Quality Rice. Quality Life.

2017
National Rice R&D
Highlights

RICE CHEMISTRY and FOOD SCIENCE DIVISION

Philippine Rice Research Institute
Central Experiment Station
Maligaya, Science City of Muñoz, 3119 Nueva Ecija

TABLE OF CONTENTS

Rice Chemistry and Food Science Division

Division Head: Rosaly V. Manaois

Executive Summary

The Rice Chemistry and Food Science Division (RCFSD) focuses on rice grain chemistry, processing, and quality. It evaluates grain quality of rice lines and varieties, establishes the rice grain qualities preferred by various consumer groups and the industry, and updates and improves and/or optimizes existing protocols for the evaluation of the quality of rice grains and other materials. RCFSD also develops technologies on other uses of rice and its by-products and promotes value-added products from rice and rice-based crops for improved health and nutrition. In line with these functions, the Division implemented two projects: (1) grain quality assessment of rice lines and varieties and (2) nutrition, health, and wellness potential of rice and rice-based crops

Project 1 focused on the evaluation of grain quality characteristics of rice in support to the PhilRice breeding program. It is composed of two studies: 1) grain quality screening of early generation and pre-NCT rice lines and 2) survey of the grain quality preferences of consumers, millers, and traders to support the location-specific release of varieties based on grain quality. Through this project, 644 early generation and pre-NCT rice lines were profiled for grain quality and other properties specific for different breeding objectives in the Institute. The 10-year data on the general preference for long and slender raw kernels and tender and aromatic cooked rice among consumers in adverse ecosystems, except cool-elevated areas, was re-validated and updated. These results help in speeding up the development of high-yielding varieties to achieve the outcome on increased productivity of rice farming.

Project 2 assessed rice and rice-based crops and their potential use in value-added food products for improved health and nutrition, as well as income. The first study showed that dehydration and cooking methods impact the levels of phytochemicals and antioxidant capacities of the different plant foods assayed, and may therefore affect antioxidant intake of consumers. Study 2 showed that 61-85% of consumers from Central Luzon considered convenient, nutritious, and healthy rice-based bakery products as highly appealing, and this will guide PhilRice researchers on their high-value product development initiatives. For the last study, 50 pigmented germplasms deposited at PhilRice Genebank exhibited phytochemical properties that can be further explored for use as medicinal rice, functional food or nutraceutical, or as breeding materials for the development of high antioxidant rice. These outputs contribute in the outcome on enhancing the value, availability, and utilization of rice, rice-based farm crops, and products for better health, nutrition, and income.

I. Grain Quality Assessment of Rice Lines and Varieties

Evelyn H. Bandonill

Rice grain quality of both cooked and raw forms is crucial from the start of the breeding process up to the time when they are utilized by consumers and various stakeholders. This is the reason why grain quality evaluation tools must be available and must be carried out with the utmost accuracy and certainty by qualified personnel. Preference of end-users of released rice varieties was also determined. Hence, this project focused on two components namely, 1) early generation screening and 2) gathering of information on rice grain quality characteristics preferred by various stakeholders in Luzon and determination of the grain qualities of rice varieties that they usually buy/consume.

The first study involved centralization of early generation screening (EGS) of rice lines, i.e., analyses are handled by as few analysts as possible to ensure the accuracy and repeatability of results. EGS is performed to reduce the cost of grain quality evaluation of entries submitted to the National Cooperative Test (NCT) and to allow for the early identification of entries, which may have unique properties. Results showed that most of the samples screened had excellent milling, physical, and physicochemical properties. Moreover, 10 pigmented mutant samples and AON-M14 showed good performance in terms of antioxidant capacity and total anthocyanin content (TAC) in polished and unpolished forms, respectively. Among the rainfed-drought and submergence rough and brown rice samples analyzed for other parameters namely, % hull, bran, broken grains, and grain dimension, most had excellent milling potentials and few passed the standard for chalky grains. Meanwhile, majority had intermediate amylose content (AC) and high-intermediate to intermediate gelatinization temperature (GT).
The second study verified and updated the grain quality preferences for rice in Luzon. It aimed to further support the location specific release of varieties emphasizing grain quality as one of the major basis for recommendation in the NCT and bring the rice varieties appropriate in specific location. The study showed that the cooked forms of aromatic NSIC Rc 218 and soft-textured NSIC Rc 160 were highly preferred. In raw form, long and slender grains were the characteristics preferred across locations in the adverse ecosystems, except for the cool elevated areas, in which short and bold grains were favored. These results confirm similar preferences published in the past 10 years.

The results of the aforementioned studies facilitated the grain quality screening of pre-NCT rice lines and generated information for plant breeders on the general preference of consumers and stakeholders for raw and cooked milled rice across locations in the adverse ecosystems.

Centralized Grain Quality Screening

Amelia V. Morales, RP Tubera, JD Adriano, JMC Avila, EH Bandonill

This study aimed to evaluate the grain quality of early generation rice lines and identify entries for further trials. To meet this objective, the grain quality of 644 early generation and pre-NCT rice lines submitted by the Plant Breeding and Biotechnology Division, which were harvested from DS 2016, WS 2016, and DS 2017, were evaluated. Most of the samples had excellent grain quality, had milling potentials of fair brown rice, Grade 1-premium milled and head rice recovery, long grain and intermediate-slender grain shape, and intermediate amylose content.

Ten pigmented mutant samples were also analyzed for their antioxidant properties. Sample AON-M14 had the highest value with 684 mg trolox equivalent (TE).g-1 diphenylpicrylhydrazyl (DPPH) radical scavenging activity and 1043 mg.kg-1 total anthocyanin content (TAC) in unpolished form and 470 mg TE.g-1 DPPH and 911 mg.kg-1 TAC in polished form.

Additional parameters such as % hull, % bran, % brokens, and grain dimension of rough and brown rice were determined for 146 samples from rainfed-drought and submergence ecosystem. Out of 76 samples evaluated in DS 2017, 38 had excellent milling properties, in which from the 125 g rough rice starting material, the weight of hull ranged 24.1-44.3 g; bran, 3.1-13.8 g; and broken grains, 5.9-64.3 g. Rice entries PVP_16DS-2 and WV-16DS-15 passed the standard for physical attributes with Grade 1 chalky grains. Majority of the samples were long-extra long with intermediate-slender grain shape. The grain length of rough rice ranged 6.4-10.3 mm and brown rice, 4.6-7.8 mm. Most of the samples had intermediate AC with high-intermediate to intermediate GT.

Bringing the Appropriate Variety in Luzon as Determined by Rice Grain Qualities Preferred by Consumers, Millers, and Traders

Evelyn H. Bandonill, LC Castillo, MB Castillo, JCA Cacerez, OC Soco

Consumers are now becoming more selective in the quality attributes of rice that they eat. The study on rice consumer preference in the adverse ecosystems of the country conducted in the past decade had showed a general preference for soft and aromatic rice. To verify and update previous results, a consumer survey was undertaken to determine the grain quality preference of consumers in the rainfed lowland, saline, cool elevated, and upland ecosystems in North, Central, and Southern Luzon. The cooked form of popular rice varieties – NSIC Rc 218, NSIC Rc 160, NSIC Rc 222, and IR64 representing aromatic, soft, intermediate, and hard-textured rice as well as other rice varieties released in the adverse ecosystem were evaluated by randomly selected consumers in some provinces of North, Central, and

South Luzon.

Aromatic NSIC Rc 218 and soft-textured NSIC Rc 160 were highly preferred indicating consumer preference for soft and aromatic rice across all locations. Cool elevated and upland areas such as in Ifugao and Isabela had consumers who preferred aromatic rice more than soft-textured rice. However, it was notable that rice samples consumed by respondents at home mostly had high AC (20.2-24.1%) except for those collected from Nueva Ecija, Batangas, and Quezon, which mostly had intermediate AC (20.2-21.7%).

Thus, this study confirmed similar preference for cooked rice that is tender and aromatic as well as long and slender in the adverse environments of North, South, and Central Luzon published in the past 10 years. Rice breeders should consider breeding rice varieties with low to intermediate amylose content with long and slender grains for the adverse ecosystems but short and bold grains in the cool elevated areas.

II. Nutrition, Health, and Wellness Potential of Rice and Rice-Based Crops

Riza G. Abilgos-Ramos

Worldwide, there is an increasing interest on natural sources of health-promoting food and products and on cure for diseases related to aging and/or non-communicable diseases. Antioxidants in fruits and vegetables are well documented to reduce risk of life-threatening diseases while colored or pigmented rices are considered good source of health-promoting antioxidants. All these crops have great market potential and with promising use in the health and nutrition product industry.

This project evaluated the antioxidant capacities and components of some rice-based crops, assessed the marketability of developing rice-based products with health and nutritional value, and measured the antioxidants of pigmented rice materials as to their therapeutic potential against some chronic diseases. Cooking and dehydration effects on antioxidant properties of plant foods were found variable depending on the sample. Highest levels of phytochemicals and antioxidant capacities were noted in fried eggplant (purple-skinned).

For the market study, convenient, nutritious, and healthy rice-based bakery products were highly appealing and likely to be purchased. In relation to this, a brown rice cracker ice cream sandwich was developed using 50% brown rice flour and fresh buffalo's milk with feasible 2% market penetration at P30.00 per piece. The said product is due for application as utility model and for transfer to a food manufacturing company for commercial production and distribution. The results for pigmented rice collections indicate that they can be excellent source of antioxidants with preventive properties against some chronic illnesses. These outputs satisfy the outcome for enhanced value, availability, and utilization of rice, rice-based farm crops and products for better health, nutrition, and income.

Antioxidant Capacities and Antioxidant Components of Rice-Based Crops in the Philippines

Rosaly V. Manaois, JEI Zapater, AV Morales, MJC Regalado, JA Dela Cruz

This study aimed to assess the total antioxidant capacities and compositions of different crops and foodstuffs cultivated in rice-based farming areas in the country for health promotion and disease prevention of the farm households and the general public and for the potential production of functional foods and nutraceuticals. In 2017, factors that contribute to the variability in the antioxidant properties of the foodstuffs, namely cooking and dehydration techniques, were evaluated.

Screening for the influence of drying treatments (oven, lyophilization) was first conducted using nine samples including chili leaves, eggplant, green pepper, red coral lettuce, squash flower and fruit, sweet potato, turmeric, and water spinach. Effects of boiling on the said samples, except lettuce, was also evaluated. The total phenolic content and antioxidant capacities using 2,2′-Diphenylpicrylhydrazyl (DPPH) radical and 2,2′-Azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radical scavenging assays were determined. Other drying techniques (solar/sun, far infrared [FIR]) and commonly employed cooking methods (frying, baking) were additionally tested using purple skinned eggplant as sample. Results of the screening showed that lyophilized turmeric had higher total phenolic content (TPC) and antioxidant capacities, but higher values were obtained in oven-dried eggplant, suggesting that selection of appropriate dehydration methods should depend on the target phytochemicals and the sample matrix. Boiling of different plant foods likewise had variable effects depending on the material studied. The fruit samples eggplant, green pepper, and squash had significantly increased TPC and antioxidant capacity after boiling, while those of chili leaves, squash flower and turmeric decreased. In the evaluation of cooking and drying treatments on purple skinned eggplant, highest level of phytochemicals and displayed antioxidant capacities was achieved through frying, while FIR technique was the dehydration method that yielded the highest values.

Exploratory Market Research and Pre-feasibility Study for the Development of Rice-based Products with Health and Nutritional Value

Josefina F. Ballesteros, RG Abilgos-Ramos, RV Manaois, AV Morales, ESA Labargan, NT Amestoso

Poverty and malnutrition exist mostly in rural rice-producing communities. While development of rice-based products aims to help alleviate these problems, marketability of these products ensures the desired outcome of providing additional income that ultimately enhances the nutritional status and overall quality of life in these communities. This study presented a consumer-driven approach in developing health- and nutrition-based rice product concepts. It aimed to explore and gather insights on consumer trends on food, health and wellness products, perception, and acceptance of rice-based products. It also aimed to develop marketable rice-based products, as well as to determine the feasibility of commercialization. Three focus group discussions (FGD, n=24) were conducted to explore product development, marketing, nutrition, and health experts' perceptions on health and wellness. Market survey (n=339) on the products commonly consumed by the consumers and their interest on pre-identified rice-based product ideas was also conducted in Central Luzon. A rice-based product was then developed out of the 21 pre-identified product ideas. Pre-feasibility study was conducted to determine the acceptability of the developed product and the feasibility of its commercialization. FGD participants particularly associated health and wellness with nutritious and healthy food products.

Survey results showed that convenient, nutritious, and healthy rice-based bakery products were highly appealing and most likely to be purchased by 61-85% consumers from Central Luzon (n=100). An acceptable brown rice cracker sandwich (BRICS) was developed at substitution of 50% brown rice flour with ice cream made from fresh buffalo's milk. The product was determined to have high market potential based on the projected 5-year financial statements of the product. It showed that if BRICS is commercialized for 5 years, it will generate positive net profits and net cash flows with a payback period of 2.4 years, a positive net present value of P688,422.80 and an internal rate of return (37.5%) higher than the projected 12% loan interest rate for the capital. Pre-feasibility study indicated that the most feasible commercialization scenario for BRICS was at 2% market share with a selling price of P30.00 per piece. Thus, given the high market potential of BRICS, it can be commercialized and be profitable at the studied business scenario.

Therapeutic Potential of Pigmented Rice Germplasms Deposited at the Philrice Genebank against Some Common and Chronic Diseases

Rodel M. Bulatao, HF Mamucod, RP Tubera, JPA Samin, MB Castillo, XI Caguiat, MC Ferrer

This study evaluated the therapeutic potentials of 50 pigmented rice germplasms stored at PhilRice gene bank by analyzing their phytochemical content, such as TAC, TPC, total flavonoid content (TFC), and antioxidant capacities (DPPH and ABTS scavenging activities and ferric reducing antioxidant power (FRAP)). Their grain quality characteristics, specifically the milling potentials (brown rice (BR), total milled rice (TMR), and head rice (HR) recoveries), physical attributes (color, grain dimension and percent chalky grains), and physicochemical properties (amylose, protein, and gelatinization temperature), were likewise determined. Six of the 30 samples collected at PhilRice-CES were black while the rest were red-colored. Most of them had fair to good BR recovery and Grade 2 to premium TMR and HR recoveries. They all had short to long grains with bold-intermediate shape. Most of the samples had intermediate and low AC with low-high GT. The color of pigmented rice samples was negatively correlated with their phytochemical content and antioxidant activities, except for the TAC, in which higher values were recorded in black rice samples than in red varieties.

All phytochemical properties were higher in unpolished forms than in their polished counterparts. The unpolished samples had TPC of 0.6-6.3 mg gallic acid equivalent (GAE).g-1; TFC, 1.6-144.0 mg rutin hydrate equivalent (RHE).g-1; DPPH, 0.7-8.3 mg TE.g-1; ABTS, 0.9-7.6 mg TE.g-1; and FRAP, 1.5-12.9 mg TE.g-1. For the polished samples, TPC ranged 0.2-2.6 mg GAE.g-1; TFC, 0.1-2.3 mg RHE.g-1; DPPH, 0.1-1.9 mg TE.g-1 ; ABTS, 0.1-1.8 mg TE.g-1; and FRAP, 0.2-2.7 mg TE.g-1 . Germplasms collected in PhilRice-Batac consisted of four black and 16 red rices. They all had fair-good BR recovery and grade 2-premium TMR and HR recoveries. They all had short-long grains with bold-intermediate shape. Almost half of the samples had intermediate AC with low-high GT. The Batac germplasms had TPC values of 0.2-2.7 mg GAE.g-1 ; TFC, 0.8-4.5 mg RHE.g-1; DPPH, 0.4-4.3 mg TE.g-1; ABTS, 0.5-3.7 mg TE.g-1; and FRAP, 0.6-4.7 mg TE.g-1. The top 10 pigmented rice germplasms in terms of phytochemical properties were Sintang Anod, Dioron, Ugayong, Lukdit ni Abayan, Gannal Batac, Pinilisa A, Pinilisa B, Dinorado, Makiraga, and Longgot. Furthermore, initial assessment showed that planting locations significantly affected the DPPH, but not the TAC of the samples. Thus, pigmented rice germplasms stored at PhilRice Gene bank can be used by the plant breeders in developing modern rice varieties with good grain quality and phytochemical properties.

Abbreviations and acronymns

ABA – Abscicic acid
Ac – anther culture
AC – amylose content
AESA – Agro-ecosystems Analysis
AEW – agricultural extension workers
AG – anaerobic germination
AIS – Agricultural Information System
ANOVA – analysis of variance
AON – advance observation nursery
AT – agricultural technologist
AYT – advanced yield trial
BCA – biological control agent
BLB – bacterial leaf blight
BLS – bacterial leaf streak
BPH – brown planthopper
Bo - boron
BR – brown rice
BSWM – Bureau of Soils and Water Management
Ca - Calcium
CARP – Comprehensive Agrarian Reform Program
cav – cavan, usually 50 kg
CBFM – community-based forestry management
CLSU – Central Luzon State University
cm – centimeter
CMS – cystoplasmic male sterile
CP – protein content
CRH – carbonized rice hull
CTRHC – continuous-type rice hull carbonizer
CT – conventional tillage
Cu – copper
DA – Department of Agriculture
DA-RFU – Department of Agriculture-Regional Field Units
DAE – days after emergence
DAS – days after seeding
DAT – days after transplanting
DBMS – database management system
DDTK – disease diagnostic tool kit
DENR – Department of Environment and Natural Resources
DH L– double haploid lines
DRR – drought recovery rate
DS – dry season
DSA - diversity and stress adaptation
DSR – direct seeded rice
DUST – distinctness, uniformity and stability trial
DWSR – direct wet-seeded rice
EGS – early generation screening
EH – early heading
EMBI – effective microorganism-based inoculant
EPI – early panicle initiation
ET – early tillering
FAO – Food and Agriculture Organization
Fe – Iron
FFA – free fatty acid
FFP – farmer's fertilizer practice
FFS – farmers' field school
FGD – focus group discussion
FI – farmer innovator
FSSP – Food Staples Self-sufficiency Plan
g – gram
GAS – golden apple snail
GC – gel consistency
GIS – geographic information system
GHG – greenhouse gas
GLH – green leafhopper
GPS – global positioning system
GQ – grain quality
GUI – graphical user interface
GWS – genomwide selection
GYT – general yield trial
h – hour
ha – hectare
HIP - high inorganic phosphate
HPL – hybrid parental line
I - intermediate
ICIS – International Crop Information System
ICT – information and communication technology
IMO – indigenous microorganism
IF – inorganic fertilizer
INGER - International Network for Genetic Evaluation of Rice
IP – insect pest
IPDTK – insect pest diagnostic tool kit
IPM – Integrated Pest Management
IRRI – International Rice Research Institute
IVC – in vitro culture
IVM – in vitro mutagenesis
IWM – integrated weed management
JICA – Japan International Cooperation Agency
K – potassium
kg – kilogram
KP – knowledge product
KSL – knowledge sharing and learning
LCC – leaf color chart
LDIS – low-cost drip irrigation system
LeD – leaf drying
LeR – leaf rolling
lpa – low phytic acid
LGU – local government unit
LSTD – location specific technology development
m – meter
MAS – marker-assisted selection
MAT – Multi-Adaption Trial
MC – moisture content
MDDST – modified dry direct seeding technique
MET – multi-environment trial
MFE – male fertile environment
MLM – mixed-effects linear model
Mg – magnesium
Mn – Manganese
MDDST – Modified Dry Direct Seeding Technique
MOET – minus one element technique
MR – moderately resistant
MRT – Mobile Rice TeknoKlinik
MSE – male-sterile environment
MT – minimum tillage
$mtha^{-1}$ - metric ton per hectare
MYT – multi-location yield trials
N – nitrogen
NAFC – National Agricultural and Fishery Council
NBS – narrow brown spot
NCT – National Cooperative Testing
NFA – National Food Authority
NGO – non-government organization
NE – natural enemies
NIL – near isogenic line
NM – Nutrient Manager
NOPT – Nutrient Omission Plot Technique
NR – new reagent
NSIC – National Seed Industry Council
NSQCS – National Seed Quality Control Services
OF – organic fertilizer
OFT – on-farm trial
OM – organic matter
ON – observational nursery
OPAg – Office of Provincial Agriculturist
OpAPA – Open Academy for Philippine Agriculture
P – phosphorus
PA – phytic acid
PCR – Polymerase chain reaction
PDW – plant dry weight
PF – participating farmer
PFS – PalayCheck field school
PhilRice – Philippine Rice Research Institute
PhilSCAT – Philippine-Sino Center for Agricultural Technology
PHilMech – Philippine Center for Postharvest Development and Mechanization
PCA – principal component analysis
PI – panicle initiation
PN – pedigree nursery
PRKB – Pinoy Rice Knowledge Bank
PTD – participatory technology development
PYT – preliminary yield trial
QTL – quantitative trait loci
R - resistant
RBB – rice black bug
RCBD – randomized complete block design
RDI – regulated deficit irrigation
RF – rainfed
RP – resource person
RPM – revolution per minute
RQCS – Rice Quality Classification Software
RS4D – Rice Science for Development
RSO – rice sufficiency officer
RFL – Rainfed lowland
RTV – rice tungro virus
RTWG – Rice Technical Working Group
S – sulfur
SACLOB – Sealed Storage Enclosure for Rice Seeds
SALT – Sloping Agricultural Land Technology
SB – sheath blight
SFR – small farm reservoir
SME – small-medium enterprise
SMS – short message service
SN – source nursery
SSNM – site-specific nutrient management
SSR – simple sequence repeat
STK – soil test kit
STR – sequence tandem repeat
SV – seedling vigor
t – ton
TCN – testcross nursery
TCP – technical cooperation project
TGMS – thermo-sensitive genetic male sterile
TN – testcross nursery
TOT – training of trainers
TPR – transplanted rice
TRV – traditional variety
TSS – total soluble solid
UEM – ultra-early maturing
UPLB – University of the Philippines Los Baños
VSU – Visayas State University
WBPH – white-backed planthopper
WEPP – water erosion prediction project
WHC – water holding capacity
WHO – World Health Organization
WS – wet season
WT – weed tolerance
YA – yield advantage
Zn – zinc
ZT – zero tillage

Philippine Rice Research Institute
Central Experiment Station
Maligaya, Science City of Muñoz, 3119 Nueva Ecija

We are a government corporate entity (Classification E) under the Department of Agriculture. We were created through Executive Order 1061 on 5 November 1985 (as amended) to help develop high-yielding and cost-reducing technologies so farmers can produce enough rice for all Filipinos.

With a "Rice-Secure Philippines" vision, we want the Filipino rice farmers and the Philippine rice industry to be competitive through research for development in our central and seven branch stations, coordinating with a network that comprises 59 agencies strategically located nationwide.

We have the following certifications: ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management), and OHSAS 18001:2007 (Occupational Health and Safety Assessment Series).

PhilRice Central Experiment Station; Maligaya, Science City of Muñoz, 3119 Nueva Ecija; Tel: (44) 456-0277 •
Direct line/Telefax: (44) 456-0112; Email: prri.mail@philrice.gov.ph; PhilRice Text Center: 0917 111 7423;
Websites: www.philrice.gov.ph; www.pinoyrice.com

BRANCH STATIONS:

PhilRice Agusan, Basilisa, RTRomualdez, 8611 Agusan del Norte; Telefax: (85) 343-0768; Tel: 343-0534; 343-0778; Email: agusan.station@philric
PhilRice Batac, MMSU Campus, Batac City, 2906 Ilocos Norte; Telefax: (77) 772- 0654; 670-1867; Tel: 677-1508; Email: batac.station@philrice.gov.
PhilRice Bicol, Batang, Ligao City, 4504 Albay; Tel: (52) 284-4860; Mobile: 0918-946-7439 ; Email: bicol.station@philrice.gov.ph
PhilRice Isabela, Malasin, San Mateo, 3318 Isabela; Mobile: 0908-895-7796; 0915-765-2105; Email: isabela.station@philrice.gov.ph
PhilRice Los Baños, UPLB Campus, Los Baños, 4030 Laguna; Tel: (49) 536-8620; 501-1917; Mobile: 0920-911-1420; Email: losbanos@philrice.gov.p
PhilRice Midsayap, Bual Norte, Midsayap, 9410 North Cotabato; Tel: (64) 229-8178; 229-7241 to 43; Email: midsayap.station@philrice.gov.ph
PhilRice Negros, Cansilayan, Murcia, 6129 Negros Occidental; Mobile: 0932-850-1531; 0915-349-0142; Email: negros.station@philrice.gov.ph
PhilRice Field Office, CMU Campus, Maramag, 8714 Bukidnon; Mobile: 0916-367-6086; 0909-822-9813
Liaison Office, 3rd Floor, ATI Bldg, Elliptical Road, Diliman, Quezon City; Tel: (02) 920-5129

SATELLITE STATIONS:

Mindoro Satellite Station, Alacaak, Sta. Cruz, 5105 Occidental Mindoro; Mobile: 0908-104-0855
Samar Satellite Station, UEP Campus, Catarman, 6400 Northern Samar; Mobile: 0948-800-5284