



Cagayan State University Research, Development & Extension Agenda & Banner Programs 2013 - 2016

Foreword from the President

As the Cagayan State University (CSU) elevates itself to greater heights under our humble leadership, we are pleased to share the university's new banner programs and projects on research, development and extension (RD&E) covering 2013 to 2016.

This document synthesizes the collective output of a series of workshops conducted during first quarter of this year which were participated in by our top officials, senior faculty members and selected partners. It also includes updated information adapted from related documents dealing with RD&E at CSU.

Positioning itself as the "Gateway to China and Asia-Pacific" with its vast natural and human capital, Cagayan is envisioned to become one of the country's major agro-industrial hubs, trading center and premier tourist destination.

Being the province's premier higher education institution, CSU has a strategic role of advancing Cagayan's vision. CSU seeks to be a credible and distinguished center of higher education in Northern Luzon, the entire country and the global academic community. Towards this, CSU is committed to intensively pursue the development, sharing and utilization of science-based knowledge and innovations for the inclusive agro-industrial development of Cagayan Valley.

Anchored on the contemporary innovations paradigm, CSU's RD&E programs are mapped out along eight thematic areas, namely: (1) food security, self-sufficiency and safety, (2) climate change, (3) environmental resource management, (4) human health and nutrition, (5) disaster risk reduction and management, (6) enhancing renewable energy sources, (7) emerging technologies and (8) social sciences.

Consistent with these themes, our eight RD&E banner programs are: (1) agriculture for food security & poverty alleviation, (2) marine resources & fisheries, (3) environment & climate change, (4) health & nutrition, (5) industry, energy & emerging technology, (6) socio – economics & entrepreneurship, (7) higher education and; (8) law & governance & related social technology.

With the help and support of our partners, we are committed to support the vigorous implementation, monitoring and evaluation of these RD&E programs and projects at CSU in the next three years and beyond.

ROMEO R. QUILANG



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New RD&E Framework: The Innovations Paradigm

As the Cagayan State University (CSU) gears up to strengthen its capability in research, development and extension (RD&E), it needs to embrace and pursue a new RD&E paradigm. The Millennium Development Goals (MDGs) have broadened development outcomes from merely increasing food supply to include poverty reduction, human nutrition, environmental protection and related issues. As a consequence, RD&E at CSU must be linked with Cagayan's development goals to gain more relevance and have significant impact.

The emergence of global markets and new technologies, particularly ICT and biotechnology has facilitated a paradigmatic shift in RD&E. Towards this, public institutions like SUCs have adapted to the contemporary setting by redefining their priorities, changing their focus towards the poor and marginalized sectors of society.

More specifically, RD&E are seeing the emergence of new capabilities, organizations, and institutional processes where partnerships are increasingly becoming important. As a result, the process of networking, establishing strategic alliances and coalition building have become very important.

In the foregoing context, the traditional linear technology transfer model of RD&E needs to be replaced by something more suited to the contemporary setting — the innovations paradigm.

An innovation system is made up of activities and processes associated with the generation, production, distribution, adaptation and use of new technical, institutional, and organizational or managerial knowledge.

The innovation process involves a series of interaction and participation of multiple stakeholders that operate within a knowledge system. Such interactions result in the initiation, generation, modification, accumulation and utilization of improved technology.

In the local setting, the innovation process involves the complex, iterative, and dynamic interaction among various groups of stakeholders involved in the agriculture RD&E spectrum.

An innovation system has two broad elements:

- Groups of organizations and individuals involved in the generation, sharing, adaptation, and use of knowledge of socio-economic significance.
- The institutional context that governs the way these interactions and processes take place which includes the numerous norms and conventions that shape the way things are done, as well as more formal institutions such as intellectual property regimes and others.

The innovation process involves not only scientific research institutions, but also a range of other non-research organizations. Due to the foregoing, innovations come from various sources: researchers, extensionists, development agencies, farmers, civil society organizations (CSOs), the private sector and entrepreneurs. The diversity of various actors bring in a diversity of interests and knowledge systems, which could be both conflicting and complementary.

Innovations and impacts from research in the life sciences (biotechnology in particular) are increasingly dependent on new groupings, alliances, and relationships within science, and between science and the private business sector. Hence, the innovation process recognizes the importance of linkages, communication, public-private partnerships, coalitions and the way these assist information flows.

Since the innovation process depends on relationships among different people and organizations, managing these relationships is a central task of RD&E. Likewise, the conventions or institutions governing the way RD&E activities are conducted, and the role assigned to different organizations are pivotal to the innovation process.

In the Cagayan setting, the innovation process involves the complex, iterative, and dynamic interaction among various groups of stakeholders involved in the RD&E spectrum. Hence RD&E must be carried out with the broad involvement of partners and stakeholders in the province's development spectrum.

Moreover, in agricultural innovations systems, CSU adopts a perspective which posits strong linkages between ecosystems and people. In this context, innovations are embedded in three inter-dependent and interacting systems: 1) agriculture and fisheries; 2) natural resources; and 3) social systems.

Agriculture innovation systems involve the production, processing and marketing of crops, livestock, fisheries aqua marine and trees for food, feed, clothing and shelter. Their productivity and sustainability are driven by changes in climate, technologies and arrangements in the country's natural resource systems and ecological services. Social systems are characterized by population size and quality, culture, peace and order and tenurial systems. Governance integrates the manner how these systems are harnessed for human well-being.

Cagayan's Vision

With an aggregate land area of 9,003 square kilometers, the province of Cagayan has a tremendous potential. Endowed with fertile valleys, rich natural resources, mountain ranges, bodies of water and winding coastal areas, it can support a thriving agriculture, fishing, commerce and tourism industry. Aside from its rich natural resources, the province has an industrious and trainable labor force.

Cagayan's major agricultural products are rice, corn, peanut, beans, fruits, cattle, hogs, carabao, poultry and fish. Woodcraft from hardwood, rattan, bamboo, and other indigenous materials are also available in the province.

With its vast natural and human capital, Cagayan is envisioned to become one of the country's major agro-industrial hubs, trading center and premier tourist destination. This is boosted by its bustling economic zone and free port and an investment code which provides, among others, fiscal incentives to investors.

In the near future, the province aims to achieve significant breakthroughs in increasing investments, agricultural modernization and infrastructure development. Positioning itself as the "Gateway to China and Asia-Pacific," Cagayan will indeed play a vital role in the country's socio-economic development.

The Cagayan State University

The strategic role of CSU

Being the lead higher education and knowledge generating institution, the Cagayan State University (CSU) has a strategic role of advancing the province's vision. CSU seeks to be a credible and distinguished center of higher education in Northern Luzon, the entire country and the global academic community.

CSU envisions to help the country reduce poverty and attain food security, food self-sufficiency, global competitiveness, sustainability, justice and peace. It looks forward towards a robust and vibrant agriculture, fisheries, aquamarine and natural resource production, post-production and marketing systems to improve and sustain the well-being of the Cagayan Valley region.

With its eight campuses strategically spread in the province made up of 14 colleges offering 62 degree courses, CSU is in a strong position to develop human resources needed to spearhead Cagayan's economic transformation.

Along with this, CSU will embark on a proactive, dynamic and innovative research, development and extension (RD&E) programs aligned with the vision of Cagayan. Working with local, regional, national and international partners, the university can leverage its human and physical resources to pursue this initiative.

CSU's RD&E Vision, Mission & Goal

Vision: CSU as a competitive Center of RD&E excellence significantly contributing to the improved quality of life of rural communities in the Cagayan Valley region.

Mission: To intensively pursue the development, sharing, utilization and application of science-based knowledge and innovations for the inclusive agro-industrial development of the Cagayan Valley region.

Goal: To promote the development of a viable RD&E environment and strong institutional capability of CSU as a competitive provider of knowledge and innovations responsive to the agro-industrial development of the Cagayan Valley region.

Major Opportunities & Challenges

Sustaining food sufficiency and commercializing agriculture

Cagayan has vast prime agricultural lands and about two thirds of this (more than 80,000 hectares) is planted to rice and corn. Most of this is rainfed (56,783 hectares). The province is self-sufficient in food grains (240% for rice and 117% for corn). The province is one of the major suppliers of rice for Metro Manila. Likewise, it is also major supplier of legumes (e.g., peanut).

Moreover, it has areas which can be devoted to high value commercial crops which can be linked to agro-industries like peanut, sugarcane, coconut and tobacco and rainfed crops such as pigeonpea and sweet sorghum.

Even as is it self-sufficient in rice and corn, farmers average yields are still low. With new technology and optimum use of its land and human resources, Cagayan can become a food exporter and a food basket for Luzon. Working with other agencies (i.e., PhilRice) and SUCs (i.e., Isabela State University) and local government units (LGUs), CSU should modernize agriculture by developing and mobilizing location-specific technology to boost grain and legume production.

Moreover, CSU will collaborate with the Department of Trade & Industry (DTI) to link farmers with food industries to commercialize crop production in the province. By doing this, CSU will spur prosperity of smallholder farmers which is the key to Cagayan's economic development.

Developing manpower for the agriculture and service sectors

The agriculture and service sectors provide the highest opportunities of employment in Cagayan. The agriculture sector employs 66% of the total labor force while the service sector employs 28%. By strengthening its agriculture degree program in its campuses in Gonzaga, Lallo, Sanchez Mira and Piat, CSU can very well respond to provide the needed manpower for agriculture in Cagayan. This can be done by reviewing the existing curriculum and enriching it, based on contemporary trends and demands at the national and global level.

Likewise, CSU is well positioned to train manpower for the service sector with its strong degree programs especially in Civil Engineering, Computer Engineering, Electrical Engineering and Marine Sciences.

To complement its degree program, CSU will develop and implement non-degree programs (e.g., diploma and livelihood-oriented training courses) in collaboration with other educational institutions like TESDA and the DA-Agricultural Training Institute (DA-ATI).

Developing and conserving aquamarine resources

Aside from its vast lands, Cagayan has the longest shoreline (more than 400 km) in the region. The China Sea and Pacific Ocean are extensive fishing grounds for its marine and aquaculture industry.

Moreover, the province has crisscrossing rivers and creeks with the Cagayan River traversing the whole province from south to north, along its tributaries (Pinacanauan River in Peñablanca, Dummun River in Gattaran, Pared River in Alcala, Zinundungan River in Lasam and Matalag River in Rizal). Other rivers in the province are the Chico River, Pata River, Abulug River, Buguey River, Mission River and Cabcungan River.

Likewise, beaches of Sta. Ana and San Vicente fishing grounds are havens for tourists, scuba divers and fishing enthusiasts.

Working with the Bureau of Fisheries & Aquatic Resources (BFAR), Southeast Asian Fisheries and Development Center (SEAFDEC), Department of Environment & Natural Resources (DENR) and National Irrigation Administration (NIA), CSU will map out and pursue research and extension programs to develop and conserve these water resources to improve the livelihoods of fisherfolk communities and the people of Cagayan.

Furthermore, these can be tapped to provide water for domestic, agricultural, municipal and industrial purposes including tourism.

Developing manpower for the province as a gateway to Asia

Cagayan is the country's closest point to big trading partners such as China, Hong Kong, Japan, Taiwan and South Korea. This geographical advantage could be utilized to further develop the agro-industrial potential of the province for domestic and export purposes.

This is bolstered by the presence of the Cagayan Special Economic Zone and Freeport (CSEZFP) which is envisioned as the development catalyst for Northern Luzon. Through its Gonzaga campus and partners, CSU will map out and implement a comprehensive manpower training program in collaboration with the University of the Philippines (UP) and Technical Skills Development Authority (TESDA) to develop the port's human resources, especially in enhancing management capabilities of agro-based and light industries.

Reviving forestlands and underutilized grasslands

Cagayan's forest area is facing depletion due to illegal activities. With this problem, there are still a number that remains a vast forest production area of about 296,894 hectares. Considerably, these are rich sources of hardwood and other exotic species, lumber, rattan, bamboo, and other forest products.

A total of 151,768 hectares of pastureland areas and natural grasslands provide considerable potential for livestock production or diversified upland farming, an area which could be developed and improved in line with the national thrust of agro-forestry and industrialization.

RD&E in the new Agriculture & Fisheries Modernization Plan, 2011-2017

In the new Agriculture & Fisheries Modernization Plan (AFMP), 2011-2017, the Department of Agriculture (DA) spells out the focus of RD&E in Cagayan Valley region:

- 1) For the rice sub-sector, varietal improvement, new inbred and hybrid rice adaptation, integrated nutrient management, evaluation of growth enhancers, management of new pests, more appropriate farming systems, better postharvest technologies, extension modalities, value-adding, and packaging and labelling.
- 2) For the corn sub-sector, crop improvement (OPV), new hybrid corn adaptation, site-specific nutrient management/fertilizer calibrations, pest resistance assessment and management in genetically-modified organisms, management of new pests, postharvest/aflatoxin management, processing/product transformation, farming systems, extension modalities, product development/value-adding, and packaging and labelling.

- 3) For the HVCC sub-sector, varietal improvement, seed/seedling system, organic production, indigenous vegetables, off-season/protected vegetable production, management of major pests, postharvest handling/packaging, processing/value adding, extension modalities, product development/ value-adding, and packaging and labelling.
- 4) For the livestock sub-sector, genetic improvement/breeding management, breeder stock supply systems, forage/pasture development, animal nutrition/feeding management, health management, disease management, production/extension modalities, product development/value-adding, and packaging and labelling.

Research and development activities in the region during the plan period will consist mostly of the conduct of research, upgrading of facilities, and the maintenance of RD&E networks.

RD&E activities will have higher efficiencies with the establishment of an integrated agricultural laboratory during the plan period. New tissue culture laboratories, scion gardens /groves, and greenhouses, among others, will also be established, while existing ones will be maintained and upgraded if needed. The research outreach stations which are the RD&E arm and provincial extension facility of the DA in the region, will be improved, some of its facilities upgraded, and buildings built, or repaired/rehabilitated.

Governing Principles

Institutionalization of a research culture

Institutionalizing a culture of research at CSU means that top level officials, faculty, support staff and students at in all colleges, institutes and departments adopt RD&E as 'way of life' in the University. As a standard practice, administrators will encourage the faculty and support staff to use the power of research to generate innovations and adopt a research-oriented mindset for informed decision-making.

Research for impact

Impact is the bedrock of relevant research. Hence, RD&E will not only be conducted for generating articles for publications (*publish-or-perish research culture*) or to satisfy administrative requirements, but most of all, to generate innovations that will eventually improve the livelihoods of farmers, fisherfolk, grassroots communities and society as a whole.

Participatory approach

The planning, implementation and evaluation RD&E programs will involve key stakeholders particularly the faculty and staff, students, industry, manufacturing, government and non-government institutions. The extensive involvement of stakeholders in the whole RD&E cycle is quite necessary to link technology generators with technology users.

Public-private-people partnerships

Embracing the innovations paradigm requires strategic partnerships in RD&E. As a state funded higher education institution, CSU has limited physical and material resources. However, it is endowed with rich human resources from various disciplines, serving as its social capital which

can be leveraged in forging partnerships with public and private institutions. Its eight campuses strategically located all over the province will be mobilized to forge partnerships with various government agencies, private industry, civil society and other sectors.

Gender sensitivity

Gender is an important dimension of inclusive development. Hence, it is important to link gender dimensions in all RD&E programs, projects and activities, especially in developing and designing gender-friendly technologies, technology utilization and commercialization, capacity building and policy advocacy initiatives.

Complementarity among instruction, research and extension

Instruction, research and extension, which are hallmark thrusts of CSU are complementary and inter-dependent. Although instruction is CSUs major function, the generation, advancement and sharing of knowledge and innovations are equally important. CSU's research and extension functions manifest the relevance of the university in the communities it serves. The knowledge and innovations generated through RD&E will be inputted into the CSU curriculum primarily aimed at developing human capital to empower people for them to actively participate in the development process.

Balance between basic and applied research

Basic and applied research will be pursued in a balanced manner in the fields of agriculture, forestry, environment, engineering and other disciplines in the natural sciences alongside mathematics, education and teacher training, health, humanities, information and communication technology and other related disciplines in the social sciences. In addition, as a highly competitive University in the region, CSU will lead in the generation of policy-oriented and innovative researches that are locally responsive and globally competitive.

Interdisciplinary and multidisciplinary approaches

The pursuit of CSU's RD&E vision, mission, goals and objectives will cut across a wide spectrum of scientific disciplines. The traditional RD&E approach is not cost efficient and results are often fragmented to provide meaningful impact. Teaming up researchers and support personnel from various disciplines and areas of specialization will be pursued in conducting RD&E.

Technology exchange and intellectual property

The development of institutional mechanisms for sharing tested and mature technologies developed by the University will be promoted through the establishment of technology ownership and upholding intellectual property rights regimes for the protection of creative work of researchers.

Alliance-building, networking and resource generation

CSU will actively engage in research collaboration with local and international research organizations through the formation of alliances, building mechanisms for cooperation with these entities and establishing agreements on bilateral S&T cooperation. Industry-university

cooperation through the integration of training and training resources of industries, universities, research institutions and consortia shall be promoted. With the gradual decrease of government subsidy to SUCs, there is a need to increase the University's income to help fund its banner RD&E programs without much dependence on government appropriations.

RD&E Strategies

Integrated approach

CSU will adopt an integrated, multidisciplinary approach to RD&E for a more cost-effective, efficient and coordinated method of developing appropriate innovations for a specific production ecosystem. This approach is intended to optimize resources, promote a multidisciplinary interface in developing appropriate solutions to socio-economic challenges, and eliminate overlaps by various academic units of the University. To facilitate the achievement of these benefits, College/Departments RD&E agenda will address their programs towards the attainment of identified gaps around the overall themes and banner programs.

Partnerships & external linkages

The search for more effective solutions to production constraints requires the greater coordination and participation of partners and stakeholders to be more effective in implementation. Hence, the participation and financial support of local government units and national government agencies on the conduct of urgent and long term research will be sought through the development of viable linkages and partnerships with local officials and residents of critically affected areas.

Resource generation & mobilization

The commissioning of externally funded RD&E projects shall be promoted as a strategy for providing more opportunities for faculty to engage in research and as a method for generating additional resources to sustain research implementation and governance. Areas of expertise of the faculty will be identified, and the core strength of academic departments to contract research from local, regional, national and international funding agencies will be optimized.

Knowledge sharing & technology commercialization

The utilization and commercialization of innovations and technologies will be enhanced and supported as a strategy for achieving institutional, regional and national goals. Aside from the usual seminar-workshops and publications, research outputs will be shared through innovative knowledge sharing like ICT-enabled methods. The extensive sharing of RD&E outputs is expected to create opportunities for the faculty to promote their expertise and increase their contribution to institutional and national development.

Capability & capacity development

For RD&E to be more effective in generating, sharing and commercializing technologies to stakeholders, the human and physical resources of CSU will be continuously developed. Access to training in both degree and non-degree programs offered by local and foreign institutions will be broadened. Likewise, laboratory facilities needed to support the creation of RD&E centers will be improved, upgraded and acquired.

RD&E Agenda & Priority Themes

Within the foregoing context, RD&E at CSU will be conducted with strategic local, regional, national and international partners on the following themes:

- 1) **Food security, self-sufficiency and safety.** This thematic area will respond to the country's quest for sustainable food security, self-sufficiency and safety. Cagayan being a major food producer and considering the country's vulnerability to natural calamities and disasters, it is important for people to be assured of available, adequate, affordable and safe food on their table.
- 2) **Climate change** The Philippines is experiencing warming temperatures brought about by climate change, most especially in the northern and southern regions. These regions (northern Luzon and Mindanao) have also warmed the most and have dried the most. As climate change significantly affects agriculture and the environment, the four pillars of the Bali Action Plan dealing with mitigation, adaptation, technology exchange and resource sharing will guide CSU's RD&E work on this theme. Considering that climate change will impact on present and future scenarios, a strategic and holistic RD&E approach will be pursued.
- 3) **Environmental resource management.** The thrust of this theme is to maintain and improve the state of environmental resources affected by human activities (i.e., the interaction and impact of communities on the environment) and climate change. Environmental issues that affect the land, air and water will also be studied. RD&E on environmental resource management will ensure that ecosystem services are protected and maintained for equitable use and also maintain ecosystem integrity for future generations.
- 4) **Human health and nutrition.** Sound health is fundamental to human life, meeting basic needs and contributing to a productive life. In developing countries like the Philippines, hunger and health risks are aggravated by extreme poverty. Disease and malnutrition are mostly attributable to unsafe water, poor sanitation and hygiene. Many communicable diseases are emerging, so the country has to be prepared with appropriate medication, vaccines and diagnostic kits that are available and affordable to the poor.
- 5) **Disaster risk reduction management.** This theme will find out ways and means by which communities and local governments can identify, assess and reduce the risks of natural disasters. RD&E along this area will help communities reduce socio-economic vulnerabilities to disasters as well as dealing with the environmental and other hazards that trigger them. The shift from prevention and mitigation to preparedness mode in disaster risk management requires a lot of research not only in policy formulation, community development and public awareness but also in hard science (e.g. forecasting, structural engineering, etc.).
- 6) **Enhancing renewable energy sources.** Increasing the percentage of indigenous renewable energy source into the national energy mix will not only result in dollar saving, and protection of the environment but more importantly, ensuring energy security. The search, development and exploitation of renewable energy sources will involve a multi-disciplinary approach.

- 7) **Emerging technologies.** Emerging technologies are technical innovations on progressive developments within a field for competitive advantage, representing previously distinct fields which are moving towards convergence. These are indispensable in propelling the country to sustainable agro-industrial development. Currently emerging technologies include biotechnology, information technology, nanotechnology, robotics and artificial intelligence.
- 8) **Social sciences.** Being concerned with society and human nature, the social sciences cut across disciplines and has a pivotal role in societal growth and development. In the context of CSU's RD&E programs, the social sciences will cover socio-economics, entrepreneurship, higher education and law and governance.

RD&E Banner Programs & Projects

To revisit CSU's RD&E agenda and banner programs and map out a new one, top officials and faculty of all CSU campuses held an RD&E Forum on 24-25 January 2013. This was done in the light of the university's changing task environment and concomitant opportunities and challenges. In this forum, a new RD&E agenda was formulated for implementation in the next three years and beyond.

Consistent with the priority themes, the eight RD&E banner programs are: (1) agriculture for food security & poverty alleviation, (2) marine resources & fisheries, (3) environment & climate change, (4) health & nutrition, (5) industry, energy & emerging technology, (6) socio – economics & entrepreneurship, (7) higher education and; (8) law & governance & related social technology.

In a subsequent workshop on 18-20 February 2013, the senior faculty of all the campuses met to write selected proposals of RD&E projects especially for external funding.

(1) Agriculture & Fisheries for Food Security & Poverty Alleviation

A. Food crops

- Aerobic rice production system in Northeastern Cagayan
- Integrated nutrient management of upland rice
- Upscaling and outscaling the *Palayamanan* model of diversified farming
- Production of upland rice (Aringay) in Lasam, Cagayan
- Development, promotion and utilization of Adlai as alternative food source
- Assessment of existing marketing systems to enhance farmers credit
- Assessment of the credit system in agricultural production, marketing and processing
- Comparative evaluation of current postharvest facilities on corn production
- Impact assessment of upland corn production in Peñablanca and Baggao
- Impact assessment of different extension modalities to enhance adoption of appropriate corn technologies

B. High value crops

- Business opportunities in cacao production
- Integrated mango-based farming technology

- High impact coco-based farming system
- Organic Farming for chopsuey and pinakbet
- Development of cassava chips
- Establishment of genebank for tropical fruit trees in Cagayan State University – Sanchez Mira (Phase 1)
- Integration of beekeeping with the coconut Industry
- Commercialization of coco geotextiles for erosion control (biotechnology)
- Sensory evaluation of sugarcane vinegar using different indigenous substrates
- Production trial of improved sugarcane variety
- Product development of sugarcane
- Generating money from Lubeg
- Supply chain analysis of bamboo in Northeastern Cagayan
- Supply chain analysis of pineapple in Northeastern Cagayan
- Generating income from citronella growing and processing
- Product development and commercialization of fishtail palm (Anibong)
- Fortification of fruit juice drinks with turmeric
- Commercialization of native tinupig in Cagayan
- Supply chain improvement of dairy and coconut

C. Livestock & poultry

- Organic Farming for native chicken and pig
- Adaptability and performance of dairy goat (Saanen breed) under CSU Piat condition
- Goat raisers' boon: Assured money in chevon processing
- Making economic wonder via commercialization of organic native chicken in upland villages
- S&T-based feeding management for small ruminants
- Enhancing farm income through dairy carabao - pigeonpea integration
- Development and growth performance of Brahman-Holstein Fresian dairy cattle breed
- Growth performance of native pig fed with locally fermented concoctions
- Commercialization of native pig in Cagayan
- Rural enterprise development through innovative goat production systems in the province of Cagayan
- Production and commercialization of Peking duck in the community for food sustainability

D. Organic agriculture as alternative industry

- Organic agriculture training and advocacy
- Organic agriculture practices among rice farmers in Region 02
- Expansion of integrated organic farming for agricultural extension & instruction
- Economic rise from seeds of organic upland rice
- Organic corn farming system in Northeastern Cagayan
- Extent of utilization of organic fertilizer among rice farmers in Northeastern Cagayan
- Effect of natural farming fertilizer on the growth and yield performance of vegetable crops
- Utilization and commercialization of organic farm inputs
- Organic farming for chopsuey, pinakbet and indigenous vegetables

E. Indigenous fruits and vegetables

- Germplasm collection and conservation of indigenous varieties
- Promotion of culinary herb and spices
- Development of natural preservatives
- Conservation and utilization of indigenous fruits and vegetables
- Promotion and commercialization of indigenous fruits and vegetables

(2) Marine Resources & Fisheries

- Development of climate-change adaptation strategy for commercially and ecologically important aquatic indigenous species (freshwater, brackishwater and marine)
- Climate change and fisheries: perspectives of small scale fishing communities in the Babuyan marine corridor
- Development of biofuel from marine algae and fertilizer from seaweeds
- Development of seedbank for endangered indigenous (endemic) species (freshwater clam (*cabibi* and *unnuk*), local eel, *ludong*, native catfish, *gurami*, red shrimp (*aramang*))
- Best practices for a sustainable marine community
- Development of post-harvest technology
- Development, conservation and post- harvest technology for commercially important bivalve resources in the Babuyan marine corridor
- Population and reproductive biology and ecology of commercially-important sea cucumbers in northern Cagayan
- Biology, assessment, enhancement and management of native catfish
- Seedstock development and production of native catfish
- Socio-economic and market chain of native catfish
- Processing and product development of native catfish
- Sharing of catfish technology
- Valuation of marine resources in selected coastal municipalities of Cagayan
- B.S. in Fisheries and Marine Sciences – core curriculum to include the basic requirements for the Fisheries Board Examination
- B.S. in Fisheries Education – core curriculum to include the basic requirements for the Fisheries Board Examination

(3) Environment & Climate Change

- Documentation of indigenous knowledge for climate change adaption
- Impact of climate change to agricultural productivity and sustainability in Region 02
- Impact of climate change in the prevalence of diseases of livestock in Cagayan
- Climate change management practices: towards developing a risk management program
- Disaster preparedness & barangay risk reduction management among flood prone areas
- Cost effective analysis of BRRM in flood prone areas
- Establishment of disaster preparedness and response-climate change training and learning center
- Biodiversity indicators vis-à-vis climate change adaptation in PPLS, Northern Philippines
- Environmental sanitation KAP on the residents of Libag Sur, Tuguegarao City

- Knowledge, attitudes, & practices on the use of pesticides by farmers in selected communities in Region 02
- Green audit of the Cagayan State University: Basis for an integrated environment program
- Identification of sources of air pollutants in Tuguegarao City
- Identification of sources of water pollutants in Tuguegarao City
- Level of concentration of air pollutants in Tuguegarao City
- Level of concentration of water pollutants in Tuguegarao City
- Impact of changes in temperature and other environmental factors on the fishery resources in Magat Dam, Ramon, Isabela
- Effects of changes in temperature on the incidence of diseases caused by microbes
- Effects of changes in temperature on the incidence of diseases caused by fungi
- Effects of changes in temperature on the incidence of diseases caused by parasites
- A study on the levels of implementation of existing environmental laws in the City of Tuguegarao: A basis for policy advocacy
- Physico – chemical correlates of biodiversity and ecological status of freshwater gastropods in rivers of Northwestern Cagayan
- Environmental literacy of the students & professors of the College of Allied Health Sciences

(4) Health & Nutrition

- Indigenous maternal / infant health care practices
- Prevalence of intestinal parasitism in Libag Sur, Tuguegarao City
- Incidence of malnutrition in Libag Sur, Tuguegarao City
- KAP on communicable and non – communicable diseases of the Libag Sur community
- Incidence of iron – deficiency anemia in barangay Libag Sur, Tuguegarao City
- Prevalence of soil – transmitted helminthiasis in barangay Libag Sur, Tuguegarao City: Its association to their nutritional status
- Incidence of renal diseases in Libag Sur, Tuguegarao City
- KAP on water borne diseases of the Libag Sur Community
- Incidence of lifestyle diseases in Libag Sur, Tuguegarao City
- Incidence of pulmonary tuberculosis & tobacco production in Libag Sur, Tuguegarao City
- Health care motivation of Tuguegarao City communities in the control of recurring diseases
- Wellness and use of traditional medicine in the rural barangays of Tuguegarao City
- The antibacterial, antiparasitic and antifungal properties of *cryptomeria japonica*
- A case series analysis on leptospirosis in the selected municipalities in the Province of Cagayan
- Leptospirosis risk detection & reduction among farmers in selected municipalities in the Province of Cagayan
- Safety of street food within the vicinity of colleges and universities in Tuguegarao City
- The ethnobotany of Agta communities in Peñablanca, Cagayan
- Health risk assessment of the faculty, administrators & personnel of the Cagayan State University Andrews Campus
- Health risk assessment of the students of the different colleges in the CSU Andrews Campus

- Impact analysis of the deworming component of the Pantawid Pamilya Pilipino Program of the DSWD
- Level of concentration of air pollutants in the blood of selected residents in the centro barangays of Tuguegarao City
- A cohort analysis on the factors affecting the incidence of leptospirosis in selected municipalities in the 3rd District of Cagayan
- Health risk assessment of the farmers in farming communities in Region 02
- Health care motivation of the fishermen in Region 02 in the control of recurring occupational diseases
- The histology & blood composition levels of experimental animals: A data base formulation of antibacterial ointments
- Prevalence of elevated body mass index among Cagayanos: Basis for community health extension program of CSU
- Pregnancy nutritional status and its impacts on infants' birth weight
- Nutritional adequacy of foods at the CSU canteens
- Sanitary and hygienic practices of street food vendors in Cagayan
- Detection of antibiotic residue in locally prepared animal products
- Retrospective study on the prevalence of canine and human rabies in Region 02
- Tuklas Lunas researches
- Pinoy (Package for the Improvement of Nutrition of Young Children) a nutri-pack intervention for the poor
- Sanitation practices of waterless communities in Cagayan
- An assessment of water portability in barangay Libag Sur, Tuguegarao City: Its implication to water safety
- Health seeking behavior of 4Ps beneficiaries covered by PHILHEALTH.

(5) Industry, Energy & Emerging Technology

- Development of decision support system using geographic information system and remote sensing technology
- Development of renewable energy resources
- Development of new materials for low-cost housing in coastal areas
- Development of rainwater harvesting technology
- Development of irrigation water management techniques
- Apparatus for compacting and molding waste materials for cooking
- Waste-to-energy technology: Briquetting of charcoal from recycled waste materials

(6) Socio – Economics & Entrepreneurship

- Business profiling of SME s in Cagayan Province
- Needs assessment of SMEs in Cagayan Province
- Survival strategies of microenterprises in Cagayan Province
- Marketing practices of SMEs in Cagayan Province
- The organizational & operational practices & problems of SMEs in Cagayan Province
- Impact analysis of different agricultural programs in Region 02
- Impact analysis of different financing schemes availed by farmers of Libag Sur, Tuguegarao City
- Catering management (menu planning, costing, production, venue set-up, service)

- Perceptions on massage therapy and reflexology
- Analysis of the food processing/preservation industry
- Analysis of the commercial baking industry

(7) Higher Education

- Graduate tracer studies of CSU - Carig
- Assessment of NSTP Program of CSU
- Determinants of employability of BSIT graduates of CSU
- Academic performance and personality types of overseas Filipino workers' children
- Community based computer literacy program training
- Intellectual and non- intellectual factors as predictors of performance in Mathematics
- Financing of SUCs in Region 02: A comparative analysis
- Enrolment trends of coeng'g: An analysis
- Predictors of licensure exam performance of CSU students
- Predictors of performance in professional subjects among coeng'g students
- Integration of environmental science concepts in elementary, secondary and tertiary curricula and assessment
- Development of manual for thesis writing
- Academic difficulty and remediation program for CSU college students
- Emotional quotient and intellectual quotient and technological quotient: Relationship to academic achievement
- Value transformation among students of the College of Allied Health Sciences (CAHS)
- Analysis of diagnostic laboratories in relation to academic preparation of medical technologists of the BS medical technology program
- Model preparation as basis of industry and academic partnership
- School-industry matching of HIM skills: an assessment
- Predictors of medical technology board performance: its implications on college screening policies
- A profile of the learning styles of the 1st year medical technology & respiratory therapy students of the CAHS academic year 2013 – 2014
- Emotional quotient of freshmen students of CSU Andrews Campus: its implications to college instruction
- Multiple intelligences of medical technology students: its relation to academic performance
- Grammatical proficiency of 1st year CAHS students: Implications to English instruction
- Research capabilities of CAHS faculty members: A basis for a continuing in – service training
- Correlates of retention of CAHS students
- Boarding house/dormitory conditions: its effects on the academic achievements of the CAHS students
- Social networking: Its effects on student achievement levels
- The socio – economic profile of the students and faculty members of the CAHS: A basis for enhancement of the scholarship program
- The socio – economic profile of 4th year high school students of the CSU Feeder Schools: A basis for a student study loan package
- The course preferences of 4th year high school students of the CSU Feeder Schools: A basis for enhancement of the CAHS social marketing program
- Cost – Benefit Analysis of CAHS education in the field of medical technology

- A study on alternative delivery systems for the different academic programs offered by the CAHS
- A holistic pedagogy of education from Marcelian Existentialism
- Teaching styles of the professors of the CAHS: Level of knowledge and extent of application
- Perceived effects of the extracurricular and co – curricular activities on the academic performances of CAHS students
- Effectiveness of the clinical internship of the Bachelor in Science in Medical Technology
- Critical discourse analysis on the K – 12 Program of the Department of Education
- The effects of the faculty scholarship program on teaching efficiency

(8) Law & Governance & Related Social Technologies

- Management and governance of SUCs
- Revenue generation and utilization of LGUs in Region 02
- Assessment of the implementation of the basic provisions of Anti- Red Tape Act (ARTA)
- Governance and management of CSU: Towards rationalizing programs and projects
- Ethics in decision making practices among CSU officials
- Community livelihood projects and activities
- Community folks capability building activities
- Extension model development for CSU
- Media habits and preference of extension beneficiaries
- Gender mainstreaming program for CSU