNOLOGY; TECHNOLOGY TRANSFER; DIFFUSION OF INFORMATION; INNOVATION ADOPTION; FARMERS; PHILIPPINES

DOST-FPRDI [Department of Science and Technology-Forest Products Research and Development Inst.] develops competent rubber farmers, tappers, and trainers. **Martin-de Leon, A.J.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 42-43. Jul 2018.*
https://www.agriculture.com.ph/2019/06/07/dost-fprdi-develops-competent-rubber-farmers-tappers-and-trainers/

RUBBER; PRODUCTION; TECHNOLOGY; TAPPING; PLANTING; SEED; SOWING; TECHNOLOGY TRANSFER; DIFFUSION OF INFORMATION; FARMERS; TRAINING PROGRAMMES

Drawing Filipinos back to agri through rice paddy drawings. **Caballong, N.L. nlcaballong@philrice.gov.ph., Barroga, R.F., Carbungco, P.V. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 170. 2019.*

In order to boost interest in rice farming agriculture from the youth and the public, and promote farm tourism, the rice paddy art was first created in 2015 at the FutureRice Farm, Philippine Rice Research Institute, Maligaya, Science City of Muñoz, Nueva Ecija. The rice paddy art is an image created on the rice paddy using green-leafed and purple-leafed rice varieties. By employing anamorphosis on the image, the image can be viewed in perfect proportion from the ground level. As of 2019, FutureRice Rice and the PhilRice Genetic Resources Division has featured on rice paddy artworks 8 sets of famous Filipino personalities that had inspired the youth and Filipinos during the cropping seasons they were featured. During 'rice paddy art season' more farmers, students, bloggers, local government units, and private companies, and other groups from different parts of the Philippines visit the FutureRice Farm. Their farm visits become leading opportunities to see and understand smart farming, clean energy, farm mechanization, and other technologies in rice farming demonstrated in the farm. Moreover, the increased reach and engagements in social media and numerous features in national newspapers, television shows, radio shows, and websites because of the paddy art also become avenues to widely publicize the technologies in the farm that can help Filipino rice farmers.

RICE; DIFFUSION OF INFORMATION; TECHNOLOGY TRANSFER; AGRICULTURE; RURAL AREAS; TOURISM; PHILIPPINES

Historicizing the nutrition-agriculture linkage from the global food systems perspective. **Shun-Nan Chiang. Southeast Asian Regional Center for Graduate Study and Research in Agriculture (Taiwan).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 46.*

Countering the common understanding that there is a divide between the focus of agricultural development on product (Green Revolution) and on nutrient values (Nutrition-

Sensitive Agriculture), the linkage between nutrition and agriculture has existed for a long time, but the interaction of the two has changed over time. From a long-term socio-historical perspective, since the beginning of human history, the methods human beings use to collect and manage food has been impacting their dietary habits and their health conditions. Every time human beings transition into a new type of food production system, the transition may be followed by the degradation of nutritional condition for particular social groups of the society. Focusing only on the history of the modern period, this paper intends to delineate the interaction between: (1) the (trans)formation of the global food system and (2) the advances of nutrition knowledge and international nutritional governance since 1870s.Beriberi (Vitamin B1 deficiency) was prevalent in the Philippines and other rice-eating Asian countries from 1870s to 1960s. The case of Beriberi presented an early example of how the global food system and the issue of malnutrition are entangled in a complicated way. Then came the period of the Green Revolution from the 1960s to the 1980s. The origin of the Green Revolution was also based on the intention to solve the issue of hunger in the post-WWII period. Several initiatives were promoted during this period such as the USAID Food for Peace program or the UN workshops on Interfaces Between Agriculture, Nutrition, and Food Science after 1975. Anchored on the discussions of these two periods in history, discussions on the emergence of nutrition-sensitive agriculture and consider the uniqueness of nutrition-sensitive agriculture in the contemporary era are presented. These include (1) multiple forms of malnutrition interacting with each other, as well as interventions interfering with other types of malnutrition; (2) polarization of approaches to agricultural development; (3) data-driven decision-making. The study proposes policy making on nutrition-sensitive agriculture put greater premium on (1) evaluating what kind of malnutrition to be addressed, as well as the potential unintended consequences to other types of malnutrition; (2) exploring the potential of multi-functions underlying any agricultural innovations; and (3) developing a better framework of food security.

AGRICULTURAL DEVELOPMENT; HIGH YIELDING VARIETIES; FOOD SECURITY; HUMAN NUTRITION; DEVELOPMENT PROJECTS; TECHNOLOGY TRANSFER

Meet a man [Mr. Arsenio Barcelona] a man who has contributed so much to Philippine agriculture. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(11) p. 4-6. Nov 2018.* https://www.agriculture.com.ph/2019/08/09/meet-a-man-who-has-contributed-so-much-to-philippine-agriculture/

CROPS; PLANT NUTRITION; FARMERS; FARMING SYSTEMS; TECHNOLOGY; TECHNOLOGY TRANSFER; MULCHING; TRICKLE IRRIGATION; MECHANIZATION

NGO [non-governmental organizations]-established farm site teaches indigenous knowledge systems and practices. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 32-34. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/06/01/ngo-established-farm-site-teaches-indigenous-knowledge-systems-and-practices/

ORGANIC AGRICULTURE; FARMING SYSTEMS; TECHNOLOGY; TRAINING; TECHNOLOGY TRANSFER; INDIGENOUS KNOWLEDGE

Put up a farm school and earn millions. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 8-9. Apr 2020.*

FARMS; EDUCATIONAL INSTITUTIONS; DIFFUSION OF INFORMATION; TRAINING PROGRAMMES; TECHNOLOGY TRANSFER

San Mateo [Isabela, Philippines] starts reaping 'black gold'. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 44-46. Jul 2018.*
https://www.agriculture.com.ph/2019/06/08/san-mateo-starts-reaping-black-gold/

VIGNA RADIATA RADIATA; MUNG BEANS; HIGH YIELDING VARIETIES; PROPAGATION MATERIALS; SEED; QUALITY; TECHNOLOGY; TECHNOLOGY TRANSFER; PROCESSED PLANT PRODUCTS; PHILIPPINES

Successes and failures of intra-country varietal commercialization of crops in the ASEAN. **Pamplona, P.P.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 42-45. 2019.*
https://www.agriculture.com.ph/2020/04/07/the-success-and-failures-of-intra-country-varietal-commercialization-of-crops-in-the-asean/

CROPS; COCONUTS; VARIETIES; CROP MANAGEMENT; CROP PERFORMANCE; COLLECTIONS; EVALUATION; TECHNOLOGY; TECHNOLOGY TRANSFER; MARKETS; MARKETING; ASEAN

University students help rice farmers sell their produce. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 29-30. 2020.*
https://www.agriculture.com.ph/2020/06/26/university-students-help-rice-farmers-sell-their-produce/

RICE; MARKETS; MARKETING; STUDENTS; FARMERS; SOCIAL PARTICIPATION; TECHNOLOGY; TECHNOLOGY TRANSFER

We are an admirer of the late Thai King [King Bhumibol Adulyadej] (Memoirs of an agri-journalist). **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 58-60. Sep 2018.* https://www.agriculture.com.ph/2019/07/18/we-are-an-admirer-of-the-late-thai-king/

ORYZA SATIVA; PRODUCTION; DAIRY FARMS; DAIRY INDUSTRY; MILK PRODUCTION; COOPERATION; DEVELOPMENT PROJECTS; TECHNOLOGY; TECHNOLOGY TRANSFER; DIFFUSION OF INFORMATION

Young guys beat the old guards in Agri-chem business. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 4-6. 2019.*
https://www.agriculture.com.ph/2020/03/25/young-guys-beat-the-old-guards-in-agri-chem-business/

FARM INPUTS; PLANT PROTECTION; PLANT NUTRITION; TECHNOLOGY; TECHNOLOGY TRANSFER; MARKETS; ENTERPRISES; MICROBIAL PROPERTIES; SOIL DEGRADATION

Zampen chicken brings hope to inmates. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 32-35. Sep 2018.*
https://www.agriculture.com.ph/2019/07/10/zampen-chicken-brings-hope-to-inmates/

CHICKENS; INDIGENOUS ORGANISMS; PRODUCTION; ANIMAL PERFORMANCE; INCOME; FEEDS; DEVELOPMENT PROJECTS; TECHNOLOGY; TECHNOLOGY TRANSFER

E20 - ORGANIZATION, ADMINISTRATION AND MANAGEMENT OF AGRICULTURAL ENTERPRISES OR FARMS

Agricultural insurance as social protection and nutrition-sensitive agriculture strategy. **Cajucom, N.R. Philippine Crop Insurance Corporation (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 49; 134-146.*

Agriculture is vital to countries of the world, providing food for the population and employment for many farmers and fisherfolks. It is also the sector that is most vulnerable to the effects climate change. With the continued global warming and forecasted increase in extreme weather events due to climate change, agricultural production worldwide will suffer losses and will result in food shortages, increase in cost of food, and consequently

malnutrition among the poor, especially those in developing countries. One of the measures to address the losses in food production is agricultural insurance. Agricultural insurance is a risk transfer mechanism that protects the farm investments of farmers and fisherfolk against damages due to natural calamities, pests and diseases and other risks insured against. Indemnity paid by the insurer to the farmer/fisherfolk for agricultural/fisheries losses can be used to finance and continue the farming/fisheries activities of the insured. Insurance encourages lenders to provide loans for farming/fisheries activities thereby ensuring continued food production. Thus, insurance as a risk transfer mechanism helps arrest increasing food shortages, hunger and malnutrition. In the Philippines, the Philippine Crop Insurance Corporation implements the country's agricultural insurance program. Established in 1981, PCIC has 37 years' experience in agricultural insurance and has been providing various agricultural insurance products, including special agricultural insurance programs with government-subsidized premiums for subsistence farmers and fisherfolk. PCIC has 13 regional offices. 76 provincial extension offices/service desks and 4050 insurance partners nationwide. Among the insurance products of PCIC are its organic farming and urban farming insurance packages. Among the measures that need to be taken to meet the challenges posed by climate change are the following conduct of a large-scale farmers' literacy program on climate change adaptation, Good Agricultural Practices, Code Of Practice for Aquaculture, development and implementation of science-based and cost-effective measures in increasing food production as contained in various Philippine laws on agricultural modernization and climate change adaptation and mitigation. These need to be adequately financed and fully implemented as soon as possible to prevent or lessen food shortages, increase in food prices and consequently, the occurrence of hunger and malnutrition among the poor sector in developing countries. The government of all countries, together with the private sector, the academe, research institutions, international technical cooperating agencies and donors, and other stakeholders need to continuously and actively work together to address the destructive effects of climate change and the challenges these pose to food production and provision of safe and nutritious food to the increasing world population. Adequate agricultural insurance protection to the farmers, fisherfolk and other agricultural producers and stakeholders can help in meeting these challenges.

AGRICULTURAL INSURANCE; CROP INSURANCE; HUMAN NUTRITION; FARMERS; FISHERMEN; FOOD SUPPLY

From fashion to farming: a visit to Pati's Tesoro's permavulture garden in San Pablo, Laguna [Philippines]. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 32-35. 2019.* https://www.agriculture.com.ph/2020/04/03/from-fashion-to-farming-a-visit-to-patis-tesoros-permaculture-garden-in-laguna/

VEGETABLES; FRUIT TREES; FARMERS; PRODUCTS; PRODUCTION; RURAL AREAS; TOURISM; COMMUNITY INVOLVEMENT; SOCIAL PARTICIPATION; PHILIPPINES

OFW [Overseas Filipino Worker] earns more from farm tourism site in Laguna. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 50-51. 2019.* https://www.agriculture.com.ph/2020/04/09/ofw-earns-more-from-farm-tourism-site-in-laguna/

FARMS; RURAL AREAS; TOURISM; VEGETABLE CROPS; NATURE CONSERVATION; PHILIPPINES

Organic farm attracts 10,000 visitors weekly, halts illegal logging. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 4-7. Apr 2020.* https://www.agriculture.com.ph/2020/05/01/organic-farm-attracts-10000-visitors-weekly-halts-illegal-logging/

FARMS; ORGANIC AGRICULTURE; VEGETABLE CROPS; VEGETABLES; FLOWERS; FRUIT TREES; WATER BUFFALOES; RURAL AREAS; TOURISM

This Eco-Park located in the foothills of the Sierra Madre [Philippines] will connect you with nature. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 63-64. 2020.* https://www.agriculture.com.ph/2020/06/16/this-eco-park-located-in-the-foothills-of-sierra-madre-will-connect-you-with-nature/

VEGETABLE CROPS; GARDENS; NATURE RESERVES; FARMS; RURAL AREAS; TOURISM; PHILIPPINES

E21 - AGRO-INDUSTRY

Partners left the corporate world to pursue a successful agricultural social enterprise. **Necessario, N.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 40-41. 2019.* https://www.agriculture.com.ph/2020/04/06/partners-left-the-corporate-world-to-pursue-a-successful-agriculture-social-enterprise/

FRUITS; VEGETABLES; COCONUTS; THEOBROMA CACAO; GRAIN; FARMERS; MARKETING; ENTERPRISES; ORGANIC AGRICULTURE; FOOD TECHNOLOGY; PROCESSED PRODUCTS

School project turned real life agribusiness: the tale of E-Magsasaka. **Necessario, N.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 52-54. 2019.*

https://www.agriculture.com.ph/2020/04/10/school-project-turned-real-life-agribusiness-the-tale-of-e-magsasaka/

FARMS; FARMERS; VEGETABLES; FRUITS; AGRICULTURAL PRODUCTS; COSTS; PROFIT; AGROINDUSTRIAL SECTOR

Young guys beat the old guards in Agri-chem business. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 4-6. 2019.*
https://www.agriculture.com.ph/2020/03/25/young-guys-beat-the-old-guards-in-agri-chem-business/

FARM INPUTS; PLANT PROTECTION; PLANT NUTRITION; TECHNOLOGY; TECHNOLOGY TRANSFER; MARKETS; ENTERPRISES; MICROBIAL PROPERTIES; SOIL DEGRADATION

E50 - RURAL SOCIOLOGY AND SOCIAL SECURITY

Farmer musician leads a three-hectare farm that empowers women farmers in Zambaonga del Sur [Philippines]. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 33-35. Apr 2020.*
https://www.agriculture.com.ph/2020/05/16/former-musician-leads-a-three-hectare-farm-that-empowers-women-farmers-in-zamboanga-del-sur/

FARMS; ORGANIC AGRICULTURE; WOMEN; ROLE OF WOMEN; HOUSEHOLDS; INCOME; SMALL ENTERPRISES; SOAPS; PHILIPPINES

Women in nutrition—sensitive livestock production in Nepal. **Kc, R. Agriculture and Forestry University (Nepal).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 48.*

Livestock is an important component of livelihood in Nepalese agriculture system. Women contribute more than 50% of la force in agriculture in Nepal. Since men go abroad for the employment, women are solely responsible for all the indoor management activities of livestock production. The management of livestock ranges from selection of animal fodder collection, breeding management, processing of milk and animals products, and cleaning of shed. In rural areas women have no ownership over big assets such as land. ON men own such assets as well as large animals such as cows and buffalos. The women's ownership is

limited to small animal such as goat, sheep and poultry. The aim of this paper is to determine the role and participation of women in livestock production system of Nepal. A survey, aided by a questionnaire, was randomly conducted in the Chitwan District of Nepal with 126 livestock farmers as interview respondents. The interviews were complemented by a review of published materials, statistics, and literature. The results of the study indicate that women's ownership of small animals are higher as compared to large animals. The women ownership was found to be 73.33% in goat farming and 47.16% in poultry farming. Likewise, 59.25% of responsibilities of farm management were taken on by the women. Despite the fact that women composed two thirds of the agricultural workforce, their membership in dairy cooperatives were very limited. Existing societal biases keep women and their issues from getting the attention they deserve. Study results indicated that the status of women can be I by increasing their income through livestock farming for nutrition-sensitive food production.

LIVESTOCK; PRODUCTION; LIVESTOCK MANAGEMENT; WOMEN; HUMAN NUTRITION; ROLE OF WOMEN; NEPAL

E70 - TRADE, MARKETING AND DISTRIBUTION

Consumer-driven development of rice-based food product: an important key to value-adding. **Abilgos-Ramos, R.G., Ballesteros, J.F., Labargan, E.S.A., Morales, A.V., Manaois, R.V.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 95.*

Development and marketing of rice-based products provide additional income in rice-producing communities that ultimately enhances their quality of life. This study aimed to develop a healthier, nutrient-rich, and marketable rice-based food product through a market-oriented strategy. Experts' perception on health and wellness and rice-based product ideas were gathered through focus group discussions (FGD). Market trends on goods and consumer interest on pre-identified product ideas were determined through a market survey in Central Luzon, Philippines. Based on the results from the FGDs and market survey, a nutrient-rich rice-based food product was developed. The acceptability, marketability, and profitability of the product was assessed through a pre-feasibility study. FGDs revealed that the experts (n=24) associated health and wellness with nutritious and healthy food products. Survey results showed that consumers (n=339) usually purchase convenient (ready-to-eat/drink) and healthy snack foods. Brown rice cracker ice cream

sandwich (BRICS), a snack food made from brown rice flour and ice cream from buffalo's milk, was developed. Brown rice is a healthier form of rice as it has substantial amounts of protein, dietary fiber, minerals and vitamins, while buffalo's milk has higher calcium and protein, but lower cholesterol than other dairy milks. When presented to target consumers (15-30 years old, n=100), BRICS received an overall acceptability rate of 8.4 out of 9. Feasibility study forecasted that BRICS commercialized at 2% market share of the target number of consumers (n=611,473) with potential demand of 21,093 BRICS every month, PhP 20.30 cost per piece, PhP 30 (= 50% mark-up) per piece would generate positive total return of investment and an internal rate of return (37.5%) with a payback period of 2.4 years. Therefore, a market-oriented strategy is effective in developing a highly marketable product with added health and nutritional benefits which is very relevant to consumers.

ORYZA SATIVA; RICE; FOOD PROCESSING; FOOD PRODUCTION; MARKETING; CONSUMER BEHAVIOUR; VALUE ADDED

Serendipity gave Benguet [Philippines] farmers a chance to sell their strawberries in the Metro. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 18-19. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/05/11/serendipity-gave-benguet-farmers-a-chance-to-sell-their-strawberries-in-the-metro/

STRAWBERRIES; MARKETS; SUPPLY; FARMERS; MARKETING; PHILIPPINES

University students help rice farmers sell their produce. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 29-30. 2020.*
https://www.agriculture.com.ph/2020/06/26/university-students-help-rice-farmers-sell-their-produce/

RICE; MARKETS; MARKETING; STUDENTS; FARMERS; SOCIAL PARTICIPATION; TECHNOLOGY; TECHNOLOGY TRANSFER

E71 - INTERNATIONAL TRADE

Facilitating structural transformation through product space analysis: the case of Philippine exports. **Bayudan-Dacuycuy, C., Serafica, R. Philippine Inst. of Development Studies, Quezon City (Philippines).** *Research paper series no. 2019-06. Quezon City (Philippines). 2019.*
https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsrp1906.pdf

While the Philippines has a long history of trade liberalization efforts and market-oriented reforms, the country has to yet to see a genuine structural transformation. Recently, there are efforts to transform the global competitiveness of the manufacturing industry backward and forward linkages to create decent jobs and promote sustainable and comprehensive growth. Given these, it is imperative for the country to chart its short-, medium-, and long-run diversification strategies. This research assess the sophistication content of the country's current export portfolio and identifies products that result in a more diversified and high-value added mix of export commodities. Using some metrics from the products space, the paper finds that the average sophistication content of products included in the country's export basket has barely improved from 1995 to 2014. It has remained lower than the average sophistication content exports in the world market. The paper also finds that some of the products in the country's existing export basket has potential forward linkages to goods with relatively higher sophisticated goods. However, transformation does not happen overnight and requires well-thought-policies, plans, and priorities. To this end, the paper advocates the implementation of measures outlined in the Philippine Export Development Plan. It also identifies other potential actions toward human capital development, innovations, and infrastructure programs.

PHILIPPINES; EXPORTS; POLICIES; AGRICULTURAL PRODUCTS; AGRICULTURAL SECTOR

Obstacles of Philippine SMEs' [small and medium enterprise] participation in global value chains. **Francisco, J.P.S., Canare, T.A., Labios, J.R.D. Philippine Inst. of Development Studies, Quezon City (Philippines).** *Research paper series no. 2019-05. Quezon City (Philippines). Philippine Inst. of Development Studies. 2019.*
https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsrp1905.pdf

Small and medium enterprise (SMEs) play an important role in the economy of many developing countries. In the Philippines, SMEs, including microbusinesses, account for 99.5 percent of firms and 63.2 percent of employment. However, this sector remains such less productive than their large counterparts. One way to help SMEs achieve higher productive than their large counterparts. One of the way to help SMEs achieve higher productivity is to connect them to global value chains (GVCs). There are, however, a number of obstacles that make participating in GVCs difficult to SMEs. This paper attempts to determine the challenges as well as the enables of connecting SMEs to GVCs. It uses data from a survey of SMEs in Metro Manila and a set of key informant interviews (KIIs) of SME owners and officials of government agencies tasked to assist SMEs. Survey findings indicate the Philippine SME are weakly linked to GVCs. A thematic analysis of KII data suggests that challenges and enablers can be grouped into five themes: (1)competition among countries in the Association of Southeast Asian Nations and East Asia; (2)international standards, regulatory requirements, and local institutions; (3)role of government and institutions;

(4)adapting to changes in international market demand and inputs supply; and (5)entrepreneurial mindset demand and input supply; and (5)entrepreneurial mindset and skills. Based on the results, some policy implications were formulated.

SMALL ENTERPRISES; ECONOMIC SYSTEMS; POLICIES; MARKETING; PHILIPPINES

F - PLANT SCIENCE AND PRODUCTION

F01 - CROP HUSBANDRY

33 new rain lilies [Zephyranthes] bred in the Philippines. **Bautista, N.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 26-29. Nov 2018.*

ZEPHYRANTHES; LILIUM; SPECIES; HYBRIDS; VARIETIES; BREEDING METHODS; CROP MANAGEMENT; LANDSCAPING

157th farmers' training program in Kinalupihan, Bataan [Philippines]. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 48. Jul 2018.*

FARMING SYSTEMS; TECHNOLOGY; FARMERS; HARVESTING; STEMS; GREENHOUSES; TRAINING; PHILIPPINES

Aquaponic test farm proves to be a self-sustaining enterprise for this millennial farmer. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 16; 18; 20; 22. Apr 2020.* https://www.agriculture.com.ph/2020/05/05/an-aquaponic-test-farm-proves-to-be-a-self-sustaining-enterprise-for-this-millennial-farmer/

LETTUCES; TOMATOES; CULINARY HERBS; HYDROPONICS; FISHES; FARMING SYSTEMS; FARMERS

Architecture student rises from challenges and grows of flourishing garden. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 6; 8; 10. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/08/young-architecture-student-rises-from-the-challenges-and-grows-a-flourishing-garden/

DOMESTIC GARDENS; GARDENING; AMENITY PLANTING; ORNAMENTAL PLANTS; STUDENTS

Award-winning screenwriter grows ornamentals and food in her urban garden. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 40-42. Jul-Aug 2020.*

https://www.agriculture.com.ph/2020/06/01/award-winning-screenwriter-grows-ornamentals-and-food-in-her-urban-garden/

VEGETABLE CROPS; ORNAMENTAL PLANTS; PLANTING; PLANT CONTAINERS; DOMESTIC GARDENS; ORGANIC FERTILIZERS; URBAN AREAS

Award-winning visual artist is also an urban gardener. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 51-53. 2020.*
https://www.agriculture.com.ph/2020/04/02/award-winning-visual-artist-is-also-an-urban-gardener-part-1/

URBAN AGRICULTURE; GARDENING; VEGETABLE CROPS; CULINARY HERBS; PLANTING; PLANT PRODUCTION; ORNAMENTAL PLANTS

Bank employee turned an empty wall into a productive vertical vegetable garden. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 61-62; 64. 2020.*
https://www.agriculture.com.ph/2020/06/25/this-bank-employee-turned-an-empty-wall-into-a-productive-vertical-vegetable-garden/

VEGETABLE CROPS; ORNAMENTAL PLANTS; DOMESTIC GARDENS; GARDENING; PLANTING; PLANTS; WATERING; ORGANIC FERTILIZERS

Beat rising prices of veggies thru urban gardening. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 48-49. Nov 2018.*
https://www.agriculture.com.ph/2019/08/19/beat-rising-prices-of-veggies-through-urban-gardening/

VEGETABLE CROPS; LETTUCES; CHILLIES; CONTAINER PLANTING; BOTTLES; ORGANIC AGRICULTURE; URBAN AREAS

Beginners' guide to container gardening. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 35. 2020.*
https://www.agriculture.com.ph/2020/04/13/a-beginners-guide-to-container-gardening/

VEGETABLE CROPS; FRUIT TREES; CONTAINER PLANTING; GARDENING; POTS; FERTILIZERS; OLIGOCHAETA; COMPOSTING; WATERING

Best friends from Australia came back to the Philippines to farm for the people. **Necessario, N.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 26; 28. 2019.*

https://www.agriculture.com.ph/2020/04/01/best-friends-from-australia-came-back-to-the-philippines/

EDIBLE FUNGI; PRODUCTION; GROWING MEDIA; HARVESTING; COMMUNITY INVOLVEMENT; WASTE MANAGEMENT

Best management practices for corn-after-corn production. **Fin, L.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 20; 22. Oct 2018.*
https://www.agriculture.com.ph/2019/07/24/best-management-practices-for-corn-after-corn-production/

ZEA MAYS; MAIZE; HYBRIDS; SELECTION; CROP MANAGEMENT; CROP ROTATION; WEED CONTROL

Bohol's [Philippines] chocolate princess revives heirloom cacao planted in backyards. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 42; 44. 2020.*
https://www.agriculture.com.ph/2020/07/03/bohols-chocolate-princess-revives-heirloom-cacaos-planted-in-backyards/

THEOBROMA CACAO; PLANTING; INDIGENOUS ORGANISMS; CROP MANAGEMENT; FARMERS; ENTERPRISES; DOMESTIC GARDENS; PHILIPPINES

Bright strategy in fruit production (Memoirs of an Agri Journalist). **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 61. Sep 2018.*
https://www.agriculture.com.ph/2019/07/19/bright-strategy-in-food-production/

FRUIT TREES; FRUIT CROPS; ORCHARDS; PLANTING; INTERCROPPING; PRODUCTION; MARKETING; FARMS; RENT

Caloocan [Philippines] housewife makes her own garden soil from the materials in her environment. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 43-44. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/05/08/caloocan-housewife-makes-her-own-garden-soil-from-the-materials-in-her-environment/

DOMESTIC GARDENS; VEGETABLE CROPS; WATERING; PLANTING; SOIL; GROWING MEDIA; PHILIPPINES

Cebuano food entrepreneur likes to use fresh ingredients from their own home garden. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 41-43. 2020.*

https://www.agriculture.com.ph/2020/04/15/cebuano-food-entrepreneur-likes-to-use-fresh-ingredients-from-their-own-home-garden/

VEGETABLE CROPS; PLANTING; GARDENING; PLANT ESTABLISHMENT; CROPS; PLANT PRODUCTION; HEALTH FOODS; ORGANIC AGRICULTURE

'Clever' farmer [Mr. Clever Domingo of Barangay [village] Del Corpuz] in Cabatuan, Isabela [Philippines]. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 50-51. Jul 2018.* https://www.agriculture.com.ph/2019/06/09/a-clever-farmer-from-cabatuan-isabela/

VIGNA RADIATA RADIATA; MUNG BEANS; ORYZA SATIVA; CROP ROTATION; FUNGICIDES; FOLIAR APPLICATION; PLANT GROWTH SUBSTANCES; CROP YIELD; CROP MANAGEMENT; SOIL FERTILITY; FARMERS; PHILIPPINES

Coming up Rosit: farmer mailman finds success in cacao farming. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 26-31. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/22/coming-up-rosit-former-mailman-finds-success-in-cacao-farming-part-1/

THEOBROMA CACAO; HYBRIDS; PLANTING; HARVESTING; CROP MANAGEMENT; MARKETING; INCOME; PROCESSING; PROCESSED PLANT PRODUCTS

Culinary school unveils 'Culinary Agripreneurship' Diploma Program. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 20-21. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/14/culinary-school-unveils-culinary-agripreneurship-diploma-program/

STUDENTS; EDUCATIONAL INSTITUTIONS; TRAINING COURSES; CONTAINER PLANTING; VEGETABLE CROPS; SUSTAINABILITY; FOOD SECURITY

Cultural management practices among onion farmers in Nueva Ecija [Philippines]. **De Luna, J.E., Patricio, M.G., Diaz, M.S., Pagaduan, R.V., Espino, A.N., Jr., Mandac, J.N.R., Garcia, C.J.E., Villamayor, A., Aquino, J.D.C. Central Luzon State Univ., Science City of Muñoz, 3119 Nueva Ecija (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 209-210. Jul-Dec 2019.*

Onion is popular vegetable grown for its pungent bulb and flavorful leaves. Central Luzon accounts for the highest volume and hectarage of onion production. Current cultural management practices of onion farmers in Nueva Ecija were studied, based on interview

with 180 farmers from the nine municipalities. Farmers responded to a combination of semi-structured questionnaires and focused group discussions. Socio-demographc characteristics of onion growers, cropping pattern, irrigations, fertilizer, pest, and other cultural management practices and related activities were documented. All data were analyzed using central tendency theory. Most farmer-respondents were male (91%), married (95%), and had secondary education (53%). On average, 104 ha were devoted to onion production and most farmers planted in November-March (68%). Most farmers used Red Pinoy variety (73%), sowed in seeds in November (74%), and applied synthetic fertilizers (66%). All farmers used synthetic pesticides and majority practiced crop rotation (94%). Some (34%) practiced good sanitation and 1% applied botanical plant extracts to control pests. Nobody planted trap and repellant crops. Most (63%) irrigated sanitation onions more than 10x per cropping season with an interval of 3-7 days (69%). Majority (67%) harvested onion 81-90 days after transplanting and replied primarily on synthetic pesticides to control pests. Some practices were not being used maybe because of lack of information and/or poor adoption of technologies. Some of these cultural management practices were used as basis in evaluating and enhancing effectiveness of measures in controlling onion armyworms, Spodoptera exigua (Hubner).

ONIONS; ALLIUM CEPA; FARMERS; SPODOPTERA EXIGUA; CULTURAL METHODS; PHILIPPINES

Dry direct seeding in drought prone rainfed areas in the Philippines. **Bueno, C.S. lenysuniobueno@gmail.com., Carandang, R.B., Banayo, N.P.M.C., Aquino, E.P. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science. Santos, R.C., Basuel, E., Abon, J.E.O., Bautista, E.G., Suralta, R.R., Corales, A.M. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 170. 2019.*

Dry direct seeding (DDS) is promising option to address unreliable rainfall patterns and labor scarcity in rainfed rice areas. DDS can advance rice planting time to escape droughts or strong typhoons at the end of wet season. This study aimed to compare the performance of rice crops established through manual methods by farmers practice (FP) of dry direct seeding in selected drought-prone rainfed areas. In addition, this study determined the economic advantage of using mechanized by direct seeding over manual methods. The three manual methods used were line seeding, dibbling and broadcasting, with seed rates of 200- 80- and 240-kg/ha, respectively. The seed rate used for mechanized DDS using MP seeder was 60-kg/ha. Results showed that the average seedling emergence counted at 14 days after seeding was 175 plants m-2 with MP plots while 688 plants m-2 as average for

the three FP methods. Consequently, the number of tillers at vegetative stage was higher by 20-30% with F P methods compared with MP plots. However, the higher tiller number in FP plots did not result to more panicle number at harvest. Grain yield in the MP plots ranged from 3.96-4.59 t/ha while from 3.80 to 4.25 t/ha in FP plots and the difference was not a significant. The crop establishment cost was lower by 32-60% in MP plots and net income was increased from PhP 2,651 to 16,097/ha while from 3.80 to 4.25 t/ha in FP plots and net income was increased from PhP 2,651 to 16,097/ha in MP plots in comparison with farmers' practice depending whether line seeding, dibbling or broadcasting. Mechanized DDS using MP seeder is a promising technology for drought-prone rainfed but further research is needed to confirm the economic advantage of MP over FP in other areas and other water-scarce environments.

ORYZA SATIVA; PLANT ESTABLISHMENT; DIRECT SOWING; DROUGHT; RAINFED FARMING; PHILIPPINES

Eastern Rizal, a vegetable basket for Metro Manila [Philippines]. **Dy, R.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 24-25. Oct 2018.*
https://www.agriculture.com.ph/2019/07/25/eastern-rizal-a-vegetable-basket-for-metro-manila/

VEGETABLES; FRUITS; PRICES; CROP MANAGEMENT; PHILIPPINES

Egg carton trays are excellent places to grow seedlings. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 28. 2020.*
https://www.agriculture.com.ph/2020/04/16/egg-carton-trays-are-excellent-places-to-grow-seedlings/

PLANTS; GARDENING; PLANT CONTAINERS; GERMINATION; TRANSPLANTING; SEEDS; SEEDLINGS

Export-ready succulents grow amidst the cold. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p.46-47. Apr 2020.*
https://www.agriculture.com.ph/2020/05/23/export-ready-succulents-grow-amidst-the-cold/

VEGETABLES; VEGETABLE CROPS; FARMS; PLANTING; GARDENING; COLD SEASON

Farm shifts from specialty produce to table vegetables. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 8-9. May-Jun 2020.*

https://www.agriculture.com.ph/2020/06/08/farmer-shifts-from-specialty-produce-to-table-vegetables/

VEGETABLES; VEGETABLE CROPS; PLANTING; FARMING SYSTEMS; SUSTAINABILITY; FARMERS

Former marketing executive establishes chili farm and product line in just five months. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 31-36. 2020.* https://www.agriculture.com.ph/2020/08/09/former-marketing-executive-establishes-chili-farm-and-product-line-in-just-five-months-part-1/

CHILLIES; CAPSICUM ANNUUM; FARMS; PLANTING; HARVESTING; MARKETS; PROCESSING; PROCESSED PLANT PRODUCTS

Farming family lives their lives around nature and agriculture. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 18-22. 2020.* https://www.agriculture.com.ph/2020/08/23/farming-family-lives-their-lives-around-nature-and-agriculture-part-1/

VEGETABLE CROPS; FRUIT TREES; CROP MANAGEMENT; CROPS; URBAN AGRICULTURE; FARMING SYSTEMS

FIESTA addresses sweet potato challenges. **Dibdiben, R.P.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 22-23. 2020.*

IPOMOEA BATATAS; SWEET POTATOES; VARIETIES; SUPPLY BALANCE; CULTURAL METHODS; PROPAGATION MATERIALS; PROCESSED PLANT PRODUCTS; WILTS; TRICHODERMA

Fiesta underscores importance of cacao industry. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 59. Nov 2018.*

THEOBROMA CACAO; PRODUCTION; TECHNOLOGY; INDUSTRY; MARKETS; RAW MATERIALS; CROP MANAGEMENT; PLANT ESTABLISHMENT; PROCESSED PLANT PRODUCTS

FilAm millennial left corporate job to start an urban farm. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 18-19. May-Jun 2020.* https://www.agriculture.com.ph/2020/06/23/filam-millennial-left-corporate-job-to-start-an-urban-farm/

VEGETABLES; VEGETABLE CROPS; FARMS; URBAN AGRICULTURE; FERTILIZER APPLICATION; ORGANIC FERTILIZERS; COMPOSTING; SITE PREPARATION

FilAm plant influencer transformed his home into a tropical paradise. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 38-39. 2020.* https://www.agriculture.com.ph/2020/07/01/plant-influencer-spends-roughly-p250000-on-200-species-of-houseplants/

ORNAMENTAL PLANTS; DOMESTIC GARDENS; GARDENING; PLANTING; PLANTS; CROP MANAGEMENT

Five tips on how to build raised garden beds. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 36-37. 2020.* https://www.agriculture.com.ph/2020/04/29/five-tips-on-how-to-build-raised-garden-beds/

CULINARY HERBS; VEGETABLE CROPS; PLANTING; GARDENING

Flourishing rooftop garden in Quezon City [Philippines]. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 50-51. 2020.* https://www.agriculture.com.ph/2020/05/18/a-flourishing-rooftop-garden-in-quezon-city/

URBAN AGRICULTURE; GARDENING; GARDENS; VEGETABLE CROPS; ORNAMENTAL PLANTS; COMPOSTING; PHILIPPINES

Flowers have their place in the scheme of things (Memoirs of an Agri-Journalist). **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 55. Jul 2018.* https://www.agriculture.com.ph/2019/06/12/flowers-have-their-place-in-the-scheme-of-things/

EUPHORBIA PULCHERRIMA; FLOWERS; CUT FLOWER PRODUCTION; CUT FLOWERS; DEMAND; CONTRACT FARMING; INCOME

Foraging in the city. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 54-55. 2020.*

EDIBLE FUNGI; PLANTING; URBAN AREAS; FOODS; FOOD TECHNOLOGY

Former CPA [certified public accountant] now runs a successful garden business. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (6) p. 52-54. 2020.*

ORNAMENTAL PLANTS; GARDENING; DOMESTIC GARDENS; PLANTING; PLANTS; CROP MANAGEMENT; ENTERPRISES

Fresh start advocates good health, sound environment. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 58-60. Jul 2018.* https://www.agriculture.com.ph/2019/06/14/fresh-start-advocates-good-health-sound-environment/

LETTUCES; LACTUCA SATIVA; VARIETIES; HEALTH FOODS; ORGANIC FOODS; ORGANIC AGRICULTURE; ORGANIC FERTILIZERS; COMPOSTING; OLIGOCHAETA

From fashion to farming: a visit to Pati's Tesoro's permavulture garden in San Pablo, Laguna [Philippines]. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 32-35. 2019.* https://www.agriculture.com.ph/2020/04/03/from-fashion-to-farming-a-visit-to-patis-tesoros-permaculture-garden-in-laguna/

VEGETABLES; FRUIT TREES; FARMERS; PRODUCTS; PRODUCTION; RURAL AREAS; TOURISM; COMMUNITY INVOLVEMENT; SOCIAL PARTICIPATION; PHILIPPINES

Garden space constraints? a permaculturist shares home gardening tips for your garden. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 38-39. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/23/garden-space-constraints-a-permaculturist-shares-home-gardening-tips-for-your-garden/

DOMESTIC GARDENS; GARDENING; ALTERNATIVE AGRICULTURE; VEGETABLE CROPS; PLANT CONTAINERS; CROP MANAGEMENT

Grandma from Bulacan [Philippines] finds fortune in oyster mushrooms and uses it to help others. **Necessario, N.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p.30-31. 2019.* https://www.agriculture.com.ph/2020/04/02/grandma-from-bulacan-finds-fortune-in-oyster-mushroom-and-uses-it-to-help-others/

EDIBLE FUNGI; PLEUROTUS OSTREATUS; PRODUCTION; MARKETS; FOOD TECHNOLOGY; FOOD PROCESSING; PROCESSED PRODUCTS; PHILIPPINES

Growth performance of tissue-cultured lakatan banana (Musa sapientum Linn) in response to bagging media. **Salvador, R.C. Sr. Caraga State Univ., Ampayon, Butuan City (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de

la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 91.*

This study was conducted from July to September 2012 at Central Mindanao University [Philippines] to determine the growth performance of tissue-cultured-derived banana in response to bagging media. The experiment was laid out in a Complete Randomized Design (CRD) with six treatments and four replications as T1= pure sawdust (SD) T2= pure coco coir dust (CCD) T3= pure vermicast (VC) T4= VC+ CCD+ SD (1:1:1) T5= VC+CCD+SD (1:1:3) T6= VC+CCD+SD (1:1:5), respectively and data were analyzed using ANOVA in CRD. Results revealed that growth of tissue cultured banana Lakatan seedlings in plant height, number of leaves, percent mortality and percent return on investment were significantly affected by different bagging media. Pure vermicast exhibits the highest plant height (40.92 cm) and the lowest plant height (10. 52 cm) of treatment 1 of pure sawdust. The number of leaves per plant had a highly significant difference. Pure vermicast had the highest number of leaves per plant (4.62) and the lowest (2.69) were showed in the treatment 2 with pure coco coir dust. The percent mortality showed a highly significant difference among treatment means, pure sawdust have the highest percent mortality (42.50%) followed by pure coco coir dust of 22.50%, pure vermicast and combination 1:1:5 ratio of VC+CCD+SD with 2.50% and 1:1:3 ratio combination of VC=CCD+SD have 5.00% mortality while 1:1:1 ratio of VC+CCD+SD combination showed the zero mortality within two months after planting of Lakatan banana tissue-cultured plantlet to bagging media. In percent return on investment 1:1:5 ratio combinations of VC+CCD+SD have the highest ROI of 44A7% while the lowest is at pure sawdust of negative 6.5%.

MUSA PARADISIACA; MUSA (BANANAS); VARIETIES; TISSUE CULTURE; COMPOSTING; OLIGOCHAETA; PROFIT; GROWTH; COIR; SAWDUST; GROWTH

'Gulayan sa Piitan': jail personnel and inmates convert idle land into a vegetable farm. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 46-47. 2020.*
https://www.agriculture.com.ph/2020/05/13/gulayan-sa-piitan-jail-personnel-and-inmates-convert-idle-land-into-a-vegetable-farm/

DOMESTIC GARDENS; VEGETABLE CROPS; GARDENING; GARDENS; FARMING SYSTEMS; LIVESTOCK; CHICKENS; SWINE; DUCKS

Here's what you need to know before starting your own balcony garden. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 26. 2020.*
https://www.agriculture.com.ph/2020/04/11/heres-what-you-need-to-know-before-starting-your-own-balcony-garden/

VEGETABLE CROPS; CULINARY HERBS; FRUIT CROPS; GARDENING; GARDENS; HYDROPONICS; FERTILIZER APPLICATION

High school teacher loses summer side jobs, how earns extra income from the crops he grows. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 54-55. 2020.* https://www.agriculture.com.ph/2020/07/14/a-high-school-teacher-lost-his-side-jobs-now-earns-extra-income-from-the-crops-he-grows/

VEGETABLE CROPS; DOMESTIC GARDENS; GARDENING; PLANTING; CROP MANAGEMENT; INCOME; HOUSEHOLDS

Homemade aquaponic system made from recycled materials. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 22; 24. 2020.* https://www.agriculture.com.ph/2020/06/24/a-homemade-aquaponics-system-made-from-recycled-materials/

VEGETABLE CROPS; FISHES; HYDROPONICS; FARMING SYSTEMS; DOMESTIC GARDENS; WATER QUALITY

Honeydew melon. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 18-19. Jul 2018.* https://www.agriculture.com.ph/2019/05/29/honeydew-melon/

MELONS; HYBRIDS; PLANTING; SEEDS; FERTILIZER APPLICATION; IRRIGATION; PRUNING; HARVESTING; POSTHARVEST TECHNOLOGY

Housewife gardens during the pandemic and inspires her children to follow her footsteps. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 46-47. 2020.* https://www.agriculture.com.ph/2020/06/10/a-housewife-gardens-during-the-pandemic-and-inspires-her-children-to-follow-in-her-footsteps/

DOMESTIC GARDENS; GARDENING; VEGETABLE CROPS; PLANTING; HOUSEHOLDS; FOOD COMPOSITION; FOOD SECURITY

How to grow emerald green melons. **Ancheta, A.V.** *Agriculture (Philippines). 0118-857-7. v. 25 (1) p.14. 2021.*

CUCUMIS MELO; MELONS; PLANTING; CROP MANAGEMENT; HARVESTING

How to start a survival garden and grow your own food. **Barcelona, J.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 11-12. Jul-Aug 2020.*

https://www.agriculture.com.ph/2020/07/19/how-to-start-a-survival-garden-and-grow-your-own-food/

DOMESTIC GARDENS; GARDENING; VEGETABLE CROPS; HERBACEOUS PLANTS; CONTAINER PLANTING; PLANT CONTAINERS; PLANT ESTABLISHMENT

Human resources director escapes 'emotional nut' through gardening. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 56-57. 2020.*
https://www.agriculture.com.ph/2020/07/17/human-resources-director-escapes-emotional-rut-through-gardening/

ORNAMENTAL PLANTS; DOMESTIC GARDENS; GARDENING; CROP MANAGEMENT; PLANTING; PLANTS

Increase yield through proper inputs. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 48-49. Sep 2018.*
https://www.agriculture.com.ph/2019/07/14/increase-yield-through-proper-inputs/

ORYZA SATIVA; HYBRIDS; FERTILIZER APPLICATION; FOLIAR APPLICATION; PLANT GROWTH SUBSTANCES; TRADITIONAL FARMING; CULTURAL METHODS; YIELD INCREASES

List of plant-in-a-pot grow kits for gardening newbies. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 63. 2020.*
https://www.agriculture.com.ph/2020/03/26/a-list-of-plant-in-a-pot-grow-kits-for-gardening-newbies-kids-and-kids-at-heart-can-start-here/

URBAN AGRICULTURE; GARDENING; DOMESTIC GARDENS; VEGETABLE CROPS; CONTAINER PLANTING

Lomboy farms: a pioneer of Philippine viticulture. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 36-37. 2019.*
https://www.agriculture.com.ph/2020/04/04/lomboy-farms-a-pioneer-of-philippine-viticulture/

GRAPES; PLANT ESTABLISHMENT; CROP MANAGEMENT; FARMS; POSTHARVEST TECHNOLOGY; RURAL AREAS; WINEMAKING; TOURISM; PHILIPPINES

Look Ma, no soil! a Cavite [Philippines]- based plant grower enjoys propagating Tillandsias. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 60-62. 2019.*

https://www.agriculture.com.ph/2020/04/13/look-ma-no-soil-a-cavite-based-plant-grower-enjoys-propagating-tillandsias/

TILLANDSIA; VARIETIES; ORNAMENTAL PLANTS; CROP MANAGEMENT; WATERING; LIGHTNING; PHILIPPINES

Lot of people are interested in hydroponics. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 22-23. Sept 2018.*

VEGETABLES; MELONS; STRAWBERRIES; HYDROPONICS; GROWING MEDIA; NUTRIENT SOLUTIONS

May's organic garden bags best tourist attraction award. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 52-53. Nov 2018.*
https://www.agriculture.com.ph/2019/08/20/mays-organic-garden-bags-best-tourist-attraction-award/

GARDENS; VEGETABLE CROPS; ORNAMENTAL PLANTS; LIVESTOCK; RURAL AREAS; TOURISM; SUSTAINABILITY

Maximizing space: a government officer turned his rooftop into a mini-farm. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 56-58. 2020.*
https://www.agriculture.com.ph/2020/05/03/maximizing-space-a-government-officer-turned-his-rooftop-into-a-mini-farm-part-1/

DOMESTIC GARDENS; GARDENING; CONTAINER PLANTING; COMPOSTING; FARMING SYSTEMS; TILAPIA; CHICKENS

Mechanization makes farming more profitable. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 18; 20; 22. Nov 2018.*
https://www.agriculture.com.ph/2019/08/12/mechanization-makes-farming-more-profitable/

FARMS; MECHANIZATION; SOWING; EQUIPMENT; PRODUCTION; EFFICIENCY; PRODUCTIVITY; SUSTAINABILITY; LABOUR; COSTS

Meet a man [Mr. Arsenio Barcelona] a man who has contributed so much to Philippine agriculture. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(11) p. 4-6. Nov 2018.*
https://www.agriculture.com.ph/2019/08/09/meet-a-man-who-has-contributed-so-much-to-philippine-agriculture/

CROPS; PLANT NUTRITION; FARMERS; FARMING SYSTEMS; TECHNOLOGY; TECHNOLOGY TRANSFER; MULCHING; TRICKLE IRRIGATION; MECHANIZATION

Millennial housewife grows vegetables and saves more than a thousand in monthly grocery costs. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 49-51. 2020.* https://www.agriculture.com.ph/2020/07/16/a-millennial-housewife-grows-vegetables-and-saves-more-than-a-thousand-in-monthly-grocery-costs/

VEGETABLE CROPS; DOMESTIC GARDENS; GARDENING; PLANTING; CROP MANAGEMENT

Mobilizing the nutritional power of vegetable. **Woperies, M. World Vegetable Center (Taiwan).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 56.*

Vegetable production in Asia is big business, which is focused, on a few globally important crops. This is the case despite the fact that traditional vegetables are more robust and have greater inherent nutritional power. To mobilize that power, a combination of supply and demand interventions is needed - from household gardens that address family nutrition to market-oriented farming aimed at urban consumers. WorldVeg and partners have reached close to 60,000 vulnerable rural households in Africa and Asia with household garden approaches. They continuously work with families to grow their own vegetables and paying attention to nutrition messaging and water, sanitation, and hygiene practices This integrated agriculture-nutrition-health approach has shown promise in terms of enhancing diet diversity at the household level. For urban consumers, it is important to emphasize links in food value chains. On the supply side, food systems must deliver more diverse sources of safe, affordable and nutritious vegetables. Productivity needs to be enhanced in a safe and sustainable manner by promoting good agricultural practices and affordable protected cultivation. Improvements in transportation infrastructure and processing cold storage, and synchronized production and marketing will help in reducing postharvest losses. Promoting year-round production, aggregation, and agreed-pricing through contract farming may lead to lower and more stable prices for vegetables and improve consumer choices. On the demand side, radio, and TV broadcasts school meal programs and food festivals celebrating healthy and locally produced food will help to enhance knowledge about the importance to eat well. Introduction of subsidies and taxes need to be considered to prompt change in consumer behavior. Nutrition labeling and traceability, and banning advertisements for unhealthy food may nudge consumers towards better nutrition. The

cost of malnutrition to society is staggering, yet spending on nutrition-specific interventions by government donors and multilateral institutions remains woefully inadequate.

VEGETABLES; PLANT PRODUCTION; NUTRITIVE VALUE; HUMAN NUTRITION; HEALTH

Modeling an edible garden in a workplace in the Philippines. **Gonzales, M.S., Glorioso, I.G., Avila, J.D., Arevalo, S.F.Q., De Leon, D.Y., Quiambao, M.A., Malit, A.M.P., Capanzana, M.V. Department of Science and Technology, Bicutan, Taguig City (Philippines). Food and Nutrition Research Inst.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 96.*

Poor diet, partly due to low vegetable, consumption is a risk factor to metabolic diseases. Vegetable intake of Filipinos declined from 1978 to 1993 and only slightly increased from 2003 to 2013 as reported by the Department of Science and Technology (DOST) Food and Nutrition Research Institute (FNRI) in 2013. Vegetable gardening can potentially improve diet quality that may help alleviate metabolic diseases. DOST-FNRI collaborated with a private seedling company on project 'Oh My Gulay! sa FNRI' (Oh My Vegetables! in FNRI) in modeling an urban garden in the workplace. It aimed to set-up an urban edible garden and encourage vegetable consumption among DOST-FNR1 employees. The descriptive research included reasons for buying the garden's produce, among others. An edible garden of 397 z in FNRI grounds was planted with vegetables. Nutrition information boards on these vegetables were placed. Promotion efforts included garden tour for DOST-FNR visitors, national media coverage, postings in FNRI online sites, and project presentation to DOST Regional Directors and National Nutrition Council (NNC)'s Food Gardening Congress. After harvest, vegetables were sold to FNRI and DOST employees. There were 105 harvest days from June 2017 to August 2018. Out of 1,123.42 kg of vegetables harvested ,007,182 kg (89.65%) were bought by FNRI and DOST employees with total sales of PhP 40,519.18 (USD 747.17) from 89 buyers. The remaining 116.235 kg (10.35%) served as promotional items. Partner private seedling company conducted trainings on vegetable planting among selected FNRI employees and DOST employees. Technical assistance from DOST-FNRI's partner and vermicompost donations from Villar Foundation ensured the garden's sustainability. Maintaining the edible garden in the workplace resulted to the vegetable habit of employees as evidenced by their patronage of vegetables. Among trained employees, several started their edible gardens at home. The 0MG! sa FNRI is now being adopted by several DOST Regional Offices. Modelling an edible garden in FNRI can be a sustainable initiative that can help address metabolic diseases.

VEGETABLE CROPS; GARDENS; SEEDLINGS; DIET; FOOD INTAKE; URBAN AGRICULTURE; PHILIPPINES

Natural farming made a businessman's agricultural dream come true. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 23-25. May-Jun 2020.*
https://www.agriculture.com.ph/2020/04/17/natural-farming-made-a-businessmans-agricultural-dream-come-true/

FARMING SYSTEMS; ORGANIC AGRICULTURE; VEGETABLE CROPS; FRUIT CROPS; PLANTING

Negros [Philippines]-based agripreneur uses herbs to create now flavours for favorite local delicacy. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 20-22. May-Jun 2020.*
https://www.agriculture.com.ph/2020/04/22/a-negros-based-agripreneur-uses-herbs-to-create-new-flavors-for-a-favorite-local-delicacy-part-1/

FARMING SYSTEMS; SMALL FARMS; VEGETABLE CROPS; LIVESTOCK; FARMS; CHICKENS; FOODS; FOOD TECHNOLOGY; PHILIPPINES

NGO [non-governmental organizations]-established farm site teaches indigenous knowledge systems and practices. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 32-34. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/06/01/ngo-established-farm-site-teaches-indigenous-knowledge-systems-and-practices/

ORGANIC AGRICULTURE; FARMING SYSTEMS; TECHNOLOGY; TRAINING; TECHNOLOGY TRANSFER; INDIGENOUS KNOWLEDGE

OFW [overseas Filipino workers] grows survival crops through container and hydroponic gardening. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 45-47. 2020.*
https://www.agriculture.com.ph/2020/04/14/ofw-grows-survival-crops-through-container-and-hydroponic-gardening/

VEGETABLE CROPS; FRUITS; CONTAINER PLANTING; HYDROPONICS; GARDENING; WATER QUALITY; ORGANIC AGRICULTURE; COMPOSTS; COMPOSTING

OFW [Overseas Filipino Worker] shares his experience as red okra grower. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 6; 8. 2020.*

https://www.agriculture.com.ph/2020/06/30/an-ofw-shares-his-experience-as-red-okra-grower/

ABELMOSCHUS ESCULENTUS; OKRAS; VARIETIES; SEEDS; PLANTING; VEGETABLE CROPS; FARMS; CROP MANAGEMENT

Okra, a food for health-conscious people. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 40-41. Sep 2018.*
https://www.agriculture.com.ph/2019/07/12/okra-a-food-for-health-conscious-people/

ABELMOSCHUS ESCULENTUS; VARIETIES; PLANTING; PROXIMATE COMPOSITION; CROP MANAGEMENT; FERTILIZER APPLICATION; HEALTH FOODS; DIETARY FIBRES

One step forward against hunger. **Ancheta, A.V.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 6; 8. 2020.*

VEGETABLE CROPS; FARMING SYSTEMS; SMALL FARMS; CROP MANAGEMENT; CROPS; FOOD SECURITY; COMMUNITY DEVELOPMENT

Ordinary housewife is now a vegetable entrepreneur. **Rubio, R.M.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 38-39. 2019.*
https://www.agriculture.com.ph/2020/04/05/ordinary-housewife-is-now-a-vegetable-entrepreneur/

ABELMOSCHUS ESCULENTUS; OKRAS; ORGANIC AGRICULTURE; HARVESTING; INCOME; COMMUNITY DEVELOPMENT; HOUSEWIVES

Organic production system as an approach to nutrition-sensitive agriculture. **Mamaril, V.R. Department of Agriculture, BPI Cmpd. Visayas Ave. Diliman, Quezon City (Philippines). Bureau of Agriculture and Fisheries Standards Div.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 35.*

It is one of the major missions of the Philippines' Department of Agriculture (DA) to help and empower the farming and fishing communities and the private sector to produce sufficient, accessible, and affordable food for every Filipino, as well as to earn a decent

income. As one of the DA banner programs in attaining the national sustainability of agriculture and food security, the promotion of a production system that sustains the health of soils, ecosystems, and people was formally started in 2012 after the crafting of the National Organic Agriculture Program (NOAP) pursuant to the Organic Agriculture Act of 2010 (RA No. 10068). Organic agriculture is a holistic production management system, which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices over the use of off-farm inputs and utilizes cultural, biological, and mechanical methods as opposed to synthetic materials. It combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved (PNS/BAFS 07:2016). Organic production systems contribute to nutrition-sensitive agricultural production as well as in ensuring that our food is nutritious, safer, more diverse, and most importantly, is yielded from sustainable farming.

ORGANIC AGRICULTURE; FARMING SYSTEMS; FISHING OPERATIONS; SUSTAINABILITY; PHILIPPINES

Ormoc [Leyte, Philippines] seminary's pocked herb garden provides ingredients for friars' meals. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 40-41. 2020.*
https://www.agriculture.com.ph/2020/07/05/ormoc-seminarys-pocket-herb-garden-provides-ingredients-for-friars-meals/

CULINARY HERBS; DOMESTIC GARDENS; GARDENING; PLANTING; FOODS; PHILIPPINES

Papaya propagated by marcotting. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 42-44. Nov 2018.*
https://www.agriculture.com.ph/2019/08/17/papaya-propagated-by-marcotting/

CARICA PAPAYA; LAYERING; VEGETATIVE PROPAGATION; ROOTING; GROWING MEDIA; WATERING

Parish priest constructs a garden to teach sustainability to his community. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 14; 16. Nov 2018.*
https://www.agriculture.com.ph/2020/05/06/parish-priest-constructs-a-garden-to-teach-sustainability-to-his-community/

DOMESTIC GARDENS; GARDENING; VEGETABLE CROPS; PLANT ESTABLISHMENT

Partners setup an azolla farm to provide feed for their livestock. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 25 (1) p. 22-23. 2021.*

https://www.agriculture.com.ph/2020/05/22/partners-setup-an-azolla-farm-to-provide-feed-for-their-livestock/

AZOLLA; FARMS; PLANTING; DOMESTIC GARDENS; VEGETABLE CROPS; FEEDS; LIVESTOCK

Permaculture site in a sight to see in the city. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 52-53. Apr 2020.*
https://www.agriculture.com.ph/2020/05/26/permaculture-site-is-a-sight-to-see-in-the-city/

ALTERNATIVE AGRICULTURE; FARMING SYSTEMS; URBAN AREAS; ENVIRONMENTAL IMPACT; SUSTAINABILITY

Plant factories in Taiwan to promote food and nutrition security in an urban setting. **Wei Fang. National Taiwan Univ. Taipei City 10617 (Taiwan). Dept. of Bio-Industrial Mechatronics Engineering.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 58.*

Plant factory, or vertical farming, with artificial lighting (PFAL) is considered as one of the promising agricultural technologies that can address the ever-challenging future of the planet. This presentation introduced the key components of PFAL and advantages of PFAL in view of efficient resource utilization such as fresh water, nutrient, carbon dioxide, and land. The current development of PFAL industry in Taiwan was also discussed.

PLANTS; FARMING SYSTEMS; TECHNOLOGY; HUMAN NUTRITION; FOOD SECURITY; TAIWAN

Planting rice how more fun, more profitable. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 14; 16. Sep 2018.*

ORYZA SATIVA; HYBRIDS; PLANTING; FARMING SYSTEMS; TECHNOLOGY; TRANSPLANTERS; HARVESTERS; STEMS; CROP YIELD; PRODUCTION COSTS; COST BENEFIT ANALYSIS

Practical tips on how to grow culinary herbs. **Espiritu, L.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 12-13. Sep 2018.*
https://www.agriculture.com.ph/2019/07/06/practical-tips-on-how-to-grow-culinary-herbs/

CULINARY HERBS; PLANTING; GROWING MEDIA; SEEDS; PROPAGATION MATERIALS; TRANSPLANTING; FERTILIZER APPLICATION; HARVESTING

Preserve our dwindling Sago palm [Metroxylon sagu]. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 36-38. Jul 2018.*
https://www.agriculture.com.ph/2019/06/04/preserve-our-dwindling-sago-palm/

METROXYLON; PROPAGATION MATERIALS; PLANTING; FOOD TECHNOLOGY; PROCESSING; STARCH; FOODS

Project: cultivate tomato. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 50. 2020.*

LYCOPERSICON ESCULENTUM; TOMATOES; PLANTING; PLANT PRODUCTION; WATERING; PEST CONTROL

Promoting nutrition-sensitive school gardens and feeding programs through the school and home gardens project: the case of Laguna, Philippines. **Africa, L.S. Philippines Univ. Los Baños, College, Laguna (Philippines). Coll. of Human Ecology.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 57.*

To address the problem of undernutrition and its consequences among school children, as well as the youth's declining interest in agriculture; SEARCA [Southeast Asian Regional Center for Graduate Study and Research in Agriculture] partnered with the University of the Philippines Los Baños (UPLB) and the Department of Education (DepEd)-Laguna to implement the School and Home Gardens Project (SHGP). This participatory action research focused on strengthening the complementation between the existing school-based feeding and 'Gulayan sa Paaralan' programs. Overall, the series of capability building activities for teachers and school heads promoted a better understanding about the interconnections of food and nutrition, organic agriculture, edible landscaping, climate change, and solid waste management. Moreover, the program enhanced the involvement of parents, local government units, and other stakeholders through the (1) holding of training/workshops, (2) seed exchange activities among schools and household, (3)conduct of regular school and home garden visitation, (4) provision of technical assistance in the establishment and sustainability of school and home gardens, (5) sharing of best practices of school garden that can be adopted in other school and home gardening, (6) provision of financial

assistance from the office of the municipal mayor for scaling-up of school and home gardens project, and (7) evaluation of the program based on the changes of nutritional status of school children. Finally, this paper provided evidence supporting why this SHGP is nutrition-sensitive by describing the outcomes based on the changes and trends of nutritional status among school children before, during, after the introduction of the interventions to the selected schools.

HUMAN NUTRITION; NUTRITIONAL STATUS; DIET; NUTRIENT AVAILABILITY; HEALTH; EDUCATIONAL INSTITUTIONS; GARDENS; DOMESTIC GARDENS; PHILIPPINES

Production and marketing practices of abaca farmers in Caraga Region [Philippines]. **Sagocsoc, R.A., Atega, T.A., Fetalsana, R.S., Alcantara, E.D.D. Caraga State Univ., Ampayon, Butuan City (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 89.*

Abaca known internationally for its world-class fiber Manila hemp, continues to be one of the priority agricultural commodities of the Department of Agriculture (DA) with the country supplying more than 87.4 percent of the total fiber market and earning more than USD 111.13 million in global trade annually. With continuing development of fiber craft industry in the Philippines, the abaca fiber market has been witnessing boost due to the growing demand for gifts, toys, and housewares. Moreover, increasing consumer inclination lifestyle products is further expected to strengthen the growth trend for abaca crafts in the coming years. Currently, there are only two major exporters of abaca fiber in the world-Philippines and Ecuador, with the Philippines for over 80% of the global production of abaca fiber. The study aimed to: (1) address current gaps of abaca industry profile for Caraga region; (2) provide baseline data/information of the abaca industry; (3) capture the production and marketing practices of the various abaca farmers, traders; (4) determine the strategic importance of abaca in Caraga economy its contribution to annual household and (5) present the problems and constraints encountered by the farmers and traders. The study was conducted in the four provinces in Caraga region, namely. Agusan del Norte, Agusan del Sur, Surigao Norte and Surigao del Sur. The researchers come up with two sets of respondents, the farmers and traders using structured questionnaires. There was also a focus group discussion among the different stakeholders. A total 1,249 respondents were interviewed. This research study is a partnership with the Philippine Rural Development am (PRDP) Results revealed that the in Caraga, planting is generally dependent on available

number of seedlings readily awesome to farmers. Majority of the farmers using corms and suckers from mother plants in own farm experience sourcing sufficient quantity of seedlings, especially when they have to rehabilitate the whole farm or setup a new farm. It is recommended that the use of abaca disease resistant seedlings will be introduced to abaca farmers for ion. Proper care and maintenance of abaca plants may be followed by abaca farmers to pro demand better price.

ABACA; PRODUCTION; INDUSTRY; MARKETING; SUPPLY; FARMERS; PHILIPPINES

Quezon [Philippines] farmer finds new sweet corn profitable. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 40-41. Jul 2018.*

ZEA MAYS; MAIZE; HYBRIDS; PLANTING; CROP YIELD; COST BENEFIT ANALYSIS; FARMERS; FARM HOLIDAYS; PHILIPPINES

Quezon City [Philippines] homemaker engaged in urban gardening as a way to feed and bond with her family. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 52-53. 2020.*

VEGETABLE CROPS; DOMESTIC GARDENS; GARDENING; URBAN AREAS; PLANTING; HARVESTING; FOODS; PHILIPPINES

San Mateo [Isabela, Philippines] starts reaping 'black gold'. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 44-46. Jul 2018.*
https://www.agriculture.com.ph/2019/06/08/san-mateo-starts-reaping-black-gold/

VIGNA RADIATA RADIATA; MUNG BEANS; HIGH YIELDING VARIETIES; PROPAGATION MATERIALS; SEED; QUALITY; TECHNOLOGY; TECHNOLOGY TRANSFER; PROCESSED PLANT PRODUCTS; PHILIPPINES

Seafarer grows food using raised bed and container gardening. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 46-47. 2020.*
https://www.agriculture.com.ph/2020/04/07/a-seafarer-grows-food-using-raised-bed-and-container-gardening/

VEGETABLE CROPS; CONTAINER PLANTING; PLANTING; FERTILIZER APPLICATION; WATERING; PLANT ESTABLISHMENT; CROPS

Seed souring basics: the do's and dont's. **Cruz, B.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 30-32. 2020.*

https://www.agriculture.com.ph/2020/05/10/seed-sowing-basics-the-dos-and-donts/

SEEDS; GERMINATION; PLANTING; SEEDLINGS; COMPOSTS; SOIL TYPES

Stephanie erecta: a beginner's guide. **Lastimosa, A.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 13 -14. 2020.*
https://www.agriculture.com.ph/2020/10/11/stephania-erecta-a-beginners-guide/

STEPHANIA; SPECIES; ORNAMENTAL PLANTS; CROP MANAGEMENT; GARDENING; POTTING

Strawberries grow in Cavite [Philippines] residence. **Taculao, P.B.S. Central Luzon State Univ., Science City of Munoz, Nueva Ecija 3119 (Philippines). Coll of Fisheries.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 16-17. May-Jun 2020.*
https://www.agriculture.com.ph/2020/04/17/strawberries-grow-in-a-cavite-residence/

STRAWBERRIES; FRAGARIA; PLANTING; GARDENING; GARDENS; PLANT ESTABLISHMENT; PHILIPPINES

Successful lawyer is also a prolific urban gardener and blogger. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 58-61. 2020.*
https://www.agriculture.com.ph/2020/06/06/successful-lawyer-is-also-a-prolific-urban-gardener-and-blogger-part-1/

URBAN AREAS; GARDENING; VEGETABLE CROPS; FARMING SYSTEMS; SMALL FARMS; DOMESTIC GARDENS

Sweet potato technologies shared to farmers. **Bedejim, A.N.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 20-21. 2021.*

IPOMOEA BATATAS; SWEET POTATOES; DISEASE CONTROL; PLANT PROPAGATION; FOOD TECHNOLOGY; NUTRITIVE VALUE

Technology forum tackles strawberry concerns. **Penchog, M.D.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 27. 2020.*

FRAGARIA; STRAWBERRIES; VARIETIES; DISEASE CONTROL; PEST INSECTS; TRICHODERMA; ROTS; BIOLOGICAL CONTROL AGENTS

Thank you, farmers! **Ancheta, A.V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 16. 2020*

VEGETABLE CROPS; PLANTING; FARMS; FARMERS; CROP MANAGEMENT; FARMING SYSTEMS

Things to consider before choosing farm life. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 23. 2020.*

FARMS; URBAN AGRICULTURE; CROP MANAGEMENT; SUSTAINABILITY; COMMUNITY INVOLVEMENT

This gardens' produce became the family's only source of income during quarantine. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 58-60. 2020.* https://www.agriculture.com.ph/2020/07/04/this-gardens-produce-became-the-familys-only-source-of-income-during-quarantine/

VEGETABLE CROPS; FRUITS; DOMESTIC GARDENS; GARDENING; PLANTING; WATERING; ORGANIC AGRICULTURE; HOUSEHOLDS; INCOME

Training sprouted into business: a couple with mushroom house aims to have a mushroom farm in Palawan [Philippines]. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v.24 04 p. 50-51. Apr 2020.* https://www.agriculture.com.ph/2020/05/25/a-training-sprouted-into-business-a-couple-with-mushroom-house-aims-to-have-a-mushroom-farm-in-palawan/

EDIBLE FUNGI; FARMS; PLEUROTUS OSTREATUS; PROCESSING; PROCESSED PLANT PRODUCTS

Two agriculturist thrive during the pandemic by growing ornamental and food crops at home. **Valdevieso, R.D.** *Agriculture (Philippines). 0118-857-7. v. 25 (1) p. 20-21. 2021.* https://www.agriculture.com.ph/2020/11/22/two-agriculturists-thrive-during-the-pandemic-by-growing-ornamental-and-food-crops-at-home/

VEGETABLE CROPS; ORNAMENTAL PLANTS; DOMESTIC GARDENS; CROP MANAGEMENT; CROPS; ORGANIC FERTILIZERS; PLANTING; PLANTS

Two millennials grow extraordinary veggies in their gardens. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p.10, 12, 14. 2020.* https://www.agriculture.com.ph/2020/07/02/two-millennials-grow-extraordinary-veggies-in-their-gardens/

OKRAS; ABELMOSCHUS ESCULENTUS; VARIETIES; PLANTING; SEEDS; SEEDLINGS; CROP MANAGEMENT; DOMESTIC GARDENS; GARDENING

Urban gardening tips for beginners from a Bicolano chef. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 48-49. 2020.*

VEGETABLE CROPS; URBAN AREAS; URBAN AGRICULTURE; GARDENING; CONTAINER PLANTING

Urban grower uses hydroponics in his small terrace garden in Rizal [Philippines]. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 44-45. 2020.*
https://www.agriculture.com.ph/2020/04/12/an-urban-grower-uses-hydroponics-in-his-small-terrace-garden-in-rizal/

VEGETABLE CROPS; GARDENS; GARDENING; HYDROPONICS; GROWING MEDIA; PHILIPPINES

Using bamboo as makeshift planters. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 58-59. 2020.*
https://www.agriculture.com.ph/2020/05/20/using-bamboo-as-a-makeshift-planter/

VEGETABLE CROPS; ORNAMENTAL PLANTS; CROP MANAGEMENT; CROPS; PLANTING; PLANTS; PLANT CONTAINERS; BAMBOOS

Watermelon production guide. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 16; 18. Oct 2018.*
https://www.agriculture.com.ph/2019/07/22/watermelon-production-guide/

CITRULLUS LANATUS; WATERMELONS; VARIETIES; PLANTING; TRANSPLANTING; FERTILIZER APPLICATION; IRRIGATION; PRUNING; POLLINATION; HARVESTING

Weekend farmer was inspired by her husbands' love for agriculture. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 27- 28. 2020.*
https://www.agriculture.com.ph/2020/04/24/weekend-farmer-was-inspired-by-her-husbands-love-for-agriculture/

FARMS; ORYZA SATIVA; FRUIT TREES; VEGETABLE CROPS; INDIGENOUS ORGANISMS; CROP MANAGEMENT; CROPS

What food to grow in a survival garden. **Barcelona, J.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 18-20. 2020.*

https://www.agriculture.com.ph/2020/09/13/what-food-to-grow-in-a-survival-garden/

VEGETABLE CROPS; CULINARY HERBS; PLANTING; DOMESTIC GARDENS; GARDENING; CROP MANAGEMENT

Win with yard long bean. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 16; 18. 2019.*
https://www.agriculture.com.ph/2020/03/26/a-win-with-yard-long-bean/

ASPARAGUS BEANS; VARIETIES; PLANTING; CROP MANAGEMENT; PLANT ESTABLISHMENT; DISEASE RESISTANCE

With kurikong [cecid fly infestation], plant jackfruit or pomelo instead of mango. **Anon.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 28-29. Apr 2020.*
https://www.agriculture.com.ph/2020/05/14/with-kurikong-plant-jackfruit-or-pomelo-instead-of-mango/

ARTOCARPUS HETEROPHYLLUS; CITRUS GRANDIS; VARIETIES; PLANTING; FERTILIZER APPLICATION; IRRIGATION

F02 - PLANT PROPAGATION

Callus induction and plant regeneration in tomato (Solanum lycopersicon L.) as affected by genotype, explant and plant growth regulators. **Maravilla, A.M.B., Valle-Descalsota, M.L.S., Damasco, O.P. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. Laurena, A.C. Philippines Univ. Los Baños, College, Laguna (Philippines). Philippine Genome Center for Agriculture, Livestock, Forestry and Fisheries.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 147. 2019.*

In plant transformation, the success is dependent on tissue and culture and regeneration-from producing good, embryogenic and friable calli to regenerating whole and healthy plants. In this study, it is of interest to find the best explant and the optimum concentration of plant growth regulators suitable for the production of desired callus and plant regeneration. Fourteen tomato genotypes were tested across 12 callus induction treatments with varying concentrations of 1-Nephthaleneacetic acid (NAA; 0 ppm, 0.5 ppm, 1 ppm and 2 ppm), and 6-benzylaminopurine (BAP; 0 ppm and 2 ppm) using two types of explant (cotyledon and hypocotyl). Cultures were observed for percent callus formation,

type of callus formed, callus size, color, and texture. Statistical analysis showed significant differences in percent callus formation and callus size across the treatment tested. The most number of calli formed was observed in the medium containing 0.5 ppm NAA and 1 ppm BAP with percent callus formation of 86.57% while the largest calli were observed in cultures with 1 ppm BAP. Plan regeneration was also observed in some cultures with 2 ppm BAP. Genotypes and type of explant have no significant affect on percent callus formation and callus size. Results showed that concentration of plant growth regulators in the medium highly effects the ability of the plant to produce callus, regardless of tomato genotype to be cultured or type of explants used.

SOLANUM; SPECIES; TOMATOES; TISSUE CULTURE; CALLUS; GENOTYPES; EXPLANTS; PLANT GROWTH SUBSTANCES

Optimal growth conditions for in vitro cultures of plant parasitic algae Cephaleuros Kunze ex E.M. Fries. **Bunjongsiri, P. Prince of Songkla Univ., Hatyai, Songkjla 90112 (Thailand). Dept. of Pest Management. anurag.su@psu.ac.th. Sungpapao, A. Prince of Songkla Univ., Hatyai, Songkjla 90112 (Thailand). Pest Management Biotechnology and Plant Physiology Lab.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 45-50. Aug 2018.*
https://pas.cafs.uplb.edu.ph/2018/march-2018-vol-101-no-1/

The genus Cephaleuros comprises plant parasitic algae distributed in tropical and subtropical zones globally. This study aimed to select culture media and optimize the culture conditions for Cephaleuros species. An extensive survey was conducted in southern Thailand and five species were found, namely, Cephaleuros diffusus on baegu leaves, C. expansa on orange jasmine leaves, C. karstenii on cacao leaves, C. pilosa on mangosteen leaves, and C. virescens on soursop leaves. To select suitable culture media, the five Cephaleuros species were cultured on Bold's basal medium (BBM), Bristol medium, high salt medium (HSM), trebouxia medium, trebouxia Bristol medium, and modified BBM. All the Cephaleuros species grew well in BBM, followed by HSM and Bristol media. Bold's basal medium amended with indole-3-acetic acid (IAA) was found to be the most suitable for growth of all these Cephaleuros species when compared with plain BBM. Furthermore, culture under 24 h light maximized growth of the five Cephaleuros species. The results showed that BBM amended with IAA was the most suitable medium for Cephaleuros species cultures under incubation with 24 h light. Gametangia-like body and sporangia were formed on BBM after 3 mo of incubation. Further research is needed regarding cultures of pure Cephaleuros species on synthetic media in genetic studies and in tests of pathogenicity in plants.

ALGAE; IN VITRO CULTURE; CULTURE MEDIA; GROWTH; HOST PARASITE RELATIONS

F03 - SEED PRODUCTION AND PROCESSING

Effect of pH and nature of water contact on the rate of seed capsule dehiscence of Ruellia tuberose. **Flores, J.G. jgflores@up.edu.ph., Ragas, R.E.G. Philippines Univ. Cebu, Gorando Ave. Lahug, Cebu City (Philippines). Dept. of Biology and Environmental Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 149. 2019.*

Ruellia tuberosa is a common weed in the locality. Even though it is considered a weed, there have been numerous studies published concerning the claimed therapeutic properties of the plant's extracts but less on its biology. The plant spreads rapidly because of its explosive seed dehiscence that allows flinging of its seeds away from the parent plant. There are different triggers to explosive seed dispersal. R. tuberosa fruits split by hygroscopic means. Whether on not moisture is the only factor of dehiscence had not been determined prior to the experiment. Water was dropped on the base, belly, and beak to determine where along the capsule dehiscence will start. Since in all five trials, the dehiscence started at the beak of the capsule, the subsequent tests were structured in a way that only beak of the capsules would be in contact with water for all treatments. In the study, it was found that the capsule exploded faster under acidic (13.4 +- 2.446 seconds) than in basic treatment (24.1 +-4.598) seconds). Studies done on similar dehiscing plants reported of pectin in the middle layer that keeps the seed pods together. It is likely that pH of the water may contribute to the delay of fruit dehiscence through its possible effect on pectin. This is a preliminary study on the effect of the acidity and alkalinity of water on the dehiscence of R. tuberosa.

WEEDS; SPECIES; PH; SEEDS; DEHISCENCE; ACIDITY; WATER; PECTINS

Storage response of soybean (Glycine max L.) seeds using oxygen scrubber and drying beads. **Aquino, A.L. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science. alaquino1@up.edu.ph, johnjiwi@gmail.com, Atienza, V.A. vaatienza@up.edu.ph. Dinglasan, A.A. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Governance and Rural Development. ally.dinglasan@gmail.com. Enicola, E.E. elmer_enicola@yahoo.com. Makiling, F.C. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. fcmakiling@up.edu.ph.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019.

Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no . 1) p. 159. 2019.

Soybean seeds deteriorate faster than other crops seeds resulting to short storage in life. High moisture content, temperature and humidity are factors known to cause rapid seed deterioration. Recent advances on seed research, however, attributes improved seed storability to lower oxygen level. An experiment was conducted at the Seed Science and Technology Laboratory, ICrops-CAFS, UPLB [Institute of Crop Science-College of Agriculture and Food Science, University of the Philippines Los Baños], to determine the shelf-life and storage behavior of soybean seeds using oxygen scrubber and drying beads. Soybean varieties used were IPB Sy 96-27-23 and Manchuria. The factors were airtight containers (glass and PET bottles) and oxygen scrubber used singly or with drying beads (oxygen scrubbers alone, oxygen scrubber plus drying beads, and control or seeds only) and storage duration. Results showed that viability and vigor of IPB Sy 96-27-23 increased after four months regardless of the container and combination of oxygen scrubber and drying beads. Germination, seedling emergence, and seedling dryweight showed an increasing trend over the 4-moth period, with the higher values using oxygen scrubber plus drying beads. Seedling dry weight also showed an increasing trend but unlike with IPB Sy 96-27-23 the response on the treatments was not consistent. Moisture content was also kept lower when oxygen scrubber is used with drying beads. These results imply that glass and PET bottles are suitable containers for maintaining seed viability and vigor but can be enhanced further with the use of oxygen scrubber and drying beads.

GLYCINE MAX; SOYBEANS; SEEDS; SEED STORAGE; SEED TREATMENT; VIABILITY; SEED CHARACTERISTICS; SEED; SEED CHARACTERISTICS; VIGOUR

Temperature during seed formation in relation to seed dormoncy in selected inbred rice (Oryza sativa) varieties. **Ramos, R.C. rc.ramos@philrice.gov.ph. Brena, S.R. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Genetic Resources Div./Seed Technology Unit. sr.brena@philrice.gov.ph.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 159-160. 2019.*

Seed dormancy refers to the inability of seeds to germinate even under the favorable condition. Environmental conditions such as temperature during seed formation and ripening on the level of dormancy among seven inbred rice varieties, NSIC Rc442, and NSIC Rc460 harvested in dry season 2018 and 2019. Temperature during seed formation and ripening were recorded in each season. Freshly threshed seeds were sampled for seed

germination and moisture content determination. Seed testing was dome in four replications following the ISTA rules for seed testing. Weekly germination was done after the first test to determine the period of after the ripening in each variety. Temperature in dry seasons 2018 during flowering stage ranged from 26.38 to 27.48 deg C in 2018 and 25.77 to 26.54 deg C in 2019. During seed ripening, temperature in 2018 was higher than 2019 by 0.78 deg C. All varieties harvested in dry season in 2018 showed significantly higher germination than those harvested in 2019.NSIC Rc440, NSIC Rc438, and NSIC Rc416 harvested in 2018 exhibited an average 56% higher germination than those produce in 2019 immediately after threshing. After fourteen days, varieties harvested in 2018 remained higher in germination rate than those harvested in 2019 by 28.6%. After harvested was longest in NSIC Rc360. Germination rate remained less than 85% after 56 days. However, dormancy was completely broken 14d after harvest in NSIC Rc438 (DS2018); NSIC Rc352 (DS2018); NSIC Rc416 (DS2018).

ORYZA SATIVA; RICE; HYBRIDS; TEMPERATURE; DORMANCY; SEEDS; GERMINATION

F04 - FERTILIZING

Advocate of pesticide-free agriculture. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 14; 16. Jul 2018.*
https://www.agriculture.com.ph/2019/05/28/advocate-of-pesticide-free-agriculture/

BRASSICA OLERACEA CAPITATA; CABBAGES; SEAWEEDS; PLANT EXTRACTS; APPLICATION RATES; PLANT GROWTH SUBSTANCES; APPLICATION METHODS; SOIL CONDITIONERS; CROP PERFORMANCE

Biofertilizer and liquid organic fertilizer production by Klebsiella sp. and Bacillus sp. **Nhu, N.T.H. Khon Kaen Univ., Khon Kaen 40002 (Thailand). Graduate School of International Program of Biological Sciences. nurrid@kku.ac.th. Riddech, N. Khon Kaen Univ., Khon Kaen 40002 (Thailand). Dept. of Microbiology.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 60-69. Aug 2018.*
https://pas.cafs.uplb.edu.ph/2018/march-2018-vol-101-no-1/

The quality and quantity of organic fertilizers were mainly affected by suitable carriers and technological limitations. Experiments were conducted to determine the potential of Bacillus sp. in enhancing the fermentation process of daily waste substrates and to evaluate the survival of Klebsiella sp. in various carriers. The test for antagonistic activity between Bacillus sp. and Klebsiella sp. showed that they were not competitive against each other. Fruit-bacteria (fruit waste substrate in combination with Bacillus sp.) was the best

treatment which had the highest amount of microorganisms on day 15 and on day 30 of the fermentation process. The survival of Klebsiella sp. was monitored over a period of 2 mo in dry inoculation as biofertilizer and in fresh inoculation as liquid organic fertilizer. Compared with bagasse and corn husk, rice straw harbored the highest number of bacteria. In fresh microbial inoculants, molasses was better than diluted distillery slop solution by nearly maintaining the number of Klebsiella sp. at 1.2 × 10 sup 7 CFU g-1, which decreased at day 60. The number of Klebsiella sp. in fermented fruit waste was also highest at day 15 and gradually decreased towards day 60. Although the number of Klebsiella sp. fell sharply during incubation time, it was higher in biofertilizer than in liquid organic fertilizer.

BIOFERTILIZERS; BACILLUS; KLEBSIELLA; SPECIES; LIQUID FERTILIZERS; FERMENTATION; FRUITS; AGRICULTURAL WASTES

Easy organic fertilizers. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 50. 2020.*

ORGANIC FERTILIZERS; FOOD WASTES; EGG SHELL; LIQUID FERTILIZERS; PROCESSING

Efficiency and efficacy of multi-purpose precision drone sprayer in controlling weeds of direct-seed rice. **Collado, W.B., Caballong, N.L. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines). nl.caballong@philrice.gov.ph., Barroga, R., Bermudez, R.V. Jr., Cañete, S.D., Orcino, J.A. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 171. 2019.*

Efficient fertilizer application ensures equal distribution and full absorption of nutrients by the rice crop. Manual broadcasting is the most is the common method of applying granular fertilizers in the rice fields in the Philippines. Meanwhile, a hexa-copter agricultural precision drone that can broadcast dry materials of a diameter between 0.5mm to 0.5mm such a granular fertilizers, seeds and feeds is starting to gain access to the local farming market. With a load capacity of 10kg, the system has automated mission feature wherein users can plot out the area and it automatically creates and follows flight path. The drone is also capable of resuming its mission path after refilling should it emptied its tank load at midflight. The potential of this technology in nutrient application in rice has not been explored. Thus, a study under the field condition at PhilRice CES [Philippine Rice Central Experiment Station] from January to May 2019 was conducted to test and compare the efficiency and effectiveness of the precision drone spreader technology with manual method in applying granular fertilizer in rice. Cutting the recommended nutrient rate into two splits, granular fertilizers were applied into two plots through the following treatments:

manual broadcast and drone spreading. Crop cut and actual yield data as well as the time spent during the application were recorded and analyzed. Results showed that the drone-spread plot has more equal distribution of nutrients based on crop cut compared to the manually broadcasted. Drone-spread plot harvest data was higher compared to the manually broadcasted plot both in the crop cut and actual yield. In terms of the duration of the fertilizer application, both are relatively equal. The results suggest that multi-purpose precision drone spreader has the same efficiency and is more effective than manual fertilizer broadcasting. This experiment will be continued in the next season under more rigorous design.

ORYZA SATIVA; DIRECT SOWING; FERTILIZER APPLICATION; TECHNOLOGY; TECHNOLOGY TRANSFER; EQUIPMENT

Farm tips: don't fertilize with urea radish with developing main root. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 59. Apr 2020.*

RAPHANUS SATIVUS; RADISHES; VARIETIES; FERTILIZER APPLICATION; AMMONIUM SULPHATE; ROOTS; TIMING

Getting to know Yara's [fertilizer company] premium crop nutrition solutions. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 8; 10. Nov 2018.* https://www.agriculture.com.ph/2019/08/10/getting-to-know-yaras-premium-crop-nutrition-solutions/

ORYZA SATIVA; ZEA MAYS; VEGETABLE CROPS; FERTILIZERS; ENVIRONMENTAL IMPACT; PLANT NUTRITION; NPK FERTILIZERS; NUTRIENTS; PLANT GROWTH SUBSTANCES; FOLIAR APPLICATION

Hevea apparatus makes old rubber trees production again. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 12; 14; 16. Nov 2018.* https://www.agriculture.com.ph/2019/08/11/hevea-apparatus-makes-old-rubber-trees-productive-again/

HEVEA; SPECIES; RUBBER; LATEX; VASCULAR TISSUES; CROP YIELD; FERTILIZER APPLICATION; NPK FERTILIZERS; ETHYLENE

How to feed a survival garden. **Barcelona, J.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p.24; 26. 2020.*

CROPS; FERTILIZER APPLICATION; GARDENS; GARDENING; COMPOSTING; FOOD WASTES

Increase yield through proper inputs. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 48-49. Sep 2018.*
https://www.agriculture.com.ph/2019/07/14/increase-yield-through-proper-inputs/

ORYZA SATIVA; HYBRIDS; FERTILIZER APPLICATION; FOLIAR APPLICATION; PLANT GROWTH SUBSTANCES; TRADITIONAL FARMING; CULTURAL METHODS; YIELD INCREASES

JADAM: a simple low-cost approach to farming. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 33-34. 2020.*
https://www.agriculture.com.ph/2020/05/01/jadam-a-simple-low-cost-approach-to-farming/

FARMING SYSTEMS; ORGANIC AGRICULTURE; FERTILIZER APPLICATION; MULCHING

Small farmer increases yield by 300%. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 10; 12. Jul 2018.*

SOLANUM MELONGENA; AUBERGINES; ZEA MAYS; INDIGENOUS ORGANISMS; VARIETIES; FOLIAR APPLICATION; CROP YIELD; AMINO ACIDS; YIELD INCREASES

Step-by-step guide to hot composting. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 38-39. 2020.*
https://www.agriculture.com.ph/2020/05/11/a-step-by-step-guide-to-hot-composting/

COMPOSTING; COMPOSTS; FOOD WASTES; MICROORGANISMS; SOIL FERTILITY

Wonder seaweeds: a green tech for rice production. **Agudera, J.P. Jr., nCaballero, G.A., Catubay, E., Nasibog, L.D. Jr., Ponteras, J.G. Southern Philippines Agri-Business and Marine and Aquatic School of Technology, Diagos, Davao del Sur (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 88.*

This study aimed to determine the level of KD foliar fertilizer and its effect in combination of different levels of KD foliar fertilizers to the yield of rice in Davao del Sur [Philippines], Specifically, it aimed to determine the level of KD fertilizer to increase yield of rice per

hectare; and its effects when combined with different levels of synthetic fertilizers on (1)yield (kg); (2)weight (g); (3)filled and unfilled grains/seeds per panicle; (4)productive tillers per hill; (5)rice bugs; and (6)added benefits to the rice farmers. The study was conducted in three different trials in 2008, 2015 and 2018 using Randomized Complete Block Design (RCBD) with six treatments replicated three times and a verification trial. Result disclosed that an eight liter KD foliar fertilizer per hectare proved significantly to have positive effects on the yield of rice and reached 4.88 metric tons. The result further increased of 6MT/ha in a verification trial when adopters claimed that a 2.5 gallons of KD/ha at 360ml per 16L spray load was used and even reached to 6.85MT/ha when NSIC Rc 160 variety was planted which significantly produced the highest yield. The results also proved that a reduction by fifty-percent (50%) use of synthetic fertilizer combined with 360ml of KD foliar fertilizer sprayed on a weekly basis produced higher yield; with the heaviest number of filled grains; and having the lowest number of unfilled grains per panicle. No significant difference on the production of productive tillers per hill at different levels of synthetic fertilizers. Rice farm sprayed with KD foliar fertilizer significantly reduced rice bugs population to five percent after seven days. The study also indicates an eighty percent additional income to rice farmers in using KD foliar fertilizer.

ORYZA SATIVA; RICE; PLANT PRODUCTION; LOWLAND; SEAWEEDS; FOLIAR APPLICATION; APPLICATION METHODS; CROP YIELD; HETEROPTERA

F06 - IRRIGATION

Dragon fruit farm saves big amount with drip irrigation. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 52-53. Jul 2018.*
https://www.agriculture.com.ph/2019/06/10/dragon-fruit-farm-saves-big-amount-with-drip-irrigation/

HYLOCEREUS UNDATUS; FRUITS; FARMS; TRICKLE IRRIGATION; QUALITY; PRODUCT DEVELOPMENT

Solar irrigation facility starts to benefit farmers. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 54-56. Sep 2018.*
https://www.agriculture.com.ph/2019/07/16/solar-irrigation-facility-starts-to-benefit-farmers/

RICE FIELDS; VEGETATION; PRODUCTION; WATER SUPPLY; IRRIGATION; SOLAR ENERGY; IRRIGATION SYSTEMS

F08 - CROPPING PATTERNS AND SYSTEMS

Agroforestry farm aims to produce quality wood in the Philippines. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 61-62. 2020.*
https://www.agriculture.com.ph/2020/05/29/agroforestry-farm-aims-to-produce-quality-wood-in-the-philippines/

TREES; FARMS; INDIGENOUS ORGANISMS; ORNAMENTAL PLANTS; AGROFORESTRY; LIVESTOCK; CHICKENS; PHILIPPINES

Aquaponic test farm proves to be a self-sustaining enterprise for this millennial farmer. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 16; 18; 20; 22. Apr 2020.*
https://www.agriculture.com.ph/2020/05/05/an-aquaponic-test-farm-proves-to-be-a-self-sustaining-enterprise-for-this-millennial-farmer/

LETTUCES; TOMATOES; CULINARY HERBS; HYDROPONICS; FISHES; FARMING SYSTEMS; FARMERS

'Gulayan sa Piitan': jail personnel and inmates convert idle land into a vegetable farm. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 46-47. 2020.*
https://www.agriculture.com.ph/2020/05/13/gulayan-sa-piitan-jail-personnel-and-inmates-convert-idle-land-into-a-vegetable-farm/

DOMESTIC GARDENS; VEGETABLE CROPS; GARDENING; GARDENS; FARMING SYSTEMS; LIVESTOCK; CHICKENS; SWINE; DUCKS

I practice multiple cropping in my rubber farm. **Ruba, R.P.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 46-47. Nov 2018.*
https://www.agriculture.com.ph/2019/08/18/practicing-multiple-cropping-a-rubber-farm/

RUBBER; THEOBROMA CACAO; COLOCASIA ESCULENTA; COFFEA; ZEA MAYS; VEGETABLE CROPS; MULTIPLE CROPPING; INTERCROPPING

Maximizing space: a government officer turned his rooftop into a mini-farm. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 56-58. 2020.*
https://www.agriculture.com.ph/2020/05/03/maximizing-space-a-government-officer-turned-his-rooftop-into-a-mini-farm-part-1/

DOMESTIC GARDENS; GARDENING; CONTAINER PLANTING; COMPOSTING; FARMING SYSTEMS; TILAPIA; CHICKENS

Permaculture site in a sight to see in the city. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 52-53. Apr 2020.*
https://www.agriculture.com.ph/2020/05/26/permaculture-site-is-a-sight-to-see-in-the-city/

ALTERNATIVE AGRICULTURE; FARMING SYSTEMS; URBAN AREAS; ENVIRONMENTAL IMPACT; SUSTAINABILITY

F30 - PLANT GENETICS AND BREEDING

33 new rain lilies [Zephyranthes] bred in the Philippines. **Bautista, N.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 26-29. Nov 2018.*

ZEPHYRANTHES; LILIUM; SPECIES; HYBRIDS; VARIETIES; BREEDING METHODS; CROP MANAGEMENT; LANDSCAPING

Bright Jean: a sweet corn variety after a farmer's heart. **Ancheta, A.V.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 24-25. Apr 2020.*
https://www.agriculture.com.ph/2020/05/06/bright-jean-a-sweet-corn-variety-named-after-a-farmer/

ZEA MAYS; HYBRIDS; PLANTING; ORGANIC FERTILIZERS; AGRONOMIC CHARACTERS

Brown rice vs. white rice. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p.38-39. Nov 2018.*
https://www.agriculture.com.ph/2019/08/15/brown-rice-vs-white-rice/

ORYZA SATIVA; VARIETIES; COLOUR; AMYLOSE; MILLING; ORGANOLEPTIC PROPERTIES

Callus induction and plant regeneration in tomato (Solanum lycopersicon L.) as affected by genotype, explant and plant growth regulators. **Maravilla, A.M.B., Valle-Descalsota, M.L.S., Damasco, O.P. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. Laurena, A.C. Philippines Univ. Los Baños, College, Laguna (Philippines). Philippine Genome Center for Agriculture, Livestock, Forestry and Fisheries.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 147. 2019.*

In plant transformation, the success is dependent on tissue and culture and regeneration-from producing good, embryogenic and friable calli to regenerating whole and healthy plants. In this study, it is of interest to find the best explant and the optimum concentration of plant growth regulators suitable for the production of desired callus and plant regeneration. Fourteen tomato genotypes were tested across 12 callus induction treatments with varying concentrations of 1-Nephthaleneacetic acid (NAA; 0 ppm, 0.5 ppm, 1 ppm and 2 ppm), and 6-benzylaminopurine (BAP; 0 ppm and 2 ppm) using two types of explant (cotyledon and hypocotyl). Cultures were observed for percent callus formation, type of callus formed, callus size, color, and texture. Statistical analysis showed significant differences in percent callus formation and callus size across the treatment tested. The most number of calli formed was observed in the medium containing 0.5 ppm NAA and 1 ppm BAP with percent callus formation of 86.57% while the largest calli were observed in cultures with 1 ppm BAP. Plan regeneration was also observed in some cultures with 2 ppm BAP. Genotypes and type of explant have no significant affect on percent callus formation and callus size. Results showed that concentration of plant growth regulators in the medium highly effects the ability of the plant to produce callus, regardless of tomato genotype to be cultured or type of explants used.

SOLANUM; SPECIES; TOMATOES; TISSUE CULTURE; CALLUS; GENOTYPES; EXPLANTS; PLANT GROWTH SUBSTANCES

Dry-seeded hybrid rice amazes Sultan Kudarat [Philippines] farmers. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 55. 2019.*
https://www.agriculture.com.ph/2020/04/11/dry-seeded-hybrid-rice-amazes-sultan-kudarat-farmer/

ORYZA SATIVA; HYBRIDS; SOWING; DROUGHT RESISTANCE; DISEASE RESISTANCE; PEST RESISTANCE; FERTILIZER APPLICATION; FARMERS; PHILIPPINES

Fruitful 3-year-old Palamuti bignay. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 53. Jul 2018.*

ANTIDESMA BUNIUS; VARIETIES; SELECTION; FARMS; WINES; WINEMAKING

Harnessing japonica rice germplasm containing high grain antioxidants. **Pacleb, M. m.pacleb@irri.org., Connor, E. e.connor@irri.org., Raquid, R. r.raquid@irri.org., Chebotarov, D. International Rice Research Inst., Los, Baños, Laguna (Philippines). Strategic Innovation Platform. d.vhebotarov@irri.org., Huang, C.H. Hualien District Agricultural Research and Extension Station, Council of Agriculture (Taiwan). Crop Improvement Section. chiahsing@hdares.gov.tw., Li, C.P. Taiwan Agricultural Research**

Inst., Council of Agriculture (Taiwan). Crop Science Div. charngpei@tari.gov.tw., Leung, H. h.leung@irri.org., Lee, J.S. International Rice Research Inst., Los, Baños, Laguna(Philippines). Strategic Innovation Platform. js.lee@irri.org. 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 150-151. 2019.*

Free radicals containing unpaired electrons in human cells cause oxidants stress and cellular damage leading to diseases such as cancer and Alzheimer's disease. Rice contains various bioactive compounds such as flavonoids, oryzanols, and vitamin E that act as antioxidants scavenging excessive free radicals. Aus or Indica rice varieties typically possess high levels of antioxidants. However, there are no popular in the market because of their poor grain quality as compared with japonica varieties. Hence, authors aimed to identify Japonica rice germplasm containing high grain-antioxidants as well as good grain quality. Authors conducted the high-throughput antioxidant assay to screen 270 diverse Japonica rice varieties held in the International Rice Genebank (IRG) at the International Rice Research Institute (IRRI). Through a genome-wide association study (GWAS) using the 18 million single nucleotide polymorphisms (SNP) base set, authors identified a number of local associated with antioxidant accumulation in grain. For better understanding of antioxidant mechanism, authors profiled individual grain metabolites using gas chromatography mass spectrometry (GC-MS). Discovered genetic markers and specific metabolites promoting antioxidant capacity will be used in the rice nutrient program.

ORYZA SATIVA; VARIETIES; GERMPLASM; GRAIN; ANTIOXIDANTS; METABOLITES; GENES; NUCLEOTIDES; GENETIC POLYMORPHISM

Meet Bella, Pia and Sophia: the outstanding new pumpkins in the market. **Anon.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 10; 12. Apr 2020.*
https://www.agriculture.com.ph/2020/05/03/meet-bella-pia-and-sophia-the-outstanding-new-pumpkins-in-the-market/

PUMPKINS; CUCURBITA; HYBRIDS; AGRONOMIC CHARACTERS; DISEASE RESISTANCE

Molecular characterization of transgenic rice plant (Oryza sativa L.) overexpressing maize (Zea mays L.) carbonic anhydrase. **Sagusay, S.M.C. Philippines Univ. Los Baños, College, Laguna (Philippines). Graduate School. s.sagusay@irri.org., Bagunu, E.D., Mercado, M.A.G., Lin, H.C., Quick, W.P. International Rice Research Inst., Los, Baños, Laguna (Philippines). C4 Rice Center.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View

Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 151. 2019.*

Carbonic anhydrase (CA) is a zinc-metalloenzyme vital for photosynthesis which catalyzes the reversible reaction of the carbon dioxide (CO2) into bicarbonate (HCO3), the first biochemical step of the C4 photosynthesis. This study aims to determine the presence of the ZmCA1 gene in the transgenic rice lines overexpressing the maize carbonic anhydrase (CA1) gene and to characterize their physiological phenotypes. The pSCO-pZmPEPC_ZmCA1-AcV-5 construct transformed into IR64 rice plants contains ZmCA1 coding sequences driven by ZmPEPC, mesophyll specific promoter and tagged with ACV-5 epitope tag. Three ZmCA1 transgenic events CA1-07, CA-17, CA1-19) were generated and studied for molecular and physiological characterization. PCR results showed the existence of the gene in all transgenic plants and indicated that these three events and homozygous. Western blot analysis showed ZmCA1, hence there is protein expression in all transgenic events. Statistically, all transgenic events have significantly higher CA activity than the maize control. Stomatal conductance showed, significant difference in the intercellular concentration of CO2 (Ci) specifically at 300 and 400 mumol/mol between transgenic and wild-type rice plants. The observed effect of the expression of maize CA1 in rice plant will be used for future stacking genes to establish in the C4 rice genotype.

ORYZA SATIVA; TRANSGENIC PLANTS; ZEA MAYS; GENE EXPRESSION; CARBONATE DEHYDRATASE

Morphological response of transgenic corn (Zea mays L.) plantlets using a single cassette and co-bombardment. **Fronda, M.F. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. mffronda@up.edu.ph. Zaporteza, M.M. Philippines Univ. Los Baños, College, Laguna (Philippines). Philippine Genome Center. Damasco, O.P. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding; Laurena, A.C. Philippines Univ. Los Baños, College, Laguna (Philippines). Philippine Genome Center.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 152. Sep 2019.*

One of the key factors contributing to a successful plant transformation, is the ability of the transgenic tissues to develop and grow into a whole functional plant. In this study, the effect of different plasmid combinations on morphology of transgenic corn (Zea mays L.) plantlets using Particle Inflow Gun (PIG) was investigated. Two different transformation cassettes were constructed with total size ranging from 10, 200 bp to 600 bp. Corn embryos bombarded using the pCAMBIA 1302-GOI (gene of interest) and a combination of pCAMBIA

1302-GOI and pCAMBIA 1302-mGFP (Green Fluorescent Protein- reporter gene). Out of 61 successfully regenerated plantlets, 42 of these contain the only the pCAMBIA 1302-GOI while the other 19 plantlets contain both transformation cassettes as confirmed by Polymerase Chain Reaction (PCR) and fluorescence visualization. Aside from the difference in number of regenerants, abnormalities in morphology were observed in the majority of regenerated plantlets such as grassy type, no true stem, and presence of either shoot or root only. Higher frequency of plantlets with normal growth having both shoots and roots was observed in the plantlets carrying the single plasmid with gene of interest. Based on the results, the insertion of two plasmid gene of interest. Based on the results, the insertion of two plasmids with relatively large molecular size might have affected the development and growth of important organs such as the shoot and root.

ZEA MAYS; TRANSGENIC PLANTS; PLASMIDS; PLANT ANATOMY; GENES

OFW [Overseas Filipino Worker] shares his experience as red okra grower. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 6; 8. 2020.*
https://www.agriculture.com.ph/2020/06/30/an-ofw-shares-his-experience-as-red-okra-grower/

ABELMOSCHUS ESCULENTUS; OKRAS; VARIETIES; SEEDS; PLANTING; VEGETABLE CROPS; FARMS; CROP MANAGEMENT

Quezon [Philippines] farmer finds new sweet corn profitable. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 40-41. Jul 2018.*
https://www.agriculture.com.ph/2019/06/06/quezon-farmer-finds-new-sweet-corn-profitable/

ZEA MAYS; MAIZE; HYBRIDS; PLANTING; CROP YIELD; COST BENEFIT ANALYSIS; FARMERS; FARM HOLIDAYS; PHILIPPINES

Strawberries grow in Cavite [Philippines] residence. **Taculao, P.B.S. Central Luzon State Univ., Science City of Munoz, Nueva Ecija 3119 (Philippines). Coll of Fisheries.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 16-17. May-Jun 2020.*
https://www.agriculture.com.ph/?s=Strawberries+grow+in+Cavite+residence

STRAWBERRIES; FRAGARIA; PLANTING; GARDENING; GARDENS; PLANT ESTABLISHMENT; PHILIPPINES

Super gabi from Palawan [Philippines]. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 58-59. Apr 2020.*

https://www.agriculture.com.ph/2020/05/31/a-super-gabi-from-palawan/

TARO; COLOCASIA ESCULENTA; INDIGENOUS ORGANISMS; PLANTING; PHILIPPINES

Sygenta's new hybrid corn proves best for Mindanao [Philippines] highlands. **Baldovino, R.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 56-57. Jul 2018.*

ZEA MAYS; HYBRIDS; HIGH YIELDING VARIETIES; DISEASE RESISTANCE; ADAPTATION

Two millennials grow extraordinary veggies in their gardens. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p.10, 12, 14. 2020.*
https://www.agriculture.com.ph/2020/07/02/two-millennials-grow-extraordinary-veggies-in-their-gardens/

OKRAS; ABELMOSCHUS ESCULENTUS; VARIETIES; PLANTING; SEEDS; SEEDLINGS; CROP MANAGEMENT; DOMESTIC GARDENS; GARDENING

World's rice bowl: protected in perpetuity. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 60-61. Nov 2018.*
https://www.agriculture.com.ph/2019/08/21/the-worlds-rice-bowl-protected-in-perpetuity/

ORYZA SATIVA; VARIETIES; SEEDS; GENE BANKS; COLLECTIONS; CROP MANAGEMENT

F50 - PLANT STRUCTURE

Pectin content in cell-to-cell junctions and cell wall thickness of developing solid endosperms of aberrant coconuts (Cocos nucifera L.): case of makapuno and lono phenotypes. **Montano, L.R.R.A., Felisaria, K.J.U., Escobido, F.A. Philippines Univ. Los Baños, College, Laguna (Philippines). Genetics and Molecular Biology Div. Osio, C.A.L. Philippines Univ. Los Baños, College, Laguna (Philippines). Philippine Genome Center. Diaz, M.G.Q. Philippines Univ. Los Baños, College, Laguna (Philippines). Genetics and Molecular Biology Div. Cueto, C.A. Philippine Coconut Authority Albay Research Center, Guinobatan, Albay (Philippines). Lado, J.P. Philippines Univ. Los Baños, College, Laguna (Philippines). Genetics and Molecular Biology Div.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no.1) p. 153. Sep 2019.*

The ontogenic development of cell wall and protein content in soil endosperms of high-valued coconut cultivars. Makapuno and Lono, was examined. Pectin orv pectic substances determine plant tissue integrity and rigidity as these polyssacharides present in cell walls contribute to complex-physiological processes. Makapuno and Lono exhibit soft endosperm phenotypes with the former being fluffier and width observed loosed cell-to-cell adhesion, Using Laguna Tall (LAGT) as a control, freeze-dried samples from six developmental stages (6-12 months after pollination) were sectioned manually and stained with optimized concentrations of methylene blue. Visual examinations of prepared slides were performed using confocal research microscopes and resulting phytomicrographs were measured using ImageJ (1.52a). Statistical analyses were performed in the R Statistical software (3.6.0) using the Analysis of Variance (ANOVA) and Scheffe test. Results showed a significant increase in cell wall thickness as each variant matures due to polysaccharide accumulation. Further, there was a significant difference in cell wall thickness between variants. Pectin content was significantly increasing as each variant mature as a need to increase cell-to-cell adhesions. Among the cultivars, LAGT had more pectin content while Makapuno had the least. This may explain the observed loosened cell adhesion of makapuno endosperm resulting to the soft endosperm type. These findings will augment the understanding on these economically important crops and will aid in the continuing effort to create coconut cultivars with beneficial traits.

COCOS NUCIFERA; PHENOTYPES; CELLS; CELL WALLS; ENDOSPERM; PECTINS

F60 - PLANT PHYSIOLOGY AND BIOCHEMISTRY

Cytotoxicity of Peperomia pellucida (L.) HBK extracts on cancer cell lines and their effects on cfos and cjun genes. **Buhian, S.P.C., Oyong, G.G., Cabrera, E.C. De La Salle Univ., 2401 Taft Ave., Manila (Philippines). Biology Dept.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 24-32. Mar 2019.*
https://pas.cafs.uplb.edu.ph/2019/march-2019-vol-102-no-1/

The cytotoxicity of methanolic and ethanolic extracts from the plant locally known as 'Pansit-pansitan' [Peperomia pellucida (L.) HBK] on human cancer and normal cell lines was determined. Extracts were obtained by macerating fresh aerial parts of the plant with methanol and ethanol, followed by rotary evaporation. Extracts were dissolved in dimethylsulfoxide (DMSO) and filter-sterilized. Cytotoxicity was tested to human colorectal adenocarcinoma cells (HT-29), human monocytic leukemia cells (THP-1) and normal human fibroblast and liver cells (HDFn and THLE-3, respectively) using PrestoBlue sup R resazurin assay. Zeocin was used as positive control. Absolute quantification of transcript levels for the early apoptic cfos and cjun marker genes was conducted using quantitative real time polymerase chain reaction (qRT-PCR). Cytotoxicity tests showed that based on the

guidelines of the US National Cancer Institute, both extracts were highly cytotoxic to the cancer cell lines, as evidenced by their half maximal cytotoxic concentration (IC sub 50) values below 20 mug/mL. These ranged from 7.374 to 12.112 mug/mL. On the other hand, the extracts were found to be nontoxic to the two normal cell lines HDFn and THLE-3, with IC sub 50 of 55.629 mug/mL and 67.547 mug/mL, respectively, for the methanolic extract; and 52.188 mug/mL and 63.483 mug respectively, for the ethanolic extract. Expression of the early apoptotic gene cjun and cfos was found to be upregulated in both HT-29 and THP-1 treated with IC sub 50 of the plant extracts. The results showed that the extracts have promising anticancer therapeutic potential, as suggested by the upregulation of the expression of the early apoptic genes cjun and cfos in cancer cells, without being cytotoxic to normal cells.

PEPEROMIA; SPECIES; PLANT EXTRACTS; NEOPLASMS; MEDICINAL PROPERTIES; TOXICITY

Hevea apparatus makes old rubber trees production again. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 12; 14; 16. Nov 2018.*
https://www.agriculture.com.ph/2019/08/11/hevea-apparatus-makes-old-rubber-trees-productive-again/

HEVEA; SPECIES; RUBBER; LATEX; VASCULAR TISSUES; CROP YIELD; FERTILIZER APPLICATION; NPK FERTILIZERS; ETHYLENE

Nutrient quality, phytochemical profile, antioxidant activity and horticultural traits of sugod-sugod [Momordica cochinchinensis (lour.) Spreng.]. **Mateo, J.M.C., Oraye, C.D. cdoraye@up.edu.ph. Rodulfo, G.S. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. Antonio, M.A. Mariano Marcos State Univ., City of Batac, Ilocos Norte (Philippines). Research Directorate. Maghirang, R.G. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). Formerly The Philippine Agriculturist. 0115-463X. v. 44 (Supplement no. 1) p. 152. Sep 2019.*

In the Philippines, only few studies have been conducted in Momordica cochinchinensis (known as sugod-sugod in the Ilocos Region [Philippines] with respect to its production, horticultural traits and information on nutritional quality. Evaluation of morphological characteristics of sugod-sugod accessions (Gac R113-084, Gac 141696, Gac 163209, Gac 163506) showed some differences in leaf shape, flower color, fruit shape, fruit color, fruit length, fruit width and number of seeds per fruit. For the proximate analysis of Gac 141696, the immature flesh had 94% moisture, 0.15% oil, 1.35% protein, 1.37% fiber and 0.66% ash

while the mature flesh had 91% moisture, 0.32% oil, 2.26% protein, 1.37% and 2.62% ash. Aril on the other hand, had higher oil content (2.03%) than the flesh although protein, fiber and ash were comparable (1.89%, 2.54% and 0.44, respectively). It is noteworthy that the seeds had a high amount of oil (26.14%) and protein (20.33%)compared to other parts of the fruit. For the phytochemical profiling and antioxidant activity screening. It was found out that total phenolics and total flavonoids was highest in the aril (452.02 mg/100g FW and 109.50 mg/100g FW). The relative scavenging actively of the different parts of the fruits were comparable (from 2.12% in the mature flesh to 3.84% in the immature flesh). This study proved the differences in terms of various horticultural traits among the different occasions of sugod-sugod and that it is good source of nutrients, phytochemicals and antioxidants. A future research undertaking will be done on sugod-sugod seeds in terms of its bioactivity assays, characterization of oil content and protein profiling.

MOMORDICA; SPECIES; BIOCHEMISTRY; ANTIOXIDANTS; PROXIMATE COMPOSITION; NUTRITIVE VALUE; PLANT ANATOMY; AGRONOMIC CHARACTERS

Tolerance to air pollution and mitigation potential of Bougainvillea sp. and Ehretia microphylla in selected areas of Cebu, Philippines. **Dalagan, J.G. jgdalagan1@up.edu.ph. Ragas, R.E.G. Philippines Univ. Cebu, Gorando Ave. Lahug, Cebu City (Philippines). Dept. of Biology and Environmental Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 160. 2019.*

Air particulate matters pose risks not only human health but also to the environment. In the cities of Cebu, streets are characterized by a low vegetative cover and empervious surfaces making air pollution hard to control. Some plants, however, have the potential to reduce air pollution through passive filtration. In this study, to common plants, Bougainvillea sp. and Ehretia mycrophylla, grown in the city streets and rural areas of Cebu were examined to determine their mitigation potential. The APTI or the Air Pollution Tolerance Index is an index used to assess tolerance of plants to air pollutants. By measuring the four biochemical parameters that comprise the APTI, Bougainvillea sp. and Ehritia mycrophylla, grown in the city were found to be tolerant of air pollutants with APTI values of 24 and 25, respectively. Moreover, since the ascorbic acid acid (AA) content revealed a positive correlation between the APTI, the high amount of AA observed in plants that were grown in the city but not in rural areas implies strong physiological defense of those plants in the city against adverse effects of oxidizing pollutants. Scanning electron microscopy further revealed large particulate matters suspended on the guard cells of the stomata of Bougainvillea sp. and on trichomes of Ehritia mycrophylla. Together, this clearly manifests the ability of both plants to reduce air pollution load leaving the city relatively free of pollutants.

BOUGAINVILLEA; SPECIES; AIR POLLUTION; POLLUTANTS; MOISTURE CONTENT; ASCORBIC ACID; CHLOROPHYLLS; PHILIPPINES

Total phenolic compounds and anti-oxidant activity of methanolic extracts from leaves of different accession of 'Carabao' mango. **Guevarra, M.L.D. mdguevarra@up.edu.ph. Mateo, J.M.C. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding. Ocampo, E.T.M. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 160. 2019.*

Mango is one of the most highly valued crops in the country and ranks third in economic importance among major fruits. A number of mango varieties exists consumed locally, however, 'Carabao' is the most widely grown and preferred cultivar both for fresh consumption and processing. Mango leaves contain phenolic compounds that exhibited valuable pharmacological effects such as an anti-oxidant and anti-inflammatory actions. Forty-eight 'Carabao' mango accessions maintained at IPB, CAFS, UPLB [Institute of Plant Breeding, College of Agriculture and Food Science, University of the Philippines Los Baños] were evaluated for functional properties of their leaves. Specifically, the total phenols, flavonoids and anti-oxidant activities were assayed. The total phenolic contents varied from 12.29 to 27.47 g gallic acid equivalents 100 g/dry weight (DW) of sample, while total flavonoids ranged from 8.01 to 17.88 g catechin equivalents 100g/DW. The antioxidants capacity, measured as the scavenging activity for antioxidants ranged from 54.78-92.35%. The relative scavenging activity was positively correlated with both phenolic compounds studied, with R sq of 0.84 and 0.79 for total phenols and flavonoids respectively. The study yielded outstanding accessions of 'Carabao' mango with high phenolic contents and antioxidant capacity.

MANGIFERA INDICA; VARIETIES; LEAVES; ANTIOXIDANTS; FLAVONOIDS; PHENOLIC CONTENT

F62 - PLANT PHYSIOLOGY - GROWTH AND DEVELOPMENT

Growth performance of tissue-cultured lakatan banana (Musa sapientum Linn) in response to bagging media. **Salvador, R.C. Sr. Caraga State Univ., Ampayon, Butuan City (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de

la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 91.*

This study was conducted from July to September 2012 at Central Mindanao University [Philippines] to determine the growth performance of tissue-cultured-derived banana in response to bagging media. The experiment was laid out in a Complete Randomized Design (CRD) with six treatments and four replications as T1= pure sawdust (SD) T2= pure coco coir dust (CCD) T3= pure vermicast (VC) T4= VC+ CCD+ SD (1:1:1) T5= VC+CCD+SD (1:1:3) T6= VC+CCD+SD (1:1:5), respectively and data were analyzed using ANOVA in CRD. Results revealed that growth of tissue cultured banana Lakatan seedlings in plant height, number of leaves, percent mortality and percent return on investment were significantly affected by different bagging media. Pure vermicast exhibits the highest plant height (40.92 cm) and the lowest plant height (10. 52 cm) of treatment 1 of pure sawdust. The number of leaves per plant had a highly significant difference. Pure vermicast had the highest number of leaves per plant (4.62) and the lowest (2.69) were showed in the treatment 2 with pure coco coir dust. The percent mortality showed a highly significant difference among treatment means, pure sawdust have the highest percent mortality (42.50%) followed by pure coco coir dust of 22.50%, pure vermicast and combination 1:1:5 ratio of VC+CCD+SD with 2.50% and 1:1:3 ratio combination of VC=CCD+SD have 5.00% mortality while 1:1:1 ratio of VC+CCD+SD combination showed the zero mortality within two months after planting of Lakatan banana tissue-cultured plantlet to bagging media. In percent return on investment 1:1:5 ratio combinations of VC+CCD+SD have the highest ROI of 44A7% while the lowest is at pure sawdust of negative 6.5%.

MUSA PARADISIACA; MUSA (BANANAS); VARIETIES; TISSUE CULTURE; COMPOSTING; OLIGOCHAETA; PROFIT; GROWTH; COIR; SAWDUST; GROWTH

F70 - PLANT TAXONOMY AND GEOGRAPHY

Fern and lycophyte expert discovered an endemic pitcher plant. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 48-49. Apr 2020.*
https://www.agriculture.com.ph/2020/05/24/a-fern-and-lycophyte-expert-discovered-an-endemic-pitcher-plant/

INDIGENOUS ORGANISMS; PLANT ANATOMY; TAXONOMY; USES; SCIENTISTS; DRUG PLANTS

H - PLANT PROTECTION

H10 - PESTS OF PLANTS

Bon appetit: nutritious and taste rewarding local edible insects. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 60-61. Apr 2020.*
https://www.agriculture.com.ph/2020/06/02/bon-appetit-nutritious-and-taste-rewarding-local-edible-insects/

PEST INSECTS; FOODS; FOOD RESOURCES; PROXIMATE COMPOSITION; INDIGENOUS ORGANISMS; NUTRITIVE VALUE

Capacity enhancement of integrated pest management for PhilSCAT [Philippine-Sino Center for Agricultural Technology] and selected CLSU [Central Luzon State Univ., Nueva Ecija, Philippines] staff. **Garcia, V., Carbonel, R.R., Fernando, Ma.C.M., Abon, C.C. Jr., Sicat, E.V. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Philippine-Sino Center for Agricultural Technology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 210. Jul-Dec 2019.*

The training program was designed to guide the participants on the pest control using environment-friendly means to improve yield results of Philippine-Sino Center for Agricultural Technology [PhilSCAT) hybrid rice seed production and to capacitate the staff on correct pest identification and application of integrated crop management technologies during crop development. Specifically, it intends to develop the participant's technical competence on Integrated Pest Management and improve their decision-making in managing rice ecosystem to maintain pest populations below damaging levels. Also, the training hopes to achieve a least of 40% increase in the participants' level of knowledge, which can be manifested in their Grain-Knowledge (GIK). A total of 33 Central Luzon State University (CLSU) staff (CLSU) from different Centers participated in the training, namely: 46% PhilSCAT, 18% CLSU-Research Office, 15% Ramon Magsaysay Center for Agricultural Environment Studies, 12% University Business Affairs Program (UBAP), and 9% CLSU-Extension Office. Instructional strategies were (30%) participatory lecture-discussions to bring out issues and concerns, and encourage active participation among trainees, and (70%) field practicum and exercises to promote experimental learning and understand the concept or theory being introduced. Evaluating trainee performance, 92% positive increment was recorded based on pre-test and post-test of the participants. Most participants said that they were satisfied with the training course and gave it an overall

rating of outstanding and that the training was commendable and they wanted to extend its duration for more hands-on activities.

ORYZA SATIVA; RICE; HYBRIDS; SEED PRODUCTION; PEST CONTROL; UNIVERSITIES; EDUCATIONAL INSTITUTIONS; PHILIPPINES; TRAINING PROGRAMMES

Centralized screening for resistance to major insect pests of rice. **Santiago, G.C. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 205. Jul-Dec 2019.*

Insect resistance is the totality of heritable qualities that enable a plant to reduce or withstand damage insects inflict on it. Insect resistant varieties are major elements in the development of pest resistant rices aims to help farmers increase rice production. Evaluation of different lines for resistance against major pests was conducted under field and screenhouse conditions. In the field, rice lines from different ecosystems were planted late to meet the required pest pressure for evaluation against stem borers (SB). In the screenhouse, compartment seed-boxes were used to evaluate the entries against brown planthopper (BPH) and green leafhopper (GLH). NCT manual and Standard Evaluation System, (SES) of IRR [International Rice Research Inst.] were followed. During 2018 DS, 248 entries were evaluated under field conditions against SB, and under the screenhouse conditions against BPH and GLH. A low SB pressure was observed during vegetative and reproductive stages, hence , data were not valid. Most entries were intermediate to BPH and GLH in the screenhouse. In August, 2018, 560 entries were planted. These were also evaluated against SB, BPH, and GLH. Insect pressure was very low during the vegetative stage. Evaluation during reproductive stage was not valid due to rice tungro infection on susceptible check TN1. Evaluation in the screenhouse and showed the most entries were intermediate to BPH and GLH. The results will help avoid recommending highly susceptible selections as commercial varieties.

ORYZA SATIVA; RICE; FULGOROIDEA; SPECIES; STEM EATING INSECTS; PEST RESISTANCE; TESTING; CROP LOSSES

Cry1Ab-resistance detection in the Asian corn borer, Ostrinia furnacalis (Guenee), using diagnostic dose assay and F2 screen. **Saballo, K., Alcantara, E.P. Philippines Univ. Diliman, Diliman, Quezon City (Philippines). National Inst. of Molecular Biology and Biotechnology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 214. Jul-Dec 2019.*

A two-step detection method using artificial diet overlay bioassay with diagnostic dose of Cry1Ab protein followed by F2 screen of progenies from sib-mated male and female adults that survived the treatment from diagnostics dose assays was utilized for attempting to isolate major non-recessive resistance alleles from the Asian corn borer, Ostrinia furnacalis (Guenee) populations. The number of parental pair-mated male and female adults collected from three sites in Cauayan, Isabela [Philippines] ranged from 123-202 pairs. The total number of families surviving into the F2 generations ranged from 3.9. There were no surviving larval progenies from each F2 family line treated with Bt corn leaf discs. No major non-recessive resistance allele is present in the insect samples collected from the three sites in Isabela.

OSTRINIA FURNACALIS; MAIZE; VARIETIES; DIAGNOSIS; PEST RESISTANCE; LARVAE; PROGENY

Effect of habitat manipulation on the populations of beneficial organisms in hybrid rice seed production. **Garcia, V., Santiago, R.S., Abon, C.C., Jr., Sicat, E.V. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Philippine-Sino Center for Agricultural Technology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 206. Jul-Dec 2019.*

The role of ecological engineering as a component in pest management is new in rice and its benefits are given little attention. Ecological engineering modifies the environment according to ecological principles. It is useful conceptual framework for considering the practice of habitat manipulation for arthropod pest management. Habitat manipulation involves alerting the cropping system and is another form of conservation biological control. During the 2019 Dry Season at Philippine-Sino Center for Agricultural Technology (PhilSCAT) farm and experiment areas, the effect of planting flowering weeds near rice field on the population of beneficial organisms in the hybrid rice ecosystem was determined. Sweep net collections showed that rice fields planted with flowering the plants had significantly higher population (14%) of beneficial organisms than fields without (6%). Habitat manipulation which includes cultivating flowering plants as source of nectar and pollen , can help sustain Integrated Pest Management in areas with large rice monoculture. It is also serve as refuge for beneficial arthropods. Thus, farmers would spend less on rice production and their health would be protected the environment it is also guarded as chemical use in the farms is greatly reduced.

ORYZA SATIVA; HYBRIDS; BENEFICIAL ORGANISMS; PEST CONTROL; HABITATS

Elimination of the Asian subterranean termite Coptotermes gestroi (Blattodea:Rhinotermitidae) using above ground chlorfluazuron baits. **Rojo, M.J.A., Acda, M.N. Philippines Univ. Los Baños, College, Laguna (Philippines). Dept. of Forest Products and Paper Science. mnacda@yahoo.com.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 90-93. Mar 2019.* https://pas.cafs.uplb.edu.ph/2019/march-2019-vol-102-no-1/

Termite baits containing 0.10% chlorfluazuron mixed in alpha cellulose powder was evaluated against the Asian subterranean termite, Coptotermes gestroi Wasmann (formerly Coptotermes vastator Light) (Blattodea:Rhinotermitidae), in wood structures exclusively using above-ground bait (AG) stations. Wood structures with active infestations of C. gestroi were selected and baited from January to April 2016. Termite colonies from all test sites were successfully eliminated after 8-12 wk of baiting. All sites were further monitored for the next three consecutive months and no sign of either termite recovery or re-infestation of a different colony was detected. Successful elimination of C. gestroi infestation in structures using only AG stations indicated that in-ground bait stations (IGs) may not be necessary for successful termite baiting in the Philippines. Changes in termite baiting protocols in tropical countries are proposed to reduce the cost of baiting in the Philippines and other Southeast Asian countries.

COPTOTERMES; SPECIES; ATTRACTANTS; PEST CONTROL EQUIPMENT; CHLORFLUAZURON

Evaluation of golden apple snails (T. chilonis Ishii, T. japonicum Ashmead and T. evanescens Westwood) using different adhesives for rice moth, Corcyra cephalonica (Stanton), eggs. **Valdez, E.M., Donayre, D.K.M. Philippine Rice Research Inst. Central Experiment Station, Maligaya, Muñoz, Nueva Ecija (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 205. Jul-Dec 2019.*

A field study was conducted at Maria Aurora and Baler, Aurora, and Burgos, Pangasinan [Philippines] (wet season) to determine the efficacies of golden apple snails (GAS) Pomacea sp.) and Lantana camara L. as attractants to rice bug (Leptocorisa sp.). One kg each crushed and uncrushed GAS the next day after the installment. No rice bugs were attracted to the crushed GAS the next day after the installment. No rice bugs were attracted to L. camara.

POMACEA; SNAILS; LANTANA CAMARA; LEPTOCORISA; RICE; ATTRACTANTS; WET SEASON

Feeding behavior and predatory potential of Feltiella acarisuga (Vallot) against Tetranchus urticae Koch. **Balbin, K.B. Central Luzon State Univ., Science City of Muñoz, 3119 Nueva**

Ecija (Philippines). Ceballo, F.A. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Weed Science, Entomology and Plant Pathology. 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 211. Jul-Dec 2019.*

Tetranychus urticae Koch is a major pest of greenhouse crops and a vector of bacterial crown rot caused by Erwinia mallotivora Goto. A predatory gall midge, Feltiella acarisuga (Vallot), was observed preying on T. urticae. Papaya leaf discs with previously counted T. urticae eggs were placed in a Petri dish lined with moistened filter paper. A second-instar F. acarisuga larva was placed in the Petri dish containing the T. urticae eggs. Another set of experiments was conducted but using 10 T. urticae adults. After 24 h, the number of eggs or adults were counted and recorded. Data on predation for all stages of T. urticae was remarkable with second instar F. acarisuga larvae that can consume an average of 60.3 eggs and 6.1 adults in 24 h under laboratory conditions. Also, a second instar of F. acarisuga larva can consume 40% of its prey within 24 h in the laboratory. In addition, a consistent behavior of 'tasting' its prey was observed.

TETRANYCHUS URTICAE; ERWINIA; BIOLOGICAL CONTROL; FEEDING HABITS; ROTS; PREDATION

Green synthesized copper nanoparticles using chili fruits (Capsicum annum L.) and neem (Azadirachta indica A. Juss) leaf extracts and their insecticidal effects against Bemisia tabaci (Gennadius) b biotype (Hemiptera:Aleyrodidae). **Labe, M.S., Cucal, M., Patricio, M.G., Parragas, D. Central Luzon State Univ., Science City of Muñoz, 3119 Nueva Ecija (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 213. Jul-Dec 2019.*

Green extraction of chili (Capsicum annuum L.) fruits and neem (Azadiractha indica A. Juss.) leaves was conducted using hot continuous reflux method with coconut water as solvent. The aim was to produce nano-formulated organic insecticide against Bemisia tabaci (Gennadius). Such nano-technology prepared extracts (NPE) were successfully produced through spectrophotometer with absorption peaks at 1.786 at 400 nm for chili and 451 nm for neem. Furthermore, Fourier-transform infrared spectroscopy suggests that Cu nanoparticles were surrounded by different organic molecules like alcohols and phenols, ketones, aldehydes, and carboxylic acid. Hence, the use of organic solvents, such as coconut water was effective in extracting chemical groups that bear the active ingredients of neem (azadirachtin) through test for terpenoids and chili (capsaicinoids) through test for alkaloids for phytochemical analyses. Except for coconut water, the crude extracts and the NPEs

demonstrated high comparable repellent effect with dimethoate against B. tabaci B Biotype adults. The NPEs, viz., Neem NPE and Chili NPE resulted to 100% mortality 24h after treatment application comparable to dimethoate. LD sub 50 of chili NPE and neem PE was at 2.73% and 4.30%, respectively, at 50% concentration (v:v, extract: water) observed 12h after treatment application.

CAPSICUM ANNUUM; CHILLIES; BEMISIA TABACI; AZADIRACHTA INDICA; LEAVES; PLANT EXTRACTS; COPPER; HEMIPTERA; ALEYRODOIDEA; MORTALITY; APPLICATION RATES

Insect pest and natural enemies of processing tomato in Ilocos Norte and Sur [Philippines]. **Cayabyab, B.F., Gonzales, P.G., Padilla, J.DG., Benigno, M.P., Reyes, C.J.S. Philippines Univ. Los Baños, College, Laguna (Philippines). National Crop Protection Center. Mendoza, N.D., Dela Cruz, R.G. National Foods Corporation, Sarat, Ilocos Norte (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 211-212. Jul-Dec 2019.*

Insect pests and natural enemies of processing tomato were characterized from 2018-2019 to develop insect pest management technologies from crop production in Ilocos Norte and Sur [Philippines]. Processing tomato in Ilocos Region is commonly cultivated after rice as added income source. Harvested tomatoes will then be processed at North Foods Corporation, Batac, Ilocos Norte, the only operational plant in the Philippines. Secondary data were used to identify municipalities, barangays [villages], and farmers producing tomatoes. Fields were randomly selected and surveyed. Sampling was done every two weeks from two weeks after transplanting until end of cropping season. In each site, five spots were randomly selected, and five random plants were observed in each spot. The pest and beneficial insects were visually counted and recorded. Comparing the data from the 2018 field survey, there was an increased incidence of major pests. Leafmer (Liriomyza sativae Blanchard) incidence increased in 3-13 barangays in all growth stages of tomato. Tomato fruitworm Helicoverpa amigera (Hubner) and whitefly Bermisia tobaci (Gennadius) incidence also increased in six barangays from fruiting to maturity. Common cutworm Spodoptera litura (Fabricius), on the other hand, had increased as early as vegetative stage in eight barangays. Other insect pests present were hoppers, black winged aphids, 28-spotted lady beetles Epilachna vigintiopunctuta philippinensis (Dieke), mealybugs, and dipterans were also observed. Meanwhiel, together with the predatory bugs (Cyrtopeltis tenuis Reuter), coccinellid beetles, parasitoids, and different species of spiders have been recorded.

TOMATOES; LYCOPERSICON ESCULENTUM; AGROMYZIDAE; LIRIOMYZA SATIVAE; HELICOVERPA ARMIGERA; BEMISIA TABACI; SPODOPTERA LITURA; HETEROPTERA;

COLEOPTERA; PARASITOIDS; ARANEAE; PEST CONTROL; PLANT PRODUCTION; TECHNOLOGY TRANSFER; PHILIPPINES

Metagenomics of Plutella xylostella (L.): insight into the role of bacteria in increased metabolism of insecticides. **Mascareñas-Bautista, Ma.A., Cleofe, M.A.S., Valenciano, P.J., Simangan, S.S.L. Philippines Univ. Diliman, Diliman, Quezon City (Philippines). National Inst. of Molecular Biology and Biotechnology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 212-213. Jul-Dec 2019.*

The Diamondback moth (DBM), Plutella xylostella (L.), is considered the most destructive pest brassicaeous crops (e.g cabbage, pechay). It is also notorious for developing resistance against different classes of insecticides, including those derived from Bacilus thuringiensis Berliner. Besides endogenous gene expression of an organisms, previous studies have shown that the microbial ecology of an organism can contribute to the host's biological function and overall well-being (g.g. aphids and Buchnera aphidicola Munson et. al., Raftia pachyptila Jones and Proteobacteria). Additionaly, it has been determined that the predominant microbiota in the gut of DBM are Protreobacteria, implying roles in digestion and nutrient ansorption. In line with this, the main objective of the study is to determine the difference in microbial populations of DBM between resistant and susceptible strains upon insecticide exposure. However, determining the microbial ecology at a baseline level is of vital importance because this will serve as a basis for analysis of the developed strains. Thus, the microbial ecology of 1st and 4th generation from Mankayan, and the different larval stages of a2nd generation population from Buguias, will be analyzed through metagenomics.

PLUTELLA XYLOSTELLA; CABBAGES; BACILLUS THURINGIENSIS; PESTICIDE RESISTANCE; PHILIPPINES

Molecular variation among populations of two red spider mites, Tetranychus cinnabarinus (Boisduval) and T. kanzawai Kishida. **Laquinta, J.F., Cayabyab, B.F., Ardez, K.P., de Roxas, M.dL., Kahayon, C.A., Guerrero, M.S. Philippines Univ. Los Baños, College, Laguna (Philippines). National Crop Protection Center.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 213-214. Jul-Dec 2019.*

Red spider mites (RSM) are considered as one of the major and widely distributed arthropod pests of cassava. These arthropods cause the sporadic drying out of the leaf that

starts from the middle part spreading through the leaf blades sparing only the leaf veins. They usually attack mature leaves, but during very high infestation when leaves dry out easily, young leaves and shoots can also be attacked leading to stunted growth or even death of young leaves and shoots can also be attacked leading to stunted growth or even death of young planta. Gabriel's 1997 list included two morphologically-identified species of red spider mites infesting cassava in the Philippines, namely: Tetranychus cinnabarinus (Boisdual) and T. kanzawai Kishida. To aid an immediate and accurate species identification of these minute arthropods from collected samples in five provinces, DNA barcoding was conducted. Genomic DNA of each specimen were isolated and gene amplification of cytochrome oxidase I (COI), commonly used genetic marker for arthropods, was done through polymerase chain reaction (PCR). BLASTn alignments resulted to two putatively identified red spider mite species from five provinces. Molecular characterization of interspecific and intraspecific sample sequences with 879 bp were analyzed. Two polymorphic nucleotides at 665th and 668th positions (transition of T left-right arrow C) were very distinct among the species with various polymorphisms were found among local populations (Provinces) of each species. DNA barcodes were already deposited in the GenBank, which can be accessed by the public as soon as results are published.

TETRANYCHUS CINNABARINUS; TETRANYCHUS KANZAWAI; TETRANYCHIDAE; CYTOCHROME C OXIDASE; PCR; DNA

Native entomopathogenic fungi isolated from Duzce, Turkey and their virulence on the mealworm beetle, [Tenebrio molitor L. (Coleoptera:Tenebrionidae)]. **Karabarklu, S., Altin, N. Duzce Univ. (Turkey). Dept. of Plant Protection. Keskin, Y. Duzce Univ., Duzce (Turkey). Graduate School of Natural and Applied Sciences. salihkaraborklu@duzce.edu.tr.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 82-89. Mar 2019.*
https://pas.cafs.uplb.edu.ph/2019/march-2019-vol-102-no-1/

Native entomopathogenic fungi were isolated from Duzce province of Turkey and their virulence was tested against Tenebrio molitor larvae using direct spraying and grain spraying methods. Forty-five isolates were obtained. Beauveria bassiana was obtained from 24.07% of the soil samples and Metarhizium anisopliae from 11.11% of the soil samples. The level of insecticidal activity of the isolates fluctuated between 20% and 100%, when directly sprayed on the larvae. In the direct spray application, the most effective isolates were B. bassiana YK11, YK16, M. anisopliae YK43, YK44 and YK45. These isolates caused 100% mortality on the larvae of T. molitor at 168 h. In 12 isolates, there was 100% mortality at 240 h under laboratory condition. Lethal time (LT 50) of B. bassiana and M. anisopliae isolates varied from 10.48 to 127.40 h. Virulence of the fungal isolates in 3% (w/v) aqueous suspension was lower than that in the 10% aqueous (w/v) suspension in the grain spray

application. Virulence of fungal isolates was significant in 10% aqueous suspension and 93.33% and 100% mortality were observed in B. bassiana YK23 and YK26, respectively, at 240 h. B. bassiana and M. anisopliae isolates showed promising effectiveness for the control of insect pests.

TENEBRIO MOLITOR; LARVAE; BEAUVERIA BASSIANA; METARHIZIUM ANISOPLIAE; WHEATS; TURKEY; PATHOGENICITY

Precious pests and how to control them: where do we begin? **Barcelon, E.G.** *Agriculture (Philippines). 0118-857-7. v. 25 (1) p.16, 18-19. 2021.*

PEST INSECTS; PEST CONTROL; INFESTATION; BIOLOGICAL CONTROL; PESTICIDES

Production of Trichogramma parasitoids (T. chilonis Ishii, T. japanicum Ashmead and T. evanescens Westwood) using different adhesives for rice moth, Corcyra cephalonica (Stainton), eggs. **Genandoy, R.J.G., Legan, Ma.M.C., Lam, E.L., Brillon, J.A. West Visayas State Univ., Luna St, La Paz, Iloilo City, 5000 Iloilo (Philippines). Agriculture and Forestry.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Conference place:Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 205-206. Jul-Dec 2019.*

Trichogramma species that could parasitize Corcyra eggs with different adhesives were determined. This study was laid out in 2 x 4for split plot design. The different Trichogramma species, namely: T. chilonis Ishii, T. japonicum Ashmead, and T. evanescens Westwood composed the main plot and the different adhesives, namely: A1 Gum arabic), A2 Elmer's sup TM parasitization of Corcyra eggs did not differ significantly among Tricogramma species, although numerically, the highest number of parasitized eggs was by T. evanescens. Regardless of parasitoid species, the adhesives also showed no significant effect on the percentage of parasitized eggs. Nonetheless, the highest number of parasitized eggs was in Elmer's sup TM glue and the interaction between parasitoid species and adhesives yielded a significant result in the percentage of parasitized eggs. The data on the percentage of remaining eggs after physical disturbance showed highly significant difference among species and adhesive. The most number of eggs that remained on the strip was T. evanescens and adhesive. The most number of eggs that remained on the strip was T. evanescens. Regardless of species, the adhesives showed highly significant influence on the number of eggs that remained after physical disturbance. The most number of eggs that remained glued was in Elmer's sup TM glue. The interaction between species and adhesives revealed a significant result in the number of eggs that remained glued after physical disturbance.

TRICHOGRAMMA; SPECIES; CORCYRA CEPHALONICA; EGGS; STICKINESS; LEPIDOPTERA; RICE; PARASITISM

Quick response, surveillance, monitoring and management of new and emerging pests of major crops in the Philippines. **Cayabyab, B.F., Magsino, G.L., Ebuenga, M.D., Navasero, M.V., Navasero, M.M., Magalit, E.K., Montecalvo, M.P., Signabon, F.B., Padilla, C.L., Candano, R.N., Burgonio, G.A.S. Philippines Univ. Los Baños, College, Laguna (Philippines). National Crop Protection Center.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 208. Jul-Dec 2019.*

Requests for technical assistance regarding pest diseases of crops from government agencies LGUs [local government units], farmer groups/cooperatives and private entities have been increased in the past five years. Pest quick response team (QRT) had been informed in DA [Department of Agriculture] and from NCPC [National Crop Protection Center] to address these crops protection concerns. A collaborative QRT can be more proactive and respond on time to request for assistance by institutionalizing a Quick Response Program. This DA-BAR [Department of Agriculture-Bureau of Agricultural Research] funded project aims to develop monitoring and surveillance protocols and effective management strategies for new and emerging pests of onion, rice, coconut and other crops in the Philippines. Field surveys and assessments have been conducted in Regions 4B (Romblon), 5 (Albay and Sorsogon), and 9 (Zamboanga del Norte) including activities were also conducted in Region 6 (Negros Occidental) and 12 (Mlang, North Cotobato) and documented rats and rice grain bugs. Onion armyworms were positively monitored through pheromone traps in La Trinidad, Benguet vegetable farm and on asters at Bayog, Los Baños, Laguna. A new pest record of mango was identified and field investigation together with RCPC 1 nad LGUs was conducted. Notifications on the new pest records and effect of drought on crops were forwarded to concerned stakeholders. Capacity-building on pest surveillance and management including participatory action research will be done shortly together with the select RCPCs, LGUs and farmer organizations.

ORYZA SATIVA; COCOS NUCIFERA; ALLIUM CEPA; PESTS OF PLANTS; PEST CONTROL; PEST SURVEYS; MONITORING; PHILIPPINES

Review of the stick insect genus Mithrenes Stal (Phasmatodea:Lonchdidae) in the Philippines. **Eusebio, O.L., Barrion-Dupo, A.L.A. Philippines Univ. Los Baños, College, Laguna (Philippines). Entomology Section. Abenis, K.O. Philippines Univ. Los Baños, College, Laguna (Philippines). Environmental Biology Div. Lucañas, C.C. Philippines Univ. Los Baños, College, Laguna (Philippines). Entomology Section. Rasalan, J.B. Philippines**

Univ. Los Baños, College, Laguna (Philippines). Cave Ecology Lab. Naredo, J.C.B., Lit, I.L., Jr. Philippines Univ. Los Baños, College, Laguna (Philippines). Entomology Section. 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 212. Jul-Dec 2019.*

The reproductive characteristics and eggs of species under the Philippine endemic genus Mithrenes Stal were carefully examined. New material and type specimens of M. asperulus Stal revealed the presence of the preopercular organ which is absent in the other three described species. Other characters such as those of the male cerci and egg morphology suggest that a separate genus must be established fro M. mindorensis Hennemann and Conie, M. whiteheadi (Kirby). Two other species, including one from Sibuyan Island, have also been discovered and will be described under the new genus to be proposed.

PHASMIDA; BIODIVERSITY; NEW SPECIES; PHILIPPINES

Seed-to-seed research-based advisory services to manage rice insect pests at PhilRice Negros [Philippines]. **Mondejar, C.L.C., Bello, G.E., Osano-Palanog, M.J., Parina, C.J.E., Austria, R.F., Etchon, M.O., Canto, K.V., Dogeno, L.A.G., Norbe, M.A.D., Pantin, F.L.A. Philippine Rice Research Inst., Cansilayan, Murcia, Negros Occidental (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 206. Jul-Dec 2019.*

Rice areas in the Visayas [Philippines] include 430,378 ha of irrigated and 516,567 ha of rain-fed ecosystems. One of the commitments of PhilRice [Philippine Rice Research Inst.]-Negros is to produce nationally released seeds for the entire Visayas. At present, actual yields obtained at the station are low, usually associated with insect pests and diseases. Seed quality was likewise compromised because of the pest damage. In 2017, a 'pest manager' in the station was initiated through the creation of PhilRice Negros Monitoring team that conducts real-time surveillance and generates real-time management decisions for pests. Seed-to-seed monitoring protocols are developed tested and fine-tuned. Quantitative data collection in monitoring fields include characterizing insect pests injuries using four quadrats (1x1 -m) and 10-hill sampling per field. Arthropods in the field were collected through sweep net to determine pest and defender (P:D) ratio. Insect pests during seed storage were also monitored. Yellow stem borer (YSB) Scripophaga incertulas (Walker), and green leafhopper (GLH), Nephotettix nigropictus (Stal), were major pests and significantly resulted to yield loss. The highest YSB incidence was 50% of the hills and three tillers per hill. GLH was considered a major pest because of high tungro infection. Recommendations included proper cultural management practices and maintenance of

field sanitation to eliminate alternate hosts. Comparison of damages from the previous and subsequent weeks was used to evaluate the appropriateness of implemented control measures. In DS2019, no significant insect pest damage was observed, which only shows that pests were properly managed.

NEPHOTETTIX NIGROPICTUS; SCIRPOPHAGA INCERTULAS; QUALITY; SEED; MONITORING; RICE; ORYZA SATIVA; PEST CONTROL; PHILIPPINES

Selection for imidaclorpid resistance and mode of inheritance in the brown planthopper, Nilaparvata lugens (Stal) (Hemiptera:Delphacidae). **Estoy, G.F. Jr. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines). Morimura, S., Fuji, T., Matsumura, M. Kyushu Okinawa Agricultural Research Center, Koshi,Kumamoto (Japan). Agro-Environment Div. Ho Van Chien, Le Quoc Cuong, Southern Regional Plant Protection Center, Tien Giang (Vietnam).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 214. Jul-Dec 2019.*

The resistance ratio of 50% lethal dose (LD50) values for the two resistance-selected strains, i.e., resistant strains originating from Vietnam (VT-Res) and the Philippines (PH-Res), to their control strains were approx 8 and 157-fold, respectively. Reciprocal cross experiments between VT-Res and the susceptible strain (S-strain), and between PH-Res and the S-strain showed that the degree of dominance was 0.81 and 0.82 and 0.95 and 0.96, respectively. Analysis of the F2 populations and backrosses to the parental strains indicated that resistance is a major-gene trait following Mendelian inheritance. The strength of the resistance was suppressed by pre-treatment with piperonyl butoxide, an inhibitor of cytochrome P450-mono oxygenases.

NILAPARVATA LUGENS; SPECIES; PESTICIDE RESISTANCE; IMIDACLOPRID

Surveillance and monitoring of the onion armyworm, Spodoptera exigua (Hubner) in General Natividad, Nueva Ecija [Philippines]. **Manipon, K.C.C., Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Inst. for Climate Change and Environmental Management. Alberto, R.T. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Coll of Agriculture. Tagaca, R.C., Alejandro, K.T.F. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Inst. for Climate Change and Environmental Management.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 210-211. Jul-Dec 2019.*

Onion is one of the high-value crops in the Philippines and very profitable to onion armyworm (OAW), Spodoptera exigua (Hubner), infestations that could entail big yield and huge income losses to farmers. Surveillance, early stress detection and monitoring of the pests using remote sensing are looked into as one way to provide information so interventions can be implemented before a crop becomes permanently impaired. Surveillance and monitoring of onion areas in the municipality of Ge. Natividad were conducted using remote sensing technology, whereby the satellite imageries (Sentinel) of the onion ares collected at weekly basis were delineated, digitized, and processes using Google Earth and ArcGIS. OAW infestation was first detected on January 9, 2019 in Barangay [village] Picaleon and the LGU was immediately informed together with the turnover of the map generated so that interventions can be implemented the soonest possible time. A week after, however, the pest management spread to the neighboring Barangay [village] Balaring and gradually worsened as the weeks passed by and as the increasing heat of the summer months drew near. The final map generated on March 26, 2019 showed the total affected area of 150.17 ha of which 7.37 had more than 50% damage. Using remote sensing technology, pest infestation was detected early and monitored and used as an early warning tool for the LGU so that interventions could be done before the pest becomes unmanageable.

SPODOPTERA EXIGUA; ONIONS; ALLIUM CEPA; REMOTE SENSING; MONITORING; PHILIPPINES

Technology forum tackles strawberry concerns. **Penchog, M.D.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 27. 2020.*

FRAGARIA; STRAWBERRIES; VARIETIES; DISEASE CONTROL; PEST INSECTS; TRICHODERMA; ROTS; BIOLOGICAL CONTROL AGENTS

Updates on the mass rearing and preliminary field release of Comperiella calauanica Barrion et al. (Hymenoptera:Encyrtidae) for control of the coconut scale, Aspidiotus rigidus Reyne (Hemiptera: Diaspididae), in the Bicol Region [Philippines]. **Imperial, Ma.L.R., Pedrajita, L.B., Manalo, G.G., Cueto, C.A. Philippine Coconut Authority Albay Research Center, Guinobatan, Albay (Philippines). Almarinez, J.M., Amalin, D.M. De La Salle Univ., 2401 Taft Ave., Manila (Philippines). Biological Control Research Unit.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 208-209. Jul-Dec 2019.*

The coconut scale insect Aspidiotus rigidus Reyne has recently reached Albay [Philippines] and continuously poses threat to the Philippines' coconut industry. Sustainable strategy to

lower field population and prevent spread of A. rigidus can be done through augmentative release of an endoparasitoid, Compariella calauanica Barrion et al. This encyrtid wasp is a highly specific to A. rigidus. In situations that warrant adequate releases of C. calauanica for optimal biological control, a readily available source of large number of this parasitoid is crucial. The protocol developed by DLSU-BRCU [De La Salle University-Biological Control Research Unit] for laboratory (indoor) and outdoor mass rearing of C. calauanica is successfully adapted of PCA [Philippine Coconut Authority]-Albay Research Center Biological Control Laboratory. Specific, strict yet feasible conditions were followed to sustain the establishment and maintenance of stock culture of the host, A. rigidus as well as the working facilities. In the Bicol Region, the first field release of C. calauanica took place at PCA-ARC mass-reared C. Calauanica were in nearby areas with observed CSI infestation, either by vial tapping method of exposing C. calauanica-parasitized mangosteem plant (sentinel release method) right in the field Laboratory observation of leaves collected 1-2 months after release indicated high levels of parasitism. Rapid Ground Assessment method developed by PCA was undertaken to monitor parasitoid establishment and assess palm recovery in release sites.

ASPIDIOTUS; SPECIES; COMPERIELLA; COCCOIDEA; DIASPIDIDAE; ENCYRTIDAE; MASS REARING; PARASITOIDS; MONITORING; BIOLOGICAL CONTROL; PHILIPPINES

Utilization of sex pheromone in the monitoring and management of common cutworm, Spodoptera litura (Fabricius), in onion farms in Nueva Ecija and Pangasinan [Philippines]. **Gonzales, P.G., Ebuenga, M.D., Burgonio, G.A.S., Manaday, S.J.B., Cayabyab, B.A.G. Philippines Univ. Los Baños, College, Laguna (Philippines). National Crop Protection Center.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 211. Jul-Dec 2019.*

Onion growers in Pangasinan and Nueva Ecija [Philippines] experience in heavy damage of onion armywors (OAW), Spodoptera exigua (Hubner) for the last three years (2016-2018). However , during the November, 2018-March, 2019 cropping season, a high population of the common cutworm (CCW), Spodoptera litura (Fabricius), was monitored in farmers' fields in both provinces. Farmers through that the infestation was due to OAW considering that they have almost similar damage patterns especially during high larval counts on the leaves. Sex phermone for CCW was immediately procured from China for its utilization during this cropping period. Monitoring data were presented and possible management strategies were individual farmers for their immediate action.

SPODOPTERA LITURA; ONIONS; SEX PHEROMONES; DAMAGE; INFESTATION; PEST CONTROL; PHILIPPINES

Verification of the developed pest management products for vegetable production using different fertilizer management schemes. **Villarin, A., Lutap, L.A., Ramos, J.R. Mariano Marcos State Univ., Roosevelt Avenue Brgy. 12 San Blas, Paoay, 2902 Ilocos Norte (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 209. Jul-Dec 2019.*

Increasing concern about risks associated with chemicals pesticides made the development of alternative control models like the use of biopesticides against major pests necessary. Mariano Marcos State University (MMSU) developed promising biopesticide products for common insect pests of vegetables like tomato fruitworm, thrips, and mites in pepper, and Epilachna beetles in eggplant. The different products were coded as MMSU Bio-In 3, MMSU Bio-In 6, and MMSU Bio-In 8. Using the formulated biopesticide products. The effectiveness was compared to chemical pesticides in organic, inorganic, and combination (organic and inorganic) farms. Results showed that the effectiveness of the developed MMSU Biopesticide products was comparable with chemical pesticides regardless of fertilizer management enhanced when used as an alternative to chemical pesticide especially when used as an alternate to chemical pesticide. The use of biopesticides is promising considering consumer demand for safer and lesser pesticide use or even pesticide-free vegetables.

TOMATOES; PEPPER; AUBERGINES; THRIPS (GENUS); ACARINA; EPILACHNA; COLEOPTERA; PEST CONTROL; FERTILIZERS; FERTILIZER APPLICATION; BIOLOGICAL CONTROL

H20 - PLANT DISEASES

Role of morphological traits and biochemical contents in imparting resistance against Cucumber mosaic virus and Zucchini yellow mosaic virus in cucumber genotypes. **Mozamil, M. drazam1980@uaar.edu.pk. ashfaq1642@gmail.com. Khan, M.A. PMAS-Arid Agriculture Univ., Rawalpindi (Pakistan). Dept. of Horticulture. Ashfaq, M. Univ. of Agriculture Multan (Pakistan). Dept. of Plant Pathology. Shah, M.A.S. PMAS-Arid Agriculture Univ., Rawalpindi (Pakistan). Dept. of Horticulture.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 75-81. Mar 2019.*
https://pas.cafs.uplb.edu.ph/2019/march-2019-vol-102-no-1/

Cucumber, a popular vegetable of the Cucurbitaceae family, is a cultivated on a large scale all over the world including Pakistan. In the present study, the role of morphological traits and biochemical factors of six cucumber genotypes (Shaheen, Beit, Alpha, Songroo, Best Pick, All Season and Alpha Prime) were investigated in imparting resistance and

susceptibility against Cucumber mosaic virus (CMV) and Zucchini yellow mosaic virus (ZYMV). Different vegetative parameters showed different trends among the diseased and healthy plants for resistant and susceptible varieties. Total number of leaves, flowers and shoots per plant, leaf are (sq cm), plant height (cm), stem diameter (mm), total chlorophyll contents and total soluble phelos were reduced in inoculated plants of both susceptible and resistant genotypes. In resistant varieties, however, this decrease was less compared with the decrease in the inoculated plants of the susceptible varieties. The results suggest that breeders should prefer the use of variety (Beit Alpha) in the development of new resistant cucumber varieties that can perform better against CMV and ZYMV infections.

CUCUMBERS; CUCUMIS SATIVUS; VARIETIES; CUCUMBER MOSAIC CUCUMOVIRUS; ZUCCHINI YELLOW MOSAIC POTYVIRUS

Technology forum tackles strawberry concerns. **Penchog, M.D.** *[DOST-PCAARRD] Fiesta Magazine (Philippines). p. 27. 2020.*

FRAGARIA; STRAWBERRIES; VARIETIES; DISEASE CONTROL; PEST INSECTS; TRICHODERMA; ROTS; BIOLOGICAL CONTROL AGENTS

H50 - MISCELLANEOUS PLANT DISORDERS

Allelopathic influence of sorghum aqueous extract on growth, physiology and photosynthetic activity of maize (Zea mays L.) seedling. **Kamran, M. University of Sargodha-40100 (Pakistan). Dept. of Agronomy. hafizkamran1576@gmail.com. Cheema, Z.A., Farooq, M. University of Agriculture, Faisalabad 38040 (Pakistan). Dept. of Agronomy. Ali, Q. University of Agriculture, Faisalabad 38040 (Pakistan). Inst. of Soil and Environmental Sciences. Anjum, M.A. University of Sargodha-40100 (Pakistan). Dept. of Plant Pathology.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 23-41. Mar 2019.*
https://pas.cafs.uplb.edu.ph/2019/march-2019-vol-102-no-1/

The allelopathic potential of sorghum (Sorghum bicolor L. Moench) was evaluated on maize (Zea mays L.) seedlings as allelopathic influence may be inhibitory or promotive, depending upon concentration and dose. Seeds of hybrid maize (DK-919) were sown in pots containing acid-washed sand. The pots were moistened exogenously with different concentrations of sorghum leachate, viz. 100%, 50%, 25%, 10%, 5% and 3%, with and without adjuvant (Emulan at 5%) after 7 d of seedling emergence. The seedlings were harvested 30 d after sowing. Based on the results, application of sorghum allelopathic extract (SWE) at the lowest doses (5% and 3%) without adjuvant was the most beneficial for improvement of maize seedling growth. Addition of adjuvant in sorghum allelopathic extract showed

inhibitory influence on the seedling growth of maize. Maximum increase in chlorophyll, carotenoids, proteins and sugar content was observed at lower (5% and 3%) sorghum water extract concentrations. The activities of catalase, superoxide dismutase, and peroxidase were decreased at higher concentrations of sorghum allelopathic extract. Application of sorghum allelopathic extract at lower concentrations (5% and 3%) offers a pragmatic and eco-friendly option to improve the growth of maize crop.

ZEA MAYS; RICE; SORGHUM; SORGHUM BICOLOR; PHOTOSYNTHESIS; ENZYME ACTIVITY; ALLELOPATHY; PLANT GROWTH SUBSTANCES

Germination and early morphogenesis in rice as influenced by increasing levels of salinity and drought stresses. **Concepcion, J.S. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Plant Breeding and Biotechnology Div. mon230jonathan@gmail.com., Bulalayao, C.J.A., Rivera, K.K.DV., Antonio, L.J.E., Salvador, J.S. Nueva Ecija High School, Burgos St. Cabanatuan City, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 150. 2019.*

Due to water scarcity and saline intrusion, direct-seeding remains a challenge in climate-change vulnerable areas. Thus, this study was conducted to assess the germination rate and seeding development of rice under increasing drought and salinity levels. Five genotypes with varying responses to both stresses at vegetative to reproductive stages were subjected to induced drought using Polyethylene Glycol (PEG) 6000 at 5% to 30% and induced salinity using NaCl solution at EC 2 to 12. Results revealed a significant correlation in the decrease of germination as the stress level increases, with a 3.43% and 2.38% reduction per unit increase in EC level and PEG concentration, respectively. Under induced drought stress reduction in germination ranging from 39% to 80% was observed in PEG 30%. At EC=12, germination was reduced by an average of 24% across test genotypes. Increasing PEG concentration resulted in significant reduction on shoot length (r=-0.9606) and root length (r=-0.8807), wherein IR64 and PSB Rc68 have developed longer shoots across PEG concentrations. No significant reduction was observed in root and shoot length of test genotypes under unceasing EC levels. Agglomerative Clustering based on germination rate, root and shoot length under both stresses showed a 70.6% similarity in over-all response among test genotypes. PSB Rc68 showed a varied response compared to other genotypes under both stresses, while IR29 and IR64 showed similar response. PSB Rc14 was identified to have tolerance to both stresses at germination stage, and is therefore a possible variety for direct seeding method of cultivation in saline and drought-prone areas. The study also identified PEG 25% and EC=12 to have delineated the response of the test genotypes, and

can therefore be used to screen potential drought and saline stress tolerant breeding lines at germination stage.

ORYZA SATIVA; GENOTYPES; GERMINATION; MORPHOGENESIS; SALINITY; DROUGHT STRESS; PHILIPPINES

H60 - WEEDS AND WEED CONTROL

Dry-seeded hybrid rice amazes Sultan Kudarat [Philippines] farmers. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 55. 2019.*
https://www.agriculture.com.ph/2020/04/11/dry-seeded-hybrid-rice-amazes-sultan-kudarat-farmer/

ORYZA SATIVA; HYBRIDS; SOWING; DROUGHT RESISTANCE; DISEASE RESISTANCE; PEST RESISTANCE; FERTILIZER APPLICATION; FARMERS; PHILIPPINES

e-Damuhan: a weed photo recognition and catalog app. **Caballong, N.L. nl.caballong@philrice.gov.ph., Alday, P.A.A., Barroga, R.F., Donayre, D.K.M., Martin, E.C., Cayabin, H.DC. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 171. 2019.*

Weeds pose great threat to rice production. If not controlled, this group of pest can reduce yield from 44-96% by competing with rice on nutrients, water, and even sunlight. Correct identification of weed species is prerequisite to selecting, deciding and implementing effective and economical weed management strategies and techniques. Materials needed for weed identification (books, pamphlets, and techno-bulletins), however, are very limited to country. Nevertheless, mobile application tool that is capable of recognizing weed species. The app lets the users capture the photo of the unknown weed then it automatically analyzes the captured image and provide a shortlist of the possible identity of the weed. eDamuhan features a digital catalogue of the book Weeds that grow in irrigated and rainfed lowland rice fields in the Philippines. It shows common rice field weed species with their morphological characteristics, life cycle, habitat, photosynthetic activity, and impact on rice. It explains the importance of proper weed management in rice production and provides measures to control weeds. With the recognition and catalogue features of the app, farmers and AEWS will be more equipped in correctly identifying and managing weeds of rice in the field.

RICE FIELDS; WEEDS; IDENTIFICATION; WEED CONTROL; COMPUTER SOFTWARE; DIFFUSION OF INFORMATION; TECHNOLOGY TRANSFER

Effect of pH and nature of water contact on the rate of seed capsule dehiscence of Ruellia tuberose. **Flores, J.G. jgflores@up.edu.ph., Ragas, R.E.G. Philippines Univ. Cebu, Gorando Ave. Lahug, Cebu City (Philippines). Dept. of Biology and Environmental Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 149. 2019.*

Ruellia tuberosa is a common weed in the locality. Even though it is considered a weed, there have been numerous studies published concerning the claimed therapeutic properties of the plant's extracts but less on its biology. The plant spreads rapidly because of its explosive seed dehiscence that allows flinging of its seeds away from the parent plant. There are different triggers to explosive seed dispersal. R. tuberosa fruits split by hygroscopic means. Whether on not moisture is the only factor of dehiscence had not been determined prior to the experiment. Water was dropped on the base, belly, and beak to determine where along the capsule dehiscence will start. Since in all five trials, the dehiscence started at the beak of the capsule, the subsequent tests were structured in a way that only beak of the capsules would be in contact with water for all treatments. In the study, it was found that the capsule exploded faster under acidic (13.4 +- 2.446 seconds) than in basic treatment (24.1 +-4.598) seconds). Studies done on similar dehiscing plants reported of pectin in the middle layer that keeps the seed pods together. It is likely that pH of the water may contribute to the delay of fruit dehiscence through its possible effect on pectin. This is a preliminary study on the effect of the acidity and alkalinity of water on the dehiscence of R. tuberosa.

WEEDS; SPECIES; PH; SEEDS; DEHISCENCE; ACIDITY; WATER; PECTINS

J - POSTHARVEST TECHNOLOGY

J10 - HANDLING, TRANSPORT, STORAGE AND PROTECTION OF AGRICULTURAL PRODUCTS

Storage stability of thermally-processed vacuum-packed sweet corn in a cob. **Peñaflor, L.M., Tria, D.M.M. Philippines Univ. Los Baños, College, Laguna (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic*

Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 83.

Recent trends in food demand show that the perception of food has endured a thorough transformation. The diversification of food away from traditional products and fusion with western style is responsible for changes in the entire food system. Changing lifestyle have influenced various people to consume products comes under ready to eat (RTE) category. This paper aimed to provide consumer additional choices in the market towards the development of a new product from cooked corn in a cob vacuum packed in retort pouches. The potential of this product were studied through evaluation of its sensory quality and storage stability. But some cereal grains and legumes are susceptible to contamination by fungi, which produce various toxins, known as mycotoxins that are considered to be a significant human health concern. They are found particularly in stored cereals. It is important that effective preventive strategies be followed for processed food before storage. One way to address these problems is through thermal processing. Furthermore, processed samples were analyzed for their physico-chemical and microbial properties to facilitate the factors ensuring nutritional, and safety for consumption. Commercial sterility test showed negative results, indicates that samples were commercially sterile and efficient processing was achieved. The established processing schedule at 121.1 deg C retort temperature were 46.5 minutes for vacuum packed sweet corn in cob. Changes in their physico-chemical properties and highly acceptable rating for sensory attributes were observed significantly after thermal processing. At 30 deg C storage temperature, the estimated shelf-life (Q10 approach) of the pouched sweet corn in a cob is 68 days. Thus, the possibility of thermally process vacuum packed sweet corn in cob as a ready to eat product is reasonable.

ZEA MAYS; MAIZE; VARIETIES; PROCESSED PRODUCTS; KEEPING QUALITY; VACUUM PACKAGING; ORGANOLEPTIC ANALYSIS; ORGANOLEPTIC PROPERTIES

J11 - HANDLING, TRANSPORT, STORAGE AND PROTECTION OF PLANT PRODUCTS

Characterization of postharvest behavior of selected Philippine leafy vegetables at different storage temperatures. **Tababa, J.L. jltababa@up.edu.ph. Banawa, G.M., Absulio, W.L., Gonzales, D.C.H., Castro, A.C., Esguerra, E.B. Philippines Univ. Los Baños, College, Laguna(Philippines). Postharvest Training and Research Center.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 147-148. 2019.*

The leafy vegetables saluyot (Corchorus olitorius), malunggay (Moringa oleifera) and alugbati (Basella alba) are some of the indigenous vegetables in the Philippines. Indigenous vegetables are gaining popularity because of the changing lifestyles and demographics in the Philippines. These vegetables possess high nutritional value which are promoted to alleviate malnutrition and poverty. The objective of the study is to determine the postharvest behavior of saluyot, alugbati and malunggay at different storage temperatures. Freshly harvested saluyot, alugbati and malunggay in 100 g bundles were stored at different temperatures [ambient (30 deg C), 20 deg C. 13 deg C and 5 deg C] until limit of marketability. At a regular interval, visual and chemical parameters were evaluated and analyzed. Storage of saluyot at 13 deg C showed the best keeping quality both visually and chemically. Saluyot remained marketable for 7 days due to lower weight loss, witting and yellowing with higher DPPH, scavenging activity and total phenolics content compared to other storage temperatures. Alugbati, on the other storage temperatures. Total phenolics content was not affected by the different storage temperatures. Lastly, malunggay leaves stored at 5 deg C exhibited less abscission and weight loss compared to other storage temperatures allowing it to be marketable for u p to 7 days. Results of this study can provided useful information in the development of appropriate storage and packaging to prolong postharvest life of saluyot, alugbati and malunggay.

MORINGA OLEIFERA; CORCHORUS OLITORIUS; BASELLA ALBA; LEAF VEGETABLES; INDIGENOUS ORGANISMS; STORAGE; TEMPERATURE

Effect of packaging on the quality of fresh-cut jicama (Pachyrhizus erosus L.). **Banawa, G.M. gmbanawa@up.edu.ph., Absulio, W.L. wlabsulio@up.edu.ph., Gonzales, D.C.H., Tababa, J.L. Philippines Univ. Los Baños, College, Laguna (Philippines). Postharvest Horticulture Training and Research Center. Esguerra, E.B. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 148-149. 2019.*

Jicama, locally known as singkamas, is an underutilized crop with seasonal availability. It is a popular summer refreshment due to its high water content and also has high levels of antioxidant and dietary fibers. However, selling jicama with its papery peel brings not only convenience for the consumers but also imposes health hazards if not thoroughly washed and cleaned. Thus, availability of minimally processed (ready-to-eat) jicama is a good value-adding business venture once a washing, disinfection, pre-treatment, packaging and storage protocols are established. Freshly harvested jicama were washed in running water, sanitized in chlorinated water and allowed to dry. Tubers were peeled and cut into julienne. For standardization, each jicama stick is 5 cm long. Jicama sticks were soaked in 50 ppm

hypochlorite solution (0.95 ml/1L) for one minute and were spin dried for three minutes. Two packaging materials, polyethylene and polypropylene bag, were used with approximately 100 grams of jicama each. The fresh-cuts were evaluated daily for visual quality rating (VQR), color change/browning, dryness, rot/disease incidence, and weight loss. The fresh-cuts were stored at 13 deg C to simulate the temperature in supermarkets. Results showed that jicama sticks packaged with polyethylene plastic showed early browning and rotting making its overall quality rating low as early as four days. Degree of browning or color change was qualified and verified through the L. values given by the chroma meter. Also, the jicamas, in polyethylene plastic dried faster and showed a vacuum-like packaging. Browning was only seen in jicamas packaged in polypropylene plastic after eight days. Weight loss in both packaging was very low. Polypropylene plastic was found to be a better packaging material for jicama fresh-cuts as it delays browning, rotting and drying.

PACHYRHIZUS; SPECIES; QUALITY; CONTROLLED ATMOSPHERE STORAGE; POLYPROPYLENE

Effect of preharvest application of 1-M ethylcycloprophene (1-MCP)on the postharvest quality of 'Cavandesih' banana (Musa cavendishii). **Manigo, B.I. University of Southern Philippines, Tagum-Mabini Campus, Apokon, Davao del Norte (Philippines). Matuginas, J.P.L. Department of Agriculture Regional Field Office XI, Bangoy Street, Agdao, Davao City (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 149-150. 2019.*

Maintaining postharvest quality of fresh bananas is a major trading challenge of the industry, 1-Methylcyclopropene (1-MCP) can prolong postharvest quality of banana fruit by delaying the expression of ripening attributes of senescence through preventing binding of ethylene to its receptors thereby inhibiting ethylene signal transduction and downstream action. Several researchers have been conducted to investigate the effect of 1-MCP in bananas, however, inconsistencies of the results have been reported. Moreover, effectiveness of 1-MCP is governed by various factors such as cultivar, fruit maturity, concentration, time of exposure and method of application. In this study, the effect of preharvest methods (Stalk and immersion) (SEI), Bunch spraying (BS), Combination (SEI+BS), and Control) of 1-MCP application was determined through observation on the postharvest quality of 'Cavendish' bananas such as peel yellowing, sensory firmness, visual quality, weight loss, degree of shriveling, fruit drop, organoleptic attributes, chemical properties (Total Solubale Solids, Total Titratable Acidity and pH) and disease incidence. Results revealed that the preharvest methods of 1-MCP (acqueous solution dosage of 400 nL/L) application through SEI and SEI+BS methods significantly retarded the peel color change up

to 7 days of storage and prolonged its shelf life for up to 19 days under ambient storage condition. However, SEI+BS delayed fruit softening (for 15 days) and maintained visual quality (for 19 days) compared to SEI. In addition, fruits treated with 1-MCP through SEI+BS have lesser accumulated weight loss, lower degree of shriveling and reduced incidence of fruit drop compared to BS and SEI methods. In terms of cost efficiency, BS had lower cost compared to SEI and SEI+BS methods. On the other hand, the chemical properties, organoleptic attributes and disease incidence failed to show any significant difference among postharvest methods.

MUSA (BANANAS); MUSA PARADISIACA; QUALITY; POSTHARVEST TECHNOLOGY; CHEMICOPHYSICAL PROPERTIES; ORGANOLEPTIC ANALYSIS

Initial study on storage of fresh katmon fruits (Dillenia philippinensis) and sensory evaluation of katmon juice and jelly. **Artes, L.A., Wagan, A.D.M., Omaña, M.E., Tamisin, L.L. Jr.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 90.*

Katmon is one of the indigenous fruits of the Philippines that is underutilized. Traditionally, fruits are used a souring agent in Filipino dishes by some locals just like tamarind and kamias (Averhhoa bilimbi). However, the fruit has great economic potential but it is never marketed and there is little knowledge about it. Most do not know also, that it may be processed into juice, wine, jam, jelly, or souring powder. Hence, this study was conducted to characterize the fruit after harvest so that appropriate handling may be recommended to extend its shelf life during retail or prior to its processing. Physico-chemical changes such as firmness, total soluble solids, titratable acids and pH content of harvested fruits were evaluated during storage. Fruits (intact and peeled) were also packed under modified atmosphere packaging (MAP) using polyethylene bag and kept under low temperatures (13-14 deg C) for two weeks. Initial sensory evaluation of processed juice and jelly was also done during the DA-BAR [Department of Agriculture-Bureau of Agricultural Research] Anniversary and Exhibit at SM Megamall. Both moisture loss and larval development greatly reduced shelf life and fruit quality of Katmon while other measured parameters remained almost constant. Fruits also readily turned brown and soften but its fresh quality was extended under MAP by one week when packed as peeled fruits and by two weeks if packed intact. Hence, simple MAP can extend katmon's shelf life under ambient or low temperatures. Sensory test showed a very strong acceptance of both katmon juice and jelly by the exhibit visitors at Megamall.

DILLENIACEAE; INDIGENOUS ORGANISMS; FRUITS; CHEMICOPHYSICAL PROPERTIES; FOOD PROCESSING; FOOD PRODUCTION; FRUIT JUICES; ORGANOLEPTIC ANALYSIS; KEEPING QUALITY; CONTROLLED ATMOSPHERE STORAGE

Nutrition-sensitive postharvest handling, storage and processing. **Serrano, E. P. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 66; 172-180.*

Postharvest handling, storage, and processing have been shown to be the weakest link in the food supply chain. At these points, postharvest losses in terms of nutritional and physical quality can be substantial. Minimizing these losses is one of the strategies to address the challenges in nutrition-sensitive agriculture in particular and food security in general. Cereals, legumes, fruits, and vegetables are important and common sources of nutrients to meet the requirements of the human body for growth, development, and sustenance of a healthy well-being. These food types however, are also the ones that are inherently and highly perishable. This means that their nutritional contents change or diminish with time and with the methods of handling, packaging, storage, and processing. This paper discussed the nutrient content and changes in the nutrient levels in fruits, vegetables, cereals, and legumes as influenced by postharvest practices and secondary processing. The paper also presented appropriate post production strategies, techniques, or practices to minimize nutrient loss —and even enhance nutrient levels in the food commodities.

HUMAN NUTRITION; FRUITS; FOOD HYGIENE; STORAGE; FOOD PROCESSING; FOOD SUPPLY; VEGETABLE CROPS; POSTHARVEST TECHNOLOGY

J12 - HANDLING, TRANSPORT, STORAGE AND PROTECTION OF FOREST PRODUCTS

DOST-FPRDI's [Department of Science and Technology-Forest Products Research and Development Inst.] heat treatment allows pallet industry to meet global standards. **Araral, R.K. Department of Science and Technology-Forest Products Research and Development Inst., College, Los Baños, Laguna (Philippines).** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 39. Jul 2018.*

https://www.agriculture.com.ph/2019/06/05/dost-fprdis-heat-treatment-allows-pallet-industry-to-meet-global-standards/

PALLETS; INDUSTRY; PACKAGING; HEAT TREATMENT; HEAT STERILIZING; TECHNOLOGY; DRYERS; METHYL BROMIDE; FUMIGATION

J14 - HANDLING, TRANSPORT, STORAGE AND PROTECTION OF FISHERIES AND AQUACULTURAL PRODUCTS

Optimum conditioning period before packing, salt-treated water, and blue background color improved the survival of Nile tilapia (Oreochromis niloticus L.) fingerlings during transport. **Manliclic, A.D.C. Central Luzon State Univ., Science City of Munoz, Nueva Ecija 3119 (Philippines). deilmanliclic@gmail.com. Corpuz, M.N.C. Bataan Peninsula State Univ. Orani Campus, Bayan, Orani, Bataan 2112 (Philippines). Inst. of Fisheries. Vera Cruz, E.M. Bataan Peninsula State Univ. Orani Campus, Bayan, Orani, Bataan 2112 (Philippines). Inst. of Fisheries.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 76-83. Aug 2018.*
https://pas.cafs.uplb.edu.ph/2018/march-2018-vol-101-no-1/

High fish mortality caused by poor management and conventional transport practices is still a major concern for tilapia hatchery operators. This study evaluated the effect of four transport management schemes (conditioning period, salt-treated water, background color, and their combination) on the survival of Nile tilapia (Oreochromis niloticus L.) fingerlings (0.27 +- 0.07 g) during transport. The test fish were subjected to simulated transport experiments using a manually operated carrier at 6-h, 12-h, 24-h, and 48-h transport time. In experiment 1, four treatment groups (6-h, 12-h, 24-h, and 48-h conditioning time) were compared. Treatments of varying salt concentrations (0, 4, 8, and 12 g L-1) in the transport water were utilized for experiment 2. In experiment 3, different colors of transport bags (transparent, black, blue, and red) served as treatments. The most effective treatments in the preceding experiments were combined and designated as treatments for experiment 4. Results of the series of experiments showed that 48-h transport time, conditioning of 24-h before transport (78.50 +- 4.23% survival rate), addition of 4 g L-1 salt to transport water (70.30 +- 12.64%), use of blue transport bag (93.80 +- 1.48%), and the combination of these three variables (99.50 +- 0.38%) were significantly effective ($P < 0.05$) in improving the survival rate of the fish. The present study provides alternative methods for further refinement on transport management protocols to enhance survival of Nile tilapia fingerlings during transport.

OREOCHROMIS NILOTICUS; TILAPIA; PACKAGING; SALINE WATER; COLOUR; FINGERLINGS; SURVIVAL; TRANSPORT

K - FORESTRY

K01 - FORESTRY - GENERAL ASPECTS

Indigenous farmers to produce world-class coffee. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 57. Nov 2018.*

FORESTS; BIODIVERSITY; COFFEA; SPECIES; REFORESTATION; RESOURCE CONSERVATION; FARMERS; ETHNIC GROUPS

K10 - FORESTRY PRODUCTION

Agroforestry farm aims to produce quality wood in the Philippines. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 61-62. 2020.*
https://www.agriculture.com.ph/2020/05/29/agroforestry-farm-aims-to-produce-quality-wood-in-the-philippines/

TREES; FARMS; INDIGENOUS ORGANISMS; ORNAMENTAL PLANTS; AGROFORESTRY; LIVESTOCK; CHICKENS; PHILIPPINES

Bamboo offers many agricultural and agribusiness possibilities. **Dela Cruz, R.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 30-32. Apr 2020.*

BAMBUSA; BAMBOOS; USES; ORNAMENTAL PLANTS; LANDSCAPING; ENVIRONMENTAL IMPACT; FURNITURE; ENTERPRISES; AGROINDUSTRIAL SECTOR

K50 - PROCESSING OF FOREST PRODUCTS

Rediscovering our minor forest products. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 18-19. Sep 2018.*
https://www.agriculture.com.ph/2019/07/07/rediscovering-our-minor-forest-products/

NONWOOD FOREST PRODUCTS; PROCESSING; RAW MATERIALS; FURNITURE; HANDICRAFTS; INDUSTRY; TECHNOLOGY

L - ANIMAL SCIENCE, PRODUCTION AND PROTECTION

L01 - ANIMAL HUSBANDRY

Agrilink 2018 zeroes in on the hog sector. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 5-10. Sep 2018.*

LIVESTOCK; SWINE; INDUSTRY; ANIMAL HUSBANDRY; SMALL FARMS; FISHERIES; DEVELOPMENT PROJECTS; AQUACULTURE; PRODUCTION; MARKETING; TECHNOLOGY; RESEARCH; EXTENSION ACTIVITIES

Best lechon [roast pig] is Marinduque's [Philippines] native black pig. **Urlanda, R.V.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 26-27. Jul 2018.*
https://www.agriculture.com.ph/2019/05/31/the-best-lechon-is-marinduques-native-black-pig/

WILD BOAR; INDIGENOUS ORGANISMS; ANIMAL FEEDING; ROASTING; PHILIPPINES

Fan invented for checking egg yolk color. **Medenilla, V.** *Agriculture (Philippines). 0118-857-7. v.24(4) p. 44-45. Apr 2020.*
https://www.agriculture.com.ph/2020/05/22/a-fan-invented-for-checking-egg-yolk-color/

EGGS; EGG PRODUCTION; POULTRY FARMING; EGG YOLK; COLOUR; NUTRITIVE VALUE

Former mechanical engineer started a layer poultry farm to supply fresh eggs to his province. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (8) p. 9-10; 12. 2020.*
https://www.agriculture.com.ph/2020/04/27/former-mechanical-engineer-started-a-layer-poultry-farm-to-supply-fresh-eggs-to-his-province-part-1/

LAYER CHICKENS; FARMS; EGGS; EGG PRODUCTION; POULTRY; POULTRY FARMING; VEGETABLE CROPS; FRUIT TREES

From bonsais to bees: how an entrepreneurs created his own line of honey products. **Taculao, P.B.S.** Agriculture (Philippines). *0118-857-7. v.24 (06) p. 35-36. Jul-Aug 2020.*
https://www.agriculture.com.ph/2020/06/17/from-bonsais-to-bees-how-an-entrepreneur-created-his-own-line-of-honey-products/

APIS; SPECIES; APICULTURE; HONEY; HONEY PRODUCTION; PROCESSING; HIVE PRODUCTS

Managing our flocks to reduce risks of infection. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 36-37. Apr 2020.*
https://www.agriculture.com.ph/2020/05/17/managing-our-flocks-to-reduce-risk-of-infection/

POULTRY; ANIMAL DISEASES; INFECTION; DISINFECTION; HYGIENE; VACCINATION

Partners setup an azolla farm to provide feed for their livestock. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 25 (1) p. 22-23. 2021.*
https://www.agriculture.com.ph/2020/05/22/partners-setup-an-azolla-farm-to-provide-feed-for-their-livestock/

AZOLLA; FARMS; PLANTING; DOMESTIC GARDENS; VEGETABLE CROPS; FEEDS; LIVESTOCK

Road to rabbit farming: guide in raising rabbits as an alternative meat source. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 38-40. Apr 2020.*
https://www.agriculture.com.ph/2020/05/18/road-to-rabbit-farming-guide-in-raising-rabbits-as-an-alternative-meat-source/

RABBITS; ANIMAL HUSBANDRY; SMALL FARMS; RABBIT MEAT

Some people prefer renting a farm (Memoirs of an agri journalist). **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 54. Jul 2018.*
https://www.agriculture.com.ph/2019/06/11/some-people-prefer-renting-a-farm/

FARMS; RENT; ANIMAL HOUSING; ANIMAL HUSBANDRY; CAPITAL; TRANSPORT

Zampen chicken brings hope to inmates. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 32-35. Sep 2018.*
https://www.agriculture.com.ph/2019/07/10/zampen-chicken-brings-hope-to-inmates/

CHICKENS; INDIGENOUS ORGANISMS; PRODUCTION; ANIMAL PERFORMANCE; INCOME; FEEDS; DEVELOPMENT PROJECTS; TECHNOLOGY; TECHNOLOGY TRANSFER

Women in nutrition—sensitive livestock production in Nepal. **Kc, R. Agriculture and Forestry University (Nepal).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and*

Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. College, Laguna (Philippines). Interdisciplinary Studies Center for Food and Nutrition Security. Nov 2018. 192 leaves.

Livestock is an important component of livelihood in Nepalese agriculture system. Women contribute more than 50% of la force in agriculture in Nepal. Since men go abroad for the employment, women are solely responsible for all the indoor management activities of livestock production. The management of livestock ranges from selection of animal fodder collection, breeding management, processing of milk and animals products, and cleaning of shed. In rural areas women have no ownership over big assets such as land. ON men own such assets as well as large animals such as cows and buffalos. The women's ownership is limited to small animal such as goat, sheep and poultry. The aim of this paper is to determine the role and participation of women in livestock production system of Nepal. A survey, aided by a questionnaire, was randomly conducted in the Chitwan District of Nepal with 126 livestock farmers as interview respondents. The interviews were complemented by a review of published materials, statistics, and literature. The results of the study indicate that women's ownership of small animals are higher as compared to large animals. The women ownership was found to be 73.33% in goat farming and 47.16% in poultry farming. Likewise, 59.25% of responsibilities of farm management were taken on by the women. Despite the fact that women composed two thirds of the agricultural workforce, their membership in dairy cooperatives were very limited. Existing societal biases keep women and their issues from getting the attention they deserve. Study results indicated that the status of women can be I by increasing their income through livestock farming for nutrition-sensitive food production.

LIVESTOCK; PRODUCTION; LIVESTOCK MANAGEMENT; WOMEN; HUMAN NUTRITION; ROLE OF WOMEN; NEPAL

L02 - ANIMAL FEEDING

DA [Department of Agriculture] donates P8.4-M machinery for silage making. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 36-38. Sep 2018.*

GOATS; COWS; WATER BUFFALOES; FEEDS; ANIMAL FEEDING; SILAGE; MAIZE; SILAGE MAKING; FERMENTATION; FORMULATIONS; HARVESTING

Lactobacillus sp. CPP1 can help to alleviate oxidative stress in male leghorn hepatoma (Lm H) chicken liver cells. **Park, Y., Cho, J. Komkuk Univ. 120 Neungdong.ro, Gwangjin-gu, Seoul 05029 (South Korea). Dept. of Animal Science and Technology. chojs70@konkuk.ac.kr.**

Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 98-100. Aug 2018.*
https://pas.cafs.uplb.edu.ph/download/lactobacillus-sp-cpp1-can-help-to-alleviate-oxidative-stress-in-male-leghorn-hepatoma-lmh-chicken-liver-cells/

This study investigated the efficacy of Lactobacillus sp. CPP1 in protecting oxidative-damaged male Leghorn hepatoma(LMH) chicken liver cells. Catalase activity of heat-killed Lactobacillus sp. CPP1 with 10 sup 8 and 10 sup 10 colony-forming unit(CFU)/mL was 1.4- and 1.7-fold higher, respectively, than that obtained by hydrogen peroxide treatment ($P < 0.05$). Heat-killed Lactobacillus sp. CPP1 applied at 10 sup 10 CFU/mL significantly increased superoxide dismutase activity by 2.7-fold compared with hydrogen peroxide treatment ($P < 0.05$), but 10 sup 8 CFU/mL failed to increase activity. LMH cells treated with 10 sup 8 and 10 sup 10 CFU/mL of heat-killed Lactobacillus sp. CPP1 displayed decreased intracellular malondialdehyde production compared with hydrogen peroxide treatment ($P < 0.05$). Lactobacillus sp. CPP1 has potential for therapeutic use against hepatic oxidative stress in the poultry industry.

LACTOBACILLUS; SPECIES; CHICKENS; LIVER; CELLS; OXIDATION; STRESS; POULTRY; INDUSTRY

L10 - ANIMAL GENETICS AND BREEDING

Genetic diversity of Penaeus monodon (Fabricius, 1798) in the Philippines as revealed by mitochondrial cytochrome oxidase 1 (CO1). **Orosco, F.L. University of the Philippines Diliman, Quezon City 1101 (Philippines). Inst. of Biology. florosco@upd.edu.ph. Lluisma, A.O. University of the Philippines Diliman, Quezon City 1101 (Philippines). Marine Genomics and Molecular Genetics Lab. aolluisma@up.edu.ph.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 84-92. Aug 2018.*
https://pas.cafs.uplb.edu.ph/download/genetic-diversity-of-penaeus-monodon-fabricius-1798-in-the-philippines-as-revealed-by-mitochondrial-cytochrome-oxidase-i-coi/

The mitochondrial cytochrome oxidase I (COI) marker, widely used in phylogenetic and DNA barcoding studies, may also be informative with respect to intraspecies diversity and regional scale population structure. It is particularly useful when data reported from other studies and relevant for comparative studies were mostly generated using this marker. In this study, the COI marker was used to investigate the genetic diversity and structure of populations of the black tiger shrimp, Penaeus monodon (Fabricius, 1798), in the Philippines. Wild specimens were obtained from six locations across the Philippine archipelago. Among the 146 COI sequences observed, only 15 haplotypes were identified of

which only three were found to be frequent and widely distributed and the others were either unique to a site, or found in only two sites. The COI sequences therefore indicated that the six sites did not show significant genetic differentiation based on the Chi-square test, analysis of molecular variance (AMOVA), and FST analysis. However, comparison of the data with those reported for Thailand revealed that the Philippine populations have significantly lower haplotype and nucleotide diversity. The three widely distributed haplotypes in the Philippines were also observed in Thailand; these three haplotypes appeared to be the ancestral forms as suggested by the haplotype network analysis. The Philippine haplotypes showed less sequence divergence among themselves and clustered mostly in one major lineage of the tree, although two haplotypes were found to be highly divergent and clustered with other Thai haplotypes. The genetic diversity discovered in the study represents a significant resource; it also highlights opportunities for selection of better performing stocks.

PENAEUS MONODON; GENETIC VARIATION; MITOCHONDRIAL GENETICS; NUCLEOTIDES; CYTOCHROME C OXIDASE; PHILIPPINES

L40 - ANIMAL STRUCTURE

Carcass and meat quality characteristics in lechon-size black Tiaong and Kalinga [Quezon, Philippines] native pigs (organic farm) and Landrace, Large White, and their F1 crosses (conventional farm). **Bondoc, O.L. olbondoc@up.edu.ph. Dominguez, J.M.D., Bueno, C.M. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Animal Science. Santiago, R.C. Department of Agriculture, Lagalag, Tiaong, Quezon (Philippines). National Swine and Poultry Research and Development Center.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 42-55. Mar 2019.*
https://pas.cafs.uplb.edu.ph/?s=Carcass+and+meat+quality+characteristics+in+lechon-size+black+

This study aimed to compare carcass characteristics and meat quality traits of lechon-size (less than 30 kg) pigs belonging to Philippine native breeds (i.e., Black Tiaong and Kalinga) raised in organic-like production system and commercial breeds [i.e., Landrace (LDR), Large White (LRW) and their F1 crosses] obtained from a conventional swine breeding farm. Native breeds had shorter body length and shorter carcass length than commercial breeds ($P < 0.01$). Weight of ham, fore shank and hind shank were lower ($P < 0.01$) in native breeds than in the commercial breeds. However, weight of belly was higher ($P < 0.01$) in native pig breeds. Among the native breeds, Black Tiaong had heavier ham and higher ham proportion than Kalinga pigs ($P < 0.01$). Among commercial breeds, Landrace had the biggest ham and the smallest was that of the F1 LRW x LDR cross ($P < 0.01$). Pork carcass from native breeds

had lower weight of lean and bones ($P < 0.01$) but more fat and skin ($P < 0.01$) than the other commercial breeds. Loin eye areas was smaller ($P < 0.01$) in native breeds than in the commercial breeds. Pre-slaughter backfat thickness was higher in native breeds than in the commercial breeds. However, carcass backfat thickness was higher ($P < 0.01$) in native breeds than in the commercial breeds. The correlation between live and carcass backfat thickness ranged from $r = 0.59$ to 0.79. Kalinga pigs had higher ($P < 0.01$) ultimate pH (24 h post-mortem) than Black Tiaong pigs. Ultimate pH was highest in Landrace, followed by F1 LDR x LRW cross, and Large White ($P < 0.01$). Color of loin muscle was lighter and pale in native breeds in organic-like production system than in the commercial breeds from the conventional production system ($P < 0.05$). Kalinga pigs had lighter color than Black Tiaong pigs ($P < 0.05$). Color of pork was lightest In the F1 LDR x LRW cross, followed by F1 LDR x LRW cross, Landrace, and Large White ($P < 0.01$).

SWINE; INDIGENOUS ORGANISMS; BREEDS (ANIMALS); CARCASS COMPOSITION; MEAT; QUALITY; PHILIPPINES

L72 - PESTS OF ANIMALS

Parasites from the green mussel Perna viridis L. (Mollusca:Mytilidae) of Ivisan, Capiz, Philippines. **Pagador, G.E. Southeast Asian Fisheries Development Center, Tigbauan, Iloilo 5021 (Philippines). Aquaculture Dept. gepagador@seafdec.org.ph.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 93-97. Aug 2018.*
https://pas.cafs.uplb.edu.ph/download/parasites-from-the-green-mussel-perna-viridis-linnaeus-1758-mollusca-mytilidae-of-ivisan-capiz-philippines/

This study reports the parasites found in green mussel (Perna viridis L.) from Ivisan, Capiz, Philippines. Samples were collected monthly from January to December 2009. A total of 360 samples were collected, fixed in 10% formalin in seawater solution, and processed by standard histological techniques that included staining the sections with hematoxylin and eosin (H and E). The water temperature ranged from 24 to 30 degrees C and salinity from 18 to 23 ppt. Microscopic analysis showed that the most prevalent parasites were Nematopsis sp. occurring mostly in connective tissues (46%), metacestodes of Tylocephalum sp. in the mantle (18%), and a turbellarian (9%) and metacercariae in the mantle (7%). Based on these findings, these parasites may not yet be a problem to mussel farming as they were low and caused no apparent damage to the host.

PERNA; SPECIES; PARASITES; PHILIPPINES

L73 - ANIMAL DISEASES

African swine fever: a primer. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (7) p. 25-28. 2020.*
https://www.agriculture.com.ph/2020/07/05/african-swine-fever-a-primer/

SWINE; AFRICAN SWINE FEVER; INFECTION; SYMPTOMS; DISEASE CONTROL; SAFETY; HYGIENE

Detection of multidrug-resistant Salmonella sp. in Philippine native swine (Sus scrofa L.) from selected municipalities of Quezon Province, Philippines. **De Mesa, C.A.E. Philippines Univ. Los Baños, College, Laguna (Philippines). Microbiology Div. Paller, V.G.V. Philippines Univ. Los Baños, College, Laguna (Philippines). Animal Biology Div. Opulencia, R.B. Philippines Univ. Los Baños, College, Laguna (Philippines). Microbiology Div. rbopulencia@up.edu.ph.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 56-66. Mar 2019.*
https://pas.cafs.uplb.edu.ph/download/detection-of-multidrug-resistant-salmonella-spp-in-philippine-native-swine-sus-scrofa-l-from-selected-municipalities-of-quezon-province-philippines/

The increasing demand for meat of the Philippine native swine (PNS) has led to the expansion of its low-cost farming, which exposes both the animal and farmer to zoonotic pathogens such as Salmonella. Multidrug-resistant pathogens can hamper treatment and spread globally. This study aimed to determine the presence of multidrug-resistant Salmonella in PNS from Quezon province, Philippines. Fecal matter from PNS (n = 58) and environmental samples (n = 58) from 29 farms were tested for Salmonella. Fifteen (25.6%) PNS and 14 (24.1%) environmental samples were found positive for Salmonella. Logistic regression analysis indicated that swine age and farm management practices had no influence on the presence of Salmonella in PNS. Disk diffusion method against 11 antibiotic classed showed that Salmonella isolates from PNS were most commonly resistant to azithromycin (66.7%), tetracycline (53.3%) and ampicillin (46.7%). Five isolates exhibited multidrug resistance, name, resistance to ampicilin, azithromycin and tetracycline (two isolates); resistance to ampicilin, azithromycin, tetracycline and amoxicillin-clavulanic acid; resistance to ampicilin, azithromycin and amoxicillin-clavulanic acid; and resistance to ampicilin, nalidixic acid and amoxicillin-clavulanic acid. These findings are the first on microbiological status of PNS, and they provide useful information that they may be adapted in developing management practices for effective and safe farming of PNS.

SALMONELLA; WILD BOAR; INDIGENOUS ORGANISMS; DRUG RESISTANCE; PHILIPPINES

Diversity of Anopheles species and distribution of mosquito-borne disease vectors in the Philippines. **Ammugauan, M.A.T., Angeles, J.R., Malijan, R.P.B., Salazar, F.V. Department of Health Research Institute for Tropical Medicine, Filinvest Corporate City, 9002 Research Dr, Alabang, Muntinlupa (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 208. Jul-Dec 2019.*

Mosquito vector surveillance is essential for efficient, environmentally sound, and comprehensive mosquito-borne disease prevention and control. Philippine mosquito diversity and distribution had limited published and documented data. Mosquitoes were collected in 2018 from selected areas, usually those with last known malaria cases. Several provinces continuously monitor vectors to help eradicate mosquito-borne diseases, and submitted samples to the Department of Medical Entomology-Research Institute for Tropical Medicine for validation using carabao-baited traps (CBT) strategically placed in areas that would likely yield anophelines. The CBT attracts the widest range of mosquito species per trap-night compared to other techniques. Among species identified from submitted samples were 19 Anopheles vectors of malaria: An. flavirostris (Ludlow), An. litoralis King, An. maculatus quinquefasciatus Say; dengue/zika/chikungunya: Ae. aegypti (L.) and Ae. albopictus (Skuse); and Japanese encephalitis: C. tritaeniorhynchus Giles, C. fuscocephala Theobald, C. gelidus Theobald, C. vishnui Theobald. Proper identification leads to implementation of cost-effective and efficient control. The presence of mosquito vectors in an area increase the risk of transmission of mosquito-borne diseases and will provide basis for species-specific vector control strategies. These data, however, do not fully give the overall distribution of all mosquitoes in the Philippines especially Aedes, since traps targeted only night-biting using different traps to target all mosquito genera should be done to establish a complete geographic distribution of mosquitoes in the Philippines.

ANOPHELES; SPECIES; AEDES AEGYPTI; CULICIDAE; VECTORS; DENSITY; ZOONOSES; PHILIPPINES

Genetic analysis of Aedes aegypti (L.) in Manila, Philippines: dispersal pattern, and gene expression under Wolbachia infection. **Regilme, M.A., Inukai, T., Ehime Univ., 10-13 Dogohimata, Matsuyama, Ehime 790-8577 (Japan). Viacrusis, K., Amalin, D.M., Watanabe, K. De La Salle Univ., 2401 Taft Ave., Manila (Philippines).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v. 33 (2) p. 207-208. Jul-Dec 2019.*

Anthropogenic land use influences the proliferation patterns of mosquitoes across urban competence. The effect of España Boulevard [Manila, Philippines] in dispersion patterns of

dengue of dengue vector was patterns of dengue vector was examined from August through September 2017. A. aegypti were collected in the north and south sides of the road. DNA and RNA are isolated from individual mosquitoes using Qiagen AllPrep DNA/RNA isolation kit. The effect of España Boulevard in dispersion patterns of dengue vector was examined from August through September 2017. A. aegypti were collected in the north and south sides of the road. DNA and RNA are isolated from individual mosquitoes using Qiagen AllPrep DNA/RNA isolation kit. The effect of the road in the population structure was determined using 12 microsatellite loci for molecular analysis. Double digest restriction-site associated DNA sequencing revealed genome-wide single nucleotide polymorphisms. Wolbachia infections were detected vy PCR in seven adult mosquitoes. RNA sequencing explained the difference in the gene expression levels of Wolbachia infected and non-infected adult mosquitoes. Important genes in Wolbachia infected mosquitoes responsible for dengue virus inhibiting properties were analyzed. Control zones along landscapes features in urban areas that can act as barrier or corridor in mosquito dispersal could be determined. If major roads are revealed as barriers, road blocking can be used as as efficient and appropriate spatial unit in studying and controlling the vector.

AEDES AEGYPTI; CULICIDAE; HABITATS; MICROSATELLITES; RNA; NUCLEOTIDE SEQUENCE; VECTORS; ZOONOSES; PHILIPPINES

Managing our flocks to reduce risks of infection. **Lacson, S.P.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 36-37. Apr 2020.*
https://www.agriculture.com.ph/2020/05/17/managing-our-flocks-to-reduce-risk-of-infection/

POULTRY; ANIMAL DISEASES; INFECTION; DISINFECTION; HYGIENE; VACCINATION

Molecular detection of arboviruses in Culex triataeniorhynchus Giles and Culex gelidus Theobald. **Manalaysay, J., Mascarenas-Bautista, Ma.A. Philippines Univ. Los Baños, College, Laguna (Philippines). National Inst. of Molecular Biology and Biotechnology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 207. Jul-Dec 2019.*

Mosquitoes are one of the most important vectors of human pathogens. They harbor arthropod-borne viruses (arboviruses) which are the causative agents of medically important diseases. Three families of arboviruses, namely: Flaviviridae, Bunyaviridae, and Togaviridae are of public health importance because the cause dengue, zika, Japanese encephalitis (JE), and chikungunya. Culex tritaeniorhynchus Giles and C. gelidus Theobald have been reported to be among the primary vectors of JE in Asian counties. In the

Philippines, there are limited studies about Culex and the and the viruses they transmit in the community. Using Polymerase Chain Reaction, arboviruses were detected from C. tritaeniorhynchus and C. gelidus from Barangays [villages] Lalakay and Bayog Los Baños, Laguna [Philippines]. Taxonomic identification of Culex was also done using molecular methods wherein only C. gelidus agreed with the results of morphological identification previously done. The 15 different primer sets of the three arbovirus families and Tagoviridae and Bunyaviridae in C. tritaeniorhynchus and Flavivirdae, Bunyaviridae, and Togaviridae in C. gelidus. Subsequent advanced molecular analyses will be done to confirm the presence of arboviruses in these Culex samples.

CULEX TRITAENIORHYNCHUS; ORBIVIRUS; CULICIDAE; VECTORS; PATHOGENS; FLAVIVIRIDAE; BUNYAVIRIDAE; TOGAVIRIDAE; ZOONOSES

Mosquito diversity and land use change. **Mascareñas-Bautista, Ma.A., Asin, I.C.A., Ballesteros, A.J.C., Manalaysay, J.G. Philippines Univ. Diliman, Diliman, Quezon City (Philippines). National Inst. of Molecular Biology and Biotechnology.** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 206-207. Jul-Dec 2020.*

Mosquitoes are the most relevant vectors of numerous arthropod-borne viruses (arboviruses). The effect of land use change on mosquito communities as well as the incidence of vector-borne pathogens are widely emphasized, but are still poorly understood. The present community of mosquitoes was investigated in identified sites in the Makiling Forest Reserve (MFR) with data on land use change. Based on computed land use in change (relative to area) from agriculture to bare and built-up for Barangay [village] Bayog, followed by Barangay Lalakay, and then Barangay Bagong Silang. Meanwhile, 27 different mosquito species were collected, 10 of which were already reported in 1970, while 17 additional species were found. A molecular approach to identify species using COI and ITS2 genes was also be done and five out of the seven selected mosquito species agree with the morphological identification that was initially done. Detection of viruses present in the mosquitoes will also be done and these results, overall, will allow better understanding on how landscape characteristics effect the transmission dynamics of different arboviruses.

CULICIDAE; ORBIVIRUS; LAND USE; SPECIES; PATHOGENS

M - FISHERIES AND AQUACULTURE

M01 - FISHERIES AND AQUACULTURE - GENERAL ASPECTS

Comparison of DNA metabarcoding and morphology identification for stream microinvertibrate biodiversity assessment and monitoring. **Serrana, J., Miyake, Y., Gamboa, M., Watanabe, K., Ehime Univ., 10-13 Dogohimata, Matsuyama, Ehime 790-8577 (Japan).** 51st Anniversary and Annual Scientific Conference of the Pest Management Council of the Philippines., Inc. Coron, Palawan (Philippines). 2-5 Jul 2019. *Philippine Entomologist (Philippines). 0048-3753. v.33 (2) p. 212. Jul-Dec 2019.*

Conventional morphology-based identification is commonly used for routine assessment of freshwater ecosystems. However, cost and time efficient techniques like high-throughput sequencing (HTS) based approaches may resolve constraints in morphology-based surveys. Stream microinvertibrate species diversity and community composition were characterized via metabarcoding and morphological analysis from Shigenbu River Basin, to evaluate the relationship between microinvertibrate community and environmental variables was assesses. Altogether, 45 taxa (three families, six subfamilies, 31 genera, and five species) were morphologically identified from 8,276 individuals from 10 sites. Metabarcoding detected 44 species, with 35 collapsed into 11 groups matching the morphologically identified taxa. Logged depth (number of HTS reads) and abundance of morphological taxa, were significantly positively correlated, implying that quantitative data could be used for subsequent analyses. Considerably high rate of relative abundance of morphologically identified samples was detected. Recovery of samples vy incidence or presence/absence was considerably low, with a high rate of false-negative detection specifically for scarcely represented species. Given the low taxonomic resolution of morphological assignment, metabarcoding does not reflect most species naturally occurring in our site, which could further be proven with refined morphological assessment of samples. However, abundance-based detection was efficient with 92% of the individuals correctly demonstrated. DNA metabarcoding provides practical and cost-effective approach specially for rapid biological monitoring of freshwater microinvertebrate communities, but detecting scarce samples should be improved to increase sensitivity of detecting most, if not all, species.

FRESHWATER ECOLOGY; DNA; RIVERS; MONITORING; BIOASSAYS; NEW SPECIES

Impact of volcanic ash on the fishes of Lake Taal [Philippines]. **Guerrero, R.D.M.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 14. Apr 2020.*
https://www.agriculture.com.ph/2020/05/04/the-impact-of-volcanic-ash-on-the-fishes-of-lake-taal/

TILAPIA; CHANOS; SARDINELLA; FISHERY RESOURCES; DAMAGE; VOLCANIC SOILS; PHILIPPINES

M11 - FISHERIES PRODUCTION

Agrilink 2018 zeroes in on the hog sector. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 5-10. Sep 2018.*

LIVESTOCK; SWINE; INDUSTRY; ANIMAL HUSBANDRY; SMALL FARMS; FISHERIES; DEVELOPMENT PROJECTS; AQUACULTURE; PRODUCTION; MARKETING; TECHNOLOGY; RESEARCH; EXTENSION ACTIVITIES

Saving the last cyprinid in Lake Lanao [Philippines]: how we lost most of the endemic fishes in Lake Lanao and what we can do to save the remaining one. **Guerrero, R.D. III.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 28-29. Jul 2018.*
https://www.agriculture.com.ph/2019/06/01/saving-the-last-cyprinid-in-lake-lanao/

CYPRINUS; INDIGENOUS ORGANISMS; FISHERY RESOURCES; RESOURCE CONSERVATION; LAKES; PHILIPPINES

M12 - AQUACULTURE PRODUCTION

My father [Mr. Rafael Guerrero Jr.] the fish farmer. **Guerrero, R.D. III.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p. 20. 2019.*
https://www.agriculture.com.ph/2020/03/27/my-father-the-fish-farmer/

OREOCHROMIS MOSSAMBICUS; OREOCHROMIS NILOTICUS; SEX DIFFERENTIATION; SEX DIFFERENTIATION DISORDERS; FISH CULTURE; FISH PONDS

Tilapia hatcheries of Calauan, Laguna [Philippines]. **Guerrero, R.D. III.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p.36-37. Nov 2018.*
https://www.agriculture.com.ph/2019/08/14/the-tilapia-hatcheries-of-calauan-laguna/

TILAPIA; OREOCHROMIS NILOTICUS; FISH LARVAE; CAGE CULTURE; HATCHERIES; PHILIPPINES

N - AGRICULTURAL MACHINERY AND ENGINEERING

N20 - AGRICULTURAL MACHINERY AND EQUIPMENT

Branson: a multifunctional tractor suitable for farming almost any crops. **Anon.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 26-27. Apr 2020.*
https://www.agriculture.com.ph/2020/05/13/branson-a-multi-functional-tractor-suitable-for-farming-any-crop/

TRACTORS; LAND LEVELLING; SITE PREPARATION; DESIGN; EQUIPMENT PERFORMANCE

Drying grain and milling the obstacles for better profit. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 10. Oct 2018.*

RICE; GRAIN; DRYERS; POSTHARVEST TECHNOLOGY; FARM EQUIPMENT; MILLING; HUSKING; GRADING

Efficiency and efficacy of multi-purpose precision drone sprayer in controlling weeds of direct-seed rice. **Collado, W.B., Caballong, N.L. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines). nl.caballong@philrice.gov.ph., Barroga, R., Bermudez, R.V. Jr., Cañete, S.D., Orcino, J.A. Philippine Rice Research Inst., Muñoz, Nueva Ecija (Philippines).** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 171. 2019.*

Efficient fertilizer application ensures equal distribution and full absorption of nutrients by the rice crop. Manual broadcasting is the most is the common method of applying granular fertilizers in the rice fields in the Philippines. Meanwhile, a hexa-copter agricultural precision drone that can broadcast dry materials of a diameter between 0.5mm to 0.5mm such a granular fertilizers, seeds and feeds is starting to gain access to the local farming market. With a load capacity of 10kg, the system has automated mission feature wherein users can plot out the area and it automatically creates and follows flight path. The drone is also capable of resuming its mission path after refilling should it emptied its tank load at midflight. The potential of this technology in nutrient application in rice has not been explored. Thus, a study under the field condition at PhilRice CES [Philippine Rice Central Experiment Station] from January to May 2019 was conducted to test and compare the efficiency and effectiveness of the precision drone spreader technology with manual method in applying granular fertilizer in rice. Cutting the recommended nutrient rate into two splits, granular fertilizers were applied into two plots through the following treatments:

manual broadcast and drone spreading. Crop cut and actual yield data as well as the time spent during the application were recorded and analyzed. Results showed that the drone-spread plot has more equal distribution of nutrients based on crop cut compared to the manually broadcasted. Drone-spread plot harvest data was higher compared to the manually broadcasted plot both in the crop cut and actual yield. In terms of the duration of the fertilizer application, both are relatively equal. The results suggest that multi-purpose precision drone spreader has the same efficiency and is more effective than manual fertilizer broadcasting. This experiment will be continued in the next season under more rigorous design.

ORYZA SATIVA; DIRECT SOWING; FERTILIZER APPLICATION; TECHNOLOGY; TECHNOLOGY TRANSFER; EQUIPMENT

High-tech machines for rice and high-value crops. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 11. Nov 2018.*

ORYZA SATIVA; CROPS; DIRECT SOWING; TILLAGE EQUIPMENT; MECHANIZATION; ENVIRONMENTAL IMPACT

Kamico, one of the biggest exhibitors in Agrilink 2018. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 26-29. Sep 2018.*

EQUIPMENT; DESIGN; EQUIPMENT PERFORMANCE; TRACTORS; SOWING; HARVESTERS; SPRAYERS

Mechanization makes farming more profitable. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22 (11) p. 18; 20; 22. Nov 2018.*
https://www.agriculture.com.ph/2019/08/12/mechanization-makes-farming-more-profitable/

FARMS; MECHANIZATION; SOWING; EQUIPMENT; PRODUCTION; EFFICIENCY; PRODUCTIVITY; SUSTAINABILITY; LABOUR; COSTS

Name of the game is farm mechanization. **Sarian, Z.B.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 6-9. Oct 2018.*
https://www.agriculture.com.ph/2019/07/21/the-name-of-the-game-is-farm-mechanization/

RICE; MAIZE; ONIONS; PLANT PRODUCTION; FARMS; MECHANIZATION; TRANSPLANTERS; HARVESTERS; TRACTORS; POSTHARVEST TECHNOLOGY; HANDLING

Operating conditions of a peanut sizing machine for optimum performance. **Ince, A. Cukurova Univ. 01330, Balcali-Adana (Turkey). Agricultural Machinery and Technologies Engineering Dept. aince@cu.edu.tr. Akcali, I.D. Cukurova Univ. 01330 Adana (Turkey). Mechanical Engineering Dept.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 70-75. Aug 2018.*
https://pas.cafs.uplb.edu.ph/download/operating-conditions-of-a-peanut-sizing-machine-for-optimum-performance/

The study analyzed the performance and estimated the optimum operating conditions of a peanut-sizing machine prototype based on a counter-rotating cylinder pair, developed for small- and medium-sized enterprises. To this end, the tests were conducted to determine the performance and power consumption of the prototype. The performance tests were done at nine different mixture rates based on peanut size (small or medium) and over-all separating efficiency. The theoretical capacity of the machine was found to be 123, 234.8 and 321 kg h-1 for small, medium and large-size peanuts, respectively. In the preliminary tests, the average damage percentage and feeding capacity were found to be 1.76% and 126.3 kg h-1, respectively. The over-all efficiency of the peanut sizing machine decreased as the proportion of small peanuts in the material increased, with values ranging from 0.87 to 0.97. The power consumption of the separating cylinders ranged from 0.46 to 0.76 kW. The average torque value was also calculated as 25 Nm.

GROUNDNUTS; MEASUREMENT; EQUIPMENT; DESIGN; EQUIPMENT PERFORMANCE; GRADING; QUALITY

Versatile farm machines from Korea. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22 (10) p. 12. Oct 2018.*

FARM EQUIPMENT; TILLAGE EQUIPMENT; TRACTORS; PLANT ESTABLISHMENT; KOREA REPUBLIC

P - NATURAL RESOURCES AND ENVIRONMENT

P01 - NATURE CONSERVATION AND LAND RESOURCES

Importance of design when planning a garden. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 46-49. 2019.*
https://www.agriculture.com.ph/2020/04/08/the-importance-of-design-when-planning-a-garden/

ORNAMENTAL PLANTS; TREES; GARDENS; LANDSCAPE; LANDSCAPING; HORTICULTURE; ENVIRONMENTAL IMPACT

Indigenous farmers to produce world-class coffee. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p. 57. Nov 2018.*

FORESTS; BIODIVERSITY; COFFEA; SPECIES; REFORESTATION; RESOURCE CONSERVATION; FARMERS; ETHNIC GROUPS

Saving the last cyprinid in Lake Lanao [Philippines]: how we lost most of the endemic fishes in Lake Lanao and what we can do to save the remaining one. **Guerrero, R.D. III.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 28-29. Jul 2018.*
https://www.agriculture.com.ph/2019/06/01/saving-the-last-cyprinid-in-lake-lanao/

CYPRINUS; INDIGENOUS ORGANISMS; FISHERY RESOURCES; RESOURCE CONSERVATION; LAKES; PHILIPPINES

Seven endemic and indigenous plants found in Masungi Reserve [Rizal, Philippines]. **Mendenilla, V.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 62-64. Apr 2020.*
https://www.agriculture.com.ph/2020/06/03/seven-endemic-and-indigenous-plants-found-in-masungi-georeserve/

INDIGENOUS ORGANISMS; PLANTS; BIODIVERSITY; NATURE CONSERVATION; NATURE RESERVES; PHILIPPINES

This Eco-Park located in the foothills of the Sierra Madre [Philippines] will connect you with nature. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v. 24 (6) p. 63-64. 2020.*
https://www.agriculture.com.ph/2020/06/16/this-eco-park-located-in-the-foothills-of-sierra-madre-will-connect-you-with-nature/

VEGETABLE CROPS; GARDENS; NATURE RESERVES; FARMS; RURAL AREAS; TOURISM; PHILIPPINES

P06 - RENEWABLE ENERGY RESOURCES

Solar irrigation facility starts to benefit farmers. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 54-56. Sep 2018.*
https://www.agriculture.com.ph/2019/07/16/solar-irrigation-facility-starts-to-benefit-farmers/

RICE FIELDS; VEGETATION; PRODUCTION; WATER SUPPLY; IRRIGATION; SOLAR ENERGY; IRRIGATION SYSTEMS

P10 - WATER RESOURCES AND MANAGEMENT

Wastewater treatment with vermi-filtration. **Guerrero, R.D.M.** *Agriculture (Philippines). 0118-857-7. v. 22(9) p. 30-31. Sep 2018.*
https://www.agriculture.com.ph/2019/07/09/wastewater-treatment-with-vermi-filtration/

WASTEWATER; WASTEWATER TREATMENT; BIODEGRADATION; OLIGOCHAETA; FILTRATION; MICROORGANISMS; COSTS; ENERGY CONSUMPTION

P33 - SOIL CHEMISTRY AND PHYSICS

Impact of long-term gravel mulching on soil bacterial and fungal communities in the semi-arid Loess plateau of northwestern China. **Qiu, Y. qiu6646@163.com. Xie, Z., Wang, Y., Wang, L., Hua, C. Chinese Academy of Sciences, Laruzhou 730000 (China). Northwest Inst. of Eco-Environment and Resources.** Philippine Agricultural Scientist (Philippines). *Formerly The Philippine Agriculturist. 0031-4454. Mar 2018. v. 101(1) p. 51-59. Aug 2018.*
https://pas.cafs.uplb.edu.ph/download/impact-of-long-term-gravel-mulching-on-soil-bacterial-and-fungal-communities-in-the-semi-arid-loess-plateau-of-northwestern-china/

Gravel mulching is a traditional method of water conservation in the semi-arid regions of China. In this study, authors investigated the soil microbial community in a field in China's Gaolan County which has been gravel mulching for over a period of 18 yr. Compared with the non-mulch control, total organic nitrogen (TON), microbial biomass carbon (MBC), and microbial biomass nitrogen (MBN) were all significantly increased in the field with gravel mulching for over 13 yr. Moreover, after 18 yr, the soil bulk density and sand content increased significantly, thus degrading the soil microenvironment. Gravel mulch significantly altered the bacterial community structure and composition, increased the abundance of Acidobacteria, Gemmatimonadetes, Bacteroidetes, and Firmicutes, and decreased the abundance of Actinobacteria compared with the control. Gravel mulch also significantly changed the fungal community structure and composition; the soils were found to have a greater abundance of Basidiomycota and Zygomycota and reduced abundance of Ascomycota and Glomeromycota compared with the control soils after long-term gravel mulching. Redundancy analysis (RDA) revealed that the bacterial genera after 18 yr of mulching were dominated by Incertae_Sedis, Blastocatella, Desulfovibrio, Bacteroides, Gemmatimonas, Parabacteroides and Alloprevotella, and that the composition of the bacterial community was related to soil pH, bulk density, MBC and MBN. However, significant decreases in the diversity indices of Chao1, abundance-based coverage estimator

(Ace) and Shannon after 18 yr of mulching demonstrated negative effects on the complexity of the soil microbial community.

MULCHING; DRY MULCHES; SOIL CHEMICOPHYSICAL PROPERTIES; SOIL MICROORGANISMS; CHINA

P34 - SOIL BIOLOGY

Comparative assessment of biological nitrogen fixation in Pongamia pinnata, a biofuel legume tree. **Calica, P.N., Ateneo de Davao Univ., Davao City (Philippines). pnemenzocalica@gmail.com. Gresshoff, P.M. The Univ. of Queensland, St. Lucia, Brisbane, Queensland (Australia). Center for Intergrative Legume Research.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 14-23. Mar 2019.*
https://pas.cafs.uplb.edu.ph/download/comparative-assessment-of-biological-nitrogen-fixation-in-pongamia-pinnata-a-biofuel-legume-tree/

Pongamia pinnata has been established as a biofuel legume tree. Different methods such as acetylene reduction assay, ureide analysis, isotopic techniques, nitrogen difference method and isotope techniques (sup 15 N natural abundance and sup 15 N enrichment technique) were employed to analyze, assess and estimate symbiotic nitrogen fixation in 16-wk-old pongamia seedlings. In the acetylene reduction assay, the uninoculated control had negligible ethylene produced while inoculated plants were shown to have increasing ethylene production from 0-min to 60-min incubation with a range of 0.03 to 2.76 mL. Pongamia was found to produce 1.19 x 10-6 mole per plant with a Rhizobum (PR-UQ-05) inoculation. Ureide analysis was also done, not only to estimate fixed nitrogen, but also to determine the presence of allantoin in the xylem of pongamia. The result showed that allantoin was present in pongamia at low levels of 143-150 nmole, which means pongamia utilizes ureides in the form of allantoin to transport its fixed nitrogen to other plant parts to support growth and reproduction. The nitrogen difference method and isotope techniques quantified the fixed nitrogen of pongamia inoculated with PR-UQ-05 which was estimated to be 100 mg/plant (based on the difference of total N yield between the nodulated and non-nodulated pongamia seedlings) and from 20.4 mg/plant (natural abundance) to 47.4 mg/plant (enriched). The different methods used in this study showed different results based on the amount of fixed nitrogen calculated for each method. However, all of the methods employed in this study demonstrated that Pongamia inoculated with PR-UQ-05 fixed more nitrogen than the uninoculated control. The symbiotic nitrogen fixation of Pongamia demonstrated in this study is very relevant to the biofuel industries.

PONGAMIA PINNATA; LEGUMES; BIOFUELS; NITROGEN FIXATION

Q - PROCESSING OF AGRICULTURAL PRODUCTS

Q01 - FOOD SCIENCE AND TECHNOLOGY

Compliance to food safety standards of ambulant vendors in two cities of Nueva Ecija, Philippines. **Castillo, C.B. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Dept. of Hospitality Management.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 43; 116-133.*

Food safety practices of food handlers play a significant role in making sure that food is kept clean from the preparation, cooking process, and up to the time it is served to the customers (Mohan, 2006). This study assessed the compliance to food safety standards anchored on Presidential Decree 856, Code on Sanitation of the Philippines that promulgates indicators of appropriate practices in food safety and sanitation of ambulant food vendors in Science City of Munoz and San Jose City, Nueva Ecija, Philippines. Responses were elicited from ambulant vendors and street food consumers and were treated using descriptive statistics, Pearson product moment correlation (r) and t-test. The study revealed that ambulant food vendors complied the highest on the procurement of raw materials, congruent with the street food consumers' perception. Compliance of ambulant food vendors to general requirement, general appearance, water and ice used, preparation and handling, washing of utensils and distribution and point of sale were generally often observed as reported by the ambulant food vendors and perceived by the street food consumers. The results indicated a significant difference on the compliance to food safety standards of ambulant food vendors on procurement of raw materials, distribution and point of sale and overall compliance to standards, where vendors from San Jose City showed higher degree of compliance. Food safety is a multi-sectoral concern, thus, private and public sectors must create series of programs, particularly on education and information dissemination about food safety practices. These must include lectures and hands-on activities to be participated by food vendors and consumers that will help augment their knowledge on food safety practices. Regular monitoring on the part of the government must be conducted as a fundamental ascendency to ensure that small and medium scale food handlers are primary initiators of food safety in the country.

FOOD SAFETY; FOOD HYGIENE; STREET FOODS; FOOD PROCESSING; PHILIPPINES

Mushroom-based food products: concept research, formulation, and dissemination. **Manaois, R.V., Abilgos-Ramos, R.G., Ballesteros, J.F., Morales, A.V., Labargan, E.S.A. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Division.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 41; 105-111.*

Mushroom production is an important component of the agricultural crop diversification program called Palayamanam Plus, which is advocated by the Philippine Rice Research Institute. A series of market study and product development activities were conducted to promote the cultivation and utilization of mushrooms as a source of nutrition and alternative and sustainable livelihood. The market mushroom study was conducted to explore and determine attitudes toward mushroom and mushroom-based product concepts among consumers in various Palayamanan sites in Central Luzon (n=282). Results of the market study revealed a high acceptability of mushroom (97.5%) palatability (73.1%) and healthfulness (24.8%) as top reasons. It also showed the respondents on mushroom-based products such as coffee/tea, cookies, crackers/chips, and bread. In the product development activity, oyster mushroom (Pleurotus ostreatus) a milky mushroom (Calocybe indicd) were evaluated in different food preparations. This was done through laboratory testing and cooking competitions participated in by students, 4-H Club members, mothers, and recipient of the Pantawid Pamilyang Pilipino Program (4Ps). From the product development activities, 46 mushroom recipes were collected, compiled, screened, and verified. The final 37 recipes were compiled into a recipe book for dissemination to target beneficiaries and the general public. Further dissemination of the health benefits of mushroom and food preparation based on the prepared recipes was done through lectures and trainings.

EDIBLE FUNGI; PLEUROTUS OSTREATUS; RICE; FARMING SYSTEMS; PRODUCT DEVELOPMENT; RESEARCH; MARKETING

Physicochemical and microbiological assessment of street foods in Batangas City [Philippines]. **Untalan, M.K.C., Cabrera, S.G., Argente, M.A. Batangas State Univ., Rizal Ave, Extension, Batangas, 4200 Batangas (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International*

Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 87.

Food safety awareness is very important, especially these days that people are experiencing food poisoning and food borne illnesses locally and abroad. In the Philippines food poisoning incidents are increasing however, street foods is still a thriving business because it gives income to people. This study mainly aimed to determine the properties of street foods in terms of Physicochemical property and Microbial properties (Escherichia coli, Staphylococcus aureus) taken from the five sampling stations such as in the market, near Batangas State University and near schools/universities and during the two sampling periods such as rainy season and during summer. It also aimed to make a food safety plan and recommendations in handling street foods. Street food samples included in this study were kwek kwek, fish ball, and kikiam and also the two types of sauces, such as sweet sauce and spicy sauce. RCBD was used and ANOVA was employed in this study. Among the samples fishball had the highest value in terms of crude fat and ash content, while kikiam had the highest value in terms of crude protein. Both the sweet sauce and spicy sauce have the lowest crude fiber, crude protein and ash content but the, highest in terms of moisture content. It can be noted that street foods such and the two kinds of sauces in five sampling stations in Batangas City have microbial load which was beyond the Philippine National Standard. The spicy sauce obtained a high value of microbial load almost in all stations except in station 3 with the value of less 10 CFU/g. Station 2 has been found to have the highest Staphylococcus aureus and E.coli while, station 1 showed lowest presence of Staphylococcus aureus in most samples. Based on the results of the study, it is recommended that street foods vendor get proper food safety training and practice for preparing good quality foods. Vendors need to be aware of hygienic, sanitary, and technological aspects of street food vending and consumption. Training and education on these issues should be carried out to help street vendors. Moreover, it was observed that there was an increased rate of microbial load during the dry season as compared with the wet season.

STREET FOODS; CHEMICOPHYSICAL PROPERTIES; MICROBIOLOGICAL ANALYSIS; FOOD SAFETY; PHILIPPINES

Potentials of underutilized plants for nutritious food preparation. **Perez, L.B. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-*

Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 42; 112-115.

The study developed highly nutritious salad recipes that are rich in vitamin A or protein and can satisfy at least one third of the RENI of Filipino adults and eventually be introduced to the local market using three kinds of weeds: pancit-pancitan (Peperomia pellucid Linn.), takip kuhol (Centella asiatica Linn.), and talinum (Talinum fruticosum Linn.). In terms of color, aroma, taste, and texture, pancit-pancitan salad obtained the highest rating both by untrained laboratory and consumer panel. With regards to general acceptability, the untrained laboratory panel rated the three recipes as 'Very Much Acceptable', while consumer panel rated pancit pancitan and takip kuhol salad 'Very Much Acceptable' and talinum salad as 'Slightly Acceptable'. Consumer preference test showed that pancit-pancitan salad ranked as number one among others. Moreover, one serving of pancit-pancitan salad can satisfy 34.54% for RENI of Vitamin A for male and 38% for female adult aged 19-65 years old and above. For the talinum salad, it can satisfy 46.77% of RENI for male and 51.45% for female adult aged 19-65 years old and above. And in terms of protein, one serving of takip kuhol salad can satisfy 30.72% of RENI for male and 35.48% for female adult aged 19-65 years old and above. The cost of producing one serving of the most acceptable and most preferred salad recipe (pancit-pancitan salad) is PhP 15.18. The use of edible weeds in salad preparation can definitely result to a low cost but highly nutritious salad recipe.

PEPEROMIA; SPECIES; WEEDS; WILD PLANTS; NUTRITIVE VALUE; FOOD RESOURCES; FOOD TECHNOLOGY

Q02 - FOOD PROCESSING AND PRESERVATION

Ashitaba tea to be mass manufactured. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 63. Jul 2018.*
https://www.agriculture.com.ph/2019/06/15/ashitaba-tea-to-be-mass-manufactured/

ANGELICA; SPECIES; DRUG PLANTS; FOOD TECHNOLOGY; TEA; POWDERS; HEALTH FOODS

Best lechon [roast pig] is Marinduque's [Philippines] native black pig. **Urlanda, R.V.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 26-27. Jul 2018.*
https://www.agriculture.com.ph/2019/05/31/the-best-lechon-is-marinduques-native-black-pig/

WILD BOAR; INDIGENOUS ORGANISMS; ANIMAL FEEDING; ROASTING; PHILIPPINES

Brown rice vs. white rice. **Anon.** *Agriculture (Philippines). 0118-857-7. v.22 (11) p.38-39. Nov 2018.*
https://www.agriculture.com.ph/2019/08/15/brown-rice-vs-white-rice/

ORYZA SATIVA; VARIETIES; COLOUR; AMYLOSE; MILLING; ORGANOLEPTIC PROPERTIES

Chef makes his own vinegar (and you can, too). **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 64-65. 2020.*
https://www.agriculture.com.ph/2020/04/01/chef-makes-his-own-fruit-vinegar-and-you-can-too/

FRUITS; ACETIC FERMENTATION; VINEGAR; INGREDIENTS

Chemical and physical characterization of used coconut oil from vacuum frying of jackfruit (Actocarpus heterophyllys Lam) pulp as affected by frying cycle. **Braga, J.D. Cavite State Univ., Indang, Cavite (Philippines). Galvez, L. Visayas State Univ., ViSCA, Baybay, Lete (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 84.*

This study was conducted to determine the quality of coconut oil used in a two-hour jackfruit pulp in vacuum frying for 20 frying cycles. The percent free fatty acid (FFA), acid value (AV) and peroxide value (PV) of the coconut oil (unheated, 1st, 5th, 10th, and 20th frying cycle) used in vacuum frying was determined by titrimetric method. Moisture content (MC) and color were also evaluated. The FFA, AV, PV, amd MC showed significant (p less than or equal to 0.05) effect on oil as the number of frying cycle increases while Hunter an indicated insignificant effect. Peroxide value is one of the most important indices for quality evaluation of oil since the value significantly affect between and among all other oil samples as the number of frying cycle increases. Based on the standard set by the Codex Alimentarius for refined oil (10 meq 02/kg oil), such as the coconut oil used in this study, the oil should be used for only three times only to conform with the set standards for peroxide and acid value so that the welfare on the consuming public will be of topmost priority. The pairing of these two tests is a good measure for oily quality assessment.

ARTOCARPUS HETEROPHYLLUS; PULP; COCONUT OIL; FRYING; CHEMICOPHYSICAL PROPERTIES; QUALITY; EVALUATION

Consumer-driven development of rice-based food product: an important key to value-adding. **Abilgos-Ramos, R.G., Ballesteros, J.F., Labargan, E.S.A., Morales, A.V., Manaois, R.V.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 95.*

Development and marketing of rice-based products provide additional income in rice-producing communities that ultimately enhances their quality of life. This study aimed to develop a healthier, nutrient-rich, and marketable rice-based food product through a market-oriented strategy. Experts' perception on health and wellness and rice-based product ideas were gathered through focus group discussions (FGD). Market trends on goods and consumer interest on pre-identified product ideas were determined through a market survey in Central Luzon, Philippines. Based on the results from the FGDs and market survey, a nutrient-rich rice-based food product was developed. The acceptability, marketability, and profitability of the product was assessed through a pre-feasibility study. FGDs revealed that the experts (n=24) associated health and wellness with nutritious and healthy food products. Survey results showed that consumers (n=339) usually purchase convenient (ready-to-eat/drink) and healthy snack foods. Brown rice cracker ice cream sandwich (BRICS), a snack food made from brown rice flour and ice cream from buffalo's milk, was developed. Brown rice is a healthier form of rice as it has substantial amounts of protein, dietary fiber, minerals and vitamins, while buffalo's milk has higher calcium and protein, but lower cholesterol than other dairy milks. When presented to target consumers (15-30 years old, n=100), BRICS received an overall acceptability rate of 8.4 out of 9. Feasibility study forecasted that BRICS commercialized at 2% market share of the target number of consumers (n=611,473) with potential demand of 21,093 BRICS every month, PhP 20.30 cost per piece, PhP 30 (= 50% mark-up) per piece would generate positive total return of investment and an internal rate of return (37.5%) with a payback period of 2.4 years. Therefore, a market-oriented strategy is effective in developing a highly marketable product with added health and nutritional benefits which is very relevant to consumers.

ORYZA SATIVA; RICE; FOOD PROCESSING; FOOD PRODUCTION; MARKETING; CONSUMER BEHAVIOUR; VALUE ADDED

Development of frozen makapuno meat as intermediate raw material for food processing. **Cabrera, S.G., Quinay, E.B., Magnaye, N.L., Untalan, M.K.C., Perez, I.F.P., Ona, E.A., Medina, J.C. Batangas State Univ., Rizal Ave, Extension, Batangas, 4200 Batangas (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems

strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 85.*

The demand of food industry for Makapuno is increasing and with the application of Embryo Culture Makapuno technology the coconut which can produce only 2-20 % nuts can now have 75-100% Makapuno nuts, thus processing the Makapuno meat to a shelf stable product to be used by the industry is significant. The primary aim of the study was to develop Makapuno as Intermediate Raw Material for Food Processing. In addition, the study was also done to investigate the effect of blanching and blast freezing on the proximate, rancidity, microbial, and sensory characteristics of Embryo Cultured Makapuno (ECM). The Makapuno were shredded blanched at two temperatures for three different time (in minutes), blast frozen and stored until six months. Significant changes were observed in moisture content, ash content and crude protein, while there is no significant difference in the crude fat of Makapuno samples processed in varying time in all storage months. The peroxide values obtained from Makapuno were relatively low, hence the samples were stable against oxidation. The samples which were processed were found safe for microbial properties and safe for consumption. There is no significant difference in sensory properties of ice cream and pie with processed Makapuno at varying blanching time in both temperatures. The results of freeze thaw cycle showed an increased in percent thawing loss. Nylon polyethylene was used as the packaging material for the processed Makapuno since this material is suitable for blast frozen food. The results of this study can be used as a basis for further development of food products with Makapuno as ingredient.

COCOS NUCIFERA; COCONUTS; VARIETIES; FROZEN FRUITS; FOOD PROCESSING; PRESERVATION

Enhancing processing capability of indigenous people in Albay [Philippines] using sweet potato plus food products. **Llamera, E.M. Bicol Univ., 313 M. H. Del Pilar St, Tabaco City, Albay (Philippines). Technology and Entrepreneurship Dept.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 40.*

The popularity of sweet potato leads the plan of improving the processing of alternative saleable commodity as new choice of food product. This research is composed of two sub-studies, namely (1) Practices in Extent of Adaptation on Processing Technologies Used in Making Sweet Potato Food Products of the Indigenous People in Albay and (2) Development and Standardization of Sweet Potato Plus Food Products: Enhancing the Processing Capability of the Indigenous People in Albay, Philippines. The descriptive qualitative and quantitative methods of research have been used in devising a survey questionnaire to get information from members of the indigenous group, regarding the availability of colored sweet potato in their community. The study included the combinations of other root crops to improve the organoleptic characteristics in terms of aroma, appearance, palatability, taste, and satiety whereas kinesthetic characteristics deal on texture and feel of the finished food product. Initial findings showed that sweet potato crops, specifically the colored variety (purple and orange), are available in the communities of indigenous groups in the barangays [villages] of Danao in Polangui, Mapaco in Guinobatan, and Joroan in Tiwi, Albay. Sweet potato is mostly used for subsistence consumption in the indigenous groups, with only 22 3% engaged on commercial use of the crop, specifically the tubers/roots and leaves. Sweet potato is often processed as traditional food product such as kalingking, butse, caluko, and ginataan. The standardized sweet potato pritz gained 4.8 weighted mean, purple camote polvoron, lemon camote honeyed chips with 4.7 weighted mean respectively described as 'highly acceptable'. Continued development on other sweet potato products is ongoing. The study is expected to produce a module on processing sweet potato to be used in enhancing the processing skills of indigenous people together providing nutritious snacks to children in local communities.

SWEET POTATOES; ETHNIC GROUPS; FOOD PROCESSING; FOOD PRODUCTION; PHILIPPINES

Five curing durations in the production of improved salted dried product using nile tilapia (Oreochromis niloticus). **Apan, M.R.O., Saturno, J.O., Abucay, J.S. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Coll of Fisheries.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 89.*

The study was conducted to evaluate the sensory properties, acceptability and the performance of Nile Wawa at five different curing durations to produce improved salted dried product. Treatments evaluated were 30 minutes (11 control). 1 hour (T2), 1 hour and 30 minutes (T3), 2 hours (T4) and 2 hours and 30 minutes (T5) Results showed that 30

minutes obtained the highest mean sensory score in taste. Statistical analysis revealed significant difference (P<0.01) of 30 mins with 1 hour 2 hours, 2 hours, and 2 hours and 30 minutes but compare with 1-hour curing duration. No significant difference was observed in terms of shelf life for all treatments. All treatments last for three months either packed or unpacked. Economics rise, profit potential and co acceptance is encouraging.

OREOCHROMIS NILOTICUS; TILAPIA; DRIED FISH; DRYING; ORGANOLEPTIC ANALYSIS; DURATION; FOOD PROCESSING; FOOD PRODUCTION; PRESERVATION

Foraging in the city. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 54-55. 2020.*

EDIBLE FUNGI; PLANTING; URBAN AREAS; FOODS; FOOD TECHNOLOGY

Formulation optimization of meat loaf with different levels of powdered jackfruit (Artocarpus heterophyllus Lam) rags as meat extender and phosphate binder. **Braga, J.D. Cavite State Univ., Indang, Cavite (Philippines). Galvez, L. Visayas State Univ., ViSCA, Baybay, Lete (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 83.*

Utilization of industrial waste by-product is gaining attention nowadays due to the problems of waste disposal management in the manufacturing industries. The study was conducted to utilize jackfruit rags, a co-product that is considered as waste during jackfruit pulp processing, as meat extender and at the same time improve the nutritional content of the product. The levels of jackfruit rag as extender in meat loaf production was optimized using 3x3 factorial experiment using 20, 30, 40% w/w rags and 1, 2, 3% w/w phosphate as the independent variables. Sensory evaluation results were subjected to Response Surface Regression to determine and identify the optimum levels for production. Optimum formulation was subjected to verification study, microbial determination, proximate analysis and consumer test. Response Surface Regression Analysis revealed that flavor, intactness and general acceptability was significantly affected by the levels of jackfruit rags and phosphate while color, aroma and texture were not significantly affected. Level of 24.9% rags with 1.15% of phosphate was used as the optimum formulation to maximize the use of the rags' fiber at a cost of PhP 38.5 per 150g. The model used to predict the sensory acceptability of the product was reliable. Microbial analysis of the product reveals that it is safe for human consumption. The meat loaf produced contains 50.91 % moisture, 5.58% crude at 7.27% crude fiber, 30.56% crude protein and 10.69% ash. Fifty percent (50%) of the

potential consumers of the product preferred to consume formulated over the commercial meat loaf implying the optimum formulation can compete with the commercial meat loaf in the market.

ARTOCARPUS HETEROPHYLLUS; PROCESSED FOODS; PHOSPHATES; PRESERVATION; ORGANOLEPTIC ANALYSIS; BYPRODUCTS; FOOD TECHNOLOGY; ORGANOLEPTIC PROPERTIES; INGREDIENTS

Grandma from Bulacan [Philippines] finds fortune in oyster mushrooms and uses it to help others. **Necessario, N.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p.30-31. 2019.* https://www.agriculture.com.ph/2020/04/02/grandma-from-bulacan-finds-fortune-in-oyster-mushroom-and-uses-it-to-help-others/

EDIBLE FUNGI; PLEUROTUS OSTREATUS; PRODUCTION; MARKETS; FOOD TECHNOLOGY; FOOD PROCESSING; PROCESSED PRODUCTS; PHILIPPINES

Initial study on storage of fresh katmon fruits (Dillenia philippinensis) and sensory evaluation of katmon juice and jelly. **Artes, L.A., Wagan, A.D.M., Omaña, M.E., Tamisin, L.L. Jr.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 90.*

Katmon is one of the indigenous fruits of the Philippines that is underutilized. Traditionally, fruits are used a souring agent in Filipino dishes by some locals just like tamarind and kamias (Averhhoa bilimbi). However, the fruit has great economic potential but it is never marketed and there is little knowledge about it. Most do not know also, that it may be processed into juice, wine, jam, jelly, or souring powder. Hence, this study was conducted to characterize the fruit after harvest so that appropriate handling may be recommended to extend its shelf life during retail or prior to its processing. Physico-chemical changes such as firmness, total soluble solids, titratable acids and pH content of harvested fruits were evaluated during storage. Fruits (intact and peeled) were also packed under modified atmosphere packaging (MAP) using polyethylene bag and kept under low temperatures (13-14 deg C) for two weeks. Initial sensory evaluation of processed juice and jelly was also done during the DA-BAR [Department of Agriculture-Bureau of Agricultural Research] Anniversary and Exhibit at SM Megamall. Both moisture loss and larval development greatly reduced shelf life and fruit quality of Katmon while other measured parameters remained almost constant. Fruits also readily turned brown and soften but its fresh quality was

extended under MAP by one week when packed as peeled fruits and by two weeks if packed intact. Hence, simple MAP can extend katmon's shelf life under ambient or low temperatures. Sensory test showed a very strong acceptance of both katmon juice and jelly by the exhibit visitors at Megamall.

DILLENIACEAE; INDIGENOUS ORGANISMS; FRUITS; CHEMICOPHYSICAL PROPERTIES; FOOD PROCESSING; FOOD PRODUCTION; FRUIT JUICES; ORGANOLEPTIC ANALYSIS; KEEPING QUALITY; CONTROLLED ATMOSPHERE STORAGE

Instant enriched am [boiled rice water]: a convenient and nutritious complementary food for babies. **Bandonill, E.H. ehbandonill@gmail.com., Belgica, P.R., Romero, M.V. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 151. 2019.*

Breast milk is best for babies but for some reasons, Filipino mothers resort to boiled rice water (am) for complementary feeding. Am is tedious to prepare and is prone to spoilage that may pose safety risk to infants and small children, PhilRice [Philippine Rice Research Inst.] has previously developed instant version of am which is more convenient to use, safe to consume, economical, and has longer shelf-life than its traditional counterpart. To further supplement the nutritional needs of the target consumers of this product, this study enriched it with other crops using banana (saba), sweet potato, and carrots. Processing (boiling, drying, and powdering) of the crops was optimized and each was conducted. Reconstituted am using 120-mesh was finally selected for instant am preparation and enrichment based on its highest cold-water solubility, water absorption index, and swelling power, water color, and comparable sensory characteristics with the control (traditional am). Nutritional analysis showed that aside from carbohydrates as source of energy, the instant am contained some amounts of dietary fiber, phosphorous, Vitamin B3, sodium, calcium, and iron. Based on sensory assessment by selected male and female panelists, instant am enriched with carrots at 6% concentration was the most acceptable among banana and sweet potato in terms of aroma, color, mouthfeel, taste, and viscosity. This study showed that enrichment has enhanced its quality and acceptability. Thus, instant enriched am is a more convenient, nutritious, and shelf-stable alternative to the traditional boiled rice water.

RICE; BOILING; WATER; NUTRITIVE VALUE; INFANT FOODS; INFANTS

Local sauce brands choose natural and support local. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 23(9) p.22; 24. 2019.*
https://www.agriculture.com.ph/2020/03/28/local-sauce-brands-choose-natural-and-support-local/

FRUITS; VEGETABLES; FOOD TECHNOLOGY; FOOD PROCESSING; PROCESSED PRODUCTS; SAUCES

Malunggay (Moringa oleifera) powder with dilis (Stolephorus indicus) flour. **Favor, C.C., Gatus, D.N., Panganiban, E.O., Rufo, V.A., Salumbides, M.D. Southern Luzon State Univ., Tagkawayan Campus, Rizal Tagkawayan Quezon (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 86.*

The aim of this study was to produce malunggay powder with dilis flour. Specifically, to determine the most acceptable mixture of malunggay powder and dills flour and to establish nutrition facts of the mixture, shelf-life cost and return benefits of the product.For data collection sensory evaluation, observations and rating scales were used. Interpretation of data utilizes Weighted Mean, Analysis of Variance and Return on Investment. The study reveals that mature malunggay leaves produced more powder than young leaves and fresh dilis can produced flour only one-tenth of its fresh weight. Significant difference existed among the treatments used in the determination of acceptability of the mixture. The composition of two parts malunggay and one-part dilis flour came out the most acceptable proportion when use an ingredient in food preparation. Further, the nutrition facts evaluation showed the mixture contained fats, sodium, dietary fiber, carbohydrates, sugars, protein, Vitamin A and C, calcium, and iron. Moreover the mixture of Malunggay powder with dilis flour, was observed to have a shelf life of four weeks after processing when kept at ordinary room temperature and six weeks when refrigerated. As revealed, by the generated production of the mixture the recur investment is 52%. Based on the results, it is recommended that the whole dilis or other fish species be utilized in the product flour to be mixed with malunggay powder. Shelf-life of the mixture be validated by DOST to insure safety in the use of the product. Coordination with other agencies especially pre-schools or elementary school and DSWD to promote t utilization of the products in feeding programs.

MORINGA OLEIFERA; STOLEPHORUS INDICUS; FLOURS; POWDERS; FOOD PROCESSING; FOOD PRODUCTION

Negros [Philippines]-based agripreneur uses herbs to create now flavours for favorite local delicacy. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v. 24 (5) p. 20-22. May-Jun 2020.*
https://www.agriculture.com.ph/2020/04/22/a-negros-based-agripreneur-uses-herbs-to-create-new-flavors-for-a-favorite-local-delicacy-part-1/

FARMING SYSTEMS; SMALL FARMS; VEGETABLE CROPS; LIVESTOCK; FARMS; CHICKENS; FOODS; FOOD TECHNOLOGY; PHILIPPINES

Nutritional and sensory properties of energy bar using canna (Canna indica Linn.) flour. **Peñaranda, S.F.C., Algar-Carbonera, A.F.C. acalgar@up.edu.ph. Zubia, C.S. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Food Science and Technology. Tayobong, R.R.P. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). Formerly The Philippine Agriculturist. 0115-463X. v. 44 (Supplement no. 1) p. 153. Sep 2019.*

The Philippine Edible Canna (Canna indica Linn.) is an indigenous and underutilized crop in the Philippines used mainly for ornamental purposes due to its bright red flowers. To promote the utilization of this crop for food use, the rhizomes were converted into flour used in the production energy bars. The flour was found to have 8.52% moisture content, 1.06% crude fat, and 78.84% total carbohydrates- all of which are within the Codex and USDA standards for good quality flour. It was also found to have high crude fiber (8.07%) and no gluten content. For the energy bar, five formulations with different all-purpose flour to Canna flour ratio were prepared and subjected to sensory analysis using quality scoring test. The energy bar with 100% Canna flour obtained good score in terms of color, aroma, flavor, softness, and general acceptability. Statistical analysis using one-way ANOVA and Turkey's test showed that energy bar with 100% Canna flour is not significantly different with the control. Physicochemical tests showed that the energy bar with Canna flour have a water activity of 0.62 tapped density of 1.57 g/cube cm and hardiness of 4.14kg f. For a serving size of 80g, it has 210 calories, 6g fat, 30g carbohydrates, 2g fiber, 8g proteins, and 8g proteins, and 0g gluten content. These reported values have satisfied the required nutrient content for a product to be called an energy bar. Thus, this product is suitable for athletes and other physically active people to maintain their calorific needs.

CANNA INDICA; FLOURS; FOOD PROCESSING; NUTRITIVE VALUE; PROXIMATE COMPOSITION; ORGANOLEPTIC ANALYSIS; ORGANOLEPTIC PROPERTIES

Nutritional content and sensory acceptability of sweet potato-filled chocolate bites with added probiotic Lactobacillus casei and Lactobacillus plantarum. **Barcelon, E.G., Luneta, J.M.R. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 92.*

Chocolate bites have high potential as carrier for probiotics that could improve gut health. The introduction of chocolate bites with probiotics will provide consumers with an alternative product in addition to the traditional yogurt and milk based drink. It could be a perfect solution to an upset stomach and helps supply the required probiotics making it a delicious option for maintaining optimum digestive health. Major benefits probiotic could offer includes possible enhance response to the immune system, increased ability to digest food, reduces lactose intolerance, increase ability to assimilate the nutrients from food, among others. This study was conducted to determine the survival ability of Lactobacillus plantarum and Lactobacillus casei in sweet potato-filled chocolate bites. The nutritional content, physico-chemical properties and sensory acceptability 4.71 % dietary fiber, 0.48% lipid and 1.06% ash. Results showed that sweet potato-filled chocolate bites are high of chocolate bites were determined. The sweet potato used in this study contains 54.83% moisture, 2.93% Pr h in fat (37%), moisture (18%) and carbohydrate (38%) contents. It has protein content of 5.5% and ash content of 3%. The probiotic L plantarum increases from 11 log CFU/gram to 18 log CFU/gram on the second week of chilled storage, which is a significantly higher value than its initial population. L casei increased from 11 log CFU/gram to 17 log CFU/gram. Sensory acceptability was not significantly different for chocolate bites that contain probiotic those that don't have. Hence, sweet potato-filled chocolate bites are sensory acceptable. Probiotic products are now replacing ordinary foods when it comes to eating healthy, and consumers are slowly becoming accustomed to a new way of being conscious of what they include to their diet.

SWEET POTATOES; CHOCOLATE; LACTOBACILLUS CASEI; LACTOBACILLUS PLANTARUM; FOOD PRODUCTION; PROBIOTICS; NUTRITIVE VALUE; ORGANOLEPTIC ANALYSIS

Nutritional content and utilization of dragon fruit (Hylocereus polyrhizus) peels. **Reterta, A.J.E. Cavite State Univ., Indang, Cavite (Philippines). Trinidad, T.P. University of Santo Tomas, 1008 Manila (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G.,

Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 90.*

One of the fruits that is of great interest today is Dragon fruit (Hylocereus sp). The red pitaya (Hylocereus polyrhizus) a very nutritious fruit and may be a potential functional ingredient in the development of healthy food products. In a recent study conducted, the dragon fruit peels were found to have a higher pectin content and phytonutrients, than the flesh. For this study it aimed to characterize dragon fruit peel as a safe functional ingredient and utilize to develop a food product. First the peels were freeze-dried and was analyzed for proximate composition, dietary fiber and fermentability in vitro, phytonutrients and antioxidant activity using standard methods. Based on the gathered results, it shows that the dragon fruit peel can be an excellent source of dietary fiber (70.3g/1 00g) and contains significant amounts of insoluble (40.1g/100g) and soluble (30.2g/1 00g) fiber. The peels also produced high amounts short chain fatty acids; acetate (68.8 +- 1 A mg/g), propionate (53.8 +- 2.5 mg/g) and butyrate (32.3 +- 1/ mg/g). Dragon fruit peels are also a good source of phytonutrients such as polyphenols (459 ± 86 mg/100g), flavonoids (238 +- 10 mg/100g) and anthocyanidin (356 +- 5 mg/100g). For product utilization, jam was developed, and its physico-chemical properties were assessed. Four types of sweetener (sugar cane, honey, coco sugar and sugar palm sugar) were used to determine the most acceptable formulation. The product assessment for jam showed that the sensory evaluation and consumer acceptability resulted to a highly acceptable rating while the physico-chemical characteristics (TSS and pH) of the jack are all within acceptable levels. Data presented exhibits the potential of the peels to be a functional food ingredient for food product development. The use of food wastes such as dragon fruit peels can help in promoting produced food products that may provide health benefits.

HYLOCEREUS; SPECIES; PEEL; FOODS; FOOD PRODUCTION; NUTRITIVE VALUE; USES

Partially purified fructosyltransferase for production of low-glycemic index natural sweetener. **Acuña, N.A.S., Matel, H.L. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 85.*

There is a strong need to develop technologies for production of low glycemic index sweeteners to reverse the increasing prevalence of diabetes in the country, which is correlated with high consumption of sugar. Efforts to synthesize fructans using enzymes were explored. A fructosyltransferase was partially purified from a novel fungal isolate by ammonium sulfate precipitation. Such enzyme was subjected to various assays to characterize and evaluate the potential use for production of low-glycemic index natural sweeteners like fructooligosaccharides or FOS. Reaction was monitored for five days and the reaction products quantified through High Pressure Liquid Chromatography with Refractive Index detector using InertSustain NH2 column and acetonitrile-water (4:1; v/v). Assay using sucrose solution as a substrate demonstrates the evidence of 1-SST and 1-FFT activity by being able to produce 1-kestose and nystose, respectively. The partially purified fructosyltransferase has a specific activity of 0.38 U/mg and after 24 hours, the total fructooligosaccharide production reached 43.61 g/L. The results imply potential application for production of FOS.

SWEETENERS; ENZYMES; AMMONIUM SULPHATE; SUGAR; DIABETES

Physico-chemical and cupping quality of spray dried Aguinaldo blend instant coffee with kaong sugar as sweetener. **Barcelon, E.G., Ocfemia, P.B., Braga, J.D. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 93.*

This study was conducted to develop a spray dried Aguinaldo blend 3-in-1 instant coffee with brown kaong sugar as sweetener. Specifically, the study aimed to determine the physico-chemical properties, evaluate the cupping quality, and determine the consumer acceptability of Aguinaldo blend instant coffee with kaong sugar as sweetener. The process flow developed for Aguinaldo blend 3-in-1 instant coffee with brown kaong sugar as sweetener involved two production phases, namely: the spray drying process followed by the formulation of Aguinaldo blend instant coffee. The physico-chemical properties that were measured for the spray dried Aguinaldo blend instant coffee include solubility, pH, acidity, soluble solid, color, and turbidity. Cupping quality, taste, color, aroma, and consumer acceptability were also determined. The instant coffee blend is 98.45% soluble, with pH value of 7.11. The total soluble solid is 11 Brix, while the titratable acidity value is 64% (quinic acid). It has color intensity (L) value of 60 of the turbidity rating of 100. Consumer acceptability test showed that the spray dried Aguinaldo blend coffee is highly acceptable with a rating of 4.54 on 5-point Hedonic scale. The spray dried 3-in-1 instant

coffee conform to the quality for a pure spray dried instant coffee in terms of solubility, pH, acidity, total soluble solid, color intensity, and turbidity.

COFFEE; VARIETIES; SUGAR; SWEETENERS; CHEMICOPHYSICAL PROPERTIES; SPRAY DRYING; FOOD PROCESSING; FOOD PRODUCTION

Potentials of kalamansi nip with ginger extract. **Albiso, E.S., Polacio, E.M., Buencillo, G.D. Southern Philippines Agri-Business and Marine and Aquatic School of Technology, Diagos, Davao del Sur (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 82.*

Health and well-being, especially among children and adolescents, is a prevailing and important topic of interest nowadays. Studies have shown the growing epidemic of childhood obesity in developed and urbanized populations (Wang and Lobstein 2006). The Philippines is not an exemption, as the increase in the rates of overweight and obesity in children and adolescents from 2003 to 2011 continues (FNRI-DOST 2010; FNRI-DOST 2012). This was attributed to the unhealthy diet and consumption of synthetic food and beverages . This study paves the way to the development of a new refreshing health juice drink made from kalamansi enhanced with ginger extract. It was conducted to develop a product that will foster a healthy food diet and promote innovation on kalamansi nip with the addition of ginger extracts which are known to be rich in vitamins and minerals and are a lot healthier than the synthetic beverages that are commercially available. Hence, this study was conducted to determine the (1) acceptability of kalamansi nip at different concentration of ginger extract, (2) acceptability of the nip among different market segments; (3) nutrients available; (4) shelf-life; and its (5) profitability. Experiments were laid out in a completely randomized design (CRD) and were subjected to sensory evaluation.The nip was most acceptable with 5% ginger. The most preferred concentration of ginger was tested among different market segments and showed high acceptability among the elementary and professional evaluators. Laboratory analysis, revealed that the product contained 327 kcalper 100g, 71.35% carbohydrates, 4.55% crude fat 4.12 % saturated fats, 0.19% crude protein, sodium - 43.68ug/g sodium; potassium - 508ug/g; calcium -101 ug/g potassium - 508ug/g; and calcium - 101ug/g. Kalamansi nip and juice lasted for 51 and 3 days respectively at r° temperature. Moreover, the production of kalamansi nip had a promising return of 20-35%.

CALAMONDINS; GINGER; EXTRACTS; NUTRITIVE VALUE; PRODUCT DEVELOPMENT; KEEPING QUALITY; PROFITABILITY

Preserve our dwindling Sago palm [Metroxylon sagu]. **Yap, J.P. Jr.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 36-38. Jul 2018.*
https://www.agriculture.com.ph/2019/06/04/preserve-our-dwindling-sago-palm/

METROXYLON; PROPAGATION MATERIALS; PLANTING; FOOD TECHNOLOGY; PROCESSING; STARCH; FOODS

Product development of ready-to-eat balbas bakiro (Momordica cochinchinensis Spreng.)-watermelon gelatin snack. **Ong, G.V.P., Algar-Carbonera, A.F.C., Zubia, C.S. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Food Science and Technology. Tayobong, R.R.P. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 154-155. 2019.*

Balbas bakiro (Momordica cochinchinensis Spreng.) is an indigenous crop in the Philippines with potentially high nutritional properties but is under utilized. To address this problem, the aril part of the Balbas bakiro fruit was used to develop a ready-to-eat gelatin snack with improved nutritional properties. Natural watermelon fruit extract was added since the balbas bakiro arol has no perceivable flavor. Three formulations of the gelatin snack were prepared with different balbas bakiro aril to watermelon ration and and was subjected to sensory evaluation using Quality Scoring together with the control. Results showed that the formulation with 50:50 aril:watermelon ratio obtained high scores in terms of color, aroma, texture, sweetness, flavor, and general acceptability. Proximate analysis showed that the product with balbas bakiro aril (50:50 formulation) has higher total minerals (0.82%), crude fat (0.84%), crude fiber (0.05%) and total carbohydrates (14.20%) compared to the control. It also has higher antioxidant activity (42.67%), as well as micronutrients and phytochemicals such as Vitamin A (89 mug RAE/100g), lycopene (5.83 mg/100g), and total phenolic compounds (40.25 mg/100g). Furthermore, consumer test was conducted and results showed that balbas bakiro-watermelon geletin snack obtained high scores, from a scale of 1 (lowest) to 7 (highest), in terms appearance (6.35), taste (5.87) and overall acceptability (6.08). Thus, the incorporation of balbas bakiro aril can be used to fortify and improve the nutritional and functional properties of an existing ready-to-eat gelatin snack.

MOMORDICA; SPECIES; VARIETIES; FOOD PROCESSING; PROCESSED PLANT PRODUCTS; SNACK FOODS; PRODUCTS; PRODUCT DEVELOPMENT; NUTRITIVE VALUE

Production and sensory acceptability of dragon fruit (Hylocereus spp.) chips. **Laforteza, J.C., Barcelon, E.G. Central Luzon State Univ., Science City of Muñoz, 3119 Nueva Ecija (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 84.*

Pitaya — more commonly known as dragon fruit or pittaberry is a perennial, fast-growing, climbing vine cactus species that belongs to the family of Cactacea, is emerging in health promotion product in addition to its known application in food having nutritional and decorative effects. Fruit slices contain highly gelatinous carbohydrates, such as cellulose, hemicelluloses and simple saccharide polymers. The seasonality of consume and use them throughout the year, thus various preservation and processing techniques have been made to provide an alternative to their fresh consumption and utilization. In order to develop a high quality product and Improve the shelf life of dragon fruit, it is essential to do further processing and preservation of fruit. Currently, there are only few studies on the quality characteristics of tropical fruits particularly in dragon fruit products. The main purpose of this study is to set optimum drying process and procedure for the dragon fruit chips production. In this study, conventional cabinet-type dryer was used as a suitable drying method to preserve fruit's color as well as other vital components of the fruit. Fresh dragon fruit slices were dried in a convection oven dryer and produced dragon fruit chips from two varieties (red and white) grown in the Philippines. The characteristics of the dried dragon fruit chips samples were determined. White dragon fruit chips with blanching showed highest texture value in terms of hardness, and mean score in all parameters used in sensory evaluation. Generally, all drag: fruit chips produced from two varieties (red and white) are acceptable according to all dried product qualities.

HYLOCEREUS; SPECIES; FRUITS; FOOD PROCESSING; DRYING; ORGANOLEPTIC ANALYSIS; ORGANOLEPTIC PROPERTIES

Production of pectin from unripe off-grade Cavendish banana peel. **Santos, R.J., Mendoza, M.B., Alviola, J.N.A. Philippines Univ. Mindanao, Mintal, Davao City (Philippines). Dept. of Food Science and Chemistry. jaalviola@up.edu.ph., Digal, L.N. Philippines Univ. Mindanao, Mintal, Davao City (Philippines). School of Management.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019.

Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 155. 2019.

Cavendish banana is the most exported variety among all banana grown in the Philippines. Unripe, off-grade Cavendish banana peel was used in the production of pectin, which is an important gelling agent not readily available in Philippine Supermarkets. The chemical characteristics of Cavendish banana pectin extracted under different ph (1.5, 2.0, 2.5) and temperature 80 deg C, 90 deg C) combinations were assessed and compared with a commercial pectin sample. The best extraction condition of Cavendish banana pectin was 90 deg C, pH 2.0 and extraction time of 4 h which gave a yield of 40%. The chemical characterization of the banana pectin samples revealed equivalent weight values that were significantly higher (>1000) than the commercial pectin's equivalent weight of 953.14 which means a high-gel forming ability. The methoxyl and anhydrouronic acid (AUA) contents of banana pectin were significantly lower than those commercial pectin. This means that the former samples, except pectin from 90 deg C pH 2.0) and commercial pectin. Significant differences were observed only in viscosity and color. Pineapple jam with Cavendish banana pectin was rated as bright yellow and very viscous. A similarity high overall acceptability score was given to both samples. The chemical properties of banana pectin are generally comparable to the commercial pectin. Therefore, unripe off-grade Cavendish banana peel ne a potential source of pectin.

MUSA (BANANAS); BANANAS; PEEL; PECTINS; FOOD PROCESSING; ORGANOLEPTIC PROPERTIES

Rice bran: an excellent ingredient for functional fresh wheat noodles. **Manaois, R.V. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. rvmanaois@philrice.gov.ph., Zapater, J.E.I. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 157. 2019.*

Rice bran is an underutilized agricultural by-product abundant is essential nutrients and bioactive compounds that are implicated in disease prevention and health maintenance. This study evaluated the potential of rice bran as a functional ingredient in fresh wheat noodles. Seven non-pigmented and four pigmented rice varieties were screened for dietary fiber (DF) content and the brans with the highest DF were selected for noodle enrichment. Fresh noodles was supplemented with the bran at 0, 2, 5 and 10% (wt/wt wheat flour) and tested for acceptability by a consumer sensory panel (n=15, age > 18 years old). The DF,

protein ash, and fat content of the noodles with the highest sensory acceptability were then determined, along with a control sample (0% bran). The total phenolic content (TPC) and antioxidant capacity in terms of DPPH radical scavenging activity were also evaluated. Results showed that the bran of NSIC Rc 298 had the highest DF value among the non-pigmented samples (41.2%) and the red Minaangan among the pigmented ones (44.9%). Fresh wheat noodles can be supplementation with bran doubled the TPC of the fresh wheat noodles and raised the DPPH radical scavenging activity by 2-3x higher. In conclusion, rice bran has a great potential as an ingredient in the development of functional foods with health benefits, particularly nutrient-and antioxidant-rich fresh water noodles.

RICE; BRAN; ANTIOXIDANTS; DIETARY FIBRES; HEALTH FOODS; PHENOLIC CONTENT; ORGANOLEPTIC ANALYSIS; PASTA

Rice malt and soy beverage: a non-dairy health drink for children. **Obilgos-Ramos, R.G. ra.ramos@philrice.gov.ph., Labargan, E.S.A. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. Dasalla, J.F., Ramirez, G., Valderama, C.G. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Dept. of Food Science and Technology.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 157. 2019.*

Malt beverages have a naturally sweet caramel taste and idea source of energy while soymilk is a valuable source of proteins, vitamins, and minerals. These products provide nutrients for mental and physical development and an alternative drink for those with lactose intolerance. This study formulated a ready-to-drink malted rice beverage enriched with soymilk for children. Optimum malting parameters were evaluated for NSIC Rc160 rice variety. Formulation of the beverage was optimized by varying the levels of malt extract and soymilk, and consumer sensory acceptability (n=30, 22-68 yo parents/caretakers measurement. Physicochemicals properties (pH, TSS, and TTA) of the malt beverage were characterized. The final product was subjected to consumer test (n=50) against commercial brand among 3 to 12 year-old children child with their parents/caretakers using a 9-point hedonic face scale. Microbial and nutritional quality and beverage were also assessed Results showed that suitable malting conditions for NSIC Rc160 rice were 48 hr of steeping and germination, and kilning at 80 deg C for 24 hr. Sensory results indicated that the optimal formulation levels were 70% malt extract and 30% soymilk based on the high just-about-right score and acceptable attributes profile. The formulated drink was slightly acidic (6.16) had low titratable acidity (0.16%), and high total soluble solids (15.37 B). The malted drink was highly appealing to 3-to-12-year-old children and comparable to the commercial

malt drink. The beverage is safe for consumption based on negative E. Coli, coliform, yeasts/molds, and acceptable aerobic plate count. A 100-mL serving of the beverage can supply 64.5 kcal, 1 g fat, 11.2 g carbohydrates, and 2.4 g protein. The product can be effective vehicle in delivering macronutrients for optimal growth and development of 3-12 yo [year old] children. Further work will be on tapping other nutrient-rich food crops suitable for beverage enrichment.

RICE; MALT; SOYFOODS; HEALTH FOODS; ORGANOLEPTIC ANALYSIS; LACTOSE; CHILDREN

Rum from Negros [Philippines] that's recognized around the world. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 54-57. Apr 2020.*
https://www.agriculture.com.ph/2020/05/27/the-rum-from-negros-thats-recognized-around-the-world/

SUGARCANE JUICE; MOLASSES; DISTILLING; WINEMAKING; PHILIPPINES

Storage stability of thermally-processed vacuum-packed sweet corn in a cob. **Peñaflor, L.M., Tria, D.M.M. Philippines Univ. Los Baños, College, Laguna (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 83.*

Recent trends in food demand show that the perception of food has endured a thorough transformation. The diversification of food away from traditional products and fusion with western style is responsible for changes in the entire food system. Changing lifestyle have influenced various people to consume products comes under ready to eat (RTE) category. This paper aimed to provide consumer additional choices in the market towards the development of a new product from cooked corn in a cob vacuum packed in retort pouches. The potential of this product were studied through evaluation of its sensory quality and storage stability. But some cereal grains and legumes are susceptible to contamination by fungi, which produce various toxins, known as mycotoxins that are considered to be a significant human health concern. They are found particularly in stored cereals. It is important that effective preventive strategies be followed for processed food before storage. One way to address these problems is through thermal processing. Furthermore, processed samples were analyzed for their physico-chemical and microbial properties to facilitate the factors ensuring nutritional, and safety for consumption. Commercial sterility test showed negative results, indicates that samples were commercially sterile and efficient

processing was achieved. The established processing schedule at 121.1 deg C retort temperature were 46.5 minutes for vacuum packed sweet corn in cob. Changes in their physico-chemical properties and highly acceptable rating for sensory attributes were observed significantly after thermal processing. At 30 deg C storage temperature, the estimated shelf-life (Q10 approach) of the pouched sweet corn in a cob is 68 days. Thus, the possibility of thermally process vacuum packed sweet corn in cob as a ready to eat product is reasonable.

ZEA MAYS; MAIZE; VARIETIES; PROCESSED PRODUCTS; KEEPING QUALITY; VACUUM PACKAGING; ORGANOLEPTIC ANALYSIS; ORGANOLEPTIC PROPERTIES

Traditional and indigenized recipes at west (TIRAW): acceptability of animal-based recipes in the municipality of Lambunao,Iloilo, Philippines. **Leal, A.L., Labramonte, L.L., Roncesvalles, L.L., Lam, E.L. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 93.*

This study as part of the TIRAW project was conducted to determine the acceptability of the eleven indigenous recipes. These recipes were identified through a previous study conducted on the existing recipes of the indigenous peoples, Bukidnon tribe, in the Municipality of Lambunao, Iloilo [Philippines]. The recipes were prepared for the acceptability and were evaluated by the 30 taster-evaluators on October 6, 2017 during the in-campus food festival at the WVSU-CAF Campus. The 9-point Hedonic Rating Scale was used to measure the acceptability of the dishes based on appearance, color, flavor, texture, aroma, and general acceptability, while the Food Action (FACT) Rating Scale was used to measure the willingness to eat the dishes by the tasters. The taster-evaluators were composed of guests who were city residents, carenderia owner-cooks, faculty and staff, and students. The 11 indigenous animal-based recipes prepared and evaluated included: native chicken tinu-om (wrapped/stewed in fresh banana leaves), freshwater native stonefish (unog) tinu-om, unog in chopped cassava leaves, native chicken binakol (stewed in a clay pot), native chicken adobo, freshwater native crab (kagang) binanlag (sautéed in a brine), tinipgang (egged chopped edible indigenous leaves [anonang, balwa and lupu] steamed-cooked in banana leaves), kagang sinanlag (pan/pot roasted), and igi (native swamp/paddy snail) binanlag. Based on the results of the study, these indigenous animal-based recipes were hedonically rated from 7.53-8.13 which are 'like very much' by the taster-evaluators, and using the FACT with ratings ranging from 7.03 to 8.13, they would 'eat very often or

frequently' these dishes. The dishes may then be preserved as part of the tradition and Cultural heritage of the IPs, and as part of the menu in the local agri-eco-park of the College/Municipality. A coffee table book is set to be developed and published.

FOODS; COOKING; ANIMAL PRODUCTS; ORGANOLEPTIC ANALYSIS; INDIGENOUS ORGANISMS; ORGANOLEPTIC PROPERTIES; ETHNIC GROUPS; PHILIPPINES

Q03 - FOOD CONTAMINATION

Compliance to food safety standards of ambulant vendors in two cities of Nueva Ecija, Philippines. **Castillo, C.B. Central Luzon State Univ., 3120 Science City of Munoz, Nueva Ecija (Philippines). Dept. of Hospitality Management.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 43; 116-133.*

Food safety practices of food handlers play a significant role in making sure that food is kept clean from the preparation, cooking process, and up to the time it is served to the customers (Mohan, 2006). This study assessed the compliance to food safety standards anchored on Presidential Decree 856, Code on Sanitation of the Philippines that promulgates indicators of appropriate practices in food safety and sanitation of ambulant food vendors in Science City of Munoz and San Jose City, Nueva Ecija, Philippines. Responses were elicited from ambulant vendors and street food consumers and were treated using descriptive statistics, Pearson product moment correlation (r) and t-test. The study revealed that ambulant food vendors complied the highest on the procurement of raw materials, congruent with the street food consumers' perception. Compliance of ambulant food vendors to general requirement, general appearance, water and ice used, preparation and handling, washing of utensils and distribution and point of sale were generally often observed as reported by the ambulant food vendors and perceived by the street food consumers. The results indicated a significant difference on the compliance to food safety standards of ambulant food vendors on procurement of raw materials, distribution and point of sale and overall compliance to standards, where vendors from San Jose City showed higher degree of compliance. Food safety is a multi-sectoral concern, thus, private and public sectors must create series of programs, particularly on education and information dissemination about food safety practices. These must include lectures and hands-on activities to be participated by food vendors and consumers that will help augment their knowledge on food safety practices. Regular monitoring on the part of the

government must be conducted as a fundamental ascendency to ensure that small and medium scale food handlers are primary initiators of food safety in the country.

FOOD SAFETY; FOOD HYGIENE; STREET FOODS; FOOD PROCESSING; PHILIPPINES

Policy environment and its impact on nutrition-sensitive agriculture. **Villegas, P.M., Villegas Organic and Hobby Farm, Malvar, Batangas (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran, M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 47; 167-171.*

Nutrition is life itself. Nutritious food is medicine and our passport for overall health and wellness. This is why producing nutritious and safe food is essence of nutrition-based agriculture and food system. The Philippines, as the UN Food and Agriculture Organization reported, is a food insecure nation with its global food ranking dropping from rank 62 to 72 rank in 2017. With the country's food insecurity comes an overall poverty of 31% in 2018 of our more than 100 million population. along with 15-25% malnutrition rate. This is exacerbated by the high incidence of food-related maladies and lifestyle diseases associated with the dominance of chemical-based agriculture, environmental pollutants, and toxic substances that poison the food system. The high incidence of malnutrition and toxic food system indicates that we are already a 'sick' society suffering from ill-health and nutritional disorder. No wonder we are seeing the 'mushrooming' drug stores, hospitals, health centers, and wellness clinics, be it public or privately funded, in the whole country. These are all curative, very costly, and financially debilitating drugs and health care expenses. What we need and want is a preventive health and wellness lifestyle through a nutrition-sensitive agriculture. This means the urgent need to a significant shift to Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP), Organic, Natural Farming and Agro-ecological Agriculture. The Filipinos, especially in the rural areas, must remain dependent on healthy and cheap nutritious food such as 'malunggay' (moringa), coconut, green leafy vegetables, root crops, beans and native fruits as well as culinary and medicinal herbs and spices. Overall, the balance sheet of agricultural policy environment and its implementation points to constraining action programs (liability) outweighing the facilitating or enabling policy reforms and investment climate (assets) Furthermore, there is a serious disconnection between Agriculture and industry Development which disregards the value chain and neglects the agro-industrialization of our economy. Compounding to these misfortunes are the pervasive problems of misgovernance mismanagement and alleged graft and corruption within the sector.

FOOD INSPECTION; FOOD INTAKE; FOOD SAFETY; FOOD SECURITY; AGRICULTURE; ENVIRONMENT; POLICIES; FOOD HYGIENE

Q04 - FOOD COMPOSITION

Bon appetit: nutritious and taste rewarding local edible insects. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 60-61. Apr 2020.*
https://www.agriculture.com.ph/2020/06/02/bon-appetit-nutritious-and-taste-rewarding-local-edible-insects/

PEST INSECTS; FOODS; FOOD RESOURCES; PROXIMATE COMPOSITION; INDIGENOUS ORGANISMS; NUTRITIVE VALUE

Dietary fiber, resistant starch, and grain quality: essential for the development of low glycemic index rice. **Romero, M.V. mtvromero@gmail.com. Bandonill, E.H., Ramos, R.G.A. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. Kosik, O. Rothamsted Research (United Kingdom). Dept. of Plant Sciences. Singh, R.K., Sreenivasulu, N. International Rice Research Inst., College, Laguna (Philippines). Crop and Environmental Sciences Div. Shewry, P., Lovegrove, A. Rothamsted Research (United Kingdom). Dept. of Plant Sciences.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 2-5 Jul 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 148. 2019.*

Rice is mainly consumed as polished from where the outer nutritious bran layer is removed. Consequently, white rice is comprised mostly of starch (>90%) with only protein, dietary fiber and micronutrient contents. Since it is rapidly digested in the human gastrointestinal tract, white rice has a high glycemic index (GI). The consumption of foods with high GI and low dietary fiber (DF) is associated with increased risks for chronic diseases including type 2 diabetes, cardiocascular disease, and cancer. In the development of low GI rice, the important factors are DF, resistant starch (RS), and grain quality. Thus study screened 370 rice lines for DF and RS. Eleven rice lines were then selected, planted and characterized in detail for water extractable (WE) and water unextractable (WU) DF, RS, GI, and grain quality (milling recovery, physical attributes, physicochemical properties, cooking parameters, and sensory properties). WE-DF was composed of arabinose, galactose, glucose, xylose, and mannose while WU-DF were fucose, rhamnose, arabinose, galactose, glucose, xylose mannose, galacturonic acid, and glucoronic acid. RS ranged from 0.43 to 3.30%. Most of the lines had greater than or equal to GI. Meanwhile, they had generally good brown rice total

milled rice, and head rice recoveries, Grain length ranged from short to long while grain shape was either bold, intermediate, or slender. For the physicochemical properties, the crude protein ranged 7.3-9.1% while the amylose content was 10.0-25.5%. Data for cooking water, cooking time, height increase, weight increase, and cooked rice hardness were also collected for each rice line. Majority of the lines had good sensory properties for both the raw and cooked forms. This study is a huge step towards the development of rice varieties with low GI which could help address the increasing incidence of chronic diseases, particularly diabetes, in countries where rice is the staple food.

RICE; DIETARY FIBRES; STARCH; GRAIN; QUALITY; BLOOD SUGAR; DIABETES; PROXIMATE COMPOSITION

Fortification of rice with vitamins Bi , B5, and B6 through surface modification and absorption. **Tiozon, R.N. Jr. De La Salle Univ., 2401 Taft Ave., Manila (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 91.*

Rice is an important staple food that provides dietary energy supply to almost half of the world's population. However, milling process is applied to improve many properties of rice often remove most of its nutritional contents. Rice fortification is therefore sought to improve the daily intake of essential nutrients and address malnutrition and other health issues of the vast majority of the human population. Surface modification through sonication is a simple and convenient technique in making the rice kernel more porous and susceptible for absorption of vitamins such as folic acid. Through this technique, levels of folic acid can be enhanced in rice kernels leading to its fortification. A range of conditions (i.e. soaking for 1, 2, and 3 h with folic acid concentrations of 50, 100, and 200 ppm and milled for 0 s, 60 s, and 120 s at room temperature) will be used to investigate the uptake of folic acid in the fortified rice. The quality of fortified rice will be evaluated based on the head rice yield (HRY), kernel dimensions, and color. The amount of folic acid before and after cooking will be measured using gradient elution in HPLC. Sensory evaluation will be performed to determine its visual and taste acceptability.

RICE; VITAMINS B; NUTRITIVE VALUE; ORGANOLEPTIC ANALYSIS; KERNELS; FOLIC ACID; FOOD ENRICHMENT

Golden rice meets food safety standards in three global leading regulatory agencies. **Anon.** *Agriculture (Philippines). 0118-857-7. v. 22(7) p. 24-25. Jul 2018.* https://www.agriculture.com.ph/2019/05/30/golden-rice-meets-food-safety-standards-in-three-global-leading-regulatory-agencies/

ORYZA SATIVA; RICE; VARIETIES; FOOD ENRICHMENT; FOOD SAFETY; NUTRITIVE VALUE

Radio frequency dielectric heating combined with ultraviolet irradiation induces changes in structural, oxidative and antioxidant properties of beta-lactoglobulin. **Yuwei Wu, Yuanrong Zheng, Bright Dairy and Food Co., Ltd., Shanghai (China). State Key Lab. Danfeng Wang, Shanghai Jiao Tong Univ., Dongchuan Road, Shanghai (China). SJTU-OSU Innovation Center Environmental Sustainability and Food Control. Zhenmin Liu, Yun Deng. Bright Dairy and Food Co., Ltd., Shanghai (China). State Key Lab. y_deng@stju.edu.cn.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 67-74. Mar 2019.* https://pas.cafs.uplb.edu.ph/download/radio-frequency-dielectric-heating-combined-with-ultraviolet-irradiation-induces-changes-in-structural-oxidative-and-antioxidant-properties-of-%ce%b2-lactoglobulin/

The study investigated the impact of radio frequency dielectric heating (RF) alone or in combination with ultraviolet light (UVC) irradiation on structural, oxidative, and antioxidant properties of beta-lactoglobulin. All treatments decreased total sulfhydryl group (TSH), disulfide bonds (S-S), reducing power, fluorescence intensity, alpha-helix and beta-turn structures. Treatments increased random coils, free sulfhydryl group, surface hydrophobicity, 1,1-diphenyl-2-picrylhydrazyl (DPPH) and 2-ethyl benzothiazoline-6-sulfonate (ABTS). Treatment with radio frequency dielectric heating (RF) alone (5 min) resulted in the highest S-S, and the lowest carbonyl contents and antioxidant activities. RF (5 min) + ultraviolet light (UVC) (25 min) generated the maximum random coils, carbonyl and ABTS, and likewise resulted in the minimum alpha-helix, beta-turn, TSH, and S-S.

BETA LACTOGLOBULIN; ANTIOXIDANTS; ULTRAVIOLET IRRADIATION; RADIOACTIVITY; PROTEIN CONTENT

Pigmented rice: a potential chemotherapeutic drug for breast cancer. **Bulatao, R.M. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. rmbulatao@philrice.gov.ph., Nicdao, D.S., de Padua, Z.P., Quiming, N.S., Nicolas, M.G. Philippines Univ. Manila, Zone 72, 670 Padre Faura St, Ermita, Manila (Philippines). Dept. of Physical Sciences and Mathematics. Samin, J.P.A. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. Caguiat, X.G.I., Ferrer, M.C. Philippine Rice**

Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Genetic Resources Div. Mamucod, H.F. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 154. 2019.*

Cancer is the third leading cause of morbidity and mortality in the Philippines. Among women, breast cancer is the main cause o death with an estimated case of 20,267 in 2015 at 1% increase rate annually. The inability of chrmotherapeutic drugs to selectively kill cancer cells and leave normal cells unharmed calls for the development of the new anticancer drugs that are more effective and less toxic. Because of this, scientists are exploring on the possible use of natural products in the treatment of cancers. One possible candidate is the pigmented rice samples(10 each black and red rice) were extracted using different solvent systems and then subjected to brine shrimp lethality assay using Artemia Salina. The most cytotoxic samples for black and red rice varieties were undergone phytochemical analysis and cell viability assay using two breast cancer cell lines (MCF-7 and MDAOMB-231). Results showed that Kawitan (red) and Piniliza Zambales (black) had the lowest lethality concentrations at 50 (LC sub 50) of 0.37 ppm and 19.23 ppm among the samples, respectively. They were also found to have high phytochemical content and strong antioxidant activities. Partial purification revealed 10 fractions for Kawitan and 8 fractions for Pinilisa. Fraction 3 of both Kawitan and Pinilisa obtained the lowest LC sub 50 values of 139.35 ppm and 114.64 ppm, respectively. Furthermore, the Fraction 3 (68.94%) and 4 (96.41%) of Kawitan had the highest growth inhibition against MCF-7 and MDA-MB-231 cells, respectively. Meanwhile, Fraction 3 of Pinilisa Zambales had the highest growth inhibition for both MCF-7 (50.60%) and MDA-231 (67.81%) cells. The study concluded that pigmented rice varieties are potential source or cheap and safe chemotherapeutic drug against breast cancer.

ORYZA SATIVA; RICE; VARIETIES; PIGMENTS; COLOUR; ANTIOXIDANTS; DRUGS; NEOPLASMS

Pungency characterization of garlic bulbs from various areas in the Philippines. **Nuevo, P.A. perly4246@gmail.com., sampaloc2004@yahoo.com., Artes, L.A., Maunahan, M.V., Resorez, J.M. Philippines Univ. Los Baños, College, Laguna (Philippines). Postharvest Horticulture Training and Research Center.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 155. 2019.*

Garlic bulbs taken from 10 production areas and markets in the country were sampled approximately three to five months after harvest (August-October, 2018). There were evaluated for pungency by analyzing its pyruvate level. Total soluble solids (TSS) content of the bulbs was also measured. Bulbs taken from the Ilocos Region had comparable pyruvate content with those from Mindoro (approx 88 umol/g FW pyruvate). Such levels were about the same as reported in Argentina (Natale and Camargo, 2005). Comparison between bulb sizes showed that smaller bulbs had usually higher pyruvate content than the bigger bulbs of the same batch. After about a month of ambient condition (approx 30C), the pyruvate content of local garlic increased by about 50% in majority of the samples. However, TSS values obtained were about 33 deg Brix with no distinct trend.

GARLIC; BULBS; SMELL; DIFFUSION; PYRUVATES; PRODUCTION LOCATION; PHILIPPINES

Rice bran: an excellent ingredient for functional fresh wheat noodles. **Manaois, R.V. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div. rvmanaois@philrice.gov.ph., Zapater, J.E.I. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Div.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 157. 2019.*

Rice bran is an underutilized agricultural by-product abundant is essential nutrients and bioactive compounds that are implicated in disease prevention and health maintenance. This study evaluated the potential of rice bran as a functional ingredient in fresh wheat noodles. Seven non-pigmented and four pigmented rice varieties were screened for dietary fiber (DF) content and the brans with the highest DF were selected for noodle enrichment. Fresh noodles was supplemented with the bran at 0, 2, 5 and 10% (wt/wt wheat flour) and tested for acceptability by a consumer sensory panel (n=15, age > 18 years old). The DF, protein ash, and fat content of the noodles with the highest sensory acceptability were then determined, along with a control sample (0% bran). The total phenolic content (TPC) and antioxidant capacity in terms of DPPH radical scavenging activity were also evaluated. Results showed that the bran of NSIC Rc 298 had the highest DF value among the non-pigmented samples (41.2%) and the red Minaangan among the pigmented ones (44.9%). Fresh wheat noodles can be supplementation with bran doubled the TPC of the fresh wheat noodles and raised the DPPH radical scavenging activity by 2-3x higher. In conclusion, rice bran has a great potential as an ingredient in the development of functional foods with health benefits, particularly nutrient-and antioxidant-rich fresh water noodles.

RICE; BRAN; ANTIOXIDANTS; DIETARY FIBRES; HEALTH FOODS; PHENOLIC CONTENT; ORGANOLEPTIC ANALYSIS; PASTA

Q70 - PROCESSING OF AGRICULTURAL WASTES

Planters made of pandan leaves provide income for Laguna [Philippines] farmers. **Taculao, P.B.S.** *Agriculture (Philippines). 0118-857-7. v.24 (06) p. 22-23. Jul-Aug 2020.* https://www.agriculture.com.ph/2020/06/10/planters-made-of-pandan-leaves-provide-income-for-laguna-farmers/

PANDANUS; LEAVES; PLANT CONTAINERS; ORGANIC AGRICULTURE; FARMERS; INCOME; PHILIPPINES

Sheets happened: pineapple leaves become an alternative source of paper. **Hubilla, E.K.** *Agriculture (Philippines). 0118-857-7. v.24 (4) p. 41-43. Apr 2020.* https://www.agriculture.com.ph/2020/05/21/sheets-happened-pineapple-leaves-become-an-alternative-source-of-paper/

ANANAS COMOSUS; PINEAPPLES; LEAVES; PULPING; PULP; PLANT FIBRES; RAW MATERIALS; PAPER; PAPERMAKING

Q80 - PACKAGING

Optimization of process parameters for the extraction of anthocyanins from black rice bran using response surface methodology. **Bulatao, R.M., Samin, J.P.A., Tubera, R.P. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Rice Chemistry and Food Science Division. Rubio, M.M.M., Romano, D.C., Rafael, R.R. Central Luzon State Univ., Nueva Ecija (Philippines). Dept. of Chemistry. rudy_macky@yahoo.com, m.bulatao@philrice.gov.ph.** *Philippine Agricultural Scientist (Philippines). Formerly The Philippine Agriculturist. 0031-4454. v. 102 (1) p. 1-13. Mar 2019.* https://pas.cafs.uplb.edu.ph/download/optimization-of-process-parameters-for-the-extraction-of-anthocyanins-from-black-rice-bran-using-response-surface-methodology/

This study aimed to optimize different process parameters for the extraction of anthocyanins from black rice bran using Response Surface Methodology (RSM). To determine its degradation profile, the stability of crude anthocyanin extract (CAE) against selected biologically relevant buffers was also evaluated. Two-level full factorial and Box-Behnken designs were employed in the screening and optimization of extraction parameters, respectively. CAE was prepared from black rice bran using conventional and optimized methods, and the resulting extract was determined for their phytochemical

content and antioxidant scavenging activities. Stability of the optimized CAE was further evaluated using biologically relevant buffers for 48 h. Results showed that the optimum conditions for the extraction of anthocyanins were 60% ethanol, 0.2% hydrochloric acid, and 215 min of extraction. The CAE obtained from the optimized method was 4 times higher in anthocyanins, 2.3 times higher in 2,2-diphenyl-1-picrylhydrazyl(DPPH) radical scavenging activity, 1.7 higher in phenolics and ferric reducing antioxidant power (FRAP) values, and 1.5 times higher in flavonoids than that obtained from the conventional method. In terms of its stability, the optimized CAE did not undergo substantial degradation at pH 1, while significant degradation was observed at pH 7.4. Addition of 10% newborn calf serum had no significant effect on the stability of anthocyanin. The half-life of anthocyanins from the optimized CAE ranged from 29.0 to 32.5 h based on first order kinetics. The study suggests that RSM is a practical and effective statistical tool that can be used to optimize the best conditions in extracting athocyanins from black rice bran.

RICE; VARIETIES; BRAN; ANTHOCYANINS; EXTRACTION; ANTIOXIDANTS; CHEMICOPHYSICAL PROPERTIES

Well-designed packaging can help agriproduct sales. **Tan, Y.** *Agriculture (Philippines). 0118-857-7. v. 23 (9) p. 56-58. 2019.*

AGRICULTURAL PRODUCTS; FOODS; PACKAGING; DESIGN; PACKAGING MATERIALS; CONSUMERS

S - HUMAN NUTRITION

S01 - HUMAN NUTRITION - GENERAL ASPECTS

Achieving food and nutrition security through social protection. **Dewi, O. Research and Development Center for Social Welfare Ministry of Social Affairs (Indonesia). Research Division for Social Rehabilitation and Social Empowerment.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 31.*

In Indonesia, 7.8 million (35.6%) of the 23 million children under five years of age suffer from stunting, with 18.5% in the very short category and 17.1% in the short category. The stunting tolerance limit of WHO is set at 20% or one fifth of the total number of toddlers.

This also resulted in WHO establishing Indonesia as a country with poor nutritional status. In the National Medium-Term Development Plan (RPJMN), the Indonesian government is targeting a decrease in stunting prevalence from an initial status of 32.9% to 28% in 2019. For the reduction of stunting rates, the government has also set 100 priority districts to be handled in the initial stages.

CHILDREN; FOODS; NUTRITIONAL STATUS; FOOD SECURITY; INDONESIA

Achieving nutritional security through the development of healthier rice: progress and prospects. **Swamy, W. International Rice Research Inst., Los, Baños, Laguna (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 61.*

More than one billion people, particularly children and women, suffer from Iron (Fe), Zinc (Zn), and Vitamin A (Vit A) deficiency related diseases in South and Southeast Asia. These are the regions where rice is the major staple food and supplies 50 to 80% of the caloric intake, but polished rice is low in essential micronutrients (Fe, 2-3 ppm; Zn, 12-14 ppm, Beta-Carotene, 0 ppm). Zn deficiency causes growth retardation, impaired immune function and diarrhea; while, Vit A deficiency causes blindness and reduced immunity, resulting in serious global health problems. Biofortification of rice with micronutrients has been suggested to be one of the most sustainable, targeted, food-based and cost-effective approaches to combat micronutrient malnutrition. There is a huge genetic variation for grain Zn in rice germplasm which can be exploited by breeding to develop high Zn rice varieties. Similarly, genetically modified golden rice can supply Vit A, which can be introgressed to popular rice varieties to develop pro Vitamin A-rich rice. The development of healthier rice varieties with micronutrients and Vit A will contribute significantly to improve the health of human populations and will result to inclusive growth. The recent progress in the development of healthier rice varieties was also discussed in the presentation.

ORYZA SATIVA; RICE; HUMAN NUTRITION; FOOD SUPPLY; NUTRIENT INTAKE; NUTRITIONAL REQUIREMENTS; FOOD ENRICHMENT

Adding diversity as a new dimension in the food security framework. **Shun-Nan Chiang, Capiña, X.G. Southeast Asian Regional Center for Graduate Study and Research in Agriculture, Los Baños, Laguna (Philippines).** International Conference on Nutrition-

Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 94.*

The international development field is undergoing a paradigm shift from a focus on hunger to an increased focus on the coexistence of multiple forms of malnutrition. The composition between the United Nation's MDG and SDG demonstrates this paradigm shift. While the indicator of MDG-1 only focuses on energy deficiency, in contrast, in SDG, relevant indicators include energy deficiency, subjective experience of food security, chronic undernutrition, and over-/underconsumption of calories. Overall, the shift from MDGs to SDGs involved two major changes namely: (1)ending all forms of malnutrition has become a central part of the goal and (2)sustainable agriculture now shares the same goal with hunger to multiple forms of malnutrition calls for an update of the original food security framework. However, since 'food security framework' and nutrition security framework, However, since 'food security framework' and 'nutrition security framework' both have distinct dimensions, it is not easy to develop an operationalize. Based on this observation, the authors argue that it may be more realistic to consider specifically how the food system could contribute to one specific dimension - adequate and nutritious food - of nutrition security. As a result, the authors intend to propose a 'food security for nutrition framework by adding a new dimension of 'diversity' to the original food security framework. Based on the results of the study, the authors argue that 'diversity' should serve as the precondition of all other dimensions and be achieved throughout the entire food system from production to consumption, including agricultural diversity, dietary diversity, cultural diversity, and the diversification of the entire food system.

FOOD SECURITY; MALNUTRITION; AGRICULTURE; HUMAN NUTRITION

Community convergence approach lesson from Thailand. **Chavasit, V. Mahidol Univ., Salaya, Nakhonpathom (Thailand). Inst. of Nutrition.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings Interdisciplinary Studies Center for Food and Nutrition Security. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). p. 29; 101-104.*

The most desirable outcome of the food system is good quality of life for a population within a sustainable living environment. Under a good food system, agriculture, food, nutrition and health are culturally linked with socio-economic and environmental awareness. As a developing agricultural country that has a main income from food exportation, Thailand must be able to sustainably produce safe and nutritious food to overcome food and nutrition insecurity and problems of inequality among the members of the population, as well as providing premium grade products for the world market. Since 1970, Thailand has used a nutrition - sensitive agricultural approach for food production to solve protein energy malnutrition and micronutrient deficiency. Multi-sector collaboration at the policy-making level was the key to success in designing practical strategies for different stakeholders at a community level. Within 20 years, the malnutrition problem was drastically reduced from 50% to 7% in preschool children. However, a double in malnutrition problem still remains and is expanding in an opposite direction. Thailand is now top-ranking in terms of over nutrition among the ASEAN countries. To overcome this, the policy on a community approach with multi-sector collaboration still remains, however with an expanding number of stakeholders using different channels. Nutrition education, especially in terms of limiting sodium, sugar, and fat intakes, as well as increasing consumption of fruits and vegetables, is another key strategy for overcoming NCDs. In addition, nutrition-sensitive agricultural practices are carefully performed by considering both supply and demand sides regarding market needs and the zoning system. Additional stakeholders from both public and private sectors are now more involved. The term 'Community' in Thailand's present food system is expanding more than ever to encompass communities of stakeholders in different contexts and using different channels to converge in addressing the nation's double burden of malnutrition.

MALNUTRITION; OVERFEEDING; FOODS; AGRICULTURE; HEALTH; THAILAND

Effect of the community-based feeding program on the children's nutritional status. **Montaño, R.N., Bingil, G.P.B. West Visayas State Univ., Luna St, La Paz, Iloilo City, 5000 Iloilo (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 94.*

Nutritional status is a major determinant of the health and well-being of children. This study was done in a certain barangay [village] in Cagayan de Oro City which is identified as a depressed area. The people earn their livelihood by serving as market / food vendors, tricycle drivers, laborers, security guards, and other low-income generating jobs. This study

intended to determine the effects of community-based feeding program on the nutritional status of children. This program involved the feeding of the children as well as the implementation of kitchen garden especially the planting of malunggay (horseradish) and other green leafy vegetables; and nutrition education with emphasis on menu planning to their parents. The study involved a purposive sampling of children having the age range of 0-5 years old and who were found to be underweight and severely underweight. Anthropometric data on their weight and height were taken before and after the feeding program. The children were fed with energy-dense meals during lunch time for around one month Observation, interview, questionnaire, and test were also utilized to gather the data from parents. Findings reveal that the nutrition-related activities helped improve the nutritional status of the children under study as indicated by a significant increase in their weight after the feeding program. Thus the program was effective. addressing the children's nutritional problem. The study points to the need to sustain the community-based feeding program for the benefit of malnourished children in the community.

CHILDREN; NUTRITIONAL STATUS; FEEDING SYSTEMS; DOMESTIC GARDENS; DEVELOPMENT PROJECTS

Food policies and the Philippine plan of action for nutrition in promoting healthy diets. **Raval, J.B. International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 70.*

The Philippines, like many countries, is facing the double burden of malnutrition. Stunting remains high at 33.4% children under five years old (2015) and at the same time prevalence of overweight and obesity is increasing at 3.9% among children under five years of age (2015) and 31.1% (2013) among adults.One of the key factors affecting malnutrition is the consumption of poor diets. The presentation discussed the existing food and nutrition policies and programs that promote healthy diets. It also presented the Philippines Plan of Action for Nutrition 2017-2022 as the Framework for addressing malnutrition in the Philippines, including its program that promote healthy diets.Policies and programs included those that promote healthy food environments, improve access to healthier food options, and fiscal measures to reduce consumption, of unhealthy food and beverage. It discussed some if the gaps identified in achieving healthy diet and improved nutrition.

Recommendations for improving the food system and the role of the agriculture sector in promoting nutrition were also presented.

MALNUTRITION; HUMAN NUTRITION; DIET; FOOD POLICIES; PHILIPPINES

Food waste and food security among Filipino households. **Capanzana, M.V. Department of Science and Technology, Bicutan, Taguig City (Philippines). Food and Nutrition Research Inst.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 67.*

The world is still challenged by the persistent problems of hunger and malnutrition, yet it is producing more than enough food. Food loss and food waste, collectively termed as 'food wastage' refers to decrease of food throughout the subsequent pathways of food in the supply chain. This food wastage is seen to represent a missed potential opportunity to improving food security. FAO data in 2015 revealed that one third of the food produced in the world for human consumption, or approximately 1.3 billion tons, are lost or wasted every year. This food wastage can already feed millions of individuals suffering from hunger and malnutrition across the globe. The review paper aimed to described the food waste among Filipino households, particularly during the final stage of the supply chain - household food consumption. It also highlights food waste implication to nutrient intake and food security status. The Department of Science and Technology (DOST)Food and Nutrition Research Institute (FNRI) estimates food waste through the Household Food Consumption Component Of the National Nutrition Survey. In particular, post-consumption waste or the food left unutilized in the household's plate or table discarded or fed to pets were measured through weighing. In 2015, the average food wastage per day was 62 grams with highest contributions from cereals and cereal products, fish, meat and poultry, and vegetables. A wide variation in the amount of household plate waste was observed across regions, with the highest amounts recorded in CAR (103 grams) and Eastern Visayas (100grams). Rural households reported significantly higher amount ($p<0.05$) of plate waste that their urban counterparts. While total plate waste was observed to be similar across wealth quintiles, waste from fish, meat and poultry was highest in the richest quintile and lowest in the poorest quintile. Converting the amount of household plate waste into its nutrient equivalent, a total of I 72 kilocalories or 2.3% of the available energy is lost per day. Similarly, this accounted for about 2.7%, 1.9%, and 0.7% of available carbohydrate, protein and fat intakes. Furthermore, food waste at the household level is associated with being food insecure. Thus, strengthening support to the government's initiative for a zero hunger

Philippines, also call for a zero food waste starting at home. Further studies on food waste outside home or how different food establishments and how these can alleviate food insecurity problem should also be conducted.

FOOD WASTES; FOOD SECURITY; HUMAN NUTRITION; HOUSEHOLDS; PHILIPPINES

Governance aspect of nutrition-sensitive food systems. **Carada, W.B. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Governance and Rural Development.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 53.*

Governance is a cross-cutting issue in the discussion and practice of nutrition-sensitive agriculture. The paper highlights governance of nutrition-sensitive agriculture as an approach to enhance the supply and demand for nutritious food and to add nutritional value or minimize food and nutrient loss thereby improving food security. Governance — the systems of rules, authority and institutions that steer or coordinate state and non-state actors — of food systems are usually not coherent and harmonized in developing countries. To enhance integration, coordination, and inclusiveness the paper endorses a nutrition-sensitive food systems governance approach. The food system approach advocates an interconnected and adaptive governance covering the various subsystems of the chain — from input provision, production, distribution, trading/marketing, consuming of food, utilization, and disposal. The paper further upholds that a strong link between the food system and its external environment should be maintained, as any distortion in any element and/ or environment of a food system affects the other subsystem/s or element/s of the chain. Inflation, for example, disturbs food access and ultimately, nutrition status. The paper strongly supports the governance of nutrition-sensitive food systems as an approach to food security, granting individuals the right to sufficient, healthy, and culturally appropriate food for all. The study recommends the strengthening of local governance of nutrition-sensitive food systems where food providers and consumers make joint decisions on food issues that benefit and protect all.

GOVERNANCE; FOOD SAFETY; FOOD SECURITY; HUMAN NUTRITION

Historicizing the nutrition-agriculture linkage from the global food systems perspective. **Shun-Nan Chiang. Southeast Asian Regional Center for Graduate Study and Research in Agriculture (Taiwan).** International Conference on Nutrition-Sensitive Agriculture and Food

Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 46.*

Countering the common understanding that there is a divide between the focus of agricultural development on product (Green Revolution) and on nutrient values (Nutrition-Sensitive Agriculture), the linkage between nutrition and agriculture has existed for a long time, but the interaction of the two has changed over time. From a long-term socio-historical perspective, since the beginning of human history, the methods human beings use to collect and manage food has been impacting their dietary habits and their health conditions. Every time human beings transition into a new type of food production system, the transition may be followed by the degradation of nutritional condition for particular social groups of the society. Focusing only on the history of the modern period, this paper intends to delineate the interaction between: (1) the (trans)formation of the global food system and (2) the advances of nutrition knowledge and international nutritional governance since 1870s.Beriberi (Vitamin B1 deficiency) was prevalent in the Philippines and other rice-eating Asian countries from 1870s to 1960s. The case of Beriberi presented an early example of how the global food system and the issue of malnutrition are entangled in a complicated way. Then came the period of the Green Revolution from the 1960s to the 1980s. The origin of the Green Revolution was also based on the intention to solve the issue of hunger in the post-WWII period. Several initiatives were promoted during this period such as the USAID Food for Peace program or the UN workshops on Interfaces Between Agriculture, Nutrition, and Food Science after 1975. Anchored on the discussions of these two periods in history, discussions on the emergence of nutrition-sensitive agriculture and consider the uniqueness of nutrition-sensitive agriculture in the contemporary era are presented. These include (1) multiple forms of malnutrition interacting with each other, as well as interventions interfering with other types of malnutrition; (2) polarization of approaches to agricultural development; (3) data-driven decision-making. The study proposes policy making on nutrition-sensitive agriculture put greater premium on (1) evaluating what kind of malnutrition to be addressed, as well as the potential unintended consequences to other types of malnutrition; (2) exploring the potential of multi-functions underlying any agricultural innovations; and (3) developing a better framework of food security.

AGRICULTURAL DEVELOPMENT; HIGH YIELDING VARIETIES; FOOD SECURITY; HUMAN NUTRITION; DEVELOPMENT PROJECTS; TECHNOLOGY TRANSFER

Mobilizing the nutritional power of vegetable. **Woperies, M. World Vegetable Center (Taiwan).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 56.*

Vegetable production in Asia is big business, which is focused, on a few globally important crops. This is the case despite the fact that traditional vegetables are more robust and have greater inherent nutritional power. To mobilize that power, a combination of supply and demand interventions is needed - from household gardens that address family nutrition to market-oriented farming aimed at urban consumers. WorldVeg and partners have reached close to 60,000 vulnerable rural households in Africa and Asia with household garden approaches. They continuously work with families to grow their own vegetables and paying attention to nutrition messaging and water, sanitation, and hygiene practices This integrated agriculture-nutrition-health approach has shown promise in terms of enhancing diet diversity at the household level. For urban consumers, it is important to emphasize links in food value chains. On the supply side, food systems must deliver more diverse sources of safe, affordable and nutritious vegetables. Productivity needs to be enhanced in a safe and sustainable manner by promoting good agricultural practices and affordable protected cultivation. Improvements in transportation infrastructure and processing cold storage, and synchronized production and marketing will help in reducing postharvest losses. Promoting year-round production, aggregation, and agreed-pricing through contract farming may lead to lower and more stable prices for vegetables and improve consumer choices. On the demand side, radio, and TV broadcasts school meal programs and food festivals celebrating healthy and locally produced food will help to enhance knowledge about the importance to eat well. Introduction of subsidies and taxes need to be considered to prompt change in consumer behavior. Nutrition labeling and traceability, and banning advertisements for unhealthy food may nudge consumers towards better nutrition. The cost of malnutrition to society is staggering, yet spending on nutrition-specific interventions by government donors and multilateral institutions remains woefully inadequate.

VEGETABLES; PLANT PRODUCTION; NUTRITIVE VALUE; HUMAN NUTRITION; HEALTH

Nutrition-sensitive humanitarian food assistance. **Gluning, S. UN World Food Programme Philippines (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive*

Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 68.

As the world's largest humanitarian organization addressing the challenges of global hunger and nutrition, the UN World Food Programme Philippines (WFP) embraces Sustainable Development Goals 2 (Achieving Zero Hunger) and 17 (Partnerships to support achievement of the SDGs) as its core- mandates. In the next five years, WFP along with its partners will continue providing support to the Philippine government to end hunger, improve nutrition, and achieve food security in contexts of development, humanitarian, and emergency. Food insecurity and malnutrition are widespread in the country. Many Filipinos suffer from lack of food or poor diets despite increasing food availability. This is because of inadequate access to food due to high poverty and low income, especially a among the rural population that are generally engaged in agriculture. This situation is exacerbated by recurrent natural and man-made emergencies and disasters. The Philippines is the second most at risk country from the effects of climate change that largely affects agriculture, income, food insecurity, and nutrition. WFP provides nutrition-sensitive support during humanitarian events. It contributes to addressing the displaced population's immediate hunger needs through general food distribution and unconditional cash transfers. WFP initiatives also work towards preventing malnutrition from worsening, particularly -among young children, as well as pregnant and lactating women, through its nutrition program. The organization provides nutritious food through its emergency school feeding so that children stay in school and support communities from the onset of emergency until recovery and rehabilitation through its livelihood programs (i.e food for asset, cash for asset) From 2018-2023, the WFP's Country Strategic Plan will support the Philippine Development Plan in its vision. 'All citizen are from hunger and poverty, have equal opportunities, enabled by fair and just society that is governed with order and unity. A nation where families live together, thriving in vibrant, culturally diverse, and resilient communities'.

HUMAN NUTRITION; FOOD SECURITY; MALNUTRITION; EXTENSION PROGRAMMES; DEVELOPMENT PROJECTS

Nutrition-sensitive postharvest handling, storage and processing. **Serrano, E. P. Philippines Univ. Los Baños, College, Laguna (Philippines). Inst. of Crop Science.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 66; 172-180.*

Postharvest handling, storage, and processing have been shown to be the weakest link in the food supply chain. At these points, postharvest losses in terms of nutritional and physical quality can be substantial. Minimizing these losses is one of the strategies to address the challenges in nutrition-sensitive agriculture in particular and food security in general. Cereals, legumes, fruits, and vegetables are important and common sources of nutrients to meet the requirements of the human body for growth, development, and sustenance of a healthy well-being. These food types however, are also the ones that are inherently and highly perishable. This means that their nutritional contents change or diminish with time and with the methods of handling, packaging, storage, and processing. This paper discussed the nutrient content and changes in the nutrient levels in fruits, vegetables, cereals, and legumes as influenced by postharvest practices and secondary processing. The paper also presented appropriate post production strategies, techniques, or practices to minimize nutrient loss —and even enhance nutrient levels in the food commodities.

HUMAN NUTRITION; FRUITS; FOOD HYGIENE; STORAGE; FOOD PROCESSING; FOOD SUPPLY; VEGETABLE CROPS; POSTHARVEST TECHNOLOGY

Palayamanan as a strategy in promoting nutrition-sensitive agriculture. **Corales, R.G., Rivera, J.M., Sajor, J.T., Gabriel, D.A. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Agronomy Soils and Plant Physiology Div. Tan, M.A.C., Corales, A.M. Philippine Rice Research Inst., Maligaya, Science City of Muñoz, Nueva Ecija (Philippines). Technology Management Services Div.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 60; 147-160.*

One of the world's greatest challenges today is achieving food and nutrition security. In the Philippines, many Filipinos are also suffering from lack of food and malnutrition due to high poverty and low income and despite in the steady increases in the Gross Domestic Product over the years. This concern is further aggravated by frequent man-made and natural disasters affecting mostly the poor. Food and nutrition security concerns can be addressed with the production of sufficient, available, accessible and affordable safe and diverse nutritious food to meet the population's dietary requirements and food preferences in an environmentally sustainable manner. Palayamanan which was initiated by the Philippine Rice Research Institute (PhilRice) is an innovative rice-based production system model that

employs crop diversification, intensification, and integration to increase farm productivity and income of farm families in a sustainable manner. It also helps empower and enhance climate change resiliency of rural farm families. Palayamanan produced diverse food products such as cereals, root crops, vegetables, fruits, foods of animal origin and mushroom in a continuous and sustainable manner thus ensuring the availability, accessibility and affordability of nutritious safe food to people in the rural communities. With this, Palayamanan can qualify as a strategy in promoting nutrition sensitive agriculture in the rural communities.

FOOD SECURITY; LIVESTOCK; EDIBLE FUNGI; HUMAN NUTRITION; EXTENSION ACTIVITIES; EXTENSION PROGRAMMES; PLANT PRODUCTION; TECHNOLOGY

Plant factories in Taiwan to promote food and nutrition security in an urban setting. **Wei Fang. National Taiwan Univ. Taipei City 10617 (Taiwan). Dept. of Bio-Industrial Mechatronics Engineering.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 58.*

Plant factory, or vertical farming, with artificial lighting (PFAL) is considered as one of the promising agricultural technologies that can address the ever-challenging future of the planet. This presentation introduced the key components of PFAL and advantages of PFAL in view of efficient resource utilization such as fresh water, nutrient, carbon dioxide, and land. The current development of PFAL industry in Taiwan was also discussed.

PLANTS; FARMING SYSTEMS; TECHNOLOGY; HUMAN NUTRITION; FOOD SECURITY; TAIWAN

Policy environment and its impact on nutrition-sensitive agriculture. **Villegas, P.M., Villegas Organic and Hobby Farm, Malvar, Batangas (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran, M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 47; 167-171.*

Nutrition is life itself. Nutritious food is medicine and our passport for overall health and wellness. This is why producing nutritious and safe food is essence of nutrition-based

agriculture and food system. The Philippines, as the UN Food and Agriculture Organization reported, is a food insecure nation with its global food ranking dropping from rank 62 to 72 rank in 2017. With the country's food insecurity comes an overall poverty of 31% in 2018 of our more than 100 million population. along with 15-25% malnutrition rate. This is exacerbated by the high incidence of food-related maladies and lifestyle diseases associated with the dominance of chemical-based agriculture, environmental pollutants, and toxic substances that poison the food system. The high incidence of malnutrition and toxic food system indicates that we are already a 'sick' society suffering from ill-health and nutritional disorder. No wonder we are seeing the 'mushrooming' drug stores, hospitals, health centers, and wellness clinics, be it public or privately funded, in the whole country. These are all curative, very costly, and financially debilitating drugs and health care expenses. What we need and want is a preventive health and wellness lifestyle through a nutrition-sensitive agriculture. This means the urgent need to a significant shift to Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP), Organic, Natural Farming and Agro-ecological Agriculture. The Filipinos, especially in the rural areas, must remain dependent on healthy and cheap nutritious food such as 'malunggay' (moringa), coconut, green leafy vegetables, root crops, beans and native fruits as well as culinary and medicinal herbs and spices. Overall, the balance sheet of agricultural policy environment and its implementation points to constraining action programs (liability) outweighing the facilitating or enabling policy reforms and investment climate (assets) Furthermore, there is a serious disconnection between Agriculture and industry Development which disregards the value chain and neglects the agro-industrialization of our economy. Compounding to these misfortunes are the pervasive problems of misgovernance mismanagement and alleged graft and corruption within the sector.

FOOD INSPECTION; FOOD INTAKE; FOOD SAFETY; FOOD SECURITY; AGRICULTURE; ENVIRONMENT; POLICIES; FOOD HYGIENE

Potentials of underutilized plants for nutritious food preparation. **Perez, L.B. Cavite State Univ., Indang, Cavite (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 42; 112-115.*

The study developed highly nutritious salad recipes that are rich in vitamin A or protein and can satisfy at least one third of the RENI of Filipino adults and eventually be introduced to the local market using three kinds of weeds: pancit-pancitan (Peperomia pellucid Linn.),

takip kuhol (Centella asiatica Linn.), and talinum (Talinum fruticosum Linn.). In terms of color, aroma, taste, and texture, pancit-pancitan salad obtained the highest rating both by untrained laboratory and consumer panel. With regards to general acceptability, the untrained laboratory panel rated the three recipes as 'Very Much Acceptable', while consumer panel rated pancit pancitan and takip kuhol salad 'Very Much Acceptable' and talinum salad as 'Slightly Acceptable'. Consumer preference test showed that pancit-pancitan salad ranked as number one among others. Moreover, one serving of pancit-pancitan salad can satisfy 34.54% for RENI of Vitamin A for male and 38% for female adult aged 19-65 years old and above. For the talinum salad, it can satisfy 46.77% of RENI for male and 51.45% for female adult aged 19-65 years old and above. And in terms of protein, one serving of takip kuhol salad can satisfy 30.72% of RENI for male and 35.48% for female adult aged 19-65 years old and above. The cost of producing one serving of the most acceptable and most preferred salad recipe (pancit-pancitan salad) is PhP 15.18. The use of edible weeds in salad preparation can definitely result to a low cost but highly nutritious salad recipe.

PEPEROMIA; SPECIES; WEEDS; WILD PLANTS; NUTRITIVE VALUE; FOOD RESOURCES; FOOD TECHNOLOGY

Promoting nutrition-sensitive school gardens and feeding programs through the school and home gardens project: the case of Laguna, Philippines. **Africa, L.S. Philippines Univ. Los Baños, College, Laguna (Philippines). Coll. of Human Ecology.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 57.*

To address the problem of undernutrition and its consequences among school children, as well as the youth's declining interest in agriculture; SEARCA [Southeast Asian Regional Center for Graduate Study and Research in Agriculture] partnered with the University of the Philippines Los Baños (UPLB) and the Department of Education (DepEd)-Laguna to implement the School and Home Gardens Project (SHGP). This participatory action research focused on strengthening the complementation between the existing school-based feeding and 'Gulayan sa Paaralan' programs. Overall, the series of capability building activities for teachers and school heads promoted a better understanding about the interconnections of food and nutrition, organic agriculture, edible landscaping, climate change, and solid waste management. Moreover, the program enhanced the involvement of parents, local government units, and other stakeholders through the (1) holding of training/workshops,

(2) seed exchange activities among schools and household, (3)conduct of regular school and home garden visitation, (4) provision of technical assistance in the establishment and sustainability of school and home gardens, (5) sharing of best practices of school garden that can be adopted in other school and home gardening, (6) provision of financial assistance from the office of the municipal mayor for scaling-up of school and home gardens project, and (7) evaluation of the program based on the changes of nutritional status of school children. Finally, this paper provided evidence supporting why this SHGP is nutrition-sensitive by describing the outcomes based on the changes and trends of nutritional status among school children before, during, after the introduction of the interventions to the selected schools.

HUMAN NUTRITION; NUTRITIONAL STATUS; DIET; NUTRIENT AVAILABILITY; HEALTH; EDUCATIONAL INSTITUTIONS; GARDENS; DOMESTIC GARDENS; PHILIPPINES

Restoring the link of agriculture with nutrition and environment. **Rasco, E.T. Jr. National Academy of Science and Technology, General Santos Ave, Taguig, 4044 (Philippines). Agricultural Sciences Div.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 69; 161-166.*

Since the Industrial Revolution and its offshoot, the Green Revolution, agriculture has become decoupled from environmental care and worse, from human health nutrition. Food systems resulting from industrial (dubbed as 'modern') agriculture gave rise to what is now referred to as the Western diet, Which is linked to global epidemics of obesity, diabetes, hypertension, and other chronic diseases. 'Modern' agricultural practices resulted in widespread poverty in the rural sector because of low profitability from farming. This paper describes how 'modern' agriculture and food systems have evolved and how we should be concerned. It also describes the technological trajectories and societal changes needed to ensure the agriculture will not only be good for farmers but also for the consumer and the environment.

HUMAN NUTRITION; ENVIRONMENT; FOOD SECURITY; FOOD SAFETY; AGRICULTURAL DEVELOPMENT; HIGH YIELDING VARIETIES; TECHNOLOGY; TECHNOLOGY TRANSFER

Rice corn blend: responding to twin challenge of rice self-sufficiency and diabetes in the Philippines. **Salazar, A.M. Philippines Univ. Los Baños, College Laguna (Philippines). Inst. of Plant Breeding.** International Conference on Nutrition-Sensitive Agriculture and Food

Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 65.*

There are some ironies in the country's tack for food security and there is a need to resolve these. One is our 'insistence' in a lowland irrigated crop more suited for the plains while we are basically a mountainous country. Another is our 'rice or bust' approach even if the rate of diabetes is on the rise. Rice-corn blend is one feasible and immediately implementable approach. The agronomic advantage of corn as C4 crop and being basically rainfed makes it a practical and sustainable means to do away with rice importation, which is only 10% of our requirement. This will definitely help our corn farmers. Basic studies and some local feeding efforts have shown also that corn can help address nutritional concerns in our poor young malnourished populace and diabetes for adults — poor and not poor. As a unique food staple formulation in Asia, rice-corn blend is practical solution to resolve such ironies and be the take off for a 'busog, malusog at maunlad na Pilipinas'.

ORYZA SATIVA; RICE; MAIZE; HUMAN NUTRITION; FEEDING; DIABETES; PHILIPPINES

Supporting smallholder farmers and family farming for achieving food and nutrition security in ASEAN. **Penunia, E. Asian Farmers' Association for Sustainable Rural Development, Loyola Heights, Quezon City (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 30.*

All over the world, family farmers make up 98% of farming holdings, responsible for at least 56% of agriculture production on 56% of agriculture lands. In the Asia Pacific region, family farmers comprise 85% of farming holdings with around 80% of them small scale, meaning, working on less than two hectares of land. Yet, Asia Pacific is home to 63% of the world's poorest, hungriest, most malnourished people, many of them relying on agriculture for a living. The work on securing food and nutrition security must therefore rely on the active involvement and dynamism of these million of small scale family farmers. Women farmers, who comprise half of the farming population, and who provide as much as 90% of the farming work, and who are responsible putting food on the table, must be at the center of all actions to achieve SDG 1 and 2. AFA members have exerted initiatives, in partnerships

with other stakeholders, to unlock the potential of family farmers, including women and youth, producing good results for food and nutrition security. These results can be further upscaled through a favorable policy environment.

SMALL FARMS; FARMERS; FOOD SECURITY; ASEAN

Sustainable fish food value chain for improving nutrition. **Thilsted, S.H. The World Fish Center, Bayan Lepas, (Malaysia). Value Chains and Nutrition.** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 29.*

The Tonle Sap Lake and floodplain are diverse, dynamic, and multi-functional agro-ecosystems, providing common pool resources including fish and other aquatic species to over five million Cambodian people. WorldFish and partners have been conducting integrated, nutrition-sensitive fish agri-food systems interventions in the Tonle Sap floodplain since 2012, optimizing opportunities derived from the seasonality and flow of water in rice fields and water bodies. These interventions include strengthening of community fish refuge (CFR) communities; establishment and management of CFRs, polyculture of large and micronutrient-rich small fish in ponds in rice fields and homestead ponds; seasonal production of micronutrient-rich vegetable around CFRs and in homestead gardens; production of small fish powder for use in complementary feeding; social behavioral change communication for adoption of essential nutrition and hygiene actions; women's empowerment; and monitoring and evaluation. Results are presently available for activities related to communities (over 33,000 household) and areas served by 40 CFRs from 2012 to 2016. CFR communities with more women members and ability to raise funds were able to better manage CFRs. Fish biomass, species diversity, and the amount of fish sold, consumed, and processed increased from 2012 to 2016. Promotion of fish powder increase fish consumption in young children, making significant contribution to year-round intake of micronutrients (e.g. vitamin b12, calcium, zinc and iron). An integrated, nutrition-sensitive approach offers opportunities to contribute to diverse, nutritious diets through multiple pathways (e.g. household income, women's empowerment and own food production). Going forward, context-specific transformation taking place in communities and agro-ecosystems must be considered. Monitoring must include data on improvements as well as negative effects abated. Key gaps in recognizing the irreplaceable contribution of fish for improving food and nutrition security are lack of data on intra-household fish intake as well as nutrient composition and food safety of species commonly consumed and caught.

MALNUTRITION; FOOD SECURITY; SUSTAINABILITY; FSH; FOOD INTAKE

Sustaining and scaling up nutrition-sensitive agriculture. **Oro, E.M., Gonsalves, J. International Inst. of Rural Reconstruction, IIRR James Yen Center Km 39 Aguinaldo Highway Brgy. Biga 2,, Silang, Cavite, 4118 (Philippines).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 59.*

School garden produce are promoted to be used in feeding programs to improve the nutritional status of school children however, the disconnect between these two programs was observed. This action research aimed to identify nutritional contributions of gardens, specifically as source of vegetables used for feeding and as a learning laboratory where nutrition and environmental education can be conducted. Fifty-eight (58) lighthouse schools (LS) were designated within Region IVA (Calabarzon)[Cavite, Laguna, Batangas, Rizal, Quezon, Philippines] where a total of 80,222 children were enrolled in 2016-2017. Out of the LS, three schools were selected as sentinel research sites (in Cavite province), where rigorous collection of qualitative and quantitative data, including productivity data of a 200 sq. meter school garden, was undertaken. Survey forms and questionnaires were also used in these LS to support data collection needs. For the effects of supplementary feeding, FNRI-DOST verified the nutritional assessments in three sentinel schools and three LS from July to August 2016. Better integration of school gardens, school feeding, and nutrition education was achieved as shown by the utilization of garden produce (42%) in the feeding program, use of gardens for nutrition education (65.45%), and enhanced garden diversity with an average of 26 crops. Results of a 120-day feeding cycle using indigenous vegetables and iron-fortified rice showed that there was a significant decrease in the proportion of undernourished students aged 5.1-10 and 10.1-19 from baseline (100%) to endpoint (64.71%). Nationwide uptake of the integrated school nutrition model is underway via institutionalization and increased investments by the government and private sector. Makin feeding use of the school gardens' indigenous vegetable produce in school-based supplementary feeding effectively improved nutritional status of school children. School gardens have proven to be an excellent mechanism to promote nutrition-sensitive agriculture, especially if agroecological inputs are used, which ensuring produce that is safe and free from chemical residues.

EDUCATIONAL INSTITUTIONS; GARDENS; HUMAN NUTRITION; FOOD SECURITY; INDIGENOUS ORGANISMS; CHILDREN; NUTRITIONAL STATUS; PHILIPPINES

Women in nutrition—sensitive livestock production in Nepal. **Kc, R. Agriculture and Forestry University (Nepal).** International Conference on Nutrition-Sensitive Agriculture and Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 48.*

Livestock is an important component of livelihood in Nepalese agriculture system. Women contribute more than 50% of la force in agriculture in Nepal. Since men go abroad for the employment, women are solely responsible for all the indoor management activities of livestock production. The management of livestock ranges from selection of animal fodder collection, breeding management, processing of milk and animals products, and cleaning of shed. In rural areas women have no ownership over big assets such as land. ON men own such assets as well as large animals such as cows and buffalos. The women's ownership is limited to small animal such as goat, sheep and poultry. The aim of this paper is to determine the role and participation of women in livestock production system of Nepal. A survey, aided by a questionnaire, was randomly conducted in the Chitwan District of Nepal with 126 livestock farmers as interview respondents. The interviews were complemented by a review of published materials, statistics, and literature. The results of the study indicate that women's ownership of small animals are higher as compared to large animals. The women ownership was found to be 73.33% in goat farming and 47.16% in poultry farming. Likewise, 59.25% of responsibilities of farm management were taken on by the women. Despite the fact that women composed two thirds of the agricultural workforce, their membership in dairy cooperatives were very limited. Existing societal biases keep women and their issues from getting the attention they deserve. Study results indicated that the status of women can be I by increasing their income through livestock farming for nutrition-sensitive food production.

LIVESTOCK; PRODUCTION; LIVESTOCK MANAGEMENT; WOMEN; HUMAN NUTRITION; ROLE OF WOMEN; NEPAL

S40 - NUTRITION PROGRAMMES

Nutrition-sensitive food systems for improved nutrition in the ASEAN: a strategic approach for Southeast Asia. **Lee, W.T.K. Agriculture Organization of the United Nations (FAO), Bangkok 10200 (Thailand).** International Conference on Nutrition-Sensitive Agriculture and

Food Systems strategic approaches to nutrition-sensitive agriculture and food systems in Southeast Asia: conference proceedings. Angeles, D.E., Maghuyop, M.A.G., Cecilio, M.C., Palma, A.M.S., de la Cruz, B.C., Beltran,M.M. *International Conference on Nutrition-Sensitive Agriculture and Food Systems: Strategic Approaches to Nutrition-Sensitive Agriculture and Food Systems in Southeast Asia. Tagaytay City (Philippines). 7-10 Nov 2018. p. 27; 99-100.*

In the Asia Pacific region, the coexistence of chronic hunger, undernutrition, micronutrient deficiency, stunting, obesity, and non-communicable diseases affect millions of people. This has led to a wide range of health and well-being, as well as socio-economic challenges. Furthermore, the effects of climate change, over explore natural resources, environmental unsustainability, rapid technological shifts, and uneven socio-economic growth has aggravated the burden on agriculture and food system. There is a rising concern on how to feed the growing population sustainability in the Asia Pacific region. Following the publication of the Lancet series on Maternal and Child Nutrition (2013), commitments from 164 countries in the world to fight malnutrition in all its forms was secured by signing the Rome Declaration in 2014 during the Second International Conference on Nutrition (ICN2) in Rome, as well as the establishment of the Sustainable Development Goal 2 (2015-30) to improve food security and nutrition and sustainable agriculture, governments increasing recognize how sustainable agriculture and food systems can address the problems of food insecurity, malnutrition and poor health. FAO supports countries to identify the underlying problems and potential entry points to reshape their food system for improved nutrition by dissecting and evaluating the food systems through engaging with actors at each stage of the food supply chain (i.e. how food is produced, harvested, processed, stored, transported, distributed, marketed, regulated, and advertised). The aim is to make agriculture and food systems more nutrition-sensitive, efficient, and sustainable to supply nutritious foods for human consumption. It can also reduce the advent impacts on natural resources and the environment. To make this happen, governments will need to turn political commitment into concrete action.

FOOD SECURITY; MALNUTRITION; FOODS; AGRICULTURE; ASEAN

T - POLLUTION

T01 - POLLUTION

Tolerance to air pollution and mitigation potential of Bougainvillea sp. and Ehretia microphylla in selected areas of Cebu, Philippines. **Dalagan, J.G. jgdalagan1@up.edu.ph. Ragas, R.E.G. Philippines Univ. Cebu, Gorando Ave. Lahug, Cebu City (Philippines). Dept. of Biology and Environmental Science.** 25. Federation of Crop Science Societies of the Philippines/1. Federation of Plant Science Associations of the Philippines Scientific

Conference. Apo View Hotel, Davao, City (Philippine). 16-21 Sep 2019. *Philippine Journal of Crop Science (Philippines). 0115-463X. v. 44 (Supplement no. 1) p. 160. 2019.*

Air particulate matters pose risks not only human health but also to the environment. In the cities of Cebu, streets are characterized by a low vegetative cover and empervious surfaces making air pollution hard to control. Some plants, however, have the potential to reduce air pollution through passive filtration. In this study, to common plants, Bougainvillea sp. and Ehretia mycrophylla, grown in the city streets and rural areas of Cebu were examined to determine their mitigation potential. The APTI or the Air Pollution Tolerance Index is an index used to assess tolerance of plants to air pollutants. By measuring the four biochemical parameters that comprise the APTI, Bougainvillea sp. and Ehritia mycrophylla, grown in the city were found to be tolerant of air pollutants with APTI values of 24 and 25, respectively. Moreover, since the ascorbic acid acid (AA) content revealed a positive correlation between the APTI, the high amount of AA observed in plants that were grown in the city but not in rural areas implies strong physiological defense of those plants in the city against adverse effects of oxidizing pollutants. Scanning electron microscopy further revealed large particulate matters suspended on the guard cells of the stomata of Bougainvillea sp. and on trichomes of Ehritia mycrophylla. Together, this clearly manifests the ability of both plants to reduce air pollution load leaving the city relatively free of pollutants.

BOUGAINVILLEA; SPECIES; AIR POLLUTION; POLLUTANTS; MOISTURE CONTENT; ASCORBIC ACID; CHLOROPHYLLS; PHILIPPINES